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28 Ekim - 1 Kasım 2024, Antalya, Türkiye

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35th NATIONAL BIOCHEMISTRY CONGRESS

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The main aim of the journal is to support the research and publishing culture by ensuring that every published manuscript has an added value and thus providing international acceptance of the "readability" of the manuscripts published in the journal.

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WELCOME MESSAGE

Dear Colleagues, Dear Friends,

We will organize the 35th National Biochemistry Congress as an international congress as usual. We have been appointed the organizer for the 2024 Balkan Clinical Laboratory Federation (BCLF) Meeting, therefore we will join our national congress with BCLF this year. Our joint congress will be containing our Republic Day as usual and will be organized with the name XXXI. Balkan Clinical Laboratory Federation Meeting // 35th National Biochemistry Congress between 28 October - 1 November 2024 in Side, Antalya at the Starlight & Manavgat Convention Center.

We are in process of preparing the scientific program. As usual, our congress will be endorsed by IFCC and EFLM. The faculty will consist of many scientists from IFCC and EFLM, as well as BCLF and our country. IVD companies will have satellite symposia and as a tradition we will have hands-on and theoric workshops. First time in Europe a biochemistry congress will be credit by EFLM and participants will earn CPECS® credits.

TBS will offer grants to young investigators and our abstracts will be published as a supplement of Turkish Journal of Biochemistry which is listed in the Science Citation Index-Expanded.

We are happy to invite you to the beatiful scientific setting and share your knowledge and experiences, meet international colleagues especially from Balkan countries and contribute to the scentific and colorful program of our congress.

Join us and let's meet once more in the most significant scientific biochemistry congress in Eurasia.

Best regards,

Dr. Doğan Yücel
President, Turkish Biochemical Society

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- Serafettin Ozkurt

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- Doğan Yücel
- Oğuzhan Zengi
- Tomáš Zima

SCIENTIFIC PROGRAM

October 28th, Monday

16:00-16:30 Opening Ceremony
Welcome Notes
Doğan Yücel
Lokman Hekim University, Türkiye
President, Turkish Biochemical Society

Dobrin Svinarov
Medical University of Sofia, Bulgaria
BCLF President

Tomris Özben
IFCC President, EFLM Immediate Past President
Akdeniz University, Türkiye

Tomáš Zima
Charles University of Prague, Czechia
EFLM President-Elect

16:30-17:15 Keynote 1
Chair: Doğan Yücel
Current and Future Advances and Challenges in Laboratory Medicine
Tomris Özben
IFCC President, EFLM Immediate Past President
Akdeniz University, Türkiye

17:15-17:45 Coffee Break

17:45-18:30 Keynote 2
Chair: Ferhan Sağın
Alcohol - Epidemiology, Metabolism and its Clinical Consequences
Tomáš Zima
Charles University of Prague, Czechia
EFLM President-Elect

SCIENTIFIC PROGRAM

October 29th, Tuesday

09:00-10:30 Optimizing Analytical Accuracy: Integrating Biological Variation and Performance Specifications
Chairs: Abdurrahman Coşkun, Çiğdem Sönmez

09:00-09:30 Understanding Biological Variation, Its Importance for the Laboratory and the Clinician
Graham Jones
University of New England, Australia

09:30-10:00 Analytical Performance Specifications: Moving from Models to Practical Recommendations
Mauro Panteghini
Bydgoszcz Collegium Medicum, Nicolaus Copernicus University, Poland

10:00-10:30 How Allowable Bias Becomes Part of Imprecision and What That Means for Your Laboratory
Marc Thelen
Radboud University, the Netherlands

10:30-11:00 Coffee Break

11:00-11:45 Keynote 3
Chair: Sedef Yenice
Florence Nightingale Hospital, İstanbul
Laboratory Medicine: Advancing Diagnostics and Data Analytics for Better Health for All
Octavia M. Peck Palmer
University of Pittsburgh, USA

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Chair: Oğuzhan Zengi
Data and Digitilization in Laboratory Processes
Habib Özdemir
Türkiye Health Data Research and Artificial Intelligence Applications Institute

12:30-13:30 Lunch Break

13:30-14:15 Keynote 4
Chair: Muhittin Serdar
How EQA Can be Used to Study the Impact of Analytical Performance on Clinical Classification
Marc Thelen
Radboud University, the Netherlands

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Chairs: Süleyman Demir, Hülya Kılıç

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Vera Lukic
Railway Healthcare Institute, Serbia

SCIENTIFIC PROGRAM

October 29th, Tuesday

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Hikmet Can Çubukçu
The Ministry of Health, Health Services General Directorate, Türkiye

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Deniz İlhan Topçu
İzmir City Hospital, Türkiye

15:30-15:45 Organization, Standardization and Harmonization of Laboratory Medicine in Albania
Anyla Bulo Kasneci
University Hospital Center "Mother Teresa", Albania

15:45-16:15 Coffee Break

16:15-17:00 Satellite Symposium - Mindray
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Recent update on educational recommendations from the IFCC Committee on Clinical Application of Cardiac Bio-Marker
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Chairs: Mehmet Şeneş, Oytun Portakal

17:00-17:25 Comprehensive Risk Management in Medical Laboratories: Leveraging Recent ISO Guidelines
Soycan Mızrak
Uşak University, Türkiye

17:25-17:50 How to Manage Patient and Clinician Experience to Improve Satisfaction with Clinical Laboratory Services
Merve Sibel Güngören
Mamak Devlet Hastanesi, Türkiye

17:50-18:05 Evaluation of Clinical Performance, Risk Likelihood and Diagnostic Sensitivity under ISO 15189/ EU-IVDR Requirements – Practical Example from a Romanian Flow Cytometry Department
Mihaela Zlei
Regional Institute of Oncology, Romania

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Verica Jakjimoska
City Hospital '8th September', Skopje, Macedonia

18:20-18:30 Question / Answer

SCIENTIFIC PROGRAM

October 30th, Wednesday

09:00-10:30 Diagnostic Techniques and Biomarkers in Hematology and Coagulation
Chairs: Ferruh Kemal İşman, Konca Altınkaynak

09:00-09:15 Coagulation Markers in Non-Hodgkin Lymphoma
Snezhana S. Stoencheva
Medical University of Plovdiv, Bulgaria

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Milena Velizarova
Medical University of Sofia, Bulgaria

09:40-10:05 Advanced Clinical Parameters in Anemia Diagnostics
Meltem Kilercik
Acıbadem University, Türkiye

10:05-10:30 The Role of Mass Spectrometry in Clinical Medicine
Dobrin Svinarov
Medical University of Sofia, Bulgaria
BCLF President

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11:00-11:45 Keynote 5
Chair: Aylin Sepici Dinçel
Oxidative Stress in Type 2 Diabetes, Thyroid Disease, and Severe Psychiatric Disease: Focus on Nucleid Acid Metabolism
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Tomris Özben
IFCC President, EFLM Immediate Past President
Akdeniz University, Türkiye
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Selçuk University, Türkiye

SCIENTIFIC PROGRAM

October 30th, Wednesday

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Bydgoszcz Collegium Medicum, Nicolaus Copernicus University, Poland

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Chairs: Ahmet Kızıltunç, Berrin Berçik İnal

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Tanja Antunovic, Aleksandra Stefanovic, Vladimir Prelevic, Najdana Gligorovic Barhanovic
Clinical Centre of Montenegro, Montenegro

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Olivera Jordanova
University Children Hospital, Skopje, North Macedonia

16:20-16:35 Lipid Metabolism in Gestational Diabetes
Jovana Stojić, Aleksandra Zeljković, Jelena Vekić, Daniela Ardalić, Gorica Banjac, Jasmina Ivanišević, Željko Miković, Aleksandra Stefanović
Medicus Lab, Bajina Bašta, Serbia

16:35-16:50 Current Vitamin D Status Among Pregnant Women in Republic Of North Macedonia
Aleksandra Atanasova Boshku
Ss. Cyril and Methodius University, Skopje, North Macedonia

16:50-17:00 Question / Answer

SCIENTIFIC PROGRAM

October 30th, Wednesday

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17:15-18:30 Clinical Laboratory Workup for Metabolic Assessment
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University Ss Cyril and Methodius, Faculty of Medicine, Republic of North Macedonia

17:40-17:55 Triglyceride/glucose Index - A Practical Tool to Explore Changes in the Aminotransferase and Metabolic Control Parameter Ratios
Radivoj Jadrić
University of Sarajevo, Bosnia and Herzegovina

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Dragana Puhalo Sladoje
University of East Sarajevo, Bosnia and Herzegovina

18:10-18:25 MiR-122 as a Potential Biomarker for Type 2 Diabetes
Ana Ninic
University of Belgrade, Serbia

18:25-18:30 Question / Answer

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by invitation only

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İbrahim Karakuş
Head of Examination and Diagnostic Services Department, Ministry of Health, Ankara

SCIENTIFIC PROGRAM

October 31st, Thursday

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Chairs: Hilal Koçdor, Sedat Abuşoğlu

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Adina Hutanu
"George Emil Palade" University of Medicine, Romania

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Tamer Bego
University of Sarajevo, Bosnia and Herzegovina

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Yana Bocheva, Pavlina Peneva, Silviya Nikolova
University Hospital "St. Marina" Varna, Bulgaria

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Octavia M. Peck Palmer
University of Pittsburgh, USA

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Acıbadem University, Türkiye

SCIENTIFIC PROGRAM

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Florence Nightingale Hospital, İstanbul

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National Turberculosis Reference Laboratory, Albania

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University of Medicine, Tirana, Albania

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University of Crete, Greece

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University of Crete, Greece

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Yağmur Azbazdar
Biological Chemistry Dept., UCLA, Los Angeles, California, USA

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ORAL PRESENTATION PROGRAM

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ORAL PRESENTATION PROGRAM

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Gamze Turna Saltoglu, Nevin Belder, Serap Yalcin Azarkan

OP044
CD34+ HEMATOPOIETIC STEM CELLS ENUMERATION COMPARISON OF UNRELATED DONORS AT BASELINE AND BEFORE TRANSPLANTATION
Koza Murat, Çiğdem Sönmez, Sümeyye Ünal Ateş, Köksal Kafa, Nedim Akkaya, Aysun Bay

OP045
DEVELOPMENT OF LC-MS/MS METHOD FOR MEASUREMENT OF ARGININE, HOMOARGININE, ORNITHINE, CITRULLINE, ARGININOSUCCINATE, ADMA AND SDMA IN DIALYSIS PATIENTS
Murat Çelik, Prof. Dr. Emine Karakuş

ORAL PRESENTATION PROGRAM

October 28th, Monday

17:00-18:30 Session 06 - Hall C - Chairs: Chairs: Ramazan Kocabaş, Yasemin Atıcı

OP046
INVESTIGATION OF THE PROTECTIVE EFFECTS OF APOLIPOPROTEİN E MIMETIC PEPTIDE IN A CELL MODEL OF ACUTE HEPATOTOXICITY
Aleyna Öztüzün, Bürke Çırçırlı, Mutay Aslan

OP047
ALCOHOL AND SUBSTANCE USE TRENDS
Ayla Yıldız

OP048
ANTI-INFLAMMATORY EFFECT APOLIPOPROTEİN E MIMETIC PEPTIDE IN HEPATIC CELL MODEL OF ACUTE HEPATOTOXICITY
Bürke Çırçırlı, Aleyna Öztüzün, Mutay Aslan

OP049
IN VITRO EVALUATION OF CYTOTOXIC EFFECTS OF PARAPROBIOTICS AND POSTBIOTICS AS NEW PHARMACEUTICALS ON HEPATOCELLULAR CANCER CELLS
Elif Hilal Vural, Gülçin Alp Avcı

OP050
PHOTODYNAMIC THERAPY AGAINST GLIOBLASTOMA: INVESTIGATING PHENOSELENAZINE BASED PHOTOSENSITIZER AS A PROMISING THERAPEUTIC AGENT
Elif Yesilcimen, Osman Karaman, Zubeyir Elmazoglu, Gorkem Gunbas

OP052
NIR-ACTIVATED SILICON-RHODAMINE BASED PHOTOSENSITIZER AS A PROMISING THERAPEUTIC AGENT AGAINST GLIOBLASTOMA
Naz Ozogul, Osman Karaman, Zubeyir Elmazoglu, Emrullah Gorkem Gunbas

OP054
EVALUATION OF THE FREQUENCY OF PREGABALIN AND GABAPENTIN USE AS ADDICTIVE SUBSTANCES IN DRUG ADDICTION TREATMENT PATIENTS
Şükran Bıçakcı, Özge Yakar, Mehmet Şeneş

ORAL PRESENTATION PROGRAM

October 30th, Wednesday

09:00-10:30 Session 07 - Hall B - Chairs: Canan Yılmaz, Selin Yıldız

OP015
THE ROLE OF TOTAL ANTIOXIDANT AND OXIDANT STATUS IN RHEUMATOID ARTHRITIS AND SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS: RELATIONSHIP WITH OXIDATIVE STRESS
Nazlı Helvacı, Alev Kural, Ergin Çam, Duygu Sarı Ak, Barış Gundogdu

OP055
COMPARISON OF AUTOMATED ANALYSERS "ALARIS ALS-64E" AND "VISION C" FOR ERYTHROCYTE SEDIMENTATION RATE VIA WESTERGREN METHOD
Berna Yıldırım Şık, Berrin Öztaş

OP056
ESTIMATING OF WITH-IN SUBJECT BIOLOGICAL VARIATION OF HEMATOLOGICAL PARAMETERS IN PEDIATRIC AGE GROUP
Coskun Cavusoglu

OP058
EVALUATING SERUM FREE LIGHT CHAIN MEASUREMENT AND REFERENCE CHANGE VALUE IN THE MONITORING OF MONOCLONAL GAMMOPATHY
Hatice Bozkurt Yavuz, Soycan Mızrak, Ali Volkan Özdemir

OP059
EVALUATION OF SIGMA METRICS FOR IMMUNOTURBIDIMETRIC ASO AND RF ASSAYS
Havva Büyükyavuz, Berrak Güven

OP060
CAN MOVING MULTIPLES OF THE MEDIAN BE USED AS A PATIENT-BASED REAL-TIME QUALITY CONTROL TOOL?
Havva Yasemin Çinpolat, Hamdi Oğuzman

OP061
MEASURING THE IMPACT: SEVERITY OF HARM IN LABORATORY ERRORS OF 195 TESTS
Hikmet Can Çubukçu, Murat Cihan, Hamit Hakan Alp, Serkan Bolat, Oğuzhan Zengi, Kamil Taha Uçar, Deniz İlhan Topcu, Muhammed Fevzi Kılınçkaya, Habib Özdemir, Murat Gülşen, Hayri Canbaz, Doğan Yücel, Muhittin Abdulkadir Serdar

OP062
BIORAD D100 VS ADAMS HA 8180V FOR HBA1C MEASUREMENT: A METHOD COMPARISON STUDY
Humeyra Ozturk Emre

OP063
VERIFICATION OF THE REPEATABILITY OF THE D-DIMER ASSAY
Müjgan Ercan Karadağ, Özge Fenercioğlu

ORAL PRESENTATION PROGRAM

October 30th, Wednesday

OP112
TARGETING THE KYNURENINE PATHWAY IN THE PANCREATIC DUCTAL ADENOCARCINOMA IN-VITRO MODEL
Ceren Gümedag, Bahanur Durgut, Sevcan Atay

09:00-10:30 Session 08 - Hall C - Chairs: Nilgün Işıksaçan, Settar Kosova

OP064
THE EVALUATION OF LDL-C CALCULATION WITH SAMPSON-NIH AND FRIEDEWALD EQUATIONS IN PATIENTS WITH LOW LDL-C LEVELS OR HYPERTRIGLYCERIDEMIA
Emir Matpan, Neslihan Yıldırım Saral, Aysun Toker, Mustafa Serteser

OP065
WHICH SHOULD BE REPORTED FOR LOW PROTEIN LEVELS IN BODY FLUIDS: LOQ OR LOD?
Esra Yılmaz, Medeni Arpa

OP066
COMPARISON OF HbA1c MEASUREMENT METHODS: BORONATE AFFINITY CHROMATOGRAPHY vs. CAPILLARY ELECTROPHORESIS
Fatma Sengul Bag, Fikret Akyurek

OP067
INVESTIGATION OF THE COMPATIBILITY BETWEEN HPLC, AUTOANALYZER AND CAPILLARY ELECTROPHORESIS DEVICES IN HBA1C MEASUREMENT
İrem Arslantürk, Ergin Taşkın, Ebubekir Bakan, Dilek Gül

OP068
EVALUATION OF LOT-TO-LOT VARIATION OF CALIBRATOR ON LOW HIGH SENSITIVE TROPONIN T RESULTS
Kezban Çavdar Yetkin, Hacer Doğan, Medine Alpdemir, Mehmet Şeneş

OP069
DEVELOPMENT OF SALIVARY CORTISOL MEASUREMENT IN THE DIAGNOSIS OF CENTRAL ADRENAL INSUFFICIENCY AND ASSESSMENT OF SERUM DHEA AND DHEA-S LEVELS ROLE
Nigar Abdullazade, Alev Ozon, Oytun Portakal Akçin

OP070
COMPARISON OF TURNAROUND TIMES FOR DIFFERENT BECKMAN COULTER DEVICES: EXPERIENCE FROM THE EMERGENCY LAB, ISTANBUL TRAINING AND RESEARCH HOSPITAL
Tugay Solar, Özlem Demirelce, Berrin Berçik İnal

OP072
EFFECTS OF ADROPIN ON A RAT MODEL OF SUBARACHNOID HEMORRHAGE
Tuğçe Çeker, Ayşenur Sümer Coşkun, Mehmet Bülbül, Ahmet Özak, Gamze Tanrıöver, İnanç Elif Gürer, Hazal Tuzcu Balaban, Mutay Aslan

ORAL PRESENTATION PROGRAM

October 30th, Wednesday

15:30-17:00 Session 09 - Hall B - Chairs: Ayfer Çolak, Ahmet Rıfat Balık

OP073
DRY CHEMISTRY VS. DIRECT ENZYMATIC METHODS: A COMPARATIVE ANALYSIS OF AMMONIA MEASUREMENT TECHNIQUES
Neslihan Cihan Çalışgan, Yunus Gören

OP074
MOVING AVERAGE MEETS BIOLOGICAL VARIATION: MOVING PERCENTAGE OF FAILED DELTA CHECKS (MPFDC), A NEW PATIENT-BASED REAL-TIME QUALITY CONTROL MODEL
Niyazi Samet Yilmaz, Bayram Sen, Sena Turkmen, Hikmet Can Cubukcu, Ozlem Gulbahar

OP075
DETERMINATION OF BIOLOGICAL VARIATION OF CARBOHYDRATE-CONTAINING AND CARBOHYDRATE-DEFICIENT TRANSFERRINS BY INDIRECT SAMPLING APPROACH
Ömer Faruk Çakmak, Medine Alpdemir, Mehmet Şeneş

OP076
A PRACTICAL APPROACH TO LIPEMIA: POLYETHYLENE GLYCOL
Sümeyye Yılmaz, Oğuzhan Zengi, Alper Gümüş

OP077
OPTIMIZING TROPONIN T TURNAROUND TIMES IN A CARDIOVASCULAR HOSPITAL
Vesile Örnek Diker

OP078
DETERMINATION OF URINE NETRIN-1 AND BETA-HYDROXY BUTYRATE LEVELS IN DIABETIC KETOACIDOSIS CASES
Yücel Yüzbaşıoğlu, Çiğdem Yücel, Ertan Cömertpay, Meryem Sebla Ertuğrul, Mustafa Girayhan Ünlü, Yavuz Katırcı

OP079
EVALUATION OF CONDUCTIVITY-BASED OSMOLALITY MEASUREMENT IN URINE USING THE URIT US 2000C
Köksal Kafa, Koza Murat, Sümeyye Ünal Ateş, Nedim Akkaya, Çiğdem Sönmez, Aysun Bay

OP080
COMPARISON OF TWO COLUMNS AND MOBILE PHASE COMPOSITIONS FOR SIMULTANEOUS DETERMINATION OF VITAMINS A (RETINOL) AND E (α-TOCOPHEROL) USING HPLC-UV
Umut Göktan Duman, Sami Karyeyen, Erdim Sertoğlu

OP081
DETERMINATION OF THE EFFECTS OF GENOTOXIC AND OXIDATIVE DAMAGE OF ENVIRONMENTAL POLLUTANT MICROPLASTICS ON ZEBRAFISH (Danio rerio)
Sevda Önder, Gülsüm Koçak, Aysel Çağlan Günal, Aylin Sepici Dinçel

ORAL PRESENTATION PROGRAM

October 30th, Wednesday

15:30-17:00 Session 10 - Hall C - Chairs: Alev Kural, Mehmet Fatih Alpdemir

OP082
THE EFFICIENCY OF GLYCATED HEMOGLOBIN (HbA1c) TEST ON DIAGNOSIS OF DIABETES MELLITUS AT DIFFERENT AGE GROUPS
Ahmet Çiçek, Sami Karyeyen, Çiğdem Yücel

OP083
OXIDATIVE STRESS AND ANTIOXIDANT STATUS IN RAT LIVER : EFFECT OF CAFETERIA DIET AND RETROPERITONEAL ADIPOSE TISSUE DENERVATION
Elif Şahin, Hüseyin Çınar Zihni

OP084
DETERMINATION OF MACROPROLACTINEMIA RATE AMONG ADULTS WITH HYPERPROLACTINEMIA IN TURKIYE
Esra Paydaş Hataysal

OP085
INVESTIGATION OF SERUM ALDOSTERONE AND RENIN LEVELS IN PATIENTS WITH SCHIZOPHRENIA AND BIPOLAR DISORDER
Firdevs Sak, Fatma Akat, Eissa Ahmed Ali Al Maghrebi, Mohammad Ahmad Bık, Sümeyye Yıldız, Süleyman Baldane, Memduha Aydın, Sedat Abuşoğlu, Rukiye Tekdemir

OP086
COMPARISON OF CARDIOVASCULAR DISEASE RISK SCORES BY DIFFERENT SYSTEMS
Yasemin Atıcı, Makbule Beyza Şen, Doğan Yücel

OP087
RELATIONSHIP BETWEEN LDL PHENOTYPES, TYG INDEX AND TG/HDL-C RATIO IN CORONARY ARTERY PATIENTS
Mehtap Atak, Medeni Arpa, Hülya Kılıç

OP088
THE ROLE OF OSTEOACTIVIN IN BONE METABOLISM
Naila Hasanova

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October 30th, Wednesday

17:15-18:45 Session 11 - Hall B - Chairs: Esra Fırat Oğuz, Hümeyra Öztürk Emre

OP091
SAMPLES WHOSE FATE CHANGES BEFORE REACHING THE LABORATORY: A CASE REPORT ON PREANALYTICAL ERROR
Ayfer Meral, Evrim Senem

OP092
COULD VERY LOW CHOLESTEROL AND ITS CONSTITUENTS LEVELS BE A WARNING SIGN FOR SEPSIS?: A CASE REPORT
Evrim Senem, Ayfer Meral

OP093
IS IT A CLOT OR JUST HYPERVISCOSITY?
Kaan Kuzu, Deniz İlhan Topcu

OP094
A CASE OF FALSELY ELEVATED HIGH-SENSITIVITY CARDIAC TROPONIN I
Sümeyye Ünal Ateş, Koza Murat, Köksal Kafa, Nedim Akkaya, Çiğdem Sönmez, Aysun Bay

OP095
UNRAVELING THE MYSTERY OF PSEUDOHYPERKALEMIA: A CASE STUDY OF ELEVATED POTASSIUM IN AN ASYMPTOMATIC PATIENT
Güzin Aykal, Nur Benil Yabacı

OP096
A MULTIPLE MYELOMA CASE WITH TWO PARAPROTEIN BANDS IN SERUM IFE BECAUSE OF THE MONOCLONAL ANTIBODY THERAPY
Pınar Koyuncu, Elmas Öğüş, Gül Kırtıl, Mehmet Şeneş

OP097
EXAMINING THE BINDING PROPENSITY OF SOME NATURAL COMPOUNDS AGAINST PHOSPHODIESTERASE 5 USING MOLECULAR DOCKING AND DYNAMICS SIMULATIONS
Abdullahı Ibrahım Uba

OP098
EXPLORING THE THERAPEUTIC POTENTIAL OF PETITGRAIN ESSENTIAL OIL IN AMELIORATING COGNITIVE IMPAIRMENT AND ANXIETY: INSIGHTS FROM ZEBRAFISH MODEL
Brinza Ion, Razvan Stefan Boiangiu, Ahmed M. Abd-alkhalek, Omayma A. Eldahshan, Lucian Hritcu

OP099
EVALUATION OF THE PERFORMANCE OF CREATININE AND E-GFR RESULTS STUDIED IN BLOOD GAS ANALYZER
Büşra Kılınç, Medine Alpdemir

ORAL PRESENTATION PROGRAM

October 30th, Wednesday

17:15-18:45 Session 12 - Hall C - Chairs: İnanç Karakoyun, Medine Alpdemir

OP100
EVALUATING THE PERFORMANCES OF VARIOUS MACHINE-LEARNING SOLUTIONS TO UTILISE THE INTERLEUKIN-6 TEST REQUESTS
Emel Çolak Samsum, Mehmet Şeneş

OP101
EVALUATION OF MACHINE LEARNING ALGORITHMS AND CLASSICAL METHODS FOR CALCULATED TRANSFERRIN
Medine Alpdemir, Semih Fazlı Kayahan, Hasan Alp Turgut, Kezban Çavdar Yetkin, Hacer Doğan, Mehmet Şeneş

OP102
PREDICTING SERUM OSMOLALITY RESULTS WITH MACHINE LEARNING ALGORITHMS
Elmas Öğüş, Semih Fazlı Kayahan, Hacer Doğan, Şükran Bıçakcı, Ömer Faruk Çakmak, Hasan Alp Turgut, Naz Koçoğlu, Mehmet Okumuş, Medine Alpdemir, Mehmet Şeneş

OP103
THE IMPACT OF THE FEBRUARY 6, 2023 EARTHQUAKE ON LABORATORY TEST NUMBERS AND DIVERSITY, AND THE ROLE OF TRAINING IN PREVENTING LABORATORY ERRORS
Hamdi Oguzman, Elif Meltem Yıldız, Sabahattin Yılmaz, Ertan Yılmaz, Serdar Dogan, Oguzhan Ozcan, Abdullah Arpacı

OP104
DETERMINATION OF INTRA- AND INTER-LABORATORY REFERENCE CHANGE VALUES FOR HEMOGLOBIN A1C
Mehmet Akif Bildirici

OP105
DEFINING ELIGIBLE DELTA CHECK ANALYTES AND CONFIGURATION OF RCV-BASED THRESHOLDS
Rabia Tan

OP108
EVALUATING THE PREDICTIVE ACCURACY OF FIVE COMPUTATIONAL TOOLS FOR SCN2A MUTATION CLASSIFICATION
Esther Wilfred Okey, Ayla Arslan

ORAL PRESENTATION PROGRAM

October 31st, Thursday

09:00-10:40 Session 13 - Hall B - Chairs: Özgür Aydın, Rabia Şemsi

OP109
FLOW CYTOMETRIC DIAGNOSIS OF ACUTE MONOBLASTIC LEUKEMIA: A CASE REPORT
Alpaslan Öztürk, Funda Güçel

OP111
SYNTHESIS OF NOVEL FLUORESCENT CALIX[4]ARENES-BENZIMIDAZOLE DERIVATIVES, DETERMINATION OF CELL DEATH MECHANISMS AND MITOCHONDRIA-TARGETED BIOIMAGING
Beyza Solmaz, Alev Oğuz, Mehmet Oğuz, Bahadır Öztürk, Mustafa Yılmaz

OP113
ROLE OF CERAMIDE, ERK AND NF-kB SIGNALING IN THE ANTIPROLIFERATIVE EFFECTS OF 7-KETOSITOSTEROL IN BREAST AND LIVER CANCER CELLS
Çağatay Yılmaz, Zerrin Barut, Mutay Aslan, Bürke Çırçırlı, Tuğçe Çeker

OP114
THE EFFECT OF GALLIC ACID ON LIPID METABOLISM IN RATS WITH EXPERIMENTAL COLON CANCER
Çiğdem Fidan, Erdinç Devrim, Kamil Can Akçalı

OP115
CANNABINOMIMETICS INDUCE FERROPTOSIS VIA LIPID ACCUMULATION AND UPREGULATED TRANSFERRIN RECEPTOR GENE EXPRESSION IN HUMAN GLIOBLASTOMA CELLS
Erva Özkan, Zübeyir Elmazoğlu

OP116
EFFECTS OF DEGUELIN ON ANTI-CANCER AND MITOCHONDRIAL ENZYMES IN TWO DIFFERENT NON-SMALL CELL LUNG CANCER CELL LINES
Ezel Bildik, Arzu Yıldırım, Yağmur Kaya, Mehmet Ali Koçdor, Hilal Koçdor

OP117
EFFECT OF SALVIA CADMICA BOISS. VAR. CADMICA EXTRACT on PROLIFERATION AND APOPTOSIS in HUMAN BREAST CANCER CELL LINES
Fatma Akat, Eissa Almaghrebi, Hakan Vatansev, Hüsamettin Vatansev

OP118
INVESTIGATION OF THE EFFECTS OF ANTIMICROBIAL PEPTIDES AND VITAMIN D IN BREAST CANCER
Nurcan Umur, Funda Kosova, Bahadır Çetin, Özgü Kemal Beksaç

OP057
COMPARISON OF TWO TUBES' STABILITY FOR COMPLETE BLOOD COUNT PARAMETERS: APPROACHING DIFFERENT METHODS
Hande Şenol, Esin Avcı

ORAL PRESENTATION PROGRAM

October 31st, Thursday

09:00-10:40 Session 14 - Hall C - Chairs: Burak Barut, Neslihan Cihan Çalışgan

OP119
FOX GENE FAMILY EXPRESSION LEVELS ARE SIGNIFICANTLY DECREASED IN PDL-1 GENE SILENCED COLON CANCER CELL LINE
Cemile Zontul, Ayca Tas, Gonca Kabak, Yavuz Sılıg

OP120
LONG-TERM IMPACT OF PRENATAL STRESS ON CHOLINERGIC GENE EXPRESSION: A RAT MODEL STUDY
İlayda Varol, Yiğit Uyanıkgil, Tijen Temiz, Ayfer Yalçın, Ezgi Turunç Özoğlu

OP121
EFFECTS OF MEDICAL OZONE THERAPY AND LAVANDULA ANGUSTIFOLIA OIL TREATMENT ON XENOBIOTIC METABOLISM ENZYME EXPRESSION IN LIVER DAMAGE INDUCED BY CCl4
İrem Zehra Taş, Menekşe Kuzu, Erisa Acar, Necdet Altıner, Çağrı Öner, İsmail Sarı

OP122
CAN URINARY LONG NON CODING RNA H19 BE USED AS A PREDICTIVE BIOMARKER IN CHILDREN WITH URETEROPELVIC JUNCTION OBSTRUCTION?
Nur Çınar Şirin, Handan Hanım Örskaya, Tayfun Oktar, M İrfan Dönmez, Rifat Burak Ergül, Orhan Ziylan, Şule Seçkin, Canan Küçükgergin

OP123
INVESTIGATION OF BACTERIAL EXPRESSION AND IN VITRO FIBRIL FORMATION OF PRO-VASOPRESSIN MUTANTS
R. Dilara Vaizoğlu, Beril Erdem, Ceren Acar, Emel Sağlar Özer, Mehmet Gül, Hatice Mergen

OP124
INVESTIGATION OF EXPRESSION LEVELS OF UCA1 AND APPAT LNCRNAS IN CLINICAL ATHEROSCLEROSIS PATIENTS
Sibel Kuraş, Mehmet Kızılay, Süleyman Aycan, Mihriban Şimşek, Bekir Erdoğan, Halime Hanım Pençe

OP125
MATRIX METALLOPROTEINASE-9 EXPRESSION LEVELS IN PATIENTS WITH UNIPOLAR AND BIPOLAR DEPRESSION: A PROMISING NEW TARGET
Yunus Eken, Şevin Hun Şenol, İbrahim Fettahoğlu, İzel Cemre Akşahin, İlayda Şahin, Zilan Kop, Buket Yeşiloğlu, Harika Gözde Gözükara Bağ, Deniz Ceylan, Ceren Acar

OP126
MMP-9 GENE EXPRESSION LEVEL IN BIPOLAR DISORDER: EVALUATING RELATIONSHIPS WITH CLINICAL FEATURES AND CHILDHOOD TRAUMATIC EXPERIENCES
Zilan Kop, Yunus Eken, İzel Cemre Akşahin, İbrahim Fettahoğlu, Hidayet Ece Arat Çelik, Burcu Kök Kendirlioğlu, Esma Çörekli, Harika Gözde Gözükara Bağ, Deniz Ceylan, Ceren Acar

OP127
EVALUATING PLASMA LEVELS OF RAMP2 AND CTR PROTEINS IN FIBROMYALGIA
Zuhal Tunçbilek, Esma Özmen, Tuğba Ağbektaş, Ahmet Karadağ, Ayça Taş, Emrullah Hayta, Ragıp Ulvi Korucu, Yavuz Siliğ

ORAL PRESENTATION PROGRAM

October 31st, Thursday

14:00-16:10 Session 15 - Hall B - Chairs: Fatih Yeşildal, Zeynep Adıyaman Koçer

OP129
RETROSPECTIVE DETERMINATION OF IMMUNOPHENOTYPE PROFILES OF PATIENTS DIAGNOSED WITH ACUTE LEUKEMIA BY FLOW CYTOMETRY
Oğuzhan Özcan, Gamze Keşre, Hamdi Oğuzman, Murat Kaçmaz, Hasan Kaya

OP130
METABOLIC PROFILING REVEALS INSIGHTS INTO BLADDER CANCER PATHOGENESIS AND RECURRENCE
Hüseyin Saygın, Serkan Bolat, Demet Kablan, Hayrettin Yavuz, Meltem Kurt Yenihan, Adem Kır, Abuzer Öztürk, Akif Doğan, Onur Şenol, Halef Okan Doğan, Esat Korğalı

OP131
EVALUATION OF SERUM DICKKOPF-3 LEVELS IN PATIENTS WITH PANCREATIC ADENOCARCINOMA
Meltem Uyaner Kan, Ibrahim Kılınc, Seyma Nacar

OP132
NOVEL SCHIFF BASE CONTAINING MACROHETEROCYCLES: CDKN1A AND CSNK1A1 GENES PROFILES IN SAOS-2 OSTEOSARCOMA CELLS
Tugba Agbektas, Gulcihan Cinar, Alakbar Huseynzada, Ayca Tas, Yavuz Silig

OP133
EFFECT OF SECONDARY METABOLITES OBTAINED FROM PROBIOTIC BACTERIA ON MIRNA EXPRESSION IN BREAST CANCER CELLS BY IN VITRO CO-CULTURE
Gulcin Alp Avcı, Ulku Irem Yılmaz, Emre Avcı

OP134
INHIBITION OF ESTROGEN-DEPENDENT PROLIFERATION IN BREAST AND OVARIAN CANCER CELLS BY SPARSTOLONIN B
Yağmur Dilber, Hanife Tuğçe Çeker, Aleyna Öztüzün, Bürke Çırçırlı, Mutay Aslan

OP135
MATERNAL SERUM LEVELS OF FOXO1 AND SIRT2 IN PREGNANCIES WITH EARLY AND LATE-ONSET PREECLAMPSIA
Asuman Akkaya Fırat, Ebru Alıcı Davutoğlu, Ayşegül Özel, Rıza Madazlı

OP137
EFFECTS OF MODIFIED DIET PATTERNS ON TRYPTOPHAN METABOLITES IN INDIVIDUALS WITH TYPE 2 DIABETES
Nilüfer Alpaslan, Hüsamettin Vatansev, Muteber Gizem Keser, Kubilay Karşıdağ, Fatma Akat, Eissa Almahrebi, Muslu Kazım Körez

OP138
RETROSPECTIVE ANALYSIS OF MONOCLONAL GAMMOPATHIES: PREVALANCE AND ISOTYPE DISTRIBITION IN A LARGE PATIENT COHORT
Ebru Ertuğ

ORAL PRESENTATION PROGRAM

October 31st, Thursday

OP139
CYTOTOXIC EFFECT OF AVOCADO LEAF EXTRACT ON HUMAN BREAST CANCER CELL AND NORMAL MOUSE FIBROBLAST CELL
Gamze Tan

OP140
ROLE OF LRRC17, CATHEPSIN-K, TRACP-5B AND SOME BONE BUILDING MARKERS IN DIAGNOSIS OF POSTMENOPOZAL OSTEOPENIA AND OSTEOPOROSIS: RELATIONSHIP WITH FRAX
Hakan Bozan, Zübeyir Huyut, Server İlter, Mehmet Tahir Huyut, Halil İbrahim Akbay

OP141
EVALUATION OF SERUM SODIUM DISORDERS IN OUTPATIENTS AND INPATIENTS
Hamide Shllaku- Sefa, Ervin Marku, Gentian Kasmi, Manjola Qordja, Irena Kasmi, Ndok Marku

14:00-16:10 Session 16 - Hall C - Chairs: Berrak Güven, Turgut Aksoy

OP142
USE OF THE FLOW CYTOMETRY IN THE DIAGNOSIS OF ACUTE MEGAKARYOBLASTIC LEUKEMIA IN A PATIENT WITH DOWN SYNDROME: A CASE REPORT
İlknur Alkan Kuşabbi

OP143
ANALYSIS OF SAMPLE REJECTION RATES BY SHIFT TIMING AND DEPARTMENTAL PRACTICES IN A CLINICAL SETTING
Kamil Taha Uçar, Semih Tek, Oğuzhan Zengi, Alper Gümüş

OP144
6-HYDROXY-L-NICOTINE IMPROVES MEMORY IMPAIRMENT IN ALZHEIMER'S DISEASE MODEL MOUSE (5xFAD)
Lucian Hritcu, Razvan Stefan Boiangiu, Iasmina Honceriu, Ion Brinza, Marius Mihasan

OP145
A MACHINE LEARNING STUDY: PREDICTION OF COVID-19 PROGNOSIS USING BASELINE BIOCHEMICAL TEST RESULTS
Maide Hacer Tekin Alagöz, Mehmet Güven Günver, Ayşe Enise Göker, Evin Ademoğlu

OP147
EFFECTS OF ELLAGIC ACID ON HEMATOLOGIC PARAMETERS IN ISOPROTERENOL-INDUCED MYOCARDIAL INFARCTION
Sara Çıbık, Ergin Taşkın, İrem Arslantürk, Seda Çelik, Yeter Değer

OP148
INVESTIGATION OF THE DIETARY INFLAMMATORY INDEX IN HEMATOLOGIC MALIGNANCIES
Sema Köse, Deniz Mıhçıoğlu, Salih Sertaç Durusoy, Ali Tekbaş

ORAL PRESENTATION PROGRAM

October 31st, Thursday

OP149
EFFECT OF DOXORUBICIN ON ENDOPLASMIC RETICULUM STRESS IN RAT BRAIN TISSUES
Sevil Kör

OP150
DEVELOPING A SIMPLE AND USEFUL FORMULA FOR CALCULATING LDL-CHOLESTEROL, USING MACHINE LEARNING
Şaban Yayla, Alper Yayla, Hakan Ayyıldız, Abdullah Alvuroğlu

OP152
INVESTIGATION OF ZINC-ALPHA 2-GLYCOPROTEIN LEVELS IN PATIENTS WITH MAJOR DEPRESSIVE DISORDER
Esra Arslan, Tuğçin Mutlu, Furkan Akbaş, Hayriye Baykan, Mehmet Orbay Soğucak, Mervan Uğur Yağcı, Meryem Gül, Özgür Baykan

POSTER PRESENTATION PROGRAM

29 October-1 November

PP001
ESTABLISHMENT AND EVALUATION OF REFERENCE CHANGE VALUE-BASED DELTA CHECK FOR COAGULATION TESTS IN ALBANIA
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INVITED SPEAKER ABSTRACTS

IS001

Welcome Notes

Doğan Yücel

President, Turkish Biochemical Society

Dear Colleagues, Dear Friends,

On behalf of the Turkish Biochemical Society (TBS), it is my great pleasure to welcome you to Side, Antalya, for the Joint Meeting of the 31st Balkan Clinical Laboratory Federation Congress and the 33rd National Biochemistry Congress of TBS. Historically, TBS has organized numerous joint international congresses in collaboration with international organizations and BCLF. This BCLF Congress marks the sixth held in Türkiye, the last of which took place in Belek, Antalya, in 2019.

First of all, I would like to extend my heartfelt thanks to the BCLF Executive Board Members for approving the 31st BCLF Congress in Türkiye. I hope that, after the congress, the BCLF Executive Board will be pleased with their choice and that we will meet their expectations. Secondly, we are honored to have this congress under the auspices of the IFCC and EFLM, and we sincerely appreciate the support of these authorities.

This congress is also a joint event with the annual international biochemistry congress organized by TBS. We have a tradition of holding this congress at the end of October to coincide with the anniversary of the founding of the Republic of Türkiye on October 29. I would like to thank the BCLF EB once again for approving this date, which falls outside the usual early September timeframe for BCLF congresses. The declaration of the Republic represents the first step in the establishment of modern Türkiye, and we hold great respect for the Republic and its founder, Mustafa Kemal Atatürk. I also want to thank you all for joining us in celebrating our Republic Day.

We are gathered here with a shared goal: to advance science in general and specifically in the fields of biochemistry and clinical laboratory medicine. The congress features a robust scientific program with keynote speakers from various countries, many of whom represent key federations in laboratory medicine, such as IFCC and EFLM. We are privileged to host an outstanding lineup of keynote speakers, including Tomris Özben (President of IFCC, Ttürkiye), Tomas Zima (EFLM President-Elect, Czech Republic), Mauro Panteghini (Italy and now Poland), Octavia Palmer (President of ADLM, formerly AACC, USA), Graham Jones (Australia), Marc Thelen (Netherlands), Henrik Poulsen (Denmark), and Luciano Saso (Italy). These experts, along with numerous distinguished speakers from BCLF member countries and Türkiye, will bring immense value to the congress with their cutting-edge presentations. Furthermore, diagnostic companies will enrich the scientific program with their satellite symposia, significantly contributing to discussions on the latest developments in laboratory diagnostics.

Additionally, we have four workshops at the congress. One focuses on measuring and monitoring analytical performance using computer applications, while another covers determining reference intervals based on biological variation, also using computer-based methods. We also offer two courses on mass spectrometer use in clinical laboratory, one at the basic level and the other at an advanced level. Currently, our congress features about 50 speeches, 152 oral presentations and 145 poster presentations. Many young researchers are actively participating in the congress with their presentations. We are thrilled to see such great interest from young scientists at this congress. In response to this enthusiasm, we have provided 22 registration and 41 accommodation bursaries to 63 young colleagues (under 35 years old). We have approximately 50 sponsors for this congress, mostly diagnostic companies, and we owe them all a debt of gratitude. Thanks to their support, we are able to support young scientists. All abstracts presented at the congress will be published in the Turkish Journal of Biochemistry, the official journal of the TBS, which is listed in the Science Citation Index-Expanded.

Dear Participants,

Unfortunately, our region has faced significant political turbulence, especially over the past year. Differences

between nations and societies are, in fact, a source of richness and are inevitable. Similarly, criticism is also inevitable, even necessary. However, the weapon of criticism should never turn into the critique of weapons. Our primary hope is for this turmoil to subside and for the bloodshed and tears to end as soon as possible. Nevertheless, we have a powerful tool at our disposal: science. This tool can contribute, even if just partially, to lasting and sustainable peace in this region. In addition to participants from Europe, Balkan countries, and our own country, there are also attendees from countries such as Azerbaijan, China, Ghana, Iraq, India, Nigeria, Qatar, South Korea, Tunisia, and United Arab Emirates. This is a peaceful, beautiful gathering.

Finally, I would like to extend my gratitude to all the speakers, attendees, our sponsors, and our PCO company, Evronas.

Dear participants, in addition to the rich scientific program, the congress venue and accommodation are excellent, and the weather in Antalya is perfect for this season. I hope all attendees enjoy the meeting. I wish you a successful and fruitful congress.

Thank you for being here.

With my best regards,

Dogan Yucel, TBS and Congress President

IS002

NAVIGATING CURRENT AND FUTURE ADVANCES, INNOVATIONS AND CHALLENGES IN LABORATORY MEDICINE: OVERVIEW OF CURRENT TRENDS AND OBSTACLES

Tomris Özben[1, 2]

[1] IFCC, President
[2] EFLM, Past-president

In vitro diagnostics (IVDs) provides objective information supporting “Evidence Based Medicine” constituting a basis for accurate and fast diagnosis which leads to appropriate and more effective therapy, targets drug treatments according to patient’s response, causes reduction of morbidity, provides risk prediction and reduction, allows improved compliance, monitors recovery from disease and effects of treatment which allow for reassessment and updating of therapy, shortens length of hospital stay, lowers risk of hospital infection, and improves the quality of life of patients. Clinicians are under increasing pressure for better clinical outcomes, and IVDs contribute positively to the quality of health care through screening, diagnosis, monitoring therapy, assessment of medical interventions and therapy. IVDs are a clear and rational investment in health care. IVDs have a broad scope ranging from sophisticated technologies at the cutting edge of research and development performed in clinical laboratories to simple self-test. The overall IVD market will double over the next 10 years, driven by an aging population and an increase in non-communicable and chronic diseases in both mature and emerging markets despite changes and challenges, increasing pressures to prove medical value, and a more stringent regulatory environment. The next generation of POC platforms are expected to grow slightly faster than the central lab market. The in Vitro Diagnostic Regulation (IVDR) creates a new environment for IVD companies in terms of product development, management of product lifecycle, and commercialization approach. IVD companies need to re-register their entire IVD portfolio under the new regulation by the end of the five-year transition period. Clinical evidence demonstrates scientific validity, analytical performance, clinical performance, performance evaluation and their mutual relationship. Laboratory Medicine should focus on Advanced & Integrative Diagnostics to increase its visibility beyond providing well-functioning technical service. Every possible attempt should be performed to take part in the center of the medical dialogue and to prevent to be considered as a second healthcare provider. Innovations in digitalisation and automation will provide more accurate, faster results and reduction in cost.

IS003

ALCOHOL - EPIDEMIOLOGY, METABOLISM AND ITS CLINICAL CONSEQUENCES

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The chronic alcohol consumption is a world-wide social-economic problem.

Three metabolic pathways of ethanol were describe in human - alcohol dehydrogenase (ADH), microsomal ethanol oxidizing system (CYP2E1) and catalase. Ethanol directly bounds to different molecules (e.g. etylglucuronid) and ethanol per se and its metabolites have toxic effect on biological stuctures.

Alcohol is a very dangerous cytotoxic substance damaging the organism both acutely and chronically. Alcohol consumption is associated with more than 200 diseases, including tumors, hypertension, liver cirrhosis, brain damage and diabetes and injuries. Drinking alcohol during pregnancy may cause fetal alcohol syndrome with an incidence of 3.7 per 1000 live births in Europe. Alcohol is most commonly associated with liver damage - steatosis, alcoholic hepatitis, cirrhosis, and hepatocellular carcinoma. The influence of ethanol on the cardiovascular system is very much discussed in terms of its cardioprotective effects at very small doses (20 g/day). The protective mechanism is enabled by an increase in HDL, ApoA I, paraoxonase activity and adiponectin and lowering LDL; by an antithrombotic effect; and by an increase in insulin receptor sensitivity. The recent Wood et. all study (2018) processed data from 83 studies on 599 912 participants shows the decrease only in myocardial infarction and consuming higher doses then 100–200g of alcohol/week means a higher risk of heart attack, atrial fibrillation. Chronic alcohol consumption is associated with 10 % of tumors in males and 3 % in females. Alcohol is considered as a risk factor in upper gastrointestinal tract tumors (UADT - 25–68 % of them are associated with alcohol), hepatocellular carcinoma, colorectal carcinoma and breast cancer. There are a number of mechanisms – acetaldehyde, oxidative stress, activation of procancerogens, folic acid deficiency, decreased levels of retinoic acid, allelic variants of ADH and AlDH genes, etc.

Alcohol consumption is associated with more than 200 diseases, including tumors, hypertension, liver cirrhosis, brain damage, injuries, etc. Drinking alcohol during pregnancy may cause fetal alcohol syndrome with an incidence of 3.7 per 1000 live births in Europe. The influence of ethanol on the cardiovascular system is very much discussed in terms of its cardioprotective effects at very small doses (20 g/day). Chronic alcohol consumption is associated with 10 % of tumors in males and 3 % in females.

Laboratory markers of alcohol consumpition – ethanol level and classical markers as GGT, ALT, MCV are not specific. CDT (carbohydrate deficient transferin), ethyl glucuronid (EG) are more specific and sensitive which are widely use and they are indicators of chronic alcohol use. Alcohol causes defficiency of sialic acid in transferin - measurement of this deffect is marker of alcohol abuse. Direct metabolites are fatty acid ethylester and ethyl glucuronide (EG) which forms in liver with detection up 4 days.

CDT is the most suitable biochemical marker of alcohol abuse in routine practice and combination with biochemistry and hematological examination (GGT, uric acid, IgA, MCV, lipid profile, etc) can increase its sensitivity and specificity. Combination of GGT and CDT or CDT and EG is more effective. Primary care used CDT, for hospital also CDT for patients at risk for alcohol related surgerical complications maybe combined with ethyl glucuronide.

Acknowledgement: Supported by research projects the Cooperatio Program, research area DIAG, MH CZ DRO VFN 64165 and program EXCELES, ID: LX22NPO5104.

Keywords: Alcohol

IS004

ESTABLISHING, EVALUATING AND MONITORING ANALYTICAL QUALITY IN THE TRACEABILITY ERA

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The poor analytical quality may be the bane of medical use of laboratory tests and the fight against excessive analytical variability presents a daily struggle. Laboratories should prioritize the perspectives and needs of their customers (the patients and healthcare personnel). Among them, comparability of results from the same patient sample when measured by different laboratories using different in vitro diagnostic (IVD) medical devices is a logical priority to avoid result misinterpretation and potential patient harm. Harmonization (standardization) of laboratory measurements can be achieved by establishing metrological traceability of the results on clinical samples to stated higher-order references and providing an estimate of the uncertainty of measurement (MU). This estimate should be based on an MU budget including all known MU contributions generated by the employed calibration hierarchy, which in turn should be validated against fit-for-purpose maximum allowable MU derived according to internationally recommended models. In this presentation, the available strategies for establishing, evaluating, and monitoring analytical quality, drawing on three decades experience in the field, are reviewed. The most important aspects that may influence obtaining and maintaining analytical standardization in laboratory medicine are discussed, and practical solutions aimed at educating all stakeholders for the achievement of harmonized laboratory results offered. To fully implement the recommended approaches, all involved parties—i.e., reference providers, IVD manufacturers, medical laboratories, and External Quality Assessment organizers—must however agree on their importance and enhance their specific knowledge.

Keywords: Analytical quality, IVD, tests

IS005

DATA AND DIGITALIZATION IN LABORATORY PROCESSES

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Digitalization involves integrating digital technologies into business processes to improve efficiency and support data-driven decision-making. Today, digitalization is recognized as a powerful engine of economic growth. Clinical laboratories can now produce larger volumes of data thanks to technological advancements and automation systems. This data is processed using laboratory information systems (LIS), artificial intelligence (AI) and business intelligence (BI) tools, facilitating the more effective management of operational processes.

Laboratory Information Systems have been an essential part of clinical laboratory processes since the 1970s. Modern LIS systems, integrated with hospital information systems and other digital tools, simplify the management and analysis of laboratory data. These systems play a crucial role in tracking test results, storing data, managing quality control, and facilitating information exchange with electronic health records (EHR).

Laboratory automation enables both analytical and non-analytical tasks in clinical chemistry to be performed with minimal human intervention. This process began in the 1980s with Dr. Masahide Sasaki's development of automated laboratory systems at Kochi Medical School in Japan. Today, Total Laboratory Automation (TLA) systems offer integrated solutions for pre-analytical, analytical, and post-analytical phases. These automation systems help manage high-volume, complex tests while reducing error rates and increasing the reproducibility of results.

Big data analysis has revolutionized clinical laboratory processes. With the integration of LIS and other digital tools, large amounts of data are generated,

allowing for the development of new disease diagnosis and prognosis models. Rule based and artificial intelligence algorithms are used in areas such as auto validation and data management, enabling faster and more accurate reporting of test results.

Business intelligence tools are powerful resources for monitoring and optimizing laboratory processes. BI tools provide valuable insights for data consolidation, real-time monitoring, process optimization, and cost analysis. These tools enable laboratory managers to monitor performance metrics and make improvements to processes.

Digitalization and automation in laboratory processes play a crucial role in enhancing both operational efficiency and the quality of patient care. Big data analytics and artificial intelligence provide new solutions in laboratory medicine, contributing to faster, more accurate, and more efficient processes. In the future, the further integration of these technologies will enhance laboratory performance and improve the quality of healthcare services.

Keywords: Digitalization, Data, Data Analytics

IS006

MOVING AVERAGE AS AN ADDITIONAL QUALITY CONTROL TOOL IN THE MEDICAL LABORATORY

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Objectives: To overcome the limitations of traditional quality control (QC), the concept of patient-based real-time quality control (PBRTQC) has been introduced in medical laboratories. One of the methods of using patient results for control purposes is the moving average (MA).

The aim of our research was to apply MA procedures as an additional tool for quality control of analytical work on clinical chemistry analytes in a medical laboratory with a small daily testing volume.

Methods: A retrospective analysis was performed on data from the laboratory information system (LIS) and internal and external QC data for ten clinical chemistry analytes: albumin, AST, calcium, chlorides, cholesterol, creatinine, HDL-cholesterol, potassium, sodium, and total protein. The selection and validation of MA procedures were carried out using a bias detection simulation method. The performance of MA procedures in routine work was monitored over six months by analyzing MA alarms generated by the LIS when control limits were exceeded.

Results: Simple MA procedures were chosen as optimal for albumin, AST, calcium, chlorides, cholesterol, HDL-cholesterol, and sodium, while exponentially weighted moving average (EWMA) procedures were selected for creatinine, potassium, and total protein. The frequency of MA alarms was 0.023%. An algorithm was proposed and successfully applied for managing MA alarms.

Conclusions: In a medical laboratory with a small daily testing volume, it is possible to successfully implement MA procedures as an additional control tool in daily operations.

Keywords: quality control, moving average, patient-based real-time quality control

IS007

DIGITAL SOLUTIONS FOR QUALITY CONTROL AND VERIFICATION APPLICATIONS IN CLINICAL LABORATORY

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The field of laboratory medicine is rapidly evolving in the digital age, with numerous tools developed to enhance analytical performance specifications, risk-based internal quality control, patient-based quality control, and method verification. One such tool, the APS Calculator, has emerged as a vital resource for setting outcome-based analytical performance specifications, aligning with the well-established Model 1b approach in this domain.

Despite clinical laboratories lagging in the adoption

of contemporary risk-based quality control (QC) practices, QC Constellation represents an innovative solution. It enables the implementation of risk-based QC, integrating both analytical performance and patient risk factors to optimize QC plans. Additionally, QC Constellation supports patient-based QC, offering a continuous process monitoring solution that is both cost-effective and commutable.

Moreover, VerifyMyLab, a freely available tool, assists laboratory professionals in conducting method verification in accordance with CLSI EP15-A3 guidelines, as well as performing method comparisons for quantitative tests.

Keywords: Digital Solutions, quality control, Verification

IS008

ORGANIZATION, STANDARDIZATION AND HARMONIZATION OF LABORATORY MEDICINE IN ALBANIA

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Laboratory medicine in Albania, like in many countries, plays a critical role in the healthcare system by providing essential diagnostic services. The health system in Albania is mainly public. The state provides most of the services offered to the population in the field of promotion, prevention, diagnosis and treatment. The private sector in medicine is growing rapidly.

Regulatory Framework:Ministry of Health and Social Protection is the primary regulatory body responsible for overseeing healthcare services in Albania, including laboratory medicine.

The Order of Physicians is a non-budgetary, professional, independent public entity, who represents and protects the common interests of the members and regulates activities and relations between them, in function of the public.

The Albanian Society of Clinical Biochemistry and Laboratory Medicine is a voluntarily union of all the Clinical Biochemistry Specialist in Albania. ASoLaM is full member of BCLF, EFLM and IFCC.

Types of Laboratories:Public Laboratories are typically located within public hospitals and primary healthcare centres. They are government-funded and provide laboratory services to the population. Private Laboratories has been a significant increase in recent years. Specialized Laboratories are often part of larger hospitals or research institutions and focus on specialized tests.

Infrastructure and Technology:Laboratories in Albania vary in terms of technological capabilities. While larger urban centres may have well-equipped laboratories with modern diagnostic tools, rural and smaller facilities might still face challenges related to equipment and supplies. Efforts have been made to upgrade laboratory facilities and equipment through government initiatives and private investments.

Workforce and education:Laboratory medicine in Albania is supported by trained professionals, including medical laboratory specialists and medical laboratory technicians. All laboratory medicine specialist in Albania are medical doctors (6 years, 360 ECTS) with a post-graduate training duration of 4 years. Laboratory medicine in Albania includes three separate medical specialities: Clinical Biochemistry; Microbiology; Pathology. The sole institution in Albania, responsible for postgraduates training in laboratory medicine, is the Faculty of Medicine, UMT. The area of competence of clinical biochemistry specialists are: Clinical Chemistry, Immunochemistry, Haematology&Coagulation. From 2014 was applied an improved syllabus for post-graduate training in clinical biochemistry according to Syllabus of EFLM and UEMS. All laboratory medicine specialists in the end of their post-graduate training should be licensed from Albanian Order of Physicians as a MD specialist in the relevant area.

Quality Control and Accreditation:In Albania, General Directorate of Accreditation is the national body responsible for the accreditation of medical laboratories according to ISO15189 standard. Accreditation is not obligatory by law, but in recent years has been a rapid

movement in the awareness of public and private medical laboratories to be accredited according to ISO15189.

Challenges and Future Directions: Ongoing reforms of government aim to improve the quality of healthcare services in Albania, including laboratory medicine too. These reforms focus on better funding, infrastructure development, reorganization, centralization and integration of new diagnostic technologies.

In 2020, the Ministry of Health and Social Protection, supported by International Finance Corporation, World Bank, applied a public private partnership model (PPP) throughout the public hospital laboratory system of Albania. This initiative spanned 18 public hospital laboratories across Albania by connecting them in a LabNetworks. This PPP driving innovation in Albania's Lab Service through renovation of technology, standardization and informatization ensuring consistent, accurate and standardized laboratory service across the country. All public hospital laboratories included in LabNetworks will be accredited according to the ISO15189 within 5 years. This model has increased the quality, reliability, harmonized and expanded the range of laboratory tests offered today to the Albanian patient, significantly reducing the out-of-pocket money that they spent to have such laboratory service before.

Keywords: Organization, Education, Accreditation

IS009

RECENT UPDATE ON EDUCATIONAL RECOMMENDATIONS FROM THE IFCC COMMITTEE ON CLINICAL APPLICATION OF CARDIAC BIO-MARKERS

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The International Federation of Clinical Chemistry Committee on Clinical Application of Cardiac Bio-Markers (IFCC C-CB) provides evidence-based educational statements to support standard interpretation and utilization of cardiac biomarkers in clinical laboratories and practice. The focus of this talk will be some of our most recent educational guidance statements. We will discuss how to design and evaluate studies estimating the 99th percentile upper reference limit for cardiac troponin assays including inclusion criteria, pre-analytics and statistical approaches. We will further discuss the recently suggested pathways recommended for predicting low risk of non-ST elevation myocardial infarction already at admission to the Emergency Department. These pathways include a single sample measurement of troponin at presentation to hospital and have a sensibility for detecting NSTEMI of > 99%. Utilizing such pathways requires high analytical sensitivity and performance at low troponin concentrations and we therefore move on to discuss how the analytical performance of troponin assays at low concentrations may impact patient misclassification. This part of the talk will discuss analytical performance goals for troponin concentrations below 10-15 ng/L, providing concert suggestions for analytical variation goals and further discussing how bias (e.g. lot variations) may effect patient care. The last part of the talk will deal with the possibility of antibody-mediated interference affecting cardiac troponin results, when this should be clinically suspected and how it may be investigated by the laboratory.

IS010

MANAGING PATIENT AND PHYSICIAN EXPECTATIONSTOIMPROVESATISFACTION FROM CLINICAL LABORATORY SERVICES

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Clinical laboratories aim to achieve the satisfaction of their ultimate stakeholders: the patients and the physicians. As the extent to which patients and physicians feel their needs and expectations are met by the care provided, patient and physician satisfactions have been part of the essential criteria to measure quality care. Patient and physician expectations drive the search for higher quality in clinical laboratory services. In the current landscape of healthcare

services, modern patients have changed their health-seeking behavior and prioritized convenience, being informed and open communication. Patients also affect their clinicians' test ordering decisions. Overviewing factors affecting patient and physician experience in clinical laboratory services can be a great opportunity for clinical laboratories to manage satisfaction from services and improve the delivery of value created by laboratories.

In this session, and a potential roadmap for clinical laboratories to assess patient and clinicians needs and redesign laboratory experience for both of the main stakeholders with the help of novel digital tools will be discussed.

IS011

Evaluation of clinical performance, risk likelihood and diagnostic sensitivity under ISO 15189/ EU-IVDR requirements in flow cytometry departments

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Aim: According to the most recent regulatory requirements of the ISO 15189/ EU-IVDR medical laboratories, including departments of flow cytometry (FC), are encouraged to retrospectively assess the clinical/diagnostic sensitivity of their reports.

The current aim is to dispel the myth that the assessment of diagnostic sensitivity is not suitable for FC immunophenotyping tests.

Material and Methods: Fifteen tests/antibody panels are currently used in our department, for the diagnosis/ monitoring of malignant hemopathies. Of those, the Lymphocyte Screening Test (LST) for the diagnosis of B/T-Cell Lympho-Proliferative Disease (B/TCLPD) was selected as a prototype for the evaluation of clinical benefit/ diagnostic sensitivity and risk likelihood. Diagnostic sensitivity testing was performed by calculating the percentage of cases (percent of positive agreement - PPA) in which confirmation of the immunophenotypic diagnosis (true positive-TP/ false negative-FN) was retrospectively correlated with (para)clinical data (PCR/NGS, cytogenetics, myelogram/ blood-smear/ cytology, histopathology).

Results: 352 consecutive samples (173 bone-marrow aspirates-BM,169 peripheral-blood samples-PB and 10 body cavity effusions-Eff) sent for FC with clinical suspicions of CLPD between January 2023-July 2024 were selected and positive/ negative prediction values (PPV/ NPV) and PPA were calculated. As PPV was significantly lower in BM and Eff in comparison to PB samples (47.4, 10, 89.4, respectively), similar to PPA values (88.9 33.3, 94.7, respectively), the risk that LST test may render increased FN results when BM/ Eff samples are assessed had its likelihood upgraded from 2 (estimated) to 4.

Conclusion: To optimize the clinical benefit of such complex tests, decision-making algorithms are mandatory (ie selection of representative specimen).

Keywords: Flow cytometry, standardization, diagnostic sensitivity

IS012

SPECIFIC IGE TESTING AND CURRENT FOOD ALLERGY STATUS IN GENERAL POPULATION IN MACEDONIA

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Aim: Food allergy constitutes a major public health issue with increasing prevalence having been documented in the past few decades. It affects about 3–10% of children and up to 10% of adults. Recommended tests to support the diagnosis of IgE-mediated allergy besides skin prick tests and basophil activation are diagnostic tests measurements of the Specific IgE to allergen extracts.

Methods: The determination of allergen-specific IgE antibodies from a patient's blood sample is obtained in units of IU/ml or as RAST classes (0-6). The analyses were for the past 3 years : 2021 to 2023 for 6055 patients. The patients were tested for 20 different food

allergens: milk, egg, peanut, hazelnut, sesame, wheat, spinach, tomato, walnut, codfish, carrot, orange, strawberry, rye, gluten, celery, parsley, banana, cacao and soya.

Results: The trend for food mediated allergy in Macedonia was showing growing direction, 5% in 2021, 6% in 2022 and 10% in 2023. From a total of 8481 allergy tests, we found 2842 results (34%) to specific IgE allergens to food. 2630 (92,5%) were found negative and 212 patients (7,5%) had positive results. The most common allergens were: sesame, milk, peanuts, egg, hazelnut and wheat.

Conclusions: Over the years globally there were increasing number of positive test results to food allergens and the trend was shown the same in Macedonia. Precise diagnosis and patient management of food allergy are of major importance, both in guiding allergen avoidance and emergency treatment, also in avoiding unnecessary dietary restrictions or unnecessary tests.

Keywords: Allergen-specific IgE antibodies, allergens, food allergy

IS013

COAGULATION MARKERS IN NON-HODGKIN LYMPHOMA

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Objectives: A common complication in patients with malignancies is thrombosis. The aim of the study is to investigate the changes in coagulation markers – fibrinogen, thrombin-antithrombin complex (TAT), tissue factor (TF), prothrombin fragment (F1+2), Antithrombin III (AT III), and D-dimer in patients with non-Hodgkin lymphoma on systemic therapy.

Methods: The current investigation included 40 patients with non-Hodgkin lymphoma and a control group of 34 healthy volunteers. We measured the levels of fibrinogen, F1+2, TAT, TF, AT III and D-dimer baseline, before therapy (visit 1); monitoring response to therapy (visit 2); and after completion of therapy (visit 3). These parameters were investigated only once in the healthy controls. TF, TAT and F1+2 were measured by ELISA assay, D-dimer by an immunoturbidimetric assay, a chromogenic assay was used for AT III and a clot-based assay for fibrinogen.

Results: The levels of fibrinogen, F1+2, TAT, TF and D-dimer in patients with non-Hodgkin lymphoma were significantly higher than those in the control group, while AT III activity was significantly lower ($P<0.001$). F1+2, TAT, TF and D-dimer decreased during the follow-up, and baseline levels were significantly higher vs. visit 2 and visit 3 ($P<0.05$).

Conclusion: Our findings support the hypothesis about the relationship between malignancies and coagulation disorders. Systemic therapy significantly influences the dynamics of the coagulation markers. Patients with non-Hodgkin lymphoma are at high risk of thrombosis, and antithrombotic prophylaxis could be considered.

Keywords: Coagulation, thrombosis, non-Hodgkin lymphoma

IS014

D-DIMER TESTING: LABORATORY ASPECTS, LIMITATIONS AND FUTURE CONCEPTS

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D-dimers are by-products of fibrinolysis. In cases of increased thrombolytic activity, D-dimer tests are crucial in clinical evaluations and are well-established for diagnosing venous thromboembolism (VTE) in appropriately risk-stratified populations. While D-dimer is widely recognized as the biochemical gold standard for aiding in the VTE diagnosis and predicting the risk of recurrent thrombosis, interpreting D-dimer levels becomes increasingly

difficult with advancing age due to various factors. D-dimers can be utilized to evaluate haemostasis and active fibrinolysis, a principle applied in diagnosing disseminated intravascular coagulation (DIC), a coagulopathy caused by many diseases. Numerous studies have explored the association of D-dimers with aortic aneurysm, coronary atherosclerosis, acute myocardial infarction, and acute ischemic stroke, all of which significantly impact healthcare costs and patient quality of life. D-dimer tests are non-invasive, quick, and cost-effective diagnostic tools. However, the widespread use of D-dimer testing without a thorough understanding of its laboratory complexities has raised concerns. The results from different D-dimer assays can vary greatly due to differences in the size of degradation products containing the D-dimer antigen, the monoclonal antibodies targeting different epitopes, and variations in assay formats, calibration standards, and instrumentation. Efforts to standardize these assays have been unsuccessful because the D-dimer analyte is not consistent across different tests, leading to attempts to harmonize D-dimer testing.

Keywords: D-dimer, diagnosis, limitations, prospects, venous thromboembolism

IS015

OXIDATIVE STRESS IN TYPE 2 DIABETES, THYROID DISEASES, AND SEVERE PSYCHIATRIC DISEASES: FOCUS ON NUCLEIC ACID OXIDATION

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Oxidation is essential for mammalian life, yet it also poses hazards to life. In the cells, highly developed systems use oxidation of substrate to energy production, i.e. ATP production in the mitochondria. In this process the reduction of oxygen yields reactive intermediates with many biological functions and effects, including modifications of essential macromolecules. Integrity of nucleic acids is highly prioritized by the cell, DNA integrity is maintained by a plethora of repair systems of which many are known, while that of RNA is by production and quality control, processes that only recently have begun to be unraveled. The (bio) chemistry of DNA modification is well detailed. High constitutive levels of DNA oxidation pose cancer risk, shown for lung and breast cancer. In patients with type 2-diabetes and high RNA oxidation, the risk of death, and death from arteriosclerotic events is considerable elevated, whereas high or low DNA oxidation does not have prognostic value. Both severe psychiatric diseases, e.g. rapid cycling depression/ mania, and hypo-and hyperthyroidism are associated with increased nucleic acid oxidation, and is ameliorated when disease activity is normalized. The present challenge is to identify and test interventions that reduce nucleic acid oxidation in vivo, and test if a concomitant reduction in morbidity and mortality can be achieved. There are presently indications that individual oxidative stress can be reduced and that this translates into improved survival. GWAS studies on oxidator phenotype is ongoing and suggest that drug targets can be identified.

IS016

SERUM CYSTATIN C LEVELS: A PROMISING EARLY BIOMARKER OF CHRONIC KIDNEY DISEASE IN PEDIATRIC PATIENTS

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Introduction: Chronic kidney disease (CKD) in pediatric patients is the progressive and irreversible loss of kidney function over time, which occurs suddenly and is usually reversible, CKD develops slowly and can cause long-term problems if not treated appropriately.

Objective: The purpose of this study is to evaluate the value of serum cystatin C in early prediction of chronic kidney disease with emphasis on diagnostic and prognostic value, practical considerations, and future directions and as a biomarker for estimatin glomerular filtration rate.

Methods: The study was conducted at PHI University Clinic for Children's Diseases-Skopje. It is a retrospective-prospective study, in which 130 patients were evaluated between January 2019y and December 2023y with clinical signs, symptoms, laboratory analyses, and imaging studies for CKD.

Results: The average values of serum Cystatin C (ng /ml) showed that there is a significant difference in relation to this parameter in pediatric patients with congenital anomalies of the kidneys and urinary tract 1,24 ±1.12 in relation to pediatric patients with tubulopathies and metabolic diseases with renal affection 1.13±1.09, pediatric patients with glomerulopathies 1.09 ±1.07, and pediatric patients with other nephrological-urological diseases 1.29±1.1 at the first examination $p<0.05$. The average values of serum Cystatin C (ng /ml) showed that there is a significant difference in relation to this parameter in pediatric patients with renal stages CKD, at the first examination $p<0.05$.

Conclusions: Serum cystatin C is well established as an early and accurate biomarker of CKD, which is particularly useful in patients where creatinine is an inadequate marker or where more cumbersome methods of measuring glomerular filtration rate (GFR) are impractical. Serum Cystatin C has shown promise in detecting subtle changes in renal function earlier than traditional markers, enabling timely intervention and personalized management strategies.

Keywords: Cystatin C, Chronic kidney disease CKD, biomarkers

IS017

Current Vitamin D Status Among Pregnant Women in Republic Of North Macedonia

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Objective: Vitamin D is an essential nutrient that plays a crucial role in maintaining overall. It is essential during pregnancy, as it contributes to the proper development and well-being of both the mother and the baby. During pregnancy, the demand for vitamin D increases to support the growing needs of the developing fetus. Vitamin D helps in the absorption of calcium and phosphorus, which are vital for the formation of strong bones and teeth. It also plays a crucial role in health and in multiple biological paths such as immunomodulation, cellular proliferation and differentiation regulating the immune system, preventing inflammation, and maintaining optimal muscle function. There has been increasing interest in understanding the impact of vitamin D levels during pregnancy, particularly in Europe. Europe is a diverse continent, with varying geographical and climatic conditions. The availability of sunlight, which is necessary for the body to synthesize vitamin D, varies across different regions. This, coupled with cultural and lifestyle factors, can significantly impact vitamin D levels in pregnant women. Macedonian women differ somewhat from other European women in terms of sun exposure according to geographic latitude, climate, and attitude towards sunbathing. The lack of information on vitamin D concentrations in pregnant women in Macedonia is the major reason why no guidelines for vitamin D supplementation in pregnancy exist in contrast to many other countries that have already implemented strategies for prevention of vitamin D deficiency in pregnant women. Material and methods: We undertook a prospective study on randomly selected pregnant women in whom vitamin D concentrations were determined in two different seasons. Results: A total of 308 pregnant women aged over 18, were recruited from August, 2022 to January, 2023 with mean concentration of vitamin D: 28.82±4.8 nmol/l. According to the WHO classification for vitamin D deficiency, 77.7% of our group of women had vitamin D deficientcy (<50nmol/l). During the winter period 80 % of randomly selected pregnant woman were vitamin D deficient. Conclusion: In conclusion, despite that more than 77.3% of the pregnant women reported taking multivitamins containing vitamin D, vitamin D deficiency is highly prevalent among pregnant women in Macedonia. A targeted screening strategy to detect and treat women at high risk of severe vitamin D deficiency is clearly needed in R.N. Macedonia.

Keywords: Vitamin D, women health, pregnancy

IS018

IMPACT OF OXIDIZED LOW DENSITY LIPOPROTEIN (oxLDL) AND ANTI-oxLDL ANTIBODIES ON CARDIOVASCULAR HEALTH

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Objectives: Cardiovascular disease (CVD) remains the leading cause of death worldwide. Oxidized low density lipoprotein (oxLDL) is believed to be central to the atherosclerotic cascade. Oxidative modification of LDL induces immunogenic epitopes in the LDL molecule, and the presence of antibodies against oxidized LDL (anti-oxLDL) has been demonstrated in human sera. Anti-oxLDL titer not only can predict a presence of atherosclerotic CAD but may also be a marker of plaque instability.

Aim: The primary aim of this study was measurement of serum levels of oxLDL and anti ox-LDL concentrations in coronary artery disease (CAD) patients confirmed with coronary angiography. The secondary aim was to evaluate if there was an association between oxLDL and anti-oxLDL concentrations and conventional lipid risk factors for cardiovascular diseases (CVD).

Materials and methods: Ninety patients with coronary artery disease and 90 controls were included in the study. Patients were selected according to the positive result of coronary angiography. Patients were divided in two grpus: 40 patients in group I with coronary stenosis in at least one major coronary artery (>50%) and group II consisted of 50 patients with coronary stenosis < 50%. Lipid parameters were measured by enzymatic methods on Roche c311 Cobas Analyzer. OxLDL and anti-oxLDL were determined with sandwich ELISA technique on Chemwell Awareness Technology Analyzer.

Results: There was a significant difference between CAD patients (group I and II) and controls regarding oxLDL ($p< 0.001$). Serum anti-oxLDL antibodies did not differ between group I, group II and controls. There was a significant correlation between anti-oxLDL antibodies and LDL-c ($p<0.01$) in the group I of CAD patients.

Conclusions**:** There is an evidence that suggests a relationship between oxLDL and CAD. On the other hand, our results suggest that serum levels of Ab oxLDL are not associated with the presence and severity of CAD.

However, further prospective studies, will be of imminence importance to clarify these associations.

Keywords: Atherosclerosis, CAD, ox-LDL, anti-oxLDL antibodies

IS019

MiR-122 AS A POTENTIAL BIOMARKER FOR TYPE 2 DIABETES

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Objectives: Prevalence of type 2 diabetes (T2D) is rapidly rising in world population. The main mechanism for its manifestation relies on insulin resistance development, however significant impact of obesity and unhealthy lifestyle should not be neglected. Micro-ribonucleic acids (miR) have roles in gene expression regulation. As a liver specific miR-122 has a task to regulate genes involved in carbohydrate and lipid metabolism. It demonstrates indirect effects on regulatory gluconeogenetic enzyme. Its inhibition reduces fatty acids and cholesterol synthesis in liver.

Methods: The study included 56 apparently healthy participants and 42 participants with T2D. MiR-

122 expression were determined in platelet-poor plasma using Real-time polymerase chain reaction. Biochemical markers were determined by routine laboratory methods.

Results: Patients with T2D were significantly older, had higher body mass index (BMI), triglycerides (TG) and lower high density lipoprotein cholesterol (HDL-C) than controls (P<0.001 for all). Increased miR-122 expression was also evident in T2D (P=0.005). MiR-122 positively correlated with BMI (ρ=0.208, P=0.046), TG (ρ=0.409, P<0.001) and negatively with HDL-C (ρ=-0.241, P=0.027). However, border significant correlation was determined between miR-122 and glucose (ρ=0.198, P=0.055). Increased miR-122 expression was associated with T2D (OR=3.797, P=0.012). Furthermore, miR-122 expression was independently positively associated with T2D when adjusted for age and BMI (OR=3.725; P=0.037).

Conclusion: Elevated miR-122 expression can represent the risk for T2D development independently of age and obesity. Follow-up studies with more participants should be carried out to confirm the preliminary data regarding potential utilization of miR-122 as the biomarker for T2D prediction.

Keywords: Type 2 diabetes, MiR-122, BMI

IS020

GUT-BRAIN AXIS IN PATIENTS WITH MULTIPLE SCLEROSIS - FOCUS ON MICROBIOTA METABOLITES

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The pathogenesis of multiple sclerosis (MS), a chronic inflammatory disease, is driven by various mechanisms, the most important being the intricate inflammatory process within the central nervous system (CNS), concomitant with demyelination and neuronal degeneration. Multiple sclerosis can be classified according to the disease course in clinically isolated syndrome (CIS), relapsing-remitting MS (RRMS), or progressive MS, ultimately culminating in disability.

Among the diverse etiopathogenic factors, the role of gut microbiota and its metabolites has emerged as important triggering factors in recent years. Current research has unveiled distinctive alterations in the gut microbiota of patients with MS (PwMS) compared to control subjects, characterized by a reduction in *Firmicutes, Bifidobacterium*, and *Prevotella*, and an elevation in *Bacteroides, Blautia*, and *Akkermansia*.

On investigating further, distinct disparities have been noted between RRMS and progressive MS, with patients with RRMS exhibiting a prevalence of *Methanobrevibacter* and *Akkermansia*, and a decrease in *Butyricimonas* and *Prevotella*. Contrastingly, patients undergoing disease-modifying therapy (DMT) demonstrate an abundance of *Prevotella.*

The gut microbiota metabolites involved in MS pathogenesis include short-chain fatty acids (propionic acid, butyric acid, or acetate), medium-chain fatty acids (caproic acid), and polyamines. Evaluating gut dysbiosis and deciphering how gut microbiota metabolites modulate the cellular and humoral response within the brain and intestinal mucosa is important for deeply understanding the pathophysiology of MS. Moreover, considering the emergence of microbiota modulation therapies, a comprehensive evaluation of microbiota metabolites in PwMS is justified.

Keywords: Multiple sclerosis, microbiota, short-chain fatty acids, neuroinflammation

IS021

TRACE ELEMENT DYSREGULATION AND ITS ASSOCIATION WITH COVID-19 SEVERITY: INSIGHTS FROM THE COVLAB PROJECT

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Objective:Trace elements play essential roles in immune function and disease response. Their dysregulation has been implicated in various pathologies, including viral infections. The ongoing COVLAB project aims to provide critical insights into the role of trace elements in COVID-19 patients and their potential as biomarkers for disease progression. As part of the COVLAB project, this study investigates serum levels of key trace elements (Cu, Se, Zn, Br, I, Fe, Mg) in COVID-19 patients, examining their relationship with disease severity and progression.

Methods: We analyzed serum trace element levels in 210 COVID-19 patients, categorized by disease severity in four different groups (mild, moderate, severe and ex.letalis), using inductively coupled plasma mass spectrometry (ICP-MS). Statistical analyses were performed to explore correlations between trace element concentrations and disease progression.

Results: Significant differences were observed in Cu, Zn, Se, and Fe levels across severity groups. Zn and Se levels decreased, while Cu increased with greater disease severity. No significant variation in Mg and I levels was found between groups, although iodine levels were elevated in all cases.

Conclusion: The COVLAB project's findings underscore the importance of trace element dysregulation, particularly Zn, Se, and Cu, in the pathophysiology of COVID-19. These results highlight the potential of trace elements as biomarkers for disease severity and progression. Further research through COVLAB will deepen our understanding of how these elements influence COVID-19 outcomes and contribute to more targeted therapeutic approaches.

Keywords: Trace elements, COVID-19, disease severity

IS022

REFERENCE INTERVALS BASED ON BIOLOGICAL VARIATION DATA

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Interpreting laboratory data is a comparative process, requiring reliable reference data for accurate assessment. In human metabolism, analyte concentrations are not constant but fluctuate around a homeostatic set point, a phenomenon known as within-subject biological variation. Therefore, an interval, rather than a cutoff value, is used for interpretation.

Currently, reference intervals are estimated using population data. For this purpose, samples are collected from at least 120 reference individuals, and the analyte concentrations are measured. The highest and lowest 2.5% of values are excluded using either parametric or non-parametric statistical approaches, depending on the distribution type of the measurement results. The central 95% limits are then accepted as the limits of the reference intervals.

Although this approach has been in use since the 1960s, it has two main limitations. First, finding 120 reference individuals for all analytes is challenging. Second, despite the well-established within-subject biological variation of all biomolecules, this variation is not incorporated into the estimation of reference intervals in the classical approach.

To address these issues, we developed a new method for estimating population-based reference intervals that requires fewer reference individuals and incorporates within-subject biological variation. Compared to the conventional method, which requires samples from at least 120 reference individuals, the new method needs only about 16. Additionally, within-subject biological variation for most commonly requested analytes can be obtained from the European Federation of

Clinical Chemistry and Laboratory Medicine (EFLM) database.

In conclusion, the biological variation-based population reference interval is reliable, easy to implement, and readily applicable in medical laboratories.

IS023

NAVIGATING THE NEW REGULATORY LANDSCAPE FOR LABORATORY-DEVELOPED TESTS

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Background: The regulatory landscape for Laboratory-Developed Tests (LDTs) is undergoing significant change, primarily due to the implementation of the In Vitro Diagnostic Regulation (IVDR) in the European Union and evolving guidance from the US Food and Drug Administration (FDA). This change reflects the growing importance placed on the safety, efficacy, and clinical performance of diagnostics in the face of rapid advances in medical technology and increasing public health demands. Understanding this regulatory framework is critical for clinical and research laboratories as they navigate the complexities of compliance while driving innovation in diagnostic testing.

Objective: This presentation will provide a comprehensive overview of the new regulatory framework for LDTs, highlighting the differences between FDA regulations and the IVDR and their impact on laboratory practices. It will also discuss the challenges and opportunities these regulations present for laboratories, particularly in the context of risk classification, performance evaluation, and quality management.

Methods: To explore the regulatory landscape, this presentation includes current guidance documents, regulatory updates, and case studies of laboratories that have successfully adapted to new requirements. Key materials include the FDA's framework for LDTs, the IVDR, and comparative analyses of compliance requirements. Methodologically, the lecture will use a combination of visual aids, including charts and graphs, to illustrate the impact of the regulations on laboratory operations. This includes the creation of a bar chart depicting the cost implications of the new regulations for small and large laboratories, as well as a risk classification pyramid to illustrate the categorization of LDTs under the IVDR.

Results: The results show that both the FDA and the IVDR aim to improve the safety and efficacy of diagnostic tests, but that their approaches differ significantly. The FDA allows more flexible oversight of LDTs with limited pre-market review and a focus on post-market surveillance. In contrast, the IVDR prescribes a rigorous pre-market assessment and post-market obligations and categorizes LDTs into four risk classes that determine compliance requirements. For higher-risk LDTs (classes C and D), laboratories must demonstrate clinical performance before market launch, which includes comprehensive validation studies and ongoing post-market surveillance. The presentation highlights specific examples, such as the rapid development of COVID-19 testing, that demonstrate how laboratories have adapted their practices to meet regulatory requirements while addressing pressing public health needs.

Discussion: This regulatory change presents both challenges and opportunities for laboratories. While the increased regulatory burden can strain resources, it also encourages the implementation of robust quality management systems and rigorous performance evaluations. Laboratories will need to invest in staff training, technology upgrades, and improved compliance processes to meet the new standards. In addition, the transition from a less regulated environment to one with strict oversight requires a cultural change in laboratories that emphasizes quality and safety.

Conclusion: Navigating the new regulatory landscape for LDTs requires a proactive approach from clinical and research laboratories. By understanding the differences between FDA regulations and the IVDR, laboratories can better prepare for compliance and ensure their tests meet the required safety and performance standards. Implementing comprehensive quality management systems, continuous performance evaluation, and a commitment to compliance will not only facilitate adherence to these new regulations but

will also improve the overall quality of diagnostic testing. As the landscape continues to evolve, laboratories must remain vigilant and adaptable, embracing regulatory challenges as opportunities for innovation and improved patient care.

This presentation aims to equip laboratory professionals with the knowledge and tools necessary to effectively navigate this complex regulatory environment and promote a culture of quality and compliance in laboratory medicine.

Keywords: Developed tests, regulatory, LDTs

IS024

MEDICAL LABORATORY PROFESSIONALS' KNOWLEDGE AND ATTITUDES TOWARD ARTIFICIAL INTELLIGENCE

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Objective: Artificial Intelligence(AI) has arisen as a novel promising tool within laboratory medicine, offering a wide spectrum of potential applications. With the ongoing transformation of medical laboratories through digitalization and automation, challenges related to AI introduction, implementation, workflow changes, legal and ethical considerations emerge as a focus point among laboratory professionals. New technologies introduction has often faced resistance by the medical community, which is the target group that may currently influence organizational policies to either embrace or constrain innovative approaches in their institutions. Laboratory professionals' perspective can offer valuable insights on the appropriate pathway for AI implementation, but it yet remains an underexplored area. Our objective was to assess laboratory professionals' knowledge, concerns, interest and attitudes toward AI.

Methods: In order to provide an exploration of laboratory professionals' attitude toward AI, data were collected using a questionnaire. A cross sectional survey was designed via Google Forms and distributed to albanian laboratory professionals via WhatsApp and Email. The survey consisted in 26 questions, organized in 3 sections. The participation was entirely voluntary and anonymous. Answers were automatically collected over 4 weeks (16th July to 13th August 2024). Categorical data were analyzed using Pearson chi-square statistic, considering p-value less than 0.05 statistically significant. Data from multiple-choice questions were presented as percentages per category. Analyses were performed using SPSS.

Results: The survey was completed by 220 participants, with an age range from 21 to 66 years old and average age 38 +/-10.7 years old. Out of respondents, 90.5% were females and 9.5% were males. 30% of the participants were medical laboratory doctors, 61% laboratory technicians and the remainder were microbiologists, laboratory residents and biologists. 44% of respondents self-reported that their knowledge about AI was not at all or somewhat appropriate. AI is currently used in the laboratories of 46% of the participants, while 55.4% felt they might use it in the future and 2.7% would never use AI. They indicated that the most common usage of AI in their laboratories is focused on test results autoverification and images digital analysis, while hematology, immunochemistry and molecular biology are the fields that can benefit more from AI implementation according to them. Respondents believed that AI could help them perform their work by improving accuracy and precision (56.8%), saving time (70.5%) and reducing stress and tiredness (60.5%). Laboratory professionals identified high initial implementation cost and ethical considerations as the most important barriers of AI integration in laboratories workflow. 31.4% of the respondents feared that they might lose their job due to AI replacement and 25.5% were uncertain regarding this matter. There was observed a statistically significant more positive attitude toward AI among female respondents compared to males (P=0.003), laboratory doctors compared to technicians(P= 0.004) and those who report more appropriate knowledge of AI in comparison to participants that stated less appropriate knowledge(P=0.001). Technicians are more concerned than doctors about job displacement (P=0.04). Laboratory professionals that work in laboratories with more than 500 samples per day have a statistically significant more positive attitude toward AI(P=0.03), think that AI would

reduce stress(P=0.019) and costs(P=0.007) and would improve efficiency(P=0.01) more than their colleagues employed in laboratories with less than 500 samples per day. 66% of the survey participants acknowledged an overall positive attitude toward AI and 83.6% expressed interest in attending a training program about AI.

Conclusions: This study highlights an overall positive attitude of laboratory professionals toward AI in laboratory medicine. Education role is pivotal in promoting capacity-building and training programs for laboratory professionals, in order to enhance knowledge and competences in validating, utilizing, evaluating and regulating AI applications in medical laboratories.

Keywords: Artificial Intelligence, Laboratory professionals, Medical laboratories transformation

IS025

PROCALCITONIN AND SERUM AMYLOID A AS BIOMARKERS OF INFLAMMATION AND INFECTION

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Several biomarkers of inflammation and infection are available in clinical practice, which can be used to stratify patients, predict outcome and design therapeutic approaches. Among the different inflammatory markers available, Procalcitonin (PCT) has been recognized as a central biomarker for monitoring infection and inflammation. It has been widely used as a marker for initiating antibiotic use or discontinuing antibiotic administration. Several other biomarkers of inflammation are available among which Serum Amyloid A (SAA) has been suggested as a biomarker of inflammation, being produced by the liver as an acute phase response protein. We analyzed samples from patients hospitalized in the ICU admitted with bacterial infection and initially positive PCT, and evaluated the levels of PCT and SAA at different time points. We also compared the levels of PCT measurement between different vendors to evaluate whether the values obtained can be comparable. The clinical utility of PCT and SAA will be presented in the context of critically ill patients. The comparison between different PCT measurement approaches and efforts to support commutability of PCT measurement will be discussed.

Keywords: PCT, SAA, Sepsis

IS026

REGULATION OF THE WNT/B-CATENIN SIGNALING PATHWAY IN HEPATOCELLULAR CARCINOMA CELLS MEDIATED BY DIACYLGLYCEROL AND CERAMIDE

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Hepatocellular carcinoma (HCC) is closely linked to the aberrant activation of Wnt/β-catenin signaling. The alterations in membrane lipid composition in HCC cells with abnormal Wnt signaling remain poorly understood. In here, we utilized comprehensive lipidome profiling to investigate the membrane lipid composition of different HCC cell lines, each has mutations in components of the Wnt/β-catenin signaling pathway. We identified diacylglycerol (DAG) and ceramide as key differentially regulated lipids that were downregulated at the plasma membrane of HCC cells following Wnt3a treatment. These lipids enhanced Wnt/β-catenin signaling by promoting caveolin-mediated endocytosis of the canonical Wnt receptor complex. In contrast, the depletion of DAG and ceramide led to a suppression of signaling activity and a reduction in caveolin-mediated endocytosis in SNU475 and HepG2 cells. Furthermore, the depletion of DAG and ceramide significantly decreased the proliferation, tumor growth, and *in vivo* migration capacity of SNU475 and HepG2 cells. This study pioneers plasma membrane lipidome profiling in HCC cells, highlighting the remarkable potential of lipids to correct dysregulated signaling pathways in cancer.

ORAL PRESENTATION ABSTRACTS

OP001

EVALUATION OF THE RELATIONSHIP BETWEEN LIPID PROFILE AND INFLAMMATORY PARAMETERS IN PATIENTS WITH ACNE VULGARIS

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Objectives: Acne vulgaris is a skin disease with multifactorial etiopathogenesis. The effect of lipid metabolism on sebum synthesis in the sebaceous glands in the pathogenesis of acne vulgaris is still being investigated. The aim of this study is to investigate the relationship between lipid profile and inflammatory markers in acne vulgaris.

Methods: This study was designed as a retrospective study and the data of individuals who were diagnosed with acne vulgaris (*N: 48*) and healthy individuals without any chronic disease (*N:23*) were obtained from Mardin Training and Research Hospital Dermatology Clinic. Demographic data, lipid profile, and inflammatory parameters were statistically compared between patient and control groups.

Results: TG levels were statistically higher in acne vulgaris patients compared to control group ($p=0.039$) whereas any significance were not observed in terms of CHO, HDL-C, LDL-C, MPV, P-LCR, NLR, PLR, MLR and SII parameters ($p>0.05$). A positive correlation between P-LCR and two lipid profile parameters [CHO ($r=0.399$, $p=0.001$) and HDL-C levels ($r=0.279$, $p=0.022$)] were observed whereas a negative correlation between P-LCR and LDL-C ($r=-0.317$, $p=0.000$) was reported.

Conclusions: In current study, elevated TG levels were observed in patients with acne vulgaris and correlation was reported between P-LCR and lipid profile. Our results are significant as they indicate the need to consider the interaction between lipid profile and inflammation parameters in the treatment approach for patients with acne vulgaris.

Keywords: Acne Vulgaris, Lipid Profile, İnflammatory Parameters

OP002

INVESTIGATION OF KALLISTATIN, VEGF, INFLAMMATORY PARAMETERS, AND OXIDATIVE STRESS PARAMETERS LEVELS IN FIBROMYALGIA PATIENTS

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Objectives: Our aim was to examine Kallistatin, vascular endothelial growth factor (VEGF), inflammatory markers (Interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α)) and oxidative stress markers such as malondialdehyde (MDA), Total Antioxidant Status (TAS), Total Oxidant Status (TOS) levels in patients with Fibromyalgia Syndrome (FMS).

Methods: Our study included 50 patients followed with a diagnosis of FMS (Patient group) and 23 healthy individuals matched for age and gender (Control group). Serum levels of Kallistatin, VEGF, TNF-α, and IL-6 were measured using the ELISA method, while serum TAS and TOS levels were determined using colorimetric methods. MDA levels were assessed using the modified double boiling method by Hammode and colleagues. The Oxidative Stress Index was calculated as TOS/(TAS*100). Data were analyzed using IBM

SPSS version 22.0.

Results: The serum levels of Kallistatin, TNF-α, and IL-6 were statistically significantly higher in the patient groups compared to healthy individuals. Serum TAS levels were statistically significantly decreased in the patient groups compared to healthy individuals, while serum TOS, OSI, and MDA levels showed statistically significant increases. The area under the curve (AUC) was found 0.769 for Kallistatin in patients with FMS in ROC analiysis.

Conclusions: In this study, serum levels of Kallistatin in FMS patients were investigated for the first time in the literature. It can be suggested that Kallistatin is a biomarker playing a role in the pathogenesis of FMS. This study was supported by the Scientific Research Projects Unit of Hatay Mustafa Kemal University under the project number 23.YL.010.

Keywords: Fibromyalgia syndrome, inflammation, kallistatin, oxidative stress

OP003

DIMETHYL FUMARATE AMELIORATES CYCLOPHOSPHAMIDE-INDUCED CYSTITIS IN MICE

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Objectives: Cyclophosphamide (CP)-induced cystitis is a debilitating bladder dysfunction resulting primarily from oxidative damage and inflammation of the bladder tissue. Dimethyl fumarate (DMF) is a fumaric acid ester approved for the treatment of multiple sclerosis due to its anti-oxidant and anti-inflammatory properties. In this study, we aimed to investigate the effect of DMF in CP-induced acute cystitis and the role of oxidative stress and inflammatory response.

Methods: Female Balb/c mice were administrated DMF (100 or 300 mg/kg/day) orally for 5 consecutive days before the single dose of CP (300 mg/kg; intraperitoneally-i.p.) administration. Mesna (2-mercaptoethane sulfonate sodium; 30 mg/kg, i.p.) was administered 20 min before and at 4h, 8h after the CP injection. After 24h of CP injection, bladders were removed for the functional, biochemical and Evans-blue extravasation assays.

Results: CP markedly decreased carbachol-induced contraction of detrusor strips ($p<0.01$), which was prevented by the high-dose DMF (300 mg/kg/day) treatment ($p<0.05$). Total GSH content was decreased ($p<0.01$) whereas TNF-α level was increased ($p<0.05$) in the bladders of the cystitis group. High-dose DMF-treated mice showed an increment in total GSH content ($p<0.05$) without any alterations on TNF-α levels of the bladders compared to the cystitis group. In addition, Evans-blue dye extravasation was greatly increased in the bladders of the cystitis group ($p<0.001$), demonstrating CP-induced bladder inflammation. High-dose DMF treatment effectively reduced the Evans-blue content of the bladders compared to the cystitis group ($p<0.01$).

Conclusions: DMF improved CP-induced acute cystitis by partially suppressing oxidative stress and inflammation.

Keywords: Bladder dysfunction, detrusor, inflammation, mice, oxidative damage

OP004

EVALUATING NON-INVASIVE MARKERS OF INFLAMMATION IN RELATION TO LIVER FIBROSIS AND MODIFIED HISTOLOGICAL ACTIVITY INDEX

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Objectives: This retrospective study aimed to evaluate the relationship between the modified histological activity index (HAI), hepatic fibrosis score (ISHAK), and non-invasive inflammatory markers, including the systemic immune-inflammation index (SII), systemic inflammation response index (SIRI), and aggregate index of systemic inflammation (AISI), in patients undergoing liver biopsy.

Methods: The study analyzed liver biopsy reports from

314 patients at Ankara Training and Research Hospital, documenting HAI, fibrosis scores, and complete blood count results obtained on the same day as the biopsy. Patients were categorized based on HAI [HAI <6 (n=241) and HAI ≥6 (n=73)] and fibrosis scores [fibrosis score <3 (n=225) and ≥3 (n=89)]. Differences in inflammatory markers were assessed using the Mann-Whitney U test, and correlations were evaluated using Spearman's rank correlation coefficient, all performed in SPSS.

Results: The median age of the participants was 41.5 years (range: 15-69), with 51.6% being female and 48.4% male. The findings revealed that patients with higher fibrosis scores had significantly lower SII levels compared to those with lower fibrosis scores (p=0.01). Additionally, a weak but statistically significant negative correlation was identified between fibrosis scores and SII (p=0.02, r=-0.12). No significant differences or correlations were observed for SIRI, AISI, or HAI.

Conclusions: These findings suggest that SII may serve as a potential non-invasive marker for liver fibrosis due to its inverse association with fibrosis scores. However, the weak correlation highlights the need for further research to validate the predictive value of SII.

Keywords: hepatic fibrosis, systemic immune-inflammation index, systemic inflammation response index, aggregate index of systemic inflammation

OP005

INVESTIGATION OF THE SYSTEMIC IMMUNE INFLAMMATION INDEX IN PATIENTS WITH VITAMIN D DEFICIENCY

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Objectives: The aim of the study was to investigate a new marker of inflammation named systemic immune inflammation index (SII) in patients with vitamin D deficiency.

Methods: Serum vitamin D levels of 80 adults who presented to the internal medicine checkup outpatient clinic of our hospital were analyzed retrospectively. Individuals with acute and chronic disorders were excluded from the study. The vitamin D level was regarded as deficient if below 20 ng/mL in patient group who has forty individuals.Forty patients who has optimum serum levels of vitamin D included in the control group. Serum vitamin D levels were measured using the electrochemiluminescence immunoassay method. SII calculation was performed from whole blood count results.

Results: C reaktive protein, neutrophil, platelet, neutrophil-lymphocyte ratio (NLR), platalet-lymphocyte ratio (PLR) and SII values in the patient group were found to be statistically significantly higher than those in the control group. (p=0.049; p=0.012; p=0.045; p=0.002; p=0.045; p=0.001; p<0.05, respectively). There was a negative statistical corelation between vitamin D levels and SII values in patient group. (r=-0.305; p=0.006; p<0.01). The receiver operating characteristic curve analysis was performed for NLR, PLR and SII, the area under the curve (AUC) was found to be AUC: 67.3%, AUC: 63.3% and AUC: 70.9%, respectively.

Conclusions: According the study results ;it was a relationship between vitamin D deficiency and SII which is a systemic inflammation marker .SII was negatively correlated with vitamin D concentrations in patients.

Keywords: Vitamin D deficiency, SII, inflammation

OP006

THE RELATIONSHIP BETWEEN LDL LEVEL AND NETRIN-1 AND METHYLARGININE IN ATHEROSCLEROSIS

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Objectives: Atherosclerosis, a chronic inflammatory disease, and LDL cholesterol levels are thought to have a linear relationship. Netrin-1, a member of the laminin-like protein family, is known to have both pro-atherogenic and anti-inflammatory effects. Methylarginines, known to be effective in the cardiovascular system, were also evaluated to investigate the importance of netrin-1 and methylarginines in the pathogenesis or prediction of atherosclerosis.

Methods: Serum samples were collected from 179 individuals (104 women-%58,1, 75 men-%41,9), 89 (49.7%) with LDL cholesterol levels higher than 190 mg/dl and 90 (50.3%) with LDL cholesterol levels lower than 100 mg/dl. In our study, netrin-1 levels were analyzed by enzyme-linked immunosorbent assay (ELISA) and methyl arginine levels were analyzed by liquid chromatography-mass spectrometry (LC-MS/MS).

Results: Netrin-1 levels were significantly lower in those with LDL levels above 190 mg/dl compared to those below 100 mg/dl (596.93 [IQR, 436 – 771.29] vs. 700.16 [IQR, 508.07 – 960.52], p=.029). Methylarginine levels were significantly lower in those with LDL above 190 mg/dl than those below 100 mg/dl.

Conclusions: The fact that netrin-1 levels were lower in individuals with LDL cholesterol levels above 190 mg/dl compared to those with LDL cholesterol levels below 100 mg/dl can be explained by the fact that netrin-1 is lower in individuals with subclinical atherosclerosis than those without atherosclerosis. The lower levels of methylarginine in individuals with high LDL cholesterol may be related to the fact that the individuals have not been diagnosed with atherosclerosis, have not used cholesterol medication, and have no additional diseases.

Keywords: Atherosclerosis, methylarginine, netrin-1, ldl cholesterol

OP007

ASSOCIATION BETWEEN LYMPHOCYTE-C-REACTIVE PROTEIN RATIO AND HYPOTHYROIDISM

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Objectives: C-reactive protein (CRP) is one of the most commonly used acute phase reactants. Lymphocyte/CRP ratio (LCR) is a new inflammatory marker that has been associated with many pathologic conditions. In our study, we aimed to investigate whether there is a significant difference between the LCR levels of hypothyroid patients and healthy individuals.

Methods: In this retrospective study, age, gender, complete blood count, C-RP, thyroid stimulating hormone (TSH), free T3, free T4, LCR and neutrophil to lymphocyte ratio (NLR) parameters were evaluated in 91 hypothyroid (TSH > 4.2 µIU/ml) and 91 healthy subjects (TSH 0.27-4.2 µIU/ml) aged 18-80 years. SPSS version 27.0.1.0 was used for statistical analysis.

Results: LCR and lymphocyte were significantly lower, whereas CRP, neutrophil and NLR parameters were significantly higher in the hypothyroidism group. Receiver operating characteristic (ROC) analysis revealed that LCR and NLR values were significant in the diagnosis of hypothyroidism. In multivariate binary logistic regression analysis, the odds ratio for LCR (95% CI): 34.1 (12.3 – 103.7) (p <0,001) was significant.

Conclusions: In our study, low LCR value in hypothyroid patients was shown to have higher specificity and sensitivity than NLR value, which was successful in predicting many pathologic conditions in previous studies. In statistical analyses, LCR was found to be a better predictive parameter than NLR. In cases where thyroid function tests cannot be measured, a low LCR value can be used as a biomarker to predict hypothyroidism. Multicenter and larger population studies may reveal this important result of our study more clearly.

Keywords: Hypothyroidism, lymphocyteCRP ratio, LCR, neutrophillymphocyte ratio

OP008

EVALUATION OF THE UTILITY OF AST/ALT RATIO IN THE DIAGNOSIS OF ACUTE APPENDICITIS

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Objectives: The AST/ALT ratio has been associated with many diseases as an inflammatory marker. This study investigated the usefulness of the AST/ALT ratio in the diagnosis of acute appendicitis.

Methods: Our study is a retrospective chart review. During the 3-month period from January to April 2024, 118 patients who underwent surgery with a definite pathologic diagnosis of acute appendicitis were included in the study. A control group of 110 healthy individuals of similar age and sex was included. AST, ALT and calculated AST/ALT ratio of both groups were statistically compared.

Results: Of the 228 patients enrolled, 66.1% (n=78) of patients in the appendicitis group and 59.1% (n=65) of patients in the normal group were male, with no significant difference between the groups (p=0.274). The mean age was 26.1±19.4 years in the appendicitis group and 23.3±2.4 years in the normal group (p=0.083). AST levels were significantly higher in appendicitis groups than in normal groups (39.8±157.7 vs. 20.8±6.1; p<0.001), whereas ALT levels showed no statistical difference between groups (19.7±14.8 vs. 20.4±10.4 p=0.180). The calculated AST/ALT ratio was higher in the appendicitis group than in the control group (3.11±16.87 vs. 1.20±0.46) and a significant difference was found between the groups (p<0.001). According to ROC analysis, the area under the curve (AUC) was 0.689 (95%CI: 0.620-0.758). The cut-off value for the AST/ALT ratio was 1.47 with a sensitivity of 55.9% and specificity of 76.4%.

Conclusions: The AST/ALT ratio may be a promising biomarker for the diagnosis of acute appendicitis.

Keywords: AST/ALT ratio, appendicitis, biomarker, biochemistry

OP010

INVESTIGATION OF CALLISTATIN, INFLAMMATORY AND OXIDATIVE STRESS MARKERS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Objectives: The aim of this study was to investigate kallistatin, vascular endothelial growth factor (VEGF), interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF-α), malondialdehyde (MDA), catalase (CAT) and superoxide dismutase (SOD) levels in patients with SLE.

Methods: Three groups were formed for the study; the control group (n=28), the SLE group without organ involvement (n=30) and the SLE group with organ involvement (n=30). Serum kallistatin, VEGF, TNF-α and IL-6 levels were studied by the ELISA method, serum CAT and SOD levels by the colorimetric method.

Results: The serum levels of kallistatin, TNF-α, IL-6, VEGF and MDA levels were statistically significantly higher in patient groups compared to control group. SOD and CAT enzyme activity levels were significantly decreased in patient groups compared to healthy individuals. In addition, a low positive correlation was found between serum VEGF and MDA and IL-6, a moderate positive correlation with kallistatin, a low negative correlation with SOD, and a low and moderate negative correlation with CAT. A low to moderate negative correlation was observed between serum kallistatin and CAT.

Conclusions: Serum kallistatin levels in patients with SLE were studied for the first time in the literature. It can be argued that kallistatin may play a role in the pathogenesis of SLE in relation to inflammation and oxidative stress. This study was supported by Hatay MKU BAP Coordination Office (Project no:22. YL.031).

Keywords: Systemic lupus erythematosus, kallistatin, inflammation, oxidative stress

OP011

INVESTIGATION OF VEGF, IL-6, TNF-ALPHA, KALLISTATIN AND OXIDATIVE STRESS PARAMETERS LEVELS IN RHEUMATOID ARTHRITIS PATIENTS

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Objectives: The aim of this study was to measure serum Kallistatin, vascular endothelial growth factor (VEGF), Interleukin-6 (IL-6) and tumor Fecrosis Factor-alpha (TNF-α), malondialdehyde (MDA), Total Antioxidant Status (TAS) and Total Oxidant Status (TOS) levels in patients with Rheumatoid Arthritis (RA).

Methods: The study group was formed into three groups: 25 remission RA patients, 25 RA patients with low disease activity, and 30 RA patients with moderate-severe disease activity. In addition, 25 healthy individuals, age and gender match with the patient groups, were included as a control group. Serum IL-6, TNF-α, kallistatin, VEGF levels were studied by ELISA method, and serum TAS and TOS levels were studied by colorimetric procedures. Oxidative Stress Index was calculated as TOS/TAS*100.

Results: Kallistatin were statistically significantly higher in the low and moderate-severe activity groups compared to the control groups, as well as between the remission and moderate to severe groups. VEGF, TOS, OSI, MDA, CRP, and sedimentation levels were significantly higher in the moderate to severe groups compared to the other study groups. A low to moderate positive correlation has been found between kallistatin and IL-6, TNF-α, TOS, OSI, MDA, CRP, and sedimentation. The area under the curve (AUC) was found 0.818 for Kallistatin in patients with RA in ROC analiysis.

Conclusions: It can be suggested that Kallistatin is a marker that functions through inflammatory and oxidative pathways in the pathogenesis of RA. This study was supported by the Scientific Research Projects Unit of Hatay Mustafa Kemal University (23.YL.009).

Keywords: Rheumatoid arthritis, oxidative stress, pathogenesis, inflammation

OP012

EVALUATION OF SYSTEMIC INFLAMMATORY MARKERS IN PATIENTS WITH DEMENTIA

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Objectives: Alzheimer's disease (AD) is a neurodegenerative disease with multifactorial etiology, characterized by irreversible loss of cognitive functions. Inflammatory markers are often elevated in patients with dementia, including AD. However, whether inflammatory markers are associated with the risk of developing dementia remains unclear. The aim of this study was to evaluate systemic inflammatory markers in patients with dementia.

Methods: Eighty dementia patients and fifty-four age-matched healty controls subjects who applied to Lokman Hekim University Akay Hospital Neurology

outpatient clinic were retrospectively examined. Demographic, clinical and laboratory characteristics of dementia patients and healthy controls were evaluated. $p<0.05$ were considered statistically significant.

Results: Dementia patients and healthy controls did not differ significantly in age, smoking and body mass index ($p>0.05$). There was a family history of dementia in 53% of patients. In addition, 54% of patients with dementia had mild dementia, while 46% had moderate dementia. When the dementia group was compared with healthy controls, it was observed that C-reactive protein (CRP), neutrophil and neutrophil lymphocyte ratio (NLR) were increased in dementia patients ($p<0.05$).

Conclusions: These results suggest features of a persistent inflammatory process in patients with dementia. It was concluded that CRP and NLR, may be a useful clinical markers of inflammation for dementia patients.

This study was approved by the Lokman Hekim University Scientific Research Ethics Committee (code number: 2024224).

Keywords: Dementia, inflammation, Alzheimers disease, C-reactive protein, neutrophil lymphocyte ratio

OP013

PROTECTIVE EFFECT OF VITAMIN E AGAINST 5-HMF-INDUCED TOXICITY IN BREAST CANCER CELLS

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Objectives: Intravenous or oral consumption of 5-HMF poses significant health risks, including neurotoxicity, hepatotoxicity, nephrotoxicity, and gastric toxicity. This study aims to induce 5-HMF toxicity in breast cancer cell lines and evaluate the protective effects of Vitamin E.

Methods: MCF-7, MDA-MB-231, and BEAS-2B cells were cultured under appropriate conditions, and the Sulforhodamine B (SRB) colorimetric assay was used to assess the effects of different doses of 5-HMF and 5-HMF combined with Vitamin E on the cells. To evaluate the impact of Vitamin E on 5-HMF-induced toxicity, the cells were treated with varying doses of Vitamin E (400-50 µM) alongside the IC50 concentrations of 5-HMF. Total antioxidant status (TAS) and total oxidant status (TOS) were measured in cell lysates from the treatment groups using a commercial kit from Rel Assay.

Results: Due to the significant viability effect of Vitamin E in MCF-7 cells, the lowest effective dose of Vitamin E was determined to be 100 µM. MDA-MB-231 cells showed no changes in viability upon Vitamin E exposure. However, when comparing TAS/TOS results, an increase in oxidant levels was observed in MDA-MB-231 cells exposed to 5-HMF compared to the control. Additionally, a decrease in oxidant levels and an increase in antioxidant levels were observed in the 5-HMF + Vitamin E treatment group compared to the 5-HMF treatment group.

Conclusions: Experimental research has demonstrated that 5-HMF directly induces oxidative stress in MDA-MB-231 cells, and the increased antioxidant capacity following vitamin E treatment highlights its protective effect on these cells.

Keywords: 5-HMF, oxidative stress, antioxidant, breast cancer, vitamin E

OP014

ALTERATIONS IN METHYLARGININE DERİVATIVES AND RELATED METABOLITES IN TYPE 2 DIABETES MELLITUS WITH DYSREGULATED LIPID PROFILE

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Objectives: Asymmetric dimethylarginine is an endogenous competitive inhibitor of nitric oxide synthase and a marker of endothelial dysfunction. Derivatives of methylarginine, including asymmetric dimethyl arginine (ADMA), L-N monomethyl arginine (L-NMMA), and symmetric dimethyl arginine (SDMA) directly or indirectly reduce nitric oxide production. Type 2 diabetes mellitus (T2DM) is an expanding global health problem. This study aimed to measure serum levels of methylarginine derivatives and related metabolites in T2DM patients with dysregulated lipid profiles and compare them with healthy controls.

Methods: This study enrolled 80 patients, 40 with hyperlipidemia, 40 with average lipid profile, and 40 healthy in the control group. Serum ADMA, SDMA, L-NMMA, arginine, homoarginine, citrulline, and ornithine levels were measured with tandem mass spectrometry.

Results: Serum ADMA, SDMA, L-NMMA, citrulline, and ornithine levels were statistically significantly higher in T2DM with hyperlipidemia compared with the control group ($p<0.05$), while serum homoarginine and ornithine levels were statistically significantly lower ($p<0.05$). In contrast, serum arginine, homoarginine, and citrulline levels were statistically significantly lower in T2DM with an average lipid profile compared to the control group ($p<0.05$).

Conclusions: Higher plasma levels of ADMA and SDMA may be a novel and potent predictor of the progression of atherosclerosis in type 2 diabetic patients. These findings suggest that alterations in serum levels of these biomarkers are associated with T2DM and are influenced by the lipid profile status, highlighting the potential impact of lipid metabolism on amino acid and nitric oxide pathways in T2DM.

Keywords: Hyperlipidemia, LC-MSMS, Methylarginine, Nitric Oxide Pathway, Type 2 Diabetes Mellitus

OP015

THE ROLE OF TOTAL ANTIOXIDANT AND OXIDANT STATUS IN RHEUMATOID ARTHRITIS AND SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS: RELATIONSHIP WITH OXIDATIVE STRESS

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Objectives: Rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE) are both autoimmune diseases. Complications of these diseases may be a result of oxidative stress. Studies have shown that RA and SLE patients have high levels of total oxidants status (TOS) and low levels of total antioxidants status (TAS). The aim of this study was to investigate the levels of oxidative stress in the RA and SLE group.

Methods: The study included 51 RA patients, 33 SLE patients and 52 healthy controls. TAS levels were analysed by a method based on the bleaching of ABTS molecules, while TOS levels were analysed by a method based on the formation of a coloured complex of iron ion with xylenol orange. The Kruskal-Wallis test was used to compare the 3 groups.

Results: While albumin, C-reactive protein (CRP), erythrocyte sedimentation rate and glomerular filtration rate (eGFR) showed a statistically significant difference between groups ($p<0.05$), alanine aminotransferase (ALT), aspartate aminotransferase (AST) and creatinine levels did not show a significant difference. TOS levels were higher in the RA and SLE groups than in the control group, with a statistically significant diffe-

rence (p<0.001), while TAS levels were lower in the RA and SLE groups than in the control group, but there was no statistically significant difference (p=0.373).

Conclusions: Imbalance of TAS and TOS in RA and SLE may lead to increased inflammation, accelerated cell damage and disease exacerbation. Reducing oxidative stress may be potentially beneficial in the management of RA and SLE. Antioxidant therapies or lifestyle changes should be investigated in this regard.

Keywords: Total oxidant status, total antioxidant status, rheumatoid arthritis, systemic lupus erythematosus, oxidative stress

OP016

INVESTIGATION OF ANTIOXIDANT EFFECT OF BERBERINE ON METHOTREXATE-INDUCED OVARIAN DAMAGE IN EXPERIMENTAL RAT MODEL

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Objectives: Research on use of natural active substances against the side effects of chemotherapeutics used in cancer therapy on tissues in the clinic remains up-to-date. In this study, it was aimed to investigate the antioxidant effect of the phenolic compound Berberine (BBR) against ovarian damage caused by the chemotherapeutic agent methotrexate (MTX), which reduces the quality of life with its cytotoxic function.

Methods:250-300 g Wistar albino 30 female rats were divided into 5 groups with 6 rats in each group. Control, MTX, MTX + BBR (1 and 2 mg/kg), BBR (2 mg/kg). MTX was administered intraperitoneally at a dose of 20 mg/kg on the first day, followed by three consecutive BBR injections in the treatment groups. On the 5th day, ovarian tissues removed from decapitated rats were biochemically analysed for MDA, TOS, OSI and TAS levels to evaluate MTX-induced oxidative damage and anti-oxidant effect of BBR.

Results: In the study, the decreases in MDA, TOS and OSI levels in the BBR treatment groups, which increased in the MTX group compared to the control group, were found to be statistically significant (p<0.05). In addition, it was determined that TAS levels, which decreased in the MTX group compared to the control group, increased significantly in the BBR-applied groups (p<0.05).

Conclusions: Dose-dependent treatments of BBR after MTX administration ameliorated MTX-induced ovotoxicity through reducing oxidative damage and increasing antioxidant levels. All these findings provided strong evidence supporting the hypothesis that BBR treatment may have therapeutic effects against MTX-induced ovarian damage.

Keywords: Berberine, Chemotherapeutics, Natural products, Oxidative stress

OP017

THE IMPACT OF 3D CO-CULTURE SCAFFOLDS ON THE CELL GROWTH BEHAVIOR ASSOCIATED WİTH OXIDATIVE STRESS METABOLISM

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Objectives: 3D culture models have become more favored than 2D models since they often fail to study tissues' physiological and pathological processes and effectively replicate the intricate 3D tissue structure. Thus, this study evaluated a 3D-engineered neural co-culture model to test cell behavior for up to 7 days through oxidative stress, pentose phosphate pathway, trace element, and mineral metabolism.

Methods: Co-culture has been established with human umbilical cord vein endothelial cells (HUVECs) and neuroblastoma (SH-SY5Y) cell lines by encapsulating them in gelatin methacrylate (GelMA). Cell viability was assessed via 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide assay (MTT) assay. Oxidative stress and pentose phosphate pathway were evaluated over antioxidant enzyme activities spectrophotometrically. The cells ' trace elements and mineral levels were measured via Inductively Coupled

Plasma Mass Spectrometry (ICP-MS). The formation of the 3D co-culture microenvironment was examined through immunostaining. The development of the mimicking tissues was tracked by comparing the DAPI color contrast across all cell types from days 0 to 7.

Results: According to the cell viability assays, the 3D microenvironment did not show any toxic effects on the cell lines. Antioxidant, pentose phosphate, trace element, and mineral metabolism have not been adversely affected by the custom-built 3D co-culture system for up to 7 days. The successful and non-toxic co-culture environment between HUVEC and SH-SY5Y cells has been confirmed via immunostaining.

Conclusions: Our non-toxic 3D co-culture model enables researchers to successfully investigate cell-cell and cell-extracellular environment interactions for up to 7 days.

Keywords: 3D co-culture model, oxidative stress metabolism, trace elements and mineral metabolism

OP018

EFFECT OF BORIC ACID ON TELOMERASE ENZYME IN STREPTOZOTOCIN-TREATED RATS

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Objectives: Telomerase is a ribonucleoprotein enzyme that slows down cellular aging by protecting chromosomal ends. This study aims to investigate the effects of boric acid and telomerase levels in streptozotocin (STZ)-treated rats. STZ damages pancreatic β-cells, leading to diabetes and subsequent complications; one of the most common of these is kidney damage.

Methods: Considering the antioxidant effects of boric acid, its impact on telomerase was evaluated. Four groups were established for the study: Control, STZ, Boric Acid, and STZ+Boric Acid. Telomerase were measured using an ELISA kit. The study was conducted in accordance with the decision 2022/01-10 of the Çanakkale Onsekiz Mart University Animal Experiments Local Ethics Committee.

Results: A statistically significant difference in telomerase was observed between the STZ and Boric Acid groups ($p<0.05$). The co-treatment with Boric Acid (STZ+Boric Acid) resulted in a numerical increase in telomerase levels compared to the STZ group. The telomerase levels (mean ± SD) were as follows: Control: 1.23 ± 0.08, Boric Acid: 1.28 ± 0.05, STZ: 1.15 ± 0.06, and STZ+Boric Acid: 1.21 ± 0.07.

Conclusions: These findings suggest that Boric Acid may have a potential modulatory effect on the telomerase enzyme.

Keywords: Telomerase, Boric Acid, Streptozotocin, Kidney, ELISA

OP019

THE PREVALENCE OF MACROPROLACTIN IN PATIENTS WITH HYPERPROLACTINEMIA

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Objectives: Macroprolactin is a large molecular form of the prolactin hormone that does not cause clinical symptoms, resulting in a condition known as asymptomatic hyperprolactinemia. Given the importance of accurately assessing macroprolactin levels, this study aimed to determine the prevalence of macroprolactin.

Methods: This retrospective study was conducted on 372 macroprolactin tests performed at the Medical Biochemistry Laboratory of İzmir City Hospital between October 2023 and August 2024. The test results were evaluated by precipitating serum samples with Polyethylene Glycol to determine macroprolactin concentration, and recovery rates were assessed. Results were analyzed for the presence of true macroprolactin and examined in proportion to macroprolactin testing requests.

Results: Macroprolactin was detected in 29 (7.8%) of the patients who underwent macroprolactin testing (recovery rate: <40%). Among these individuals, 4 were male and 25 were female, with a mean age of 35 (21-56). The majority of macroprolactin test requests (98%) were referred from the Endocrinology Clinic. Additionally, 62 (16.7%) of these patients were classified in the gray zone (recovery rate: 40-60%). The remaining 281 had normal prolactin levels (recovery rate: >60%), with no evidence of macroprolactin.

Conclusions: Although the prevalence of macroprolactinemia was found to be low in our study, awareness of macroprolactinemia can aid in identifying the etiology in patients with idiopathic hyperprolactinemia, potentially reducing the need for extensive testing and pituitary imaging in certain cases. The widespread use of macroprolactin testing as a reflex test in clinical laboratories for patients with hyperprolactinemia will support accurate diagnosis and treatment processes.

Keywords: Polyethylene glycol, Endocrinology, Hyperprolactinemia, Pituitary gland

OP020

ASSOCIATION OF FIVE INSULIN RESISTANCE INDICES WITH HBA1C IN PRE-DIABETIC AND TYPE 2 DIABETES MELLITUS PATIENTS

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Objectives: The aim of this study was to investigate the association of TyG Index, HOMA-IR, TG/HDL, QUICKI and ISI parameters with HbA1c in pre-diabetic and type 2 diabetes mellitus patients and to determine which one better reflects the course of diabetes.

Methods: We have gathered 236 patients whose HbA1c levels were higher than 5.7% by examining patient files and laboratory information system records. We have divided the patients into three groups according to their HbA1c levels: patients with 5.7-6.4% HbA1c levels were definied as pre-diabetic, between 6.5%-7% as regulated type 2 DM, and those who had HbA1c levels higher than 7% were defined as non-regulated type 2 DM. Biochemical parameters were measured while HOMA-IR, QUICKI, ISI, TG/HDL and TyG index were calculated using formula. Each parameter was correlated with HbA1c and receiver operating characteristic (ROC) analysis was performed.

Results: HOMA-IR and TyG index were significantly higher in the non-regulated group than in the pre-diabetic and regulated groups, while QUICKI was lower ($p<0.017$). TyG index ($r=0.547$, $p<0.001$) and HOMA-IR ($r=0.456$, $p<0.001$) were significantly correlated with HbA1c. ROC analysis showed that TyG had a maximum area under the curve of 0.749 (0.705-0.789).

Conclusions: Both HOMA-IR and TyG index were positively, QUICKI was negatively correlated with HbA1c. However, TyG index's correlation coefficent and AUC values were slightly better than HOMA-IR. Hence, among other parameters TyG index can be used as a helpful tool like HOMA-IR to assess the presence of diabetes and glycemic control in patients with diabetes.

Keywords: Type 2 diabetes mellitus, insulin resistance, HbA1c, triglyceride

OP021

RELATIONSHIP BETWEEN THYROID FUNCTION TESTS AND ERYTHROCYTE MEMBRANE FATTY ACIDS IN HASHIMOTO THYROIDITIS

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Objectives: The aim of this study is to investigate the autoantibody levels and erythrocyte membrane fatty acids in patients with Hashimoto thyroiditis compared to control group. The potential effects of the erythrocyte membrane fatty acids on the pathogenesis of the Hashimoto thyroiditis were analyzed.

Methods: The study included 63 female Hashimoto thyroiditis patients aged (47 ± 10) and 33 healthy female control group aged (46 ± 11). Demographic characteristics, body mass index (BMI), thyroid function tests (TSH, sT4, sT3, anti-TPO), erythrocyte membrane fatty acids (heptadecanoic acid, stearic acid myristic acid, arachidonic acid, DHA, EPA) were analyzed.

Results: BMI values were significantly higher in the patient group compared to the control group ($p<0.001$). Anti-TPO autoantibody levels were significantly elevated in the patient group ($p<0.001$). Analysis of erythrocyte membrane fatty acids revealed that heptadecanoic acid, stearic acid, arachidonic acid and DHA levels were significantly higher in the patient group compared to the controls ($p<0.05$), while myristic acid levels were lower ($p<0.001$).

Conclusions: Elevated autoimmune antibody levels and alterations in fatty acid profiles may profoundly impact the metabolic and inflammatory processes in thyroid disease. These differences offer important insights for developing new strategies in the clinical management of the disease.

Keywords: Hashimoto thyroiditis, erythrocyte membrane fatty acids, thyroid function tests

OP022

INVESTIGATION OF THE RELATIONSHIP BETWEEN SERUM OXYTOCIN LEVELS AND COGNITIVE FUNCTIONS IN PATIENTS DIAGNOSED WITH SCHIZOPHRENIA

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Objectives: Schizophrenia is a severe mental illness that impairs functionality. Oxytocin, a neuropeptide, is believed to play a role in the etiology and symptomatology of schizophrenia. This study aims to examine changes in serum oxytocin levels and their association with cognitive function improvement during psychotic episodes and following antipsychotic treatment in patients with schizophrenia.

Methods: Our study involved 51 male patients with schizophrenia during acute psychotic episodes and 41 male voluntary controls without any psychiatric diagnosis. Venous blood samples were collected from controls and patients before and after treatment to measure serum oxytocin levels, which were assessed immunochemically using the ELISA method. Patients were also evaluated using the Positive and Negative Syndrome Scale (PANSS), the Cognitive Assessment Interview (CAI), the Global Assessment of Functioning (GAF), and the Reading the Mind in the Eyes Test (RMET).

Results: During psychotic episodes, patients exhibited significantly lower serum oxytocin levels (143.94±104.88 pg/ml) compared to the control group (254.12±152.58 pg/ml) ($p<0.001$). An inverse relationship was observed between serum oxytocin levels and theory of mind impairment ($p<0.05$), while no significant relationship was found with neurocognitive function impairment ($p>0.05$). Patients who responded to antipsychotic treatment (n=33) showed significant improvements in the theory of mind and neurocognitive functions, which were statistically associated with increased serum oxytocin levels ($p<0.05$).

Conclusions: The oxytocinergic system may be a mechanism underlying schizophrenia. Individual variability in oxytocinergic system reactivity could also influence the therapeutic efficacy of antipsychotic treatment in patients with schizophrenia. Further research is required to elucidate these mechanisms and their implications for treatment.

Keywords: Schizophrenia, Oxytocin, Cognitive Functions

OP024

THE IMPACT OF LEUKOCYTE REDUCTION TIME, RBCs STORAGE TIME, AND CYTOKINE LEVELS ON FEBRILE NON-HEMOLYTIC TRANSFUSION REACTIONS

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Objectives: This study aimed to investigate the relationship between febrile non-hemolytic transfusion reaction (FNHTR) and leukocyte reduction (LR) time (LR-T), RBCs storage time (RBCs-ST), and plasma cytokine levels (TNF-α, IL-1β, IL-1α, IFN-γ, IL-10, and IL-6).

Methods: 40 patients who developed FNHTR after erythrocyte suspension (ES) transfusion and 60 patients without FNHTR were included as the control group. Blood samples were collected before (pre-LR) and after (post-LR), and after transfusion (post-TR) during the preparation of the ES component, and the plasma was stored at -80°C. Cytokine levels in these plasmas were measured using the ELISA method. LR-T and RBCs-ST data were also recorded.

Results: LR-T and RBCs-ST were found to be longer in the FNHTR group compared to the control group (174±69 vs. 138±41 min and 7.65±5.85 vs. 5.66±3.44 days, respectively; $p<0.05$). In the FNHTR group, pre-LR, post-LR, and post-TR plasma IFN-γ levels increased gradually and were found to be higher than in the control group (10.13±2.47 vs. 7.19±2.67, 17.46±3.81 vs. 7.60±3.41, and 22.21±13.50 vs. 6.42±3.34, respectively; $p<0.001$). The post-LR and post-TR plasma IL-10 levels in the FNHTR group were higher than in the control group (14.19±3.12 vs. 8.26±3.89 and 16.13(7.52-88.32) vs. 7.26(2.09-19.05), respectively; $p<0.001$). ROC analysis revealed that the sum of sensitivity and specificity of both post-LR and post-TR plasma IFN-γ testing was >170 (AUC>0.90, $p<0.0001$).

Conclusions: The febrile reaction observed in FNHTR is associated with IFN-γ and IL-10 levels, which are dependent on LR-T and RBCs-ST, and they can be used as predictive markers for FNHTR.

Keywords: Febrile Non-Hemolytic Transfusion Reaction, Leukocyte reduction time, RBCs storage time, Interferon-gamma, Interleukin-10

OP025

ANALYSIS OF TMAO LEVELS AT MYELOPROLIFERATIVE DISORDERS: POSSIBLE CONNECTIONS

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Objectives: Essential Thrombocytosis (ET) and Polycythemia Vera (PV) are two myeloproliferative neoplasms that share a common characteristic of increased platelet and red blood cell production, respectively. These disorders are characterized by complex pathophysiological mechanisms, often involving dysregulation of signaling pathways and transcriptional factors that govern hematopoietic stem cell differentiation and proliferation. In this study, we aimed to provide an analysis of the connection between the Trimetil Amin n-Oxide (TMAO) levels and JAK/CALR mutations in patients with PV and ET.

Methods: We analyzed the samples who applied to the Hematology Outpatient Clinic at Selcuk University Medical Faculty. The samples were analyzed with LC-MS/MS technique, and other data was retrospectively collected with HIMS. Statistical analyses were made by SPSS v27. Shapiro Wilk, Kruskal Willis, and Mann Whitney U tests were used for parametric-non-parametric distinction and comparison of the groups.

Results: Patients groups (n=80) exhibited significantly higher TMAO levels compared to the control group (n=45) (median values were 550 ng/mL (46,40-2250) for PV and 535 ng/mL (102-2610) for ET and 381 ng/mL (6,99-2590), $p<0,05$). Also, in the JAK+ (n=42) patients, TMAO levels were slightly lower (489 ng/mL (46,4-2250) than JAK- patients (n=38) (650 ng/

mL (102-2610) respectively). In CALR+ patients (n=8), TMAO levels were higher (893 ng/mL (128-2610)) compared to CALR- group (n=72) (535 ng/mL (46,4-2250).

Conclusions: Current knowledge shows that PV occurs through the transformation seen in ET patients. TMAO, an inflammatory microbiota product that can also lead to cardiovascular diseases, may play a role in this transformation. Further studies in this area can shed light on the subject.

Keywords: Myeloproliferative Disorders, TMAO, LC-MSMS, chromatograpy, Inflammation

OP026

ANTIMICROBIAL ACTIVITY OF APHERESIS THROMBOCYTE SUSPENSION

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Objectives:The aim of our study is to investigate the antibacterial activity of apheresis thrombocyte suspension (ATS) against *Staphylococcus aureus*, *Enterococcus faecalis*, *Pseudomonas aeruginosa*, and *Escherichia coli* strains. Although there are studies in the literature regarding the antibacterial activity of platelet-rich plasma, our study is the first to investigate the antibacterial activity of platelets in ATS which is obtained from well known therapeutic procedure.

Methods: ATS samples obtained from six healthy volunteers that are sent to the laboratory for routine quality control testing are used in this study. Complete blood count parameters of the apheresis products are measured using the Mindray BC-6800 hematology analyzer. The antimicrobial activity of the apheresis products is tested against the ATCC standard strains of *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Enterococcus faecalis* using the well diffusion method. Chlorhexidine gluconate %2 was used as a positive control.

Results:In the experiments with *Pseudomonas aeruginosa*, the zone diameter around the chlorhexidine gluconate was found to be 16–17 mm, while the zone diameters in platelet suspensions with various dilutions range from 9 to 13 mm. A variable zone diameter was observed depending on serial dilutions. In the experiments with *Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, and Enterococcus faecalis*, no inhibition zones were observed in the ATS dilutions.

Conclusions: Among the bacterial groups tested, the ATS product demonstrated antibacterial activity only against *Pseudomonas aeruginosa*. This is the first study that used ATS, leukocyte free blood component, in order to observe the antibacterial activity of platelets.

Keywords: Well diffusion, apheresis thrombocyte suspension, antimicrobial activity

OP027

THE CONTRIBUTION OF FLOW CYTOMETRY IN DIFFUSE LARGE B CELL LYMPHOMA (DLBCL): A CASE REPORT

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Objectives: Diffuse large B cell lymphoma (DLBCL) is the most common form of non-Hodgkin's lymphoma, accounting for approximately 30% of cases. This lymphoma exhibits considerable heterogeneity in clinical presentation, morphology, and molecular and cytogenetic characteristics. Flow cytometry (FC) is a rapid and reliable technique for characterizing lymphoid cell populations and related diseases.

Methods: An 80-year-old male presented with a neck mass to Etlik City Hospital. PET/CT imaging from an external facility revealed high FDG uptake (SUVmax: 36.1) in the mass. Nasopharynx punch biopsy results were consistent with large B-cell lymphoma, classified as non-germinal center phenotype according to

Hans classification. The neoplastic cells were positive for CD20, Bcl-2, Bcl-6, Mum-1, and cMYC, and negative for CD10, CD5, cyclin-D1, CD30, and TdT. Flow cytometric analysis of a bone marrow sample was performed to support the diagnosis.

Results: Flow cytometric analysis revealed that 35% of lymphocytes were CD19+ with monoclonal kappa light chain. The atypical CD19+ cells were also positive for CD20, CD22, FMC7, CD81, and cyBCL-2. The immunophenotypic profile suggested a CD5 negative, CD10 negative B-lymphoproliferative disorder. The findings from flow cytometry were consistent with the histopathological results, corroborating the diagnosis.

Conclusions: While histological examination remains the gold standard for lymphoma diagnosis, FC is a valuable tool that enhances and expedites the diagnostic process, making it faster and more cost-effective. FC provides essential early diagnostic clues and is instrumental in identifying key antigens such as CD19, CD10, CD5, CD20 and cyBCL-2 in B cell malignancies.

Keywords: Diffuse large B cell lymphoma, flow cytometry

OP028

INVESTIGATING IMMUNE RESPONSE MECHANISMS IN HIV ELITE CONTROLLERS

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Objectives: This research aims to advance our understanding of the immune response mechanisms in HIV elite controllers and translate these insights into actionable strategies for clinical practice and public health.

Methods: The proposed research will adopt a multi-faceted methodology: 1. Systematic Literature Review: Conduct a comprehensive review of recent research on the immune response mechanisms in HIV elite controllers – focusing on immune responses, viral evasion mechanisms, and immune dysfunction – to identify key insight and knowledge gaps. 2. Data Analysis: Utilize advanced statistical methods to analyze available datasets and clinical data on elite controllers, identifying patterns in immune profiles, disease progression, and treatment outcome. 3. Clinical Research Collaboration: Possibly partner with institutions conducting studies on immune dysfunction in elite controllers, focusing on the impact of new biomarkers on disease progression and treatment responses. 4. Computational Modeling: Apply computational models to simulate immune responses and predict outcomes based on different treatment scenarios and patient profiles. 5. Epidemiological Studies: Use advanced epidemiological techniques to examine population-level trends and demographic factors influencing HIV transmission and progression 6. Translational Research: Translate recent research findings into actionable insights for clinical practice and public health, developing predictive models, identifying therapeutic targets, and contributing to innovative strategies for HIV prevention and treatment.

Conclusions: In conclusion, these insights will guide efforts to improve patient outcomes and inform strategies for controlling the spread of HIV/AIDS, highlighting the importance of continued research in this vital area. Through its multi-dimensional analysis, this research aspires to make meaningful contributions to the global fight against HIV/AID

Keywords: Elite controllers, immune pathways, ART

OP030

VIRAL HEPATITIS IN HAEMODIALYSIS PATIENTS AND RELATIONSHIP WITH LABORATORY TESTS

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Objectives: Hemodialysis poses a significant public health issue in managing viral hepatitis infections. This study aims to assess the prevalence of Hepatitis B (HBV), Hepatitis C (HCV), and HBV/HCV co-infection in hemodialysis patients and their relationship with laboratory tests.

Methods: A prospective, single-center study at a tertiary university hospital, included adult hemodialysis patients (age >18 years) on dialysis for over six months from January 2014. Patients with other non-infection chronic liver diseases were excluded. Testing for anti-HCV antibodies and hepatitis B surface antigen (HBsAg) was performed using chemiluminescent microparticle immunoassays (CMIA).

Results: Out of 104 patients with a mean age of 55.1 ± 11.5 years, HBV infection was present in 8 patients (7.7%), HCV in 39 patients (37.5%) and co-infection with HBV and HCV in 4 patients (3.8%). Liver function tests revealed significantly higher levels in infected patients {AST (32 ± 21 vs. 15 ± 10, p<0.001) and ALT (43 ± 21 vs. 17 ± 13, p<0.001)} , alongside lower levels of serum albumin (3.9 ± 0.4 vs. 4.1 ± 0.2, p=0.03) and total cholesterol (158 ± 38 vs. 183 ± 39, p =0.02). The inflammatory marker C-reactive protein was also elevated in infected patients (4.3 ± 3.4 vs. 3.0 ± 3.1, p value =0.05).

Conclusions: Hemodialysis patients' outcome can be improved by early diagnosis obtained through routine surveillance for viral hepatitis and periodic monitoring of liver function tests.

Keywords: Viral Hepatitis, Haemodialysis Patients

OP031

DRUNKENNESS WITHOUTH DRINKING: LESSONS LEARNED FROM ONE-YEAR FOLLOW-UP OF AN AUTO BREWERY SYNDROME CASE

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Objectives: Auto Brewery Syndrome (ABS) is a condition of alcohol intoxication withouth drinking that occurs as a result of fermentation by microbiome of human intestine with sugary foods. There are approximately 800 patients diagnosed in the United States and only three cases have been reported from Europe. A 58-year-old female patient, who was previously diagnosed as ABS was admitted to our hospital with acute alcohol intoxication. Hemicolectomy surgery, 3-hydroxyisobutyric aciduria, high taurine and pyruvic acid levels, changes in core microbiome phylums, *C. krusei* and *C. parapsilosis* colonisation, frequent intoxication attacks were detected from her medical history.

Methods: Routine biochemistry tests, CBC, blood gas analysis, NAD levels, metabolomics, WGS and microbial cultures were performed.

Results: In our hospital, her blood ethanol and lactate concentrations were reached to 320 mg/d L and 2.9 mmol/L, respectively. While there were no significant findings in blood and metabolomics tests results, intracellular NAD levels were found to be life-threateningly low. *Klebsiella pneumonia, Klebsiella oxytoca, Enterobacter cloaca, Pichia kudriavzevii, Pichia cactophila, Pichia norvegensis* were isolated.

Conclusions: While cases in the literature were treated with antimicrobial therapy and sugar restricted diet, our case is the first one in the literature treated with microbiome restoration combined with probioti-

cs and N-Acetyl Cysteine, B vitamin complex, dietary recommendations. One-year follow-up of our case revealed no attacks with food except for exposure to certain chemicals, severe stress and viral infections that lower the immune system. After a year, we think that this syndrome is not only a fermentation syndrome but also biochemical pathologies are involved in the etiology.

Keywords: Auto Brewery Syndrome, Probiotics, Microbiome, Alcohol, Alcohol Intoxication

OP032

THE ROLE OF ASYMMETRIC DIMETHYLARGININE AND NEOPTERIN IN EVALUATING COVID19 AND VACCINATION STATUS FOR THE RISK OF CORONARY ARTERY DISEASE

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Objectives: Coronavirus disease (COVID-19) is an infectious disease known to be more susceptible to the virus and to be more lethal in individuals with comorbidities (hypertension, diabetes, etc.).

Our study aimed to evaluate the risk of coronary artery disease in individuals with COVID-19 diagnosis and vaccination status using ADMA and Neopterin levels.

Methods: In this context, a total of 100 individuals between the ages of 30-65 who applied to the Chest Diseases Outpatient Clinic were included in the study. Four groups were formed: COVID19(+) and Vaccinated, COVID19(+) and Unvaccinated, COVID19(-) and Vaccinated, COVID19(-) and Unvaccinated. Routine biochemistry tests were performed on the autoanalyzer, and serum ADMA and Neopterin levels were determined by ELISA.

Results: According to the obtained data, ADMA and neopterin levels were significantly highest in COVID19(+) and vaccinated individuals, while the lowest significance level was seen in COVID19(-) and unvaccinated individuals. There is a statistically significant difference between the groups.

Conclusions: Our study is an important study in terms of examining ADMA and NP parameters simultaneously in terms of this disease group and vaccine efficacy. The correlation between ADMA and NP levels in the study groups can be evaluated in terms of coronary artery disease and the treatment approach to the disease. The high ADMA and NP levels in the groups constitute a significant risk for cardiovascular diseases and can be evaluated as two separate unrelated risk factors. Therefore, it is important to carefully consider both vaccine efficacy and the pathophysiological processes caused by the disease.

Keywords: Covid19, Neopterin, Cardiovascular Disease, Vaccine, Asymmetric Dimethylarginine

OP033

THE ROLE OF ANTI-HBC IN DETECTING OCCULT HEPATITIS B VIRUS INFECTION IN BLOOD DONORS

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Aim: Occult Hepatitis B Virus Infection (OBI), a challenge for blood safety, is identified by the presence of HBV DNA with HBsAg negative. We aimed to determine the prevalence of OBI among blood donors and investigate the predictive value of anti-HBc serology.

Methods: A retrospective study was conducted using blood donor samples collected during the first six months of 2024. Serology markers were performed using technologies: chemiluminescent microparticle immunoassays (CMIA) method for HbsAg, whereas for HBV-DNA through Reverse Transcription Polymerase Chain Reaction (RT-PCR) and Transcripti-

on-Mediated Amplification (TMA) technologies. For donors who tested positive for HBV-DNA but negative for HBsAg, an additional test Anti-HBc (CMIA) was conducted.

Results: Among 13,222 blood donors screened, the primary testing results revealed 48 (44.4%) samples as NAT reactive (TMA), but only 8 (16%) were HBV-DNA positives after the discriminatory test, and 60 (55.6%) samples as positive for HBV-DNA (RT-PCR) without detectable HBsAg, reflecting an occult HBV infection prevalence of 0.51%. Anti-HBc levels were tested in 92 (85%) of positive molecular marker cases and resulted positive in 71 (77.2%) cases, 50 (77.2%) anti-HBc positive cases were HBV-DNA positive. The ROC curves demonstrated statistically significant curves for Anti-HBc (AUC = 0.781, SE = 0.055, p = 0.000; 95% CI = 0.672 − 0.889).

Conclusions: According to the results, anti-HBc remains a significant marker for OBI and the blood donors' status.

Keywords: Occult hepatitis B virus, blood donors, anti-HBc, nucleic acid testing, hbv dna

OP036

CHATGPT-4o AND GEMINI KNOWLEDGE COMPARİSON ON CARDİAC TROPONİNS: KEY EMERGENCY BİOMARKER

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Objectives: Cardiac troponins (cTns) are essential biomarkers widely used in emergency departments for diagnosing and risk stratifying acute coronary syndromes. With the advancement of artificial intelligence (AI), there is growing interest in its potential role in interpreting biomarker results. This study aims to compare the knowledge levels of two AI applications, ChatGPT-4o and Gemini, regarding cTns.

Methods: Twenty true/false questions related to cTns were prepared by an emergency medicine specialist and a medical biochemistry specialist. The questions were derived from the 2023 European Society of Cardiology Guidelines for the Management of Acute Coronary Syndromes and Tietz Fundamentals of Clinical Chemistry, 6th Edition. These questions were posed to ChatGPT-4o and Gemini AI, and both models were asked to assess the statements as either true or false. The results were analyzed using the Chi-square test and McNemar's test through the SPSS software.

Results: ChatGPT-4o achieved a correct response rate of 70%, while Gemini achieved 75%. When comparing the responses and correct answers using the Chi-square test, the Pearson Chi-square value for ChatGPT-4o was 3.2 and for Gemini, 5.49. The *p*-value for ChatGPT-4 was 0.074, while for Gemini it was 0.019. Performance comparison between ChatGPT-4o and Gemini using McNemar's test did not reveal a statistically significant difference (p=0.25).

Conclusions: Although Gemini performed slightly better than ChatGPT-4o, the comparison was not statistically significant. Future studies should incorporate more comprehensive question types and case assessments to better evaluate the performance of these AI models.

Keywords: Artificial intelligence, troponin, acute coronary syndromes

OP037

PRODUCTION AND OPTIMIZATION OF RECOMBINANT GDH ENZYME IN BIOREACTOR SYSTEM FOR BIOTECHNOLOGICAL APPLICATIONS

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Objectives: Enzymes are biocatalysts that perform target-specific biochemical reactions in living organisms. Glucose dehydrogenase (GDH), one of the valuable enzymes for the enzyme industry, is a candidate enzyme to be used commercially in various tests for

the determination of blood sugar levels due to its glucose reduction property. This study aimed to produce the GDH enzyme recombinantly.

Methods: The plasmid carrying the gene encoding the GDH enzyme was purified and transferred to the *E. coli* BL21(DE3) expression strain to perform recombinant production of the target protein. Then, its production and activity were tested at different temperatures, substrate concentrations, pH ranges and substrates.

Results: The activity of the recombinantly produced GDH enzyme was calculated as 2917.17 U/mL and its specific activity as 1.46 kU/mg protein. The highest activity was observed at 37.5°C and 2000 mM substrate concentration. It was observed that the enzyme, which is active in a basic environment, maintains its activity under high pH conditions. In addition, it was determined that the GDH enzyme does not exhibit activity against non-glucose sugars.

Conclusions: As a result, when the recombinant GDH enzyme is compared with the enzymes in glucose diagnostic kits used today in terms of efficiency and activity, the superiority of the GDH enzyme is seen, but it needs to be tested in different disease groups of blood in terms of validation and conformation to be used in clinical glucose diagnostic tests.

This study was supported by the TÜSEB A Group Urgent R&D Project Support Program.

Keywords: Glucose dehydrogenase, Recombinant enzyme production

OP038

PROBING OLIGOMERİZATİON AND DUAL E2 BINDING SİTES OF HECT LIGASES USING NMR SPECTROSCOPY

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Objectives: E6-associated protein (E6AP), is a versatile enzyme with a central role in regulating cellular processes through the ubiquitin-proteasome system (UPS). Originally identified as a partner of the human papillomavirus (HPV) E6 oncoprotein, E6AP has since been recognized as a significant regulator of various cellular pathways, including cell cycle regulation, transcription, and tumorigenesis. To explore the oligomerization and binding dynamics of the E6AP HECT domain with UbcH7, we employed advanced solution-state NMR techniques. Our study focused on exploiting the cryptic binding site within the E6AP HECT domain using methyl-specific isotopic labeling, an approach particularly suited for NMR analysis of large proteins.

Methods: nitially, we isotopically labeled and purified E6AP HECT protein using ILVA labeling. We then performed a series of sophisticated NMR experiments, including 3D ^{13}C NOESY, 3D hCCH-NOESY, and 4D ^{13}C NOESY. Automated methods for assigning methyl NMR spectra in large proteins were utilized to complete the ILVA methyl assignments.

Results: We conducted detailed atomic-level analyses of the E6AP-UbcH7 interaction through NMR titrations, identifying two distinct regions with significant chemical shift perturbations (CSPs). Additionally, we used TRACT analysis to examine the oligomerization state of the protein at concentrations of 90 µM and 500 µM. The calculated TauC values (44.7 ns and 45.48 ns) suggest that the protein exists in a dynamic equilibrium between dimeric (36.78 ns) and trimeric (54.79 ns) forms.

Conclusions: Our findings underscore the existence of distinct E2 interaction regions on E3 enzymes, which are critical for E2-E3 interactions and the broader mechanism of action within the ubiquitin and ubiquitin-like systems.

Keywords: E6AP, NMR Spectroscopy, Ubiquitination, HECT Ligases

OP039

COMPUTATIONAL SCREENING OF REPURPOSED DRUGS FOR HMG-COA SYNTHASE 2 IN ALZHEIMER'S DISEASE

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Objectives: HMGCS2 (mitochondrial 3-hydroxy-3-methylglutaryl-COA synthase 2) plays a pivotal role as a control enzyme in ketogenesis, and its association with the β-amyloid precursor protein (APP) in mitochondria implicates a potential involvement in Alzheimer's disease (AD) pathophysiology. Our study aimed at identifying repurposed drugs using the DrugBank database capable of inhibiting HMGCS2 activity.

Methods: Exploiting the power of drug repurposing in conjunction with virtual screening and molecular dynamic (MD) simulations against predefined targets, we present new *in-silico* insight into structure-based drug repurposing.

Results: The initial molecules were screened for their binding affinity to HMGCS2. Subsequent interaction analyses and extensive 300 ns MD simulations were conducted to explore the conformational dynamics and stability of HMGCS2 in complex with the screened molecules, particularly Penfluridol and Lurasidone.

Conclusions: The study revealed that HMGCS2 forms stable protein-ligand complexes with Penfluridol and Lurasidone. Our findings indicate that Penfluridol and Lurasidone competitively bind to HMGCS2 and warrant their further exploration as potential repurposed molecules for anti-Alzheimer's drug development.

Keywords: Alzheimers disease, drug repurposing, small molecule inhibitors, virtual screening

OP040

EXPLORING THE IMPACT OF METHYLGLYOXAL MODIFICATION ON CARBONIC ANHYDRASE II ACTIVITY

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Objectives: Carbonic anhydrase (CAs, EC 4.2.1.1) is a zinc-containing metalloenzyme that reversibly catalyses carbon dioxide into bicarbonate and hydrogen ions. Carbonic anhydrase isoenzymes have roles in many physiological and pathological events such as pH regulation, transport of carbon dioxide and tumour formation. Protein modification (PTM) can increase the functional diversity of proteins and affect their function. In this study, the effects on enzyme activity of human CAII enzyme modified in vitro with methylglyoxal, an important AGE precursor molecule, were investigated.

Methods: CAII enzyme purified from human erythrocyte cells by affinity chromatography was modified in vitro with commercially purchased methylglyoxal at different doses, including the concentration reflecting the state of hyperglycaemia. Unbound methylglyoxal was removed by dialysis. Modifications were confirmed by western blotting. Hydratase and esterase activities of modified and pure CAII enzyme were measured.

Results: The esterase activity of the MGO-modified hCAII enzyme increased by 13% at low dose (1 mM), while it decreased by 67.5% at high dose (5 mM). The hydratase activity of the MGO-modified hCAII enzyme was found to increase at a higher rate than the esterase activity, with a 112% increase at low dose , and decreased by 52.9% at high dose .

Conclusions: Glycation proteins affect their structure and function. Hormetic effect of MGO has been shown in cancer cells. It was concluded that a similar effect (activation at low dose and inhibition at high dose)

may be important in the regulation of CAII activity.

Keywords: Carbonic anhydrase II, methylglyoxal, posttranslational modification

OP041

MOLECULAR AND MECHANISTIC EFFECTS OF UMBELLIFERONE ON CERVICAL CANCER

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Objectives: Cervical cancer is one of the most common malignancies among women. Umbelliferone (7-hydroxycoumarin, UMB) is a coumarin commonly found in plants. It has various pharmacological and biological benefits such as antibacterial, vasodilator, antimutagenic, ROS scavenger, antimetastatic, antilipidperoxidative. In this study, it is aimed to determine the effect of umbelliferone treatment on Hela cancer cells on apoptosis, migration and invasion.

Methods: After Hela cells were developed under laboratory conditions, these cells was treated with umbelliferone. The viability of Hela cells were evaluated by cytotoxicity test. The effects of umbelliferone treatment on of Hela cells on apoptosis, migration and invasion was determined. p53, Bax and Bcl-2 mRNA expressions were quantified by real-time quantitative PCR.

Results: Hela cells were treated with the IC_{50} dose determined by XTT test of umbelliferone. The UMB-treated groups were compared with the control group and it was observed that p53 expression increased statistically significantly in the 48 hours 100µM UMB group. Bax expression increased significantly in the groups treated with 50 µM and 100 µM UMB at 48 hours. In addition, no significant change was observed in Bcl-2 expression. It was noted that umbelliferone treatment reduced the motility of HeLa cells.

Conclusions: It is thought that umbelliferone treatment might reduce the spread of HeLa cells by inhibiting their apoptosis and invasion. Further research is needed dose- and time- dependent umbelliferone.

Keywords: Umbelliferone, Cervical cancer, Cytotoxicity, Apoptosis, Invasion

OP044

CD34+ HEMATOPOIETIC STEM CELLS ENUMERATION COMPARISON OF UNRELATED DONORS AT BASELINE AND BEFORE TRANSPLANTATION

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Objectives:Türkiye stem cell donation coordination center “TURKOK” provides potential donors’ HSC for the patients those have hematological malignancy for transplantation. For a successful transplantation the accurate enumeration of the CD34+ HSC is crucial. TURKOK provides the baseline flow cytometric enumeration of CD34+ HSC data of unrelated donated stem cells. The aim of the study is to compare the baseline CD34+ HSC enumeration results with our laboratory’s results.

Methods: Between 2018-2022 years 60 unrelated donated stem cells were included in the study. For the enumeration of the stem cell, we used Navios (Beckman Coulter) instrument and the stem cell enumeration kit. The donated baseline stem cell enumeration results were provided from the TURKOK. We compared the White blood cell (WBC), hematocrit (Htc), CD34 count, CD34 µl, and the viability parameters. The correlation of coefficient, Bland Altman plots and Passing Bablok regression analysis were used for the comparison of the results.

Results: The correlations of the parameters except viability were strong. The viability, HTC, and WBC p values <0.05. The CD34 count and CD34 µl p values

>0.05.

Conclusions: Since the accurate enumeration of CD34+ HSC is important in estimating the adequate dose to improve the transplantation success, we recommended the enumeration of the donated unrelated stem cells in their hematology laboratory before transplantation.

Keywords: Stem cell, flow cytometry, white blood cell, hematocrit, viability

OP045

DEVELOPMENT OF LC-MS/MS METHOD FOR MEASUREMENT OF ARGININE, HOMOARGININE, ORNITHINE, CITRULLINE, ARGININOSUCCINATE, ADMA AND SDMA IN DIALYSIS PATIENTS

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Objectives: A non-derivative, easy, simple and economical LC-MS/MS method was developed for simultaneous measurement of Arginine (Arg), N-methylarginine (L-NMA), Asymmetric Dimethylarginine (ADMA) and Symmetrical Dimethylarginine (SDMA) which are molecules involved in Arginine and Nitric oxide metabolism as well as their precursor molecules including Homoarginine (HArg), Ornithine (Orn), Citrulline (Cit), Homocitrulline (HCit), Argininosuccinate (ArgSuc). A pre-dialysis and post-dialysis evaluation was performed in patients with chronic kidney disease by using the LC-MS/MS method.

Methods: Mobile phase composition and column type combinations were determined in order to obtain the most ideal chromatographic separation in the shortest time for the mentioned analytes. The specificity, linearity, reproducibility and detection and quantification limits of the method were determined. After validation of the developed method according to CLSI documents, pre- and post-dialysis samples were collected from 38 chronic kidney failure (CKF) patients. In addition, measurements and evaluations were made in the samples taken from 34 healthy individuals.

Results: When the analysis results of samples taken from patients with CKF before and after dialysis and healthy control group patients are compared, SDMA, ArgSuc, Cit, HCit values are significantly higher, while HArg values are significantly lower. ($p<0.05$ for all). All metabolites except Arg were significantly decreased in the pre- and post-dialysis comparisons in CRF patients ($p<0.05$ for all).

Conclusions: Although ADMA, SDMA, ArgSuc, Cit, HCit, HArg, ArgSuc decreased with dialysis in CKF patients, all analytes except HArg were above the levels of the healthy control group. High levels of ADMA metabolites in patients with CRF will contribute to the chronic inflammation process.

Keywords: LC-MS/MS, ADMA, SDMA, Arginine, Dialysis, CKD

OP046

INVESTIGATION OF THE PROTECTIVE EFFECTS OF APOLIPOPROTEİN E MIMETIC PEPTIDE IN A CELL MODEL OF ACUTE HEPATOTOXICITY

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Objectives: Acute hepatotoxicity is a pathology that causes dysfunction of the liver. With the introduction of new drugs, herbal products and nutritional supplements every day, the incidence of toxic hepatitis is increasing. Tumor necrosis factor alpha (TNF-alpha) released because of acute hepatotoxicity triggers an inflammatory response. COG133 (APO E 133-149 amino acid region), an apolipoprotein E (APOE) mimetic peptide, binds to the low-density lipoprotein receptor (LDLR) and inhibits TNF-alpha secretion and suppresses the inflammatory response. The aim of this study was to examine the protective mechanism of COG 133 in a model of acute hepatotoxicity in liver stellate cell cultures in vitro.

Methods: Carbon tetrachloride (CCl4) was used to establish a model of acute hepatotoxicity in HSC-T6

hepatic stellate cell line. Protective effects of COG 133 treatment were assessed at different concentrations and periods. Cell viability was assessed through MTT analysis, whereas protein levels of TNF-α, nuclear factor kappa B p65 (NF-κB p65), nitric oxide synthase 2 (NOS2), interleukin (IL)-1β, transforming growth factor-beta (TGF-β), and type I collagen (Col-1) were measured using immunofluorescent staining and ELISA.

Results: A substantial decrease was observed in cell viability following CCl4 treatment while COG133 significantly increased cell survival in cells treated with CCl4. COG133 treatment markedly reduced elevated levels of TNF-α, NF-κB p65, NOS2, IL-1β, TGF-β, and Col-1, which were significantly increased following CCl4 treatment.

Conclusions: This study confirms the activation of the TNF-α signaling pathway in HSC-T6 cells subjected to CCl4-induced acute hepatotoxicity and highlights the protective efficacy of COG133. Supported by TUBITAK grant #123S697.

Keywords: Acute hepatotoxicity, CCl4, COG133, TNF-±

OP047

ALCOHOL AND SUBSTANCE USE TRENDS

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Objectives: This study examines the trends in alcohol and substance use among children and adults in Istanbul, Türkiye, highlighting the effects of concurrent alcohol and substance use and aiming to enhance awareness of this issue.

Methods: The study conducted a retrospective analysis of hospital applications between January 1, 2020, and August 31, 2024, and collected data on gender, age, and substance use from patient records. During this period, urine and blood samples from 258 individuals aged 11 to 77 were analyzed using enzymatic immunoassay at the Basaksehir Cam and Sakura Central Laboratory.

Results: We divided our study into two groups: individuals who tested positive for both alcohol and substances (36 cases) and those who were negative for alcohol but positive for substances (222 cases). In the first group, 14% of the cases tested positive alcohol, with benzodiazepine being the most commonly used substance (60%), followed by ethyl glucuronide (25%), tetrahydrocannabinol (10%), and polysubstance use (11%). In the second group (86 %), the most frequently used substance was benzodiazepine (36.1%), followed by amphetamines (28.4%), tetrahydrocannabinol (28.4%), and polysubstance use (31.5%). The alcohol-positive group had an mean age of 33.1 years (75% male), while the alcohol-negative group's mean age was 31.8 years (77.2% male). In individuals under 18 years old, benzodiazepines were identified as the most commonly used substance in both groups.

Conclusions: The study highlights the importance of trends in alcohol and substance addiction and the need to raise awareness on this issue.

Keywords: Alcohol, benzodiazepine, substance use, toxicological analysis

OP048

ANTI-INFLAMMATORY EFFECT APOLIPOPROTEIN E MIMETIC PEPTIDE IN HEPATIC CELL MODEL OF ACUTE HEPATOTOXICITY

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Objectives: Toxic hepatitis is becoming more common as new medications, herbal remedies, and dietary supplements are released daily. When acute hepatotoxicity results in the release of tumor necrosis factor alpha (TNF-alpha), an inflammatory response is triggered. An apolipoprotein E (APOE) mimetic peptide called COG133 (APO E 133–149 amino acid region) interacts with low-density lipoprotein receptors (LDLR), preventing TNF-alpha release and reducing the inflammatory response. The purpose of this work was to investigate the protective mechanism of COG

133 in liver hepatic cell cultures under an in vitro model of acute hepatotoxicity.

Methods: The hepatic cell line BRL was utilized to create a model of acute hepatotoxicity using carbon tetrachloride (CCl4). The protective effects of COG 133 therapy were evaluated across a range of times and concentrations. MTT analysis was used to measure the viability of the cells, while immunofluorescent staining and ELISA were used to measure the protein levels of TNF-α, nuclear factor kappa B p65 (NF-κB p65), nitric oxide synthase 2 (NOS2), interleukin (IL)-1β, transforming growth factor-beta (TGF-β), and type I collagen (Col-1).

Results: COG133 dramatically improved cell survival in CCl4-treated cells. After CCl4 treatment, there was a considerable increase in TNF-α, NF-κB p65, NOS2, IL-1β, TGF-β, and Col-1. However, these levels were markedly reduced by COG133 therapy.

Conclusions: This study demonstrates the protective effectiveness of COG133 and validates that the TNF-α signaling pathway is activated in BRL cells exposed to CCl4-induced acute hepatotoxicity. Supported by TUBITAK grant #123S697.

Keywords: TNF-alpha

OP049

IN VITRO EVALUATION OF CYTOTOXIC EFFECTS OF PARAPROBIOTICS AND POSTBIOTICS AS NEW PHARMACEUTICALS ON HEPATOCELLULAR CANCER CELLS

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Objectives: In recent years, studies have emphasized the importance of paraprobiotics and postbiotics, which are probiotic products with proven pharmacological effects on health and disease. Hepatocellular carcinoma (HCC) is the most common type of primary liver cancer. HCC is the 6th most frequently diagnosed cancer type in recent years and the 3rd leading cause of death due to cancer. The anticancer activity of many possible probiotic bacteria has been reported in the literature. However, there is not much information about paraprobiotics and postbiotics, also called pharmabiotics, which have just started to enter the literature. The aim of this study was to evaluate the cytotoxic effect of paraprobiotics and postbiotics obtained from possible probiotic microorganisms on the HepG2 cell line, a hepatocellular carcinoma cell.

Methods: In our study, paraprobiotics, postbiotics and HepG2 cell line obtained from L.reuteri strain were used. MTT method was used in cytotoxicity studies.

Results: According to the obtained data, it was observed that paraprobiotics and postbiotics had a proliferative effect on the healthy fibroblast cell line, which was the control group, and a significant cytotoxic effect on HepG2 cell lines. In addition, no statistically significant difference was observed when the data was compared with probiotics.

Conclusions: In recent years, the negative situations that will arise from the use of live probiotics, especially in individuals with suppressed immune systems, have drawn attention. The use of paraprobiotics and postbiotics as food supplements will be safer in these patients. In addition, the shelf life of these forms, which do not contain viability, will be longer.

Keywords: Pharmabiotics, paraprobiotics, postbiotics, Hepatacellular Carsinoma, HepG2 cell line

OP050

PHOTODYNAMIC THERAPY AGAINST GLIOBLASTOMA: INVESTIGATING PHENOSELENAZINE BASED PHOTOSENSITIZER AS A PROMISING THERAPEUTIC AGENT

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Objectives: Glioblastoma Multiforme (GBM) is the most aggressive malignant brain tumor. Photodynamic therapy (PDT) is a promising treatment strategy against GBM. It exerts cytotoxic effect by producing ROS, mainly singlet oxygen, leading to cell death. The aim of the present study was to investigate the efficacy of a novel phenoselenazine based photosensitizer 1-(7-(azetidin-1-yl)-3H-phenoselenazin-3-ylidene) azetidin-1-ium (NSeAze) with NIR light irradiation on glioblastoma cells.

Methods: U-87MG and U-118MG glioblastoma cells were treated with NSeAze for 24h to assess its dark toxicity. For PDT application, cells were treated for 2h and exposed to 660-670 nm LED light for 1h, then incubated overnight up to 24h in the dark. The cell viability was detected with MTT assay following NSeAze administration with/without the presence of scavengers. The subcellular localization in mitochondria/lysosomes was visualized by confocal microscopy.

Results: Results showed a significant reduction in cell viability with IC_{50} of 376.3±17.85 nM and 531.7±25.53 nM in U-87MG and U-118MG cells, respectively. The phototoxicity index (PI) was determined as 472.49 and 72.89, indicating the remarkable effect of NSeAze under light irradiation. The scavenger assay confirmed that NSeAze induces oxidative stress by producing mostly singlet oxygen. The subcellular localization showed that the agent predominantly accumulates in lysosomes, with a strong Pearson correlation value of 0.78, compared to mitochondria (0.69).

Conclusions: The present study showed that the novel photosensitizer NSeAze has significant antitumor activity as a PDT agent against glioblastoma cells, indicating that it may be a promising therapeutic agent in the treatment. This study is supported by ERC 852614 project grant.

Keywords: Photodynamic Therapy, Oxidative Stress, Glioblastoma Multiforme, Cancer, Photosensitizer

OP052

NIR-ACTIVATED SILICON-RHODAMINE BASED PHOTOSENSITIZER AS A PROMISING THERAPEUTIC AGENT AGAINST GLIOBLASTOMA

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Objectives: Glioblastoma multiforme (GBM) remains one of the most aggressive malignant tumors in the central nervous system with low survival rate. Insufficient standard care of the disease provoked need for an alternative treatment. Photodynamic therapy (PDT) is a treatment modality which induces oxidative stress, leading to cell death. Our main aim is to determine the potential anticancer effect of a novel silicon-rhodamine-based photosensitizer N-(2-bromo-7-(dimethylamino)-5,5-dimethyl-10-(o-tolyl)dibenzo[b,e]silin-3(5H)-ylidene)-N-methylmethanaminium (2-Me-SiR-Br).

Methods: U87-MG glioblastoma cells were treated for 0.5-2 h followed by 4- and 6-min (650nm, 364.8mW/cm^2) light irradiation in fresh medium and overnight incubation (24 h) to stimulate photodynamic effect. On the other hand, to evaluate the dark toxicity, cells were treated for 2 h followed by overnight incubation in fresh medium (24 h) without light irradiation. MTT assay was used to determine the cytotoxicity. Subcellular localization in mitochondria and lysosome at 1 hour was performed with confocal microscopy.

Results: IC50 values of 2-Me-SiR-Br following 1-hour treatment irradiated for 4-and 6-min with laser was determined as 3.61±0.12 µM and 2.72±0.12 µM, respectively. However, the IC50 value of the agent even after 2-hour treatment was calculated as 15.17±0.48 µM, without light irradiation. Pearson correlation

coefficient (R^2) for mitochondria and lysosome after 1-hour incubation is 0.95 and 0.92, respectively, which indicates localization in both organelles.

Conclusions: Our findings demonstrate that 2-Me-SiR-Br exhibits dramatic phototoxicity as opposed to a weaker effect in the dark, indicating that 2-Me-SiR-Br may be a powerful PDT agent to overcome GBM, at least *in vitro*. This study is supported by ERC 852614 project grant.

Keywords: Glioblatoma Multiforme, PDT, Cancer, Photosensitizer

OP054

EVALUATION OF THE FREQUENCY OF PREGABALIN AND GABAPENTIN USE AS ADDICTIVE SUBSTANCES IN DRUG ADDICTION TREATMENT PATIENTS

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Objectives: Pregabalin and gabapentin are widely used in the treatment of neuropathic pain,epilepsy and anxiety disorders.Toxicologic monitoring of these drugs is critical, especially in the assessment of abuse. In this study, we aimed to investigate the frequency of pregabalin and gabapentin use in patients who were admitted to the outpatient clinic of the Alcohol and Drug Addiction Treatment Center(AMATEM)and in whom no substance was detected by urine illicit drug screening test.

Methods: In this prospective study, patients aged 18-67 years,who were admitted to the AMATEM outpatient clinic of SBU Ankara Training and Research Hospital for addiction treatment between July 1 and September 1,2024,and in whom no illicit drugs (amphetamine/methamphetamine,cocaine,cannabinoids,opiates,synthetic cannabinoids and benzodiazepines) were detected in the urine illicit drug screening test by immunochemical method(Thermo Scientific, USA) were included.Patients' use of pregabalin,gabapentin and other substances were evaluated.The toxicology of the patients was analyzed by liquid chromatography AB Sciex QTRAP® 5500 triple quadropole mass spectrometry(LC-MS/MS)(Sciex, USA).

Results: Of the 557 patients included in the study, 90% were male and the mean age was 31±6. 47% of the patients were buprenorphine positive.Pregabalin/gabapentin was detected in 35%of the samples.Substance positivity was 39% in men and 28% in women. The median (IQR) concentrations of pregabalin and gabapentin were 12921 ng/mL(5665-48355) and 2487 ng/mL(631-12471),respectively.When the positive test results were analyzed,the positivity rates for pregabalin and gabapentin alone were 94%and 8%, respectively. Apart from these, amphetamine and ecstasy(12%, 2%)positivity was detected,respectively.

Conclusions: We think that the epidemiology of abuse of gabapentinoids should be evaluated in more detail and pregabalin/gabapentin testing should be considered in urine drug screening.

Keywords: LC-MS/MS

OP055

COMPARISON OF AUTOMATED ANALYSERS "ALARIS ALS-64E" AND "VISION C" FOR ERYTHROCYTE SEDIMENTATION RATE VIA WESTERGREN METHOD

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Objectives: In this study, it was aimed to evaluate the analytical performance of the automated analysers "Alaris ALS-64E" and "VISION C" for erythrocyte sedimentation rate by comparing them as per Westergren Method.

Methods: The study was started firstly with 100 samples randomly selected from the outpatient blood collection unit; however only 77 samples were evaluated. Unfortunately 10 samples were not included due to insufficient level, 4 samples due to mislabeling and 9 samples due to clotting. All blood samples were collected in evacuated tubes containing K3EDTA and sodium citrate. All samples were analysed with both Alaris ALS-64E Sediment Analyser and VISION C Sediment Analyser and Manual Westergren Method.

Results: According to Bland-Altman analysis, diffe-

rence of mean values is -2,75 (95% CI: -6,33 to 0,83) in between ALS-64E and Westergren Method; and it is -5,01 (95% CI -7,40 to -2,63) in between VISION C and Westergren Method. Satisfactory correlation and regression resulted via Linear Regression Analysis comparing ALS-64E and VISION C with the reference of Westergren Method (r= 0.851; P< 0.0001, y = 7,79 + 0,676x; r=0.842, P <0.0001; y= -0,49 +1,16x, respectively)

Conclusions: Both automated analysers are easy to use and require minimal maintenance. Both give good correlation results when compared to traditional method. Especially "Alaris ALS-64E" can be preferred for use in larger laboratories with a high number of patients, but the need for manual rotation of the tubes may affect the results due to the user factor.

Keywords: Erythrocyte sedimentation rate, Vision C, Automated analyser, Westergren Method, Alaris ALS-64E

OP056

ESTIMATING OF WITH-IN SUBJECT BIOLOGICAL VARIATION OF HEMATOLOGICAL PARAMETERS IN PEDIATRIC AGE GROUP

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Objectives: Data on biological variation have been widely used for various purposes, including the calculation of analytical performance specifications, reference change values, the index of individuality, and individual reference intervals. The direct method proposed by Fraser and Harris is based on repeated sampling from apparently healthy individuals on different days, which is challenging to perform for most analytes. In this study, instead of direct sampling, we calculated the within-subject biological variation (CV_I) of hematological parameters in a pediatric age group using retrospective laboratory data.

Methods: Retrospective data on WBC, RBC, HGB, PLT, and MCV from 1,326 individuals aged 4–19 years were included in the study. The data spanned a period of 20 months and were obtained from the Primary Care unit, all measured using the same instrument (Mindray BC-6800). After outlier removal and trend analysis, the CVI of these analytes was estimated.

Results: The CV_I estimates for males, females, and all subjects, respectively, were as follows: for WBC, 20.4, 19.8 and 20.1; for RBC, 4.34, 4.34 and 4.34; for HGB, 3.97, 4.1 and 4.02; for MCV, 3.35, 3.40 and 3.37; and for PLT, 14.2, 13.3 and 13.7.

Conclusions: Estimating the CV_I of commonly requested analytes using an indirect method based on data collected from laboratory information systems is straightforward and provides reliable estimates, particularly for pediatric age groups, where it is not easy to collect samples for estimating CV_I.

Keywords: Biological variation, data mining, within subject BV, indirect method

OP057

COMPARISON OF TWO TUBES' STABILITY FOR COMPLETE BLOOD COUNT PARAMETERS: APPROACHING DIFFERENT METHODS

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Objectives: In medical laboratory practice, we should use different tubes from different brands. In this process, it is necessary to diversify the existing riches with a new tube and reveal consistency through regular consistency tests. In our study, we aimed to demonstrate the stability of the new tube by evaluating the balance between the two tubes through differentiation, using different statistical approaches.

Methods: In the study, Jamovi (2.6.2 version) software was used for Bland Altman Analyzes, and the "Deming" package in RStudio (2024.04.2 version) software was used for both Deming and Passing-Bablok regression methods.

Results: If one or both of the variables examined were

not normally distributed, the Passing-Bablok regression method gave closer results to the bias values obtained in the Bland-Altman method. Most of the results from both regression methods were similar when both variables displayed a normal distribution. Additionally, we found that the Passing-Bablok regression method was more sensitive than Deming regression in detecting systematic bias.

Conclusions: In previous studies, the Deming regression method has often been suggested if the normality assumption is met and the Passing-Bablok regression method if it is not. Our study determined how the normal distribution affected these methods and how the bias values changed, obtaining results similar to those in the literature.

Keywords: Stability comparison, Bland-Altman, Deming regression

OP058

EVALUATING SERUM FREE LIGHT CHAIN MEASUREMENT AND REFERENCE CHANGE VALUE IN THE MONITORING OF MONOCLONAL GAMMOPATHY

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Objectives: Various methods detect monoclonal immunoglobulins. Immunofixation electrophoresis (IFE) is sensitive for determining subtypes and detecting low M-protein levels. Serum Free Light Chain (SFLC) measurement is highly sensitive for detecting very low immunoglobulin levels but is less effective at distinguishing between polyclonal and monoclonal proteins. This study retrospectively evaluated SFLC use in monitoring monoclonal gammopathy, including RCV calculation.

Methods: In this study, 254 IFE and paired SFLC results from 143 patients were evaluated. Fifty patients had repeated results. IFE was considered the gold standard, and SFLC results (kappa, lambda, kappa/lambda ratio) were classified according to the reference range. RCV values for SFLC levels were calculated. By examining the follow-up patient results, the sensitivity and specificity outcomes were compared based on the evaluation of SFLC results according to the reference range and RCV values.

Results: The RCV values for increases and decreases in kappa and lambda ranged between 27% and 40%. Among the followed-up patients, 9 entered remission, 1 experienced a relapse, and the condition of 40 patients remained unchanged during the follow-up period. The sensitivity and specificity of the kappa/lambda ratio using the reference range were 50% and 78%, respectively, while the sensitivity and specificity of SFLC evaluation using RCV were 80% and 50%, respectively.

Conclusions: Given the relatively low sensitivity of the kappa/lambda ratio evaluating with reference range, its use for follow-up purposes may not be advisable. The use of RCV values appears more meaningful in patient follow-up, as sensitivity is important for early detection of relapse.

Keywords: Multiple myeloma, monoclonal gamopathy, immunfixation electrophoresis, Reference change value, free light chain

OP059

EVALUATION OF SIGMA METRICS FOR IMMUNOTURBIDIMETRIC ASO AND RF ASSAYS

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Objectives: Turbidimetry is a method used to quantify immune-complex precipitates. According to common belief, turbidimetry generally gives better precision than other immun-complex precipitates assays. The aim of this study was to analyze turbidimetric antistreptolysin-O (ASO) and rheumatoid factor (RF) tests using the six-sigma metrics.

Methods: This study was conducted based on the external quality assurance (EQA) and internal quality control (IQC) performance of ASO and RF assay on the Cobas c501 analyzer. Sigma metric was calculated

using the Total Error Allowable (TEa), bias, and coefficient variation (% CV) as the following formula: Sigma=[(%TEa)−|Bias|] / %CV. While TEa for RF was taken from the SEQCML BV database as 13.5%, ASO was chosen as 10% since no data was available. Sigma metric of > 6 is world-class, 3-6 is good, and <3 indicates poor performance of the tests.

Results: Analyzing IQC performance, the variability was higher using control level 1 compared to level 2 for both ASO and RF. Thus, we calculated sigma metrics from the total CV obtained from the level 1 control. We identified that sigma metrics were < 3 for ASO and 3 for RF.

Conclusions: The sigma metrics vary greatly depending on the total allowable error. The reason for the unacceptable sigma value of the ASO test on the Cobas c501 is most likely due to arbitrary the choice of allowable error rate.

Keywords: Turbidimetry, Rheumatoid factor, Antistreptolysin-O

OP060

CAN MOVING MULTIPLES OF THE MEDIAN BE USED AS A PATIENT-BASED REAL-TIME QUALITY CONTROL TOOL?

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Objectives: In clinical laboratories, the real-time detection of analytical errors is essential, and patient-based real-time quality control (PB-RT-QC) methods are increasingly utilized for this purpose. This study aimed to evaluate whether the moving median (MM) of MoM (Multiples of the Median) values, derived from free beta human chorionic gonadotrophin (fβ-hCG) and pregnancy-associated plasma protein A (PAPP-A) measurements in prenatal screening, offer a more effective PB-RT-QC tool compared to MM of direct analyte concentration.

Methods: One year of prenatal screening data was retrospectively reviewed, and fβ-hCG, PAPP-A, and MoM values were recorded. Control charts were generated using ±2 SD limits based on data obtained from one year of results. Ten biased values were added to every 100th patient, and moving medians were calculated using 10, 20, and 30 patient blocks. Rejection sensitivity, approval specificity, and false rejection rates were calculated based on the detection of biased values.

Results: In the 20-block analysis, the sensitivity for fβ-hCG MoM and IU/L values were 88.9% and 81.5%; specificities of 96.3% and 94.6%; and false rejection rates of 16.4% and 23.8%, respectively. In the 10-block analysis, for PAPP-A, the sensitivity of MoM and mIU/L values were 95.0% and 11.1%; specificities of 95.9% and 95.3%; and false rejection rates of 29.9% and 80.7%, respectively.

Conclusions: As MoM values are adjusted for age, gestational week, and other factors, they may provide a more reliable PB-RT-QC tool in daily practice, especially with the support of appropriate software, enhancing real-time error detection.

Keywords: Analytical quality control, moving average, quality assurance

OP061

MEASURING THE IMPACT: SEVERITY OF HARM IN LABORATORY ERRORS OF 195 TESTS

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Objectives: This study aimed to objectively assess the potential severity of harm associated with erroneous results in 195 laboratory tests by surveying 514 specialist physicians and medical biochemistry experts.

Methods: The survey obtained participants› (75 medical biochemists, 439 clinicians) opinions on severity of harm for erroneous results of 195 tests. The comprehensive list of errors and their effects on test results were obtained from the literature and then matched with severity of harm scores from 1 (negligible effect) to 5 (life-threatening injury/death) obtained from the survey responses.

Results: Participants perceived tests like cardiac biomarkers, blood gases, coagulation parameters (activated partial thromboplastin time, prothrombin time, international normalized ratio, and D-dimer), critical ions (potassium, sodium), toxic trace elements (lead, mercury, and specific serum drug levels (lithium, digoxin) to have a higher potential for patient harm in case of errors. Medical biochemistry specialists assigned higher severity scores to some laboratory tests, including total bilirubin, pseudocholinesterase, platelet indices, and some of the drug levels (cyclosporine, methotrexate, vancomycin).

Conclusions: A substantial agreement (91%) was observed between medical biochemists and clinicians in terms of the most frequently chosen severity of harm score. The study›s practical implications extend to objective risk analysis frameworks and quality improvement initiatives in laboratory medicine. It provided objective severity scores and identified high-risk tests for targeted quality improvement initiatives and enhancing patient safety. Additionally, this study will contribute to the practical implementation of risk-based quality control guidelines by providing an objective foundation for severity of harm.

Keywords: Laboratory errors, severity of harm, patient safety, risk, risk management

OP062

BIORAD D100 VS ADAMS HA 8180V FOR HBA1C MEASUREMENT: A METHOD COMPARISON STUDY

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Objectives: The primary goal of this study was to assess the performance and agreement between the Biorad D100 and Adams HA 8180v devices in measuring HbA1c levels, with an emphasis on precision using control samples. As accurate HbA1c measurement is crucial for diabetes management, it is essential to ensure that different devices produce consistent and dependable results.

Methods: Fifty patient samples were analyzed using both the Biorad D100 and Adams HA 8180v devices. The study followed the CLSI EP09C protocol to compare the methods, adhering to standardized procedures. Statistical analyses, including Passing-Bablok regression, Bland-Altman analysis, and paired t-tests, were performed to evaluate the relationship and agreement between the two devices. Precision was assessed using control samples with varying HbA1c concentrations.

Results: Passing-Bablok regression analysis demonstrated a strong linear relationship between the two devices, with a slope of 0.816 and an intercept of 0.766. The Bland-Altman analysis showed a mean difference close to zero, with narrow limits of agreement, indicating good agreement between the devices. Paired t-tests revealed no significant differences between the devices at either control level, confirming their comparability. Precision analysis further supported the reliability of both devices, with consistent results across different control levels.

Conclusions: The Biorad D100 and Adams HA 8180v devices provided consistent, accurate, and reliable HbA1c measurements with strong agreement and precision. These findings suggest that the devices can be employed interchangeably in clinical settings to ensure valid and reliable HbA1c assessment for diabetes management.

Keywords: HbA1c

OP063

VERIFICATION OF THE REPEATABILITY OF THE D-DIMER ASSAY

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Objectives: Verification is a critical precondition in the process of to ensuring reliable, high quality laboratory test results and to increase patient safety. The term verification includes the provision of objective evidence that a measurement procedure/measuring system meets the manufacturer´s performans criteria. As an essential requirement, it is included in the International Standard ISO 15189 and intended specifically to guide the management of quality systems in clinical laboratories. The aim of this study is the of verification of the repeatability of the D-dimer assay performed on Roche Cobas 8000 autoanalyzer in our laboratory in accordance to EP15-A2 Guideline.

Methods: Verification of performance for precision study has been made with automated latex-enhanced particle immunoturbidimetric on autoanalyzer. The study was carried out as described in EP15-A2 guidelines for D-Dimer assay with 2 (two) levels of internal quality control as 3 (three) times and repetitive for 5 (five) consecutive days.

Results: The level 1 within-run precision value (Sr =0.020) and and level 2 within-run precision value (Sr=0.027), were within verification limits for D-dimer (for level 1=1.19, for level 2=3.58)

Conclusions: The obtained results prove satisfactory within-run precision of latex-enhanced particle immunoturbidimetric on autoanalyzer. The precision values of D-dimer stated by the manufacturer needs to be verified.

Keywords: Quality, Verification

OP064

THE EVALUATION OF LDL-C CALCULATION WITH SAMPSON-NIH AND FRIEDEWALD EQUATIONS IN PATIENTS WITH LOW LDL-C LEVELS OR HYPERTRIGLYCERIDEMIA

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Objectives: Low-density lipoprotein cholesterol (LDL-C) is a potential biomarker for cardiovascular disease (CVD) risk assessment and monitorization of lipid-lowering therapies. Although the Friedewald equation is the oldest and widely used one, it has low accuracy and less reliability in low LDL-C and high triglycerid values. In this study, it is aimed to compare the performance of different euqations in LDL-C calculation.

Methods: Patients having tested for triglyserid, high-density cholesterol, total cholesterol and low-density cholesterol analized by direct measurement in between 01.01.2022-31.12.2022, were selected (n = 100.153) and a retrospective study was settled. Patients with detected LDL-C < 70 mg/dl (n = 4400) and TG > 400 mg/dl (n = 2109) were cathegorized to perform regression and receiver operating characteris-

tic (ROC) analyses to find out the performance and accuracy differences of the equations (Sampson-NIH and Friedewald) depending on direct LDL-C measurement.

Results: The evaluation showed high overall accuracy and correlation between LDL-C measurements: r^2=0.88, AUC=0.97 for direct LDL-C vs. Friedewald, and r^2=0.92, AUC=0.98 for direct LDL-C vs. Sampson-NIH, with r^2=0.98 between the equations ($p < 0.001$ for all). However, in patients with low LDL-C and high triglycerides, correlations were lower: r^2=0.17 and 0.59 for direct LDL-C vs. Friedewald, r^2=0.41 and 0.71 for direct LDL-C vs. Sampson-NIH, and r^2=0.29 and 0.77 between the equations respectively ($p < 0.001$ for all).

Conclusions: Although the total data analysis showed strong correlations between Friedewald and Sampson-NIH equations, correlations became lower and unreliable for LDL-C < 70 mg/dl or TG > 400 mg/dl, suggesting direct measurements in these cases.

Keywords: Friedewald, Sampson-NIH, LDL-C, Hypertriglyceridemia, Analytical Performance

OP065

WHICH SHOULD BE REPORTED FOR LOW PROTEIN LEVELS IN BODY FLUIDS: LOQ OR LOD?

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Objectives: Biochemical tests, such as total protein and lactate dehydrogenase (LDH), are crucial in distinguishing between transudate and exudate in body fluids, alongside clinical history and physical examination. We aim to assess the impact of reporting total protein results that fall below the measurement limits on the classification of transudate and exudate.

Methods: 920 pleural and 164 peritoneal fluid sample results between 2022 and 2024 were evaluated. Serum total protein, body fluid protein, serum LDH, and body fluid LDH results were obtained. The limit of quantification (LOQ) for the total protein reagent was 30 g/L, while the limit of detection (LOD) was 0.77 g/L. Light's criteria was calculated based on both the LOQ and LOD values, and the agreement between the results was evaluated using kappa analysis.

Results: In pleural and peritoneal fluids, transudate/exudate counts were 111/809 and 37/127, respectively, when total protein values were reported according to the LOQ. There were 173/747 and 79/85 transudate/exudate counts in pleural and peritoneal fluids, respectively, when values above the LOD were considered. The agreements of the results were found to be good (kappa=0.744) for pleural fluids and moderate (kappa=0.477) for peritoneal fluids.

Conclusions: The total protein results of body fluids significantly affects clinical decisions. Therefore, deciding whether to use LOQ or LOD in reporting total protein analysis is crucial. Reagents with lower LOQ values are needed for the measurement of total protein in body fluids.

Keywords: Body fluid, detection capability, limit of quantification

OP066

COMPARISON OF HbA1c MEASUREMENT METHODS: BORONATE AFFINITY CHROMATOGRAPHY vs. CAPILLARY ELECTROPHORESIS

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Objectives: The HbA1c value is an important indicator of long-term glycemic control and plays a key role in the diagnosis and follow-up of diabetes. Currently, various methods such as boronate affinity chromatography (BAC), turbidimetry, enzymatic assays, and capillary electrophoresis (CE) are used to measure HbA1c. In this study, the performances of BAC method, recognised as the gold standard in HbA1c measurement, and CE method were compared.

Methods: The 152 patient samples included in the study were analysed by both BAC (Trinity Premier Hb9210) and CE (Sebia). Patient data were categorised into three groups according to clinical assessment values: (HbA1c <5.7%;normal), (HbA1c 5.7%-6.4%;prediabetes) and (HbA1c >6.5%;diabetes). The agreement between the two methods was assessed using kappa test, Passing-Bablok regression and Bland-Altman analysis. MedCalc software was used for the statistical analyses.

Results: Analyses by BAC and CE yielded mean HbA1c values of 6.28 (minimum: 4.5, maximum: 15.8) and 6.33 (minimum: 4.8, maximum: 15.8), respectively. According to the Bland-Altman plot, the proportion of data outside the limits of agreement is less than 5%. According to the Passing-Bablok regression analysis, the slope indicating the accuracy of the method is close to 1, and the intercept is close to 0. The kappa value was found to be 80.73% in the comparison performed by dividing the data into three groups according to the clinical decision values.

Conclusions: These results show that there is a high degree of agreement between the two methods for HbA1c measurement and that both methods are reliable for clinical use.

Keywords: HbA1c, Boronate Affinity Chromatography, Capillary Electrophoresis, Method Comparison

OP067

INVESTIGATION OF THE COMPATIBILITY BETWEEN HPLC, AUTOANALYZER AND CAPILLARY ELECTROPHORESIS DEVICES İN HBA1C MEASUREMENT

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Objectives: Diabetes Mellitus (DM) has emerged as a global public health threat. Measurement of HbA1c, which is used as a basic biomarker in the assessment of glycemic control, is widely used in laboratories. However, measurement of HbA1c levels is performed with different devices and methods. In this study, we aimed to make a comparison between the devices used in HbA1c measurements.

Methods: HbA1c-requested and finished blood samples and 80 repeated measurements of HbA1c levels were analyzed simultaneously on HPLC [Tosoh G8], Autoanalyzer [Beckman DXC 700AU] and Capillary electrophoresis [Sebia Capillarys 3Tera] devices. These analyses were performed during the HPLC and Capillary Electrophoresis device demonstration to evaluate the compatibility of the results of the devices in terms of HbA1c measurements. The data obtained from the devices were evaluated by statistical methods.

Results: Chronbach's Alpha test was used to assess inter-instrument agreement and internal consistency. The evaluation revealed that the consistency ratio between Autoanalyzer-HPLC was >0.6 while Capillary-Otoanalyzer was <0.6. Passing-Babloc regression and Bland-Altman analyses between the three instruments revealed that, in general, the instruments gave similar results, but with certain systematic differences and individual measurement variability. The intercept and slop (95% CI values) for Capillary-HPLC is -0.1409 and 0.9545; while for Autoanalyzer-HPLC it is -0.3000 and 1.000, respectively.

Conclusions: Although Cronbach's Alpha, Passing-Bablok regression and Bland-Altman tests show the internal consistency of the devices and the agreement between the devices, this may not always be sufficient. Considering the limitations of the devices and the existence of more accurate alternative devices and methods, more comprehensive studies are needed.

Keywords: HbA1c, HPLC, Otoanalizör, Diabetes Mellitus

OP068

EVALUATION OF LOT-TO-LOT VARIATION OF CALIBRATOR ON LOW HIGH SENSITIVE TROPONIN T RESULTS

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Objectives:According to published guidelines,patients with low high-sensitive troponin T(hs TnT) results(1-5 ng/L) are considered very low risk for acute coronary syndrome(ACS) and hs TnT monitoring is not required.In this study,we aimed to analyse the effect of calibrator lot change on low-level hsTnT results.

Methods:Serum hs TnT levels of a total of 78 patients were measured on a Cobas e411(Roche Diagnostic,Germany) using two different calibrator lots(Lot 1:674314 and Lot 2:743273).All studies were performed in duplicate.Statistically,the comparison of results was assessed by Pearson correlation and the difference between results was assessed by total delta control.For clinical evaluation,a cut-off value of <5 ng/L was used and the results of the two lots were grouped.Non-parametric statistical analyses were performed.SPSS ver.26(IBM SPSS,USA) was used for statistical analysis.

Results:The CV values of the analyzer were <4.61%(desirable CV:5.7%).The minimum and maximum values of hs TnT results were between 2.90-13.15 ng/L for lot1 and 2.90-14.15 ng/L for lot2.There was a statistically significant difference between the results of the two lots($p<0.001$).The r= 0.717($p<0.001$) between lots.The median delta difference and interquartile range(IQR)between lots was -1.115(-2.207-0.0001).When the groups were compared, 51.3% for lot1 and 71.8% for lot2 had hsTnT >5 ng/L results and there was a significant difference between the groups($p<0.001$).

Conclusions:These findings showed that there was a difference between the results of hs TnT measurements due to the lot change of calibrators.This may lead to unnecessary patient follow-up.In conclusion,we think that it is important to keep in mind the lot-to-lot variation of calibrators in the clinical evaluation of patient results and to inform clinicians when necessary.

Keywords: High sensitive troponin T, calibrator lot change, clinical decision, laboratory management

OP069

DEVELOPMENT OF SALIVARY CORTISOL MEASUREMENT IN THE DIAGNOSIS OF CENTRAL ADRENAL INSUFFICIENCY AND ASSESSMENT OF SERUM DHEA AND DHEA-S LEVELS ROLE

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Objectives: Accurate and early diagnosis of central adrenal insufficiency (Central AI) is important, especially in cases of partial insufficiency. Saliva has become an important diagnostic tool in recent years due to its many advantages. Valid, applicable and sensitive LC MS/MS method has gained importance in recent years for the determination of steroids in plasma and urine.

Methods: In this study, we verified an accurate and selective LC MS /MS method for the measurement of cortisol in saliva samples collected from children with suspected central adrenal insufficiency who underwent low-dose ACTH stimulation test (LDT).

Results: Linear regression analysis showed that salivary cortisol response to LDT was highly positive correlated with serum cortisol (r=0.865). Peak values of salivary cortisol were obtained at 40 min after simulation. By using the cut-off value for serum cortisol as 550 nmol/L, the ROC analysis was performed, and the cut-off value for salivary cortisol was determined as 12.0 nmol/L at 40 minutes. Plasma DHEA and DHEAS levels were found to be low in the central AI group compared to the controls ($p<0.001$); than a threshold value for DHEAS was suggested as 17.5 ug/dL. Based on the basal salivary cortisol concentration and the maximum cortisol concentration in the control and central AI groups, respectively, a new algorithm, which is rapid and inexpensive for routine application was proposed.

Conclusions: The evidence showed that salivary cortisol and plasma DHEAS measured by the sensitive LC MS/MS may be alternative methods to assess HPA axis and in the diagnosis of central AI.

Keywords: central adrenal insufficiency, basal cortisol, salivary cortisol, mass spectrometry, threshold value

OP070

COMPARISON OF TURNAROUND TIMES FOR DIFFERENT BECKMAN COULTER DEVICES: EXPERIENCE FROM THE EMERGENCY LAB, ISTANBUL TRAINING AND RESEARCH HOSPITAL

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Objectives**:** In emergency departments, rapid processing of hormone tests, especially Troponin, is critical for timely diagnosis and treatment. Our emergency laboratory faced delays in hormone test results with the Access2 device. To address this, we replaced it with a higher-capacity hormone analyzer (DXI600) from the same manufacturer and, due to space constraints, with a lower-capacity biochemistry analyzer (AU5811-DXC700). This study aims to evaluate how these changes impacted result turnaround times.

Methods: We analyzed a one-month period using both the old and new devices. We measured the time from test entry to result approval and calculated the average, median, and standard deviation (SD) of these times. A 60-minute turnaround time target was set, and the proportion of results meeting and exceeding this limit was determined.

Results**:** For biochemical tests of 23 parameters, the old device (AU5811) processed 171,092 tests, with 2,183 (1.28%) exceeding 60 minutes. The new device processed 191,377 tests, with 2,705 (1.41%) exceeding the limit. For hormone tests with 4 parameters, the old device processed 10,808 tests, with 679 (6.28%) exceeding 60 minutes. The new device processed 11,886 tests, with 248 (2.09%) exceeding the time limit.

Conclusions: With the old hormone device (Access2), 6.28% of results exceeded 60 minutes. This was reduced to 2.09% with the new device (DXI600), significantly improving turnaround times. For biochemical analyses, the proportion slightly increased from 1.28% to 1.41%. Overall, the device changes were significant and beneficial, improving efficiency and clinical outcomes.

Keywords: Emergency department, Comparison, Beckman Coulter, Turnaround times

OP072

EFFECTS OF ADROPIN ON A RAT MODEL OF SUBARACHNOID HEMORRHAGE

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Objectives: The goal was to investigate the early effects of exogenously administered adropin (AD) on neurological function, endothelial nitric oxide synthase (eNOS) expression, nitrite/nitrate levels, oxidative stress, and apoptosis in subarachnoid hemorrhage (SAH).

Methods: After administering AD intracerebroventricularly (10 µg/5 µl-rate of 1 µl/min), a SAH model was induced in Sprague-Dawley rats by injecting autologous blood into the prechiasmatic cistern. The effects of AD were evaluated 24 hours post-SAH. The modified Garcia score was used to assess functional deficits. Levels of adropin and caspase-3 prote-

ins were quantified using ELISA, while nitrite/nitrate levels, total antioxidant capacity (TAC), and reactive oxygen/nitrogen species (ROS/RNS) were measured using standard kits. eNOS expression and apoptotic neurons were identified through immunohistochemical analysis.

Results: The SAH group showed significantly lower on the modified Garcia score compared to the sham and SAH + AD groups. Administration of adropin led to an increase in brain eNOS expression, nitrite/nitrate levels, and adropin levels compared to the sham and SAH groups. SAH resulted in elevated ROS/RNS production and decreased antioxidant capacity in the brain. Adropin enhanced brain TAC and reduced ROS/RNS levels in SAH rats, with no significant differences observed between the sham and SAH + AD groups. Apoptotic cells were markedly more abundant and intense following SAH, but this increase was mitigated by adropin treatment.

Conclusions: Adropin enhances eNOS expression and alleviates neurobehavioral deficits, oxidative stress, and apoptotic cell death in a SAH model. The findings suggest that adropin offers protection against early brain injury related to SAH.

Keywords: Subarachnoid hemorrhage, Early brain injury, Adropin, eNOS, Apoptosis

OP073

DRY CHEMISTRY VS. DIRECT ENZYMATIC METHODS: A COMPARATIVE ANALYSIS OF AMMONIA MEASUREMENT TECHNIQUES

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Objectives: Ammonia measurement is critical for diagnosing neonatal urea cycle deficiencies, hepatic encephalopathy, and hepatic coma. Selection of an appropriate measurement method is essential, as results are significantly affected by preanalytical and analytical factors. This study aimed to compare the dry chemistry method with the direct enzymatic method for ammonia measurement.

Methods: Following CLSI EP9-A3 guidelines, 40 samples were collected in K3EDTA tubes and transported under a cold chain. Ammonia levels were first measured using whole blood samples on the DRI-CHEM NX10 (Fuji Film Co., Japan) analyzer. Subsequently, samples were centrifuged at 1800g for 10 minutes to obtain plasma, and plasma ammonia levels were measured using the glutamate dehydrogenase enzymatic method on the Beckman Coulter AU5800 (Beckman Coulter, CA, USA) analyzer. Coefficient of variation (CV%) values were calculated in Excel. Deming regression and Kappa analysis were performed with MedCalc and SPSS version 27, respectively. A p-value of <0.05 was considered statistically significant.

Results: CV% values were 6.95% for the Fuji Film analyzer and 4.44% for the Beckman Coulter analyzer. The Deming regression equation was $y = 0.762x + 0.034$, with 95% confidence intervals (CI) for the slope and intercept of 0.71 to 0.82 and -6.78 to 6.85, respectively. The Kappa value was 0.798 ($p < 0.001$), indicating strong agreement between the two methods.

Conclusions: The dry chemistry method consistently produced lower ammonia values compared to the enzymatic method. Despite this, both methods showed adequate clinical correlation. Given its shorter measurement time, ease of use, and cost-effectiveness, the dry chemistry method may be preferable in clinical settings.

Keywords: Ammonia, biochemistry, plasma, blood

OP074

MOVING AVERAGE MEETS BIOLOGICAL VARIATION: MOVING PERCENTAGE OF FAILED DELTA CHECKS (MPFDC), A NEW PATIENT-BASED REAL-TIME QUALITY CONTROL MODEL

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Objectives: For measurands with a low index of individuality(II), delta check is crucial. If delta percentage change(DPC) values in different patients consecutively exceed the reference change value(RCV), it may indicate an analytical problem. Similar to moving average(MA), percentage of DPCs exceeding RCV can be used as a quality control(QC) model by comparing it with a certain threshold.

Methods: Study was performed in Gazi University Biochemistry Laboratory on September-November,2023. For creatinine(alkaline picrate,Advia Chemistry Systems,Siemens), pooled-CV_a was 2.5%. Within-subject biological variation(CV_i)=4.7% was selected from EuBIVAS. RCV calculated as 19%. For DPC calculation we included previous results up to one year. If DPC>RCV, it was counted as a violation. Percentage of violations was calculated for every 20 consecutive patients. Similar to MA, when a new result is added, MpFDC(moving percentage of failed delta checks) removes the oldest data, and calculates percentage of violations continuously. QC for creatinine was performed every 2 hours(during one week), and MpFDC thresholds determined as 35%/30%(for positive/negative direction). After excluding dialysis patients and patients without previous results, and previous results measured with different system, we applied truncation(Truncation limits:<0.31 and >4.1). Remaining 5484 results were divided into 55 batches.

Results: After appyling positive and negative errors of 15% to each batch, median number of patients affected before error detection(MNPed) was 34 and 29, respectively. Median time until detection of error was 18 minutes. Sensitivity/specificity values were 93%/89% and 100%/96% for positive and negative errors, respectively.

Conclusions: MpFDC is a novel PBQC model based on CV_i ,and suitable for measurands with low II.

Keywords: Patient-based quality control, biological variation, delta checks, quality control, laboratory management

OP075

DETERMINATION OF BIOLOGICAL VARIATION OF CARBOHYDRATE-CONTAINING AND CARBOHYDRATE-DEFICIENT TRANSFERRINS BY INDIRECT SAMPLING APPROACH

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Objectives: The aim of this study was to determine the intra- and inter-individual biological variation(BV) values, reference variation value(RCV),individuality index(II) and analytical performance targets of carbohydrate-rich(CT) and carbohydrate-deficient transferrins(CDT) using an indirect sampling approach according to serially monitored routine laboratory results.

Methods: In our study,patients aged 18-65 who applied to AMATEM Polyclinic between 01.01.2023-01.08.2024 were retrospectively examined.Serial CDT and CT measurements were performed on the patients with a maximum of 2 weeks interval.CDT:asialo,monosialo and disialo and CT:trisialo,tetrasialo and pentasialo forms were measured by HPLC method(Shimadzu-LC-2052).The results of 100 patients were included as the ideal data size.The coefficients of variation(CVI) and inter-individual(CVG) of all patients were determined according to Biological Variation Data Critical Appraisal Checklist (BIVAC). RCV and II were calculated from BV elements.BV elements were determined with the online calculation tool https://turcosa.shinyapps.io/biovar/

Results: A total of 131(M: 117/F: 14) patients were included in the study.The mean age of the patients was 37.9(±10.22).The mean follow-up series of the patients was 7.35(min-max6-35).Asialo,monosialo levels were not detected in the patients. The mean values for disial,trisialo,tetrasialo and pentasialotransferrin were 1.35±0.68, 4.36±1.45, 80.92±1.83 and 13.39±1.68, respectively.For CVI and CVG(95%CI),disialo:26.25%(24.30-28.49) and 11.44%(6.19-17.86),trisialo:23.51%(21.86-25.38) and 13.28%(9.08-18.82),tetrasialo 1.47%(1.37-1.58) and 0.62%(0.36-0.93) and pentasialo 9.70%(9.12-

10.35) and 6.20%(4.68-8.22), respectively.RCV for disialo,trisialo,tetrasialo and pentasialo transferrin were calculated as 77.98-70.06-4.36 and 28.96 and II:2.29-1.77-2.36-1.56, respectively.

Conclusions: In our study,BV elements were determined for CDT and CT.This will provide better clinical usability of the tests,determination and applicability of analytical performance targets.It will also contribute to the BV database and literature for CDT and CT.

Keywords: Carbohydrate-deficient transferrin, biological variation, High performance liquid chromatography

OP076

A PRACTICAL APPROACH TO LIPEMIA: POLYETHYLENE GLYCOL

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Objectives: Lipemia, though less common than other preanalytical interferences, can significantly impact test results in clinical chemistry laboratories, leading to potential errors or sample rejection. This study explores the use of polyethylene glycol (PEG) as a method to mitigate the effects of lipemia on laboratory test outcomes.

Methods: A preliminary comparison of lipemia exclusion methods identified PEG as a relatively effective and practical solution. Based on this, PEG was chosen for the main study. Serum samples with normal biochemistry results and minimal hemolysis, icterus, and lipemia (HIL) indices were pooled and subjected to standard tests. To simulate lipemia, 20% Intralipid solution was added to the serum pool at four different concentrations, creating in-vitro lipemic samples. This study analyzed AST, ALT, GGT, AMYLASE, LIPASE, UREA, TROPONIN, LDL, HDL, TRIGLYCERID, TOTAL BILIRUBIN, DIRECT BILIRUBIN, IRON, CK, UIBC, CRP, and ASO tests and the results recorded. PEG was then added to the lipemic samples to precipitate the lipids, and tests were repeated on the clarified samples.

Results: The results from the original serum, lipemic, and PEG-treated samples were compared. Corrected results were calculated using dilution factors, and BIAS was determined relative to the original serum pool. The addition of PEG effectively excluded lipemia, with acceptable BIAS observed even in samples with high lipemia levels, where testing was otherwise challenging.

Conclusions: In conclusion, PEG proved to be an effective and cost-efficient method for excluding lipemia, making it a practical choice for routine use in clinical laboratories.

Keywords: Lipemia, interference, biochemical tests

OP077

OPTIMIZING TROPONIN T TURNAROUND TIMES IN A CARDIOVASCULAR HOSPITAL

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Objectives: This study aimed to assess the turnaround times (TATs) for troponin T testing at Mehmet Akif Ersoy Cardiovascular Surgery Training and Research Hospital. The focus was on identifying delays in the preanalytical phase (from bloodcollection to acceptance) and the laboratory phase (fromacceptance to approval).

Methods: Data were collected for troponin T tests conducted from January 1, 2024, to June 30, 2024. The TATs for both phases were analyzed to determine average, median, and standard deviation values. These results were evaluated to identify potential inefficiencies and opportunities for improvement in the testing process.

Results: The analysis revealed that the average preanalytical TAT was 21.52 minutes with a median of 18 minutes, exceeding the 15-minute target. 76.33% of samples met the target, while 23.67% did not. For the laboratory phase, the average TAT was 57.59 minutes and the median TAT was 52 minutes, which is also above the 45-minute target. However, 95.4% of samp-

les met the target, indicating overall efficiency in the laboratory phase.

Conclusions: The preanalytical phase at our hospital is slightly delayed, suggesting areas for improvement to enhance diagnostic efficiency. In contrast, the laboratory phase is highly efficient, underscoring the effectiveness of the internal processes. Future efforts should focus on reducing preanalytical delays to further improve overall turnaround times.

Keywords: Laboratory Efficiency, Troponin T, Turnaround Time

OP078

DETERMINATION OF URINE NETRIN-1 AND BETA-HYDROXY BUTYRATE LEVELS IN DIABETIC KETOACIDOSIS CASES

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Objectives: Diabetes mellitus (DM) is a chronic metabolic disorder characterized by high blood glucose levels, leading to severe complications. Diabetic ketoacidosis (DKA) is a critical acute complication of DM marked by hyperglycemia and acidosis due to ketone body accumulation. The pathophysiology involves insulin deficiency and the effects of counter-regulatory hormones, leading to increased gluconeogenesis and lipolysis. This study investigates the relationship between urine Netrin-1 and β-hydroxybutyrate (β-OHB) levels in DKA patients.

Methods: The study included 40 patients diagnosed with DKA and 40 healthy controls. Urine samples were collected, centrifuged, and stored at -80°C. Netrin-1 and β-OHB levels were measured using BTlab Quantitative ELISA kits. Data were analyzed using SPSS, with tests for normality and appropriate statistical comparisons conducted.

Results: No significant demographic differences were found between the patient and control groups. Urine ketone and glucose positivity were significantly higher in DKA patients. Blood glucose, urea, lactate, and metabolic acidosis markers were also elevated in DKA patients. No significant difference was found in urine β-OHB and Netrin-1 levels between the groups. However, a moderate positive correlation between β-OHB and Netrin-1 was observed, along with various significant correlations between these markers and other biochemical parameters.

Conclusions: This study highlights significant biochemical differences between DKA patients and healthy controls, emphasizing the importance of monitoring biochemical parameters for managing DKA. Although no significant differences in urine β-OHB and Netrin-1 levels were found, their correlation suggests a potential role in DKA pathophysiology, warranting further research with larger sample sizes.

Keywords: Diabetic ketoacidosis, netrin-1, beta-hydroxybutyrate

OP079

EVALUATION OF CONDUCTIVITY-BASED OSMOLALITY MEASUREMENT IN URINE USING THE URIT US 2000C

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Objectives: Osmolarity is the concentration of osmoles in a volume of solvent and measured in milliosmoles per kilogram of water (mOsm/kg). Urine osmolality is one of the important laboratory parameters used in the evaluation of kidney functions, electrolyte and water balance. Freezing point depression osmometers are utilized to determine a solution's osmotic strength as a reference method. Nowadays osmalality value can be estimated using conductivity. Conductivity is a nonlinear function of electrolyte concentration in liquids and is easily measured with routine urine anlay-

zers. We aimed to compare the results of conductivity and osmolarity measured by osmometer.

Methods: 17 fresh spot urine were analyzed both with urine analyzer(UritUS2000C) and freezing point osmometry. The results were statistically analyzed using MedCalc statistical software. Summary statistics of each parameter were reported in median and minimum maximum. The Pearson test was used for the correlation. Passing□Bablok linear regression analysis was used to compare osmometry and conductivity, and Bland□Altman analysis was also performed to evaluate bias and 95% CI limits of agreement.

Results: The median and minimum-maximum levels of the osmometry and conductivity were 723(65-1241) and 775 (66-1419), respectively. Within the groups, the correlation coefficient (r)was 0.97(0.9215-.0.9908) with a significance level p< .0001. Passing-Bablok regression analysis of the methods resulted in a regression equation y = -36.1848 (95% Cl: -217.3279 -67.5714)+1.2592(95% Cl:1.08-1.52)x while the significance of linearity was acceptable (Cusum test for linearity; P >0.10).

Conclusions: Conductitivity results can be safely used interchangeably instead of osmalarity.

Keywords: Conductivity, osmolarity, osmometry

OP080

COMPARISON OF TWO COLUMNS AND MOBILE PHASE COMPOSITIONS FOR SIMULTANEOUS DETERMINATION OF VITAMINS A (RETINOL) AND E (α-TOCOPHEROL) USING HPLC-UV

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Objectives: The objective of this study is to develop a rapid, sensitive, and cost-effective method for the simultaneous determination of vitamins A (Retinol) and E (α-Tocopherol) for clinical laboratories.

Methods: The analysis was conducted on an Agilent 1200 HPLC series. Two columns, Hichrom-C18 (12.5cm*4mm*5µm) and ACE-C18 (25cm*4.6mm*5µm), were evaluated using standard solutions. The method for each column was optimized with respect to mobile phase composition, flow rate, and column temperature. Column performance parameters were determined for each column under the optimized conditions.

Results: For the Hichrom-C18 column, optimal conditions with the shortest analysis time were achieved with a flow rate of 1.5 mL/min, 95% methanol, and a temperature of 45°C. Under these conditions, the retention times were A:1.7 and E: 4.3 minutes, with total analysis time of 6 minutes. For the ACE-C18 column, a flow rate of 2.0 mL/min, 100% methanol, and a temperature of 50°C were found to be optimal. These conditions resulted in longer retention times (A:2.73 and E:7.75 minutes) with total analysis time of 10 minutes. The ACE-C18 column had superior performance in nearly all performance parameters compared to the Hichrom-C18 column. Both columns exhibited comparable precision with CV<5%. The ACE-C18 column exhibited slightly better sensitivity, with a LOD of 0.9 mg/L for α-tocopherol and 0.015 mg/L for retinol.

Conclusions: The ACE-C18 column demonstrated superior performance for both vitamins. However, Hichrom-C18 column, with its lower mobile phase consumption and faster analysis time, may be more appropriate for routine and cost-effective determinations in clinical laboratories.

Keywords: Retinol, HPLC-UV, alpha-tocopherol, chromatographic columns

OP081

DETERMINATION OF THE EFFECTS OF GENOTOXIC AND OXIDATIVE DAMAGE OF ENVIRONMENTAL POLLUTANT MICROPLASTICS ON ZEBRAFISH (Danio rerio)

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Objectives: Microplastics are defined as any synthetic solid particles or polymeric matrices ranging in size from 1 to 5 mm and insoluble in water. This study aimed to evaluate the effects of polystyrene (PS) and polyethylene (PE) microplastics on DNA damage (8-OHdG, pg/mg tissue), advanced oxidation protein products (AOPP, uM/mg protein) malondialdehyde (MDA, nmol/g tissue), and glutathione (GSH, µmol/g tissue) in zebrafish.

Methods: After adapting zebrafish to laboratory conditions for two weeks, 14 with an average length of 3-5 cm were placed in 5 aquariums of 10 liters filled with spring water and with 1-5 µm PE and 9.5-11.5 µm PS at doses of 1 and 10 mg/L concentrations for 96 hours and 21 days.

Results: The tissue levels of MDA (96h, 1 mg/L PS and PE, p=0.008, p=0.041, respectively) and GSH (96h, 1 and 10 mg/L PE, p=0.004, p=0.004) were increased compared to the control group. GSH (1 and 10 mg/L PS in 21 days, p=0.033, p=0.045) and AOPP levels (1 and 10 mg/L PS in 96h, p=0.008, p<0001) were decreased compared to the control group. DNA damage as 8-OHdG levels (96h, 10 mg/L PS group, p=0.030) was reduced compared to the control group and increased in the 1 mg/L PE 21 (p=0.028) days group compared to the control group.

Conclusions: The 1 and 10 mg/L PE and PS microplastics doses were thought to affect the oxidant-antioxidant system and may cause DNA damage in zebrafish depending on the dosage and exposure time of the chemicals.

This study was supported by Gazi University Scientific Research Projects Unit with the code FDK-2022-7588. We would like to thank Gazi University Scientific Research Projects Unit for enabling our study to be conducted.

Keywords: Microplastic, Zebrafish, Oxidative damage, DNA damage

OP082

PROBING OLIGOMERİZATİON AND DUAL E2 BINDING SİTES OF HECT LIGASES USING NMR SPECTROSCOPY

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Objectives: E6-associated protein (E6AP), is a versatile enzyme with a central role in regulating cellular processes through the ubiquitin-proteasome system (UPS). Originally identified as a partner of the human papillomavirus (HPV) E6 oncoprotein, E6AP has since been recognized as a significant regulator of various cellular pathways, including cell cycle regulation, transcription, and tumorigenesis. To explore the oligomerization and binding dynamics of the E6AP HECT domain with UbcH7, we employed advanced solution-state NMR techniques. Our study focused on exploiting the cryptic binding site within the E6AP HECT domain using methyl-specific isotopic labeling, an approach particularly suited for NMR analysis of large proteins.

Methods: nitially, we isotopically labeled and purified E6AP HECT protein using ILVA labeling. We then performed a series of sophisticated NMR experiments, including 3D ^{13}C NOESY, 3D hCCH-NOESY, and 4D ^{13}C NOESY. Automated methods for assigning methyl NMR spectra in large proteins were utilized to complete the ILVA methyl assignments.

Results: We conducted detailed atomic-level analyses of the E6AP-UbcH7 interaction through NMR titrations, identifying two distinct regions with significant chemical shift perturbations (CSPs). Additionally, we used TRACT analysis to examine the oligomerization state of the protein at concentrations of 90 µM and 500 µM. The calculated TauC values (44.7 ns and 45.48 ns) suggest that the protein exists in a dynamic equilibrium between dimeric (36.78 ns) and trimeric (54.79 ns) forms.

Conclusions: Our findings underscore the existence of distinct E2 interaction regions on E3 enzymes, whi-

ch are critical for E2-E3 interactions and the broader mechanism of action within the ubiquitin and ubiquitin-like systems.

Keywords: E6AP, NMR Spectroscopy, Ubiquitination, HECT Ligases

OP083

OXIDATIVE STRESS AND ANTIOXIDANT STATUS IN RAT LIVER : EFFECT OF CAFETERIA DIET AND RETROPERITONEAL ADIPOSE TISSUE DENERVATION

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Objectives: The cafeteria (CAF) diet model, consists of tasty but unhealthy food products that humans eat, often used in animal models to mimic obesity in humans. Denervation experiments in which nerve fibers are cut used to study effects of the nervous system on adipose tissue. Studies have shown that denervation can correct metabolic disorders associated with high-fat dietary intake. Our aim was to investigate the effect of retroperitoneal adipose tissue denervation on oxidant-antioxidant status in the liver in rats fed CAF diet.

Methods: 24 male Wistar rats were used and 4 groups were randomly assigned (n=6): control, control+denervation, CAF diet, CAF diet+denervation. The first two groups were fed with laboratory rodent chow and other groups were fed CAF diet for 16 weeks. In the denervation groups, retroperitoneal adipose tissue was bilaterally denervated at week 8. At the end of period, rats were sacrificed by decapitation. Superoxide dismutase (SOD), catalase (CAT) and malondialdehyde (MDA) were measured manually, while total antioxidant status (TAS) and total oxidant status (TOS) were measured using commercial kits.

Results: MDA level increased significantly in the control+denervation group compared to the control group ($p<0.05$). In CAF group, TOS and MDA levels increased significantly compared to the control group, while CAT level decreased significantly ($p<0.05$). In the CAF+denervation group, TAS and SOD levels increased significantly, while MDA level decreased significantly ($p<0.05$) compared to the CAF group.

Conclusions: Denervation increased oxidative stress in rats fed rodent chow, but decreased in rats fed CAF diet in liver tissue.

Keywords: Cafeteria Diet, Denervation, Obesity, Oxidative Stress

OP084

DETERMINATION OF MACROPROLACTINEMIA RATE AMONG ADULTS WITH HYPERPROLACTINEMIA İN TURKIYE

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Objectives: Hyperprolactinemia is a common endocrine disorder, especially in women, caused by factors such as pregnancy, lactation, tumors, medications, or macroprolactinemia. Prolactin circulates in three forms—monomeric, dimeric, and macroprolactin—with monomeric prolactin being the dominant (about 80-90%) and biologically active form responsible for hyperprolactinemia symptoms. Macroprolactin is a high molecular weight complex (~150 kDa) composed of monomeric prolactin bound to immunoglobulin, typically IgG, forming an antigen-antibody complex. The aim of our study is to determine the prevalence of macroprolactinemia among people with hyperprolactinemia.

Methods: A total of 1948 patients with hyperprolactinemia were included in the study. Serum Prolactin levels were analyzed using the Roche Cobas e801 immunoassay system in ISLAB-2 Core Laboratory between 01.09.2023 and 01.09.2024. Samples were precipitated using polyethylene glycol (PEG) 6000. Recovery rates were classified as <40% (positive for macroprolactinemia), 40-60% (borderline), and >60% (negative).

Results: A total of 1948 patients with hyperprolacti-

nemia were included with a mean age of 32.6 ± 10.7 years. Macroprolactin was detected as positive in 11.4 % of the patients with median initial-prolactin 42.05 ng/ml (15.7–408) and median post-PEG prolactin 11.4 ng/ml (2–136), and an additional 10.9 % exhibited borderline levels of macroprolactin.

Conclusions: Our study has highlighted the importance of evaluating the presence of macroprolactinemia, particularly in patients without clinical findings consistent with hyperprolactinemia. This approach can help prevent unnecessary medication use and exposure to advanced imaging techniques, ensuring an accurate diagnosis.

Keywords: Polyethylene glycol, Hyperprolactinemia, Macroprolactin

OP085

INVESTIGATION OF SERUM ALDOSTERONE AND RENIN LEVELS IN PATIENTS WITH SCHIZOPHRENIA AND BIPOLAR DISORDER

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Objectives: Bipolar disorder (BD) is characterized by mood episodes and alternating periods of euphoria, leading to a worsening quality of life. Schizophrenia (SCZ) is a mental disorder characterized by multiple psychiatric symptoms, including hallucinations, etc. The renin-angiotensin-aldosterone system (RAAS) is crucial in regulating the sympathetic system and tone and controlling blood pressure, vascular tone, and electrolyte balance. This study aimed to measure aldosterone and renin levels in patients diagnosed with schizophrenia and bipolar disorder and to examine the relationship between them.

Methods: A total of 65 patients, 35 bipolar and 30 schizophrenia patients, were included in the study. Aldosterone and renin assay will be run using the appropriate procedure with the CLARIOstar BMG LABTECH instrument according to the manufacturer's instruction for the commercial ELISA kits ordered. Statistical analysis was performed using IBM SPSS Statistics 26.0

Results: Serum renin levels were statistically significantly higher in SCZ and BD compared to the control group ($p<0.05$). Serum aldosterone level was statistically significantly higher in BD when compared with the control group ($p<0.05$).

Conclusions: Renin levels were significantly increased in both patient groups, while aldosterone levels were significantly higher in bipolar disorder patients. Further research is needed on the roles of renin in these disorders. Based on this result, renin is associated with SCZ and BD, and renin's potential importance as a biomarker is emphasized.

Keywords: RAAS, Bipolar disorder, Schizophrenia

OP086

COMPARISON OF CARDIOVASCULAR DISEASE RISK SCORES BY DIFFERENT SYSTEMS

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Objectives: Cardiovascular diseases (CVD) are the leading cause of morbidity and mortality worldwide. Despite advances in health and technology, the global prevalence of CVD continues to increase. Early detection and treatment of CVD is important for survival. In this study, we aimed to compare and evaluate the differences between PREVENT, a newly developed system for CVD risk calculation, and other systems for CVD risk calculation.

Methods: In this study, 10-year CVD risk was calculated using PREVENT, Reynolds and Framingham systems. CVD risk scores were compared according to gender, high density lipoprotein cholesterol (HDL-C),

total cholesterol, systolic blood pressure and smoking status, which are common risk factors in all systems. To calculate the risk scores, a single variable was changed and the others were kept constant.

Results: When gender status was compared in CVD risk scores, it was observed that the risk of developing the disease was generally higher in men than in women. For both sexes, smoking status increased the risk of CVD at an earlier age compared to non-smoking status. When other risk factors were held constant, an increase in total cholesterol increased the risk score in both sexes. Considering the risk factors identified in individuals, PREVENT provided categorization in four different groups and narrower range.

Conclusions: Using PREVENT for CVD risk assessment is applicable and easy. By accurately determining the CVD risk score, steps such as earlier diagnosis, preventive treatment, reduction of drug use, and lifestyle changes can contribute to reducing the prevalence of the disease.

Keywords: Framingham, cardiovascular disease, risk assessment, Reynolds, PREVENT

OP087

RELATIONSHIP BETWEEN LDL PHENOTYPES, TYG INDEX AND TG/HDL-C RATIO IN CORONARY ARTERY PATIENTS

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Objectives: Long-term exposure to cardiometabolic risk factors, including hypertension, diabetes, obesity, hyperlipidaemia and metabolic syndrome, which increase with age, represents a significant contributor to the formation and development of atherosclerotic plaques. High plasma lipid and lipoprotein levels and insulin resistance contribute to the development and progression of atherosclerosis. There is a notable correlation between LDL phenotypes and disease. Additionally, there is a substantial relationship between insulin resistance and a novel marker, the TyG index. The objective of this study was to examine the association between LDL phenotype and the TyG index, as well as the TG/HDL-C ratio, in patients with coronary artery disease.

Methods: The study consisted of 221 patients diagnosed with coronary artery disease (CAD) and 45 healthy individuals. The plasma lipid, lipoprotein, and glucose levels were determined in a routine biochemistry laboratory using an automated analyzer. LDL phenotypes were analysed using the Quantimetrix lipoprinting system. The TyG index was calculated using the following formula: Ln (fasting TG (mg/dL) × FBG (mg/dL)/2). The TG/HDL-C ratio was calculated as an indicator of LDL diameter.

Results: When TyG index analysis was performed according to LDL phenotypes, it was found that the TyG index was higher in individuals with phenotype B, and this elevation was statistically significant ($p < 0.05$). Furthermore, the TG/HDL-C was found to be statistically significantly higher in individuals with phenotype B ($p<0.05$).

Conclusions: It was concluded that both the TyG index and the TG/HDL-C ratio have the potential to serve as novel biomarkers for the assessment of atherosclerosis risk.

Keywords: TGHDL-C RATIO, TyG index, Coronary Arter Disease, LDL phenotype

OP088

THE ROLE OF OSTEOACTIVIN IN BONE METABOLISM

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Objectives: The aim of study is to investigate the role of osteoactivin as a more sensitive and modern diagnostic biomarker in metabolic and repair processes occurring in bone and cartilage tissue in osteoporosis and osteoporotic fractures. Osteoactivin (OA) is a novel glycoprotein that is highly expressed during osteoblast differentiation.

Methods: This study was carried out on patients between the ages of 45-83 from the Department

of Traumatology and placed in 3 groups: group I - 14 patients with osteoporosis, group II - 15 patients with non-osteoporotic fractures, group III - 25 patients with osteoporotic fractures. The control group consisted of 14 healthy people. To monitor changes in osteoactivin, blood samples were taken at 3 stages: on day 1 before treatment, on day 10 of treatment, and 1 month after treatment. The concentration of OA in the blood serum was determined by ELISA method on the immunoassay analyzer "Mindray MR- 96A" using a set of reagents from the company Boster (ELISA Kit PicoKine,USA). The statistical evaluation was performed by using SPSS 22.0 program (USA).

Results: Compared to the control, osteoactivin concentration increased by 66.2% in patients with osteoporosis, 54.1% in patients with non-osteoporotic fractures, and 80.2% in patients with osteoporotic fractures,indicating that it plays an important role in the pathogenesis of osteoporotic fractures.No significant change was observed in osteoporotic fractures due to their delayed healing.

Conclusions: The ROC curve was created and it was determined that osteoactivin is a test with high general diagnostic value, specificity and informativeness in the prognosis of osteoporosis and osteoporotic fractures.

Keywords: Osteoactivin, osteoporosis, osteoporotic fractures, bone metabolism

OP090

EVALUATION OF TRIMETHYLAMINE-N-OXIDE, INDOXY SULFATE AND P-CRESOL SULFATE LEVELS IN PATIENTS WITH THYROIDITIS OF HASHIMOTO'S DISEASE

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Objectives: Hashimoto's thyroiditis (HT), an autoimmune thyroid disease, has been associated with gut microbiota and intestinal permeability. Trimethylamine-N-oxide (TMAO), indoxyl sulfate (IS) and p-cresol sulfate (p-CS) are metabolic products of the gut microbiota and have been associated with inflammation and cardiovascular risks. The aim of this study was to evaluate trimethylamine-N-oxide (TMAO), indoxyl sulfate (IS) and p-cresol sulfate (p-CS) levels in HT patients and to examine the potential effects of these biomarkers on HT pathophysiology.

Methods: The study included 59 patients with HT and 62 healthy controls. TMAO, IS and p-CS levels in serum samples were measured by LC-MS/MS method. Demographic data and thyroid function tests were recorded and statistical analyses were performed using independent sample t-test and Pearson correlation analysis for normally distributed parameters, while Mann-Whitney U test and Spearman correlation test were used for comparison between groups for non-normally distributed parameters.

Results: TMAO and IS levels were significantly higher in HT patients compared to healthy controls, while p-CS levels were higher in the HT group, but this difference was not significant. A significant positive correlation was found between TMAO, p-CS and IS in both groups.

Conclusions: This study shows that increased levels of TMAO, IS and p-CS in HT patients may be related to gut microbiota. Furthermore, the associations of these parameters with other autoimmune and cardiovascular diseases provide important clues in understanding the multisystemic effects of HT. Our study draws attention to the role of gut microbiota in the treatment and management of HT and emphasizes the importance of research in this field.

Keywords: Hashimotos thyroiditis, trimethylamine-N-oxide, indoxyl sulfate, p-cresol sulfate, gut permeability

OP091

SAMPLES WHOSE FATE CHANGES BEFORE REACHING THE LABORATORY: A CASE REPORT ON PREANALYTICAL ERROR

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Objectives: The Total Testing Process is a multi-stage procedure rooted in the concept of the brain-to-brain loop. Ensuring control over each stage is crucial to achieving the most accurate results.

Methods: A 48-year-old female patient presented to the Internal Medicine clinic with symptoms of weakness and foot pain. Initial laboratory tests, conducted under a preliminary diagnosis of "Diabetes Mellitus, Unspecified, Without Complications," revealed an HbA1c level of 9.2% (77 mmol/mol) and a fasting glucose level of 107 mg/dL. Both results were confirmed by repeat testing. Given the possibility of some patients having their blood drawn after administering their morning insulin, the results were initially validated. However, upon learning from the clinician that the patient did not have a prior diagnosis of diabetes, a new sample was obtained and re-tested. The subsequent tests indicated an HbA1c level of 5.2% (37 mmol/mol), confirmed by two independent measurements. This discrepancy led to the suspicion of a preanalytical error.

Results: A root cause analysis was conducted by reviewing all HbA1c values submitted to our laboratory on that day. It was discovered that another patient had an HbA1c level of 9.2%, with sample collection and labeling times coinciding exactly with those of the initial patient. It is likely that the empty HbA1c tube of this patient was mistakenly mixed with the other patient's samples during labeling or collection.

Conclusions: Although quality indicators for managing preanalytical errors can reduce the rate of such errors, some errors may still go undetected.

Keywords: Total Testing Process, Preanalytical Error, Quality Indicators

OP092

COULD VERY LOW CHOLESTEROL AND ITS CONSTITUENTS LEVELS BE A WARNING SIGN FOR SEPSIS?: A CASE REPORT

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Objectives: Cholesterol is integral to several key physiological processes including physical properties of the cell membrane, maintenance of cell membrane integrity, signaling pathways, immunity, and as a precursor for the synthesis of hormones, Vitamin D, and bile acids. Sepsis is a complication of infection is characterized by an uncontrolled systemic inflammatory response. The aim of this case is to draw attention to the association between low concentrations of total cholesterol, its constituents (HDL-C, LDL-C) and sepsis.

Methods: An 80-year-old male patient with Alzheimer's disease, has decubitus ulcer and indwelling urinary catheter which has been in place for 6 months, was hospitalized in palliative care. Laboratory tests revealed anemia (9.0 g/dL), leukocytosis (24.7/mm3), creatinine (2.2 mg/dL), urea (109.6 mg/dl), C-reactive protein (176 mg/L) were elevated, total cholestrol (28 mg/dl), LDL-C (<4 mg/dl) HDL-C (5 mg/dl) were decreased. Gram-negative bacterial growth was also observed in urine and blood cultures. A new blood sample from the patient was sent to the laboratory to repeat lipid profile test. Results were observed to be compatible with previous values. Based on the results, the patient's physician was consulted and procalcitonin test was measured to evaluate for sepsis.

Results: Procalcitonin level was found to be 105 ng/mL, consistent with sepsis. At the same time an information was received that the patient was transferred to intensive care unit.

Conclusions: Although the biological mechanisms that lead to hypocholesterolemia in sepsis are not fully understood, hypocholesterolemia is a frequent condition in sepsis and important as an early prognostic factor.

Keywords: Hypocholesterolemia, sepsis

OP93

IS IT A CLOT OR JUST HYPERVISCOSITY?

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Objectives: Viscosity defines the resistance of a fluid to flow, with fluids of low viscosity flowing more easily. Serum hyperviscosity is a rare condition that can provide significant information about underlying diseases. In this case, a 72-year-old male patient presented to our hospital with shortness of breath, cough, and hemoptysis.

Methods: Samples that continuously triggered clot alerts in coagulation tests and could not be evaluated due to dense plasma were rejected. Elevated levels of total protein and albumin led to serum protein electrophoresis and immunofixation electrophoresis results, which revealed the presence of IgM kappa monoclonal gammopathy in the patient.

Results: When the patient's samples were sent to a different laboratory, the results were assessed as normal, and it was understood that the problem stemmed from a deficiency in the device's aspiration pressure.

Conclusions: This case highlights the critical role of hyperviscosity in laboratory diagnosis and treatment processes and the importance of close collaboration between clinicians and laboratory specialists.

Keywords: Viscosity, Blood Coagulation Tests, Paraproteinemias, Gammopathy

OP094

A CASE OF FALSELY ELEVATED HIGH-SENSITIVITY CARDIAC TROPONIN I

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Objectives:Cardiac troponins are the most preferred markers of myocardial damage, where they can be used for diagnosis of acute coronary syndromes. New generation of sensitive immunassays for cardiac Troponin-I(TnI) and Troponin-(TnT)were widely used in clinal laboratories. Interfering substances can interfere with the reaction between analyte and reagent antibodies in immunoassays, and may lead to falsely elevated or low concentration. Our patient TnI levels had an unexpected immunoassay result.

Methods: TnI test analyzed with CenaturXP immunassay with Advia Centaur TNIH reagent using direct chemiluminometric technology. The subject suffers from cancer, the subject is also a candinate for a cilinical tiral. Due to the discordance with clinical and laboratory findings our laboratory's comment was there could be an interference for the chemiluminesenct methood. So the test was performed with the same sample with five different brand immunassay and after the precipitaion of with polyethylene glycols(PEG).

Results:Reanalyzing with different immunoassay or alternative test (TnT) was performed for the unexpected results. The patient again have elevated TnI results without PEGwith different immnassay systems expect Snibe instrument. With Roche TnTreagent mildly elevated results was found. After the precipitation with PEGthe result was within the reference range.

Conclusions: The patient have elevated TnI results without PEG with different immnassay systems expect Snibe instrument. Interference in immunoassay may lead to the misinterpretation of a patient's results and lead to wrong course of treatment given by the physician. The consequences of interference can show deleterious findings so being aware of interference

could prevent unnecessary interventions.

Keywords: Interference, Troponin T, Troponin I

OP095

UNRAVELING THE MYSTERY OF PSEUDOHYPERKALEMIA: A CASE STUDY OF ELEVATED POTASSIUM IN AN ASYMPTOMATIC PATIENT

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Objectives:Investigation and management of a case with elevated potassium levels in consecutive follow-up visits without evident clinical causes.

Methods:A 55-year-old male patient was referred by nephrology due to intermittent hyperkalemia without clinical symptoms. Blood was drawn to rule out preanalytical and analytical causes of pseudohyperkalemia, ensuring minimal tourniquet time and quick analysis. The hemolysis index was 0, with no acidosis, hemolysis or red blood cell deformities. Kidney function, insulin, HOMA-IR, aldosterone, renin, ACTH, and cortisol were all normal. Given the lack of symptoms, normal ECGs, and no identified cause, familial pseudohyperkalemia was considered.

Results:Blood was drawn from the patient and two healthy controls simultaneously into a serum separator tube and a lithium heparin tube. Baseline sodium and potassium levels were measured. Samples were incubated at 4°C, 37°C and room temperature for 2, 4, and 22 hours, with centrifugation performed before each measurement. Sodium and potassium were analyzed. In our patient, an increase in potassium levels was observed in plasma and serum samples stored at 4°C after 2,4 and 22 hours. ABC B6 gene test was sent from the patient to confirm the diagnosis of Familial Pseudohyperkalemia.

Conclusions:Although pseudohyperkalemia has long been recognized, its frequent misinterpretation emphasizes the need to remain mindful of its preanalytical causes. To enhance patient care, a standardized algorithm for investigating pseudohyperkalemia should be implemented in clinical laboratories.

Keywords: Familial pseudohyperkalemia, hyperkalemia, potassium

OP096

A MULTIPLE MYELOMA CASE WITH TWO PARAPROTEIN BANDS IN SERUM IFE BECAUSE OF THE MONOCLONAL ANTIBODY THERAPY

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Objectives: Immunofixation electrophoresis(IFE) is a gold standard biochemical technique used in the diagnosis, treatment and follow-up of monoclonal gammopathies. M protein can be seen as a sharp band in serum electrophoresis. Paraprotein types produced in monoclonal gammopathies can be defined by IFE method. In study, we aimed to evaluate the reason for the change over time in paraproteinemia bands of a MM patient.

Methods: In a 59-years-old male patients' SPE, M protein (45%) in the beta 1 region and IgA-lambda type band in serum IFE were detected. After that bone marrow needle biopsy was performed and the result was plasma cell neoplasm. Then, the patient was started to receive darzalex 1000 mg, a mAb containing the active ingredient daratumumab. In the last SPE, the M protein ratio decreased to 13% and IgA-lambda and IgG-Kappa bands were observed in the serum IFE.

Results: Daratumumab is the first monoclonal drug approved for MM. Daratumumab is an IgGk human mAb developed against CD38. It binds to CD38 and causes the tumor cell to be destroyed. CD38 is highly expressed in myeloma cells and lessly in normal cells. In our patient, the mAb treatment given to the patient was thought to be the cause of the newly formed IgG-Kappa band.

Conclusions: IFE combines SPE and immunoprecipi-

tation techniques. One of the most common causes of interference in SPE is monoclonal treatments. Therefore, when evaluating patients' SPE and IFE results, collaborating with the clinic and knowing the patient's story is essential for correct diagnosis.

Keywords: Serum protein electrophoresis, serum IFE, monoclonal antibody treatment

OP097

EXAMINING THE BINDING PROPENSITY OF SOME NATURAL COMPOUNDS AGAINST PHOSPHODIESTERASE 5 USING MOLECULAR DOCKING AND DYNAMICS SIMULATIONS

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Objectives: Phosphodiesterase 5A (PDE5A) metabolizes cGMP—a second messenger produced in response to various stimuli. Pharmacological inhibition of PDE5A Has been explored for the treatment of erectile dysfunction. This study is aimed at examining the binding of some natural compounds to the PDE5A and estimating their free energy of binding.

Methods: A chemical library of fifty compounds comprising phenolic compounds, terpenoids, and glycosides was formed based on the prominence of their medicinal properties. The compounds were docked into the active site of PDE5A using the Glides extra (XP) precision docking tool. Compounds demonstrating high binding propensity and good binding pose were submitted to 200 ns molecular dynamics (MD) simulation to examine the stability of their binding mode. Furthermore, molecular mechanics with generalized Born and surface area solvation (MM/GBSA) analysis was performed to calculate the free energy of the binding of the simulated compounds against PDE5A.

Results: The MM/GBSA calculations reveal that verbascoside has the highest free energy of binding (-87.8±9.2 kcal/mol), followed by hesperidin (-33.8±3.4 kcal/mol), rutin (-23.6±26.3 kcal/mol), caftaric acid (-21.2±3.6 kcal/mol), and chlorogenic acid (-6.0±16.5 kcal/mol). On the other hand, the cocrystal ligand, WAN (PDB ID: 3BJC)—a sildenafil derivative used as a reference compound here, was found to have a free energy of binding score of -77.7±4.5 kcal/mol, which is comparable to that of verbascoside.

Conclusions: This study demonstrates the binding of the natural compounds to PDE5A, providing insights into the relationship between structures and ligand binding affinity, which may aid future PDE5A inhibitor designs.

Keywords: PDE5 inhibitors, Natural compounds, Molecular Docking, MD simulation, MMGBSA calculation

OP098

EXPLORING THE THERAPEUTIC POTENTIAL OF PETITGRAIN ESSENTIAL OIL IN AMELIORATING COGNITIVE IMPAIRMENT AND ANXIETY: INSIGHTS FROM ZEBRAFISH MODEL

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Objectives: The study aimed to assess the cognitive and biochemical effects of Petitgrain essential oil (PGEO) on neurobehavioral function in a zebrafish model of dementia induced by scopolamine (Sco).

Methods: Chemical analysis via gas chromatography/mass spectrometry identified six compounds in PGEO, with methyl-N-methyl anthranilate representing 89.93% and γ-terpinene 6.25% of major peaks. Zebrafish were subjected to PGEO administration (25, 150, and 300 µL/L) for 19 days before being exposed to scopolamine immersion (SCOP, 100 µM) to induce cognitive impairment. The assessment of anxiety-like behavior and memory was conducted using the novel

tank diving test, Y-maze test, and novel object recognition test. Moreover, the research examined the activity of acetylcholinesterase (AChE) and the level of brain oxidative stress. Furthermore, computational predictions were utilized to determine the pharmacokinetic characteristics of the main compounds in PGEO, leveraging tools such as Molininspiration and pKCSM.

Results: *In silico* findings suggest that the majority of PGEO compounds exhibit the capacity to traverse the blood-brain barrier without eliciting hepatotoxic effects. These findings are consistent with the outcomes observed in living organisms, which demonstrated that PGEO reduced anxiety levels and enhanced spatial and recognition memory. Additionally, our findings suggest that PGEO diminishes the extent of oxidative stress in the brain caused by Sco administration and reinstates AChE activity.

Conclusions: PGEO demonstrates promising therapeutic potential in mitigating memory deficits and cerebral oxidative stress induced by Sco in a zebrafish model, suggesting its viability as a natural remedy for addressing cognitive impairment and disorders associated with oxidative stress.

Keywords: Petitgrain essential oil, spatial memory, zebrafish, oxidative stress

OP099

EVALUATION OF THE PERFORMANCE OF CREATININE AND E-GFR RESULTS STUDIED IN BLOOD GAS ANALYZER

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Objectives: In this study, it was aimed to compare the performance characteristics of plasma creatinine measured in Stat Profile Prime Plus (NSPPP; Nova Biomedical, USA) blood gas analyzer and to evaluate the glomerular filtration rate (e-GFR) data calculated according to the CKD-EPI 2021 Guideline.

Methods: Cobas 6000 (Roche Diagnostics, Germany) analyzer was used in the method comparison study. Simultaneous serum and blood gas samples were used in 136 healthy patients between the ages of 18 and 80 years who applied to the Emergency Department for creatinine and measurements and had no additional comorbidities other than the diagnosis of Chronic Renal Failure (CRF). Statistical analyses were performed with SPSS ver.27 and Excel Analyse-it programs.

Results: The within-run and within-lab %CV values of NSPPP for normal level control samples for creatinine were 3.173% and 8.592%, same %CV values for pathological level control samples were 1.555% and 1.609%. The same values of the NSPPP for creatinine and e-GFR were 0.8% (0.2; 8.5) and 99 (7.153); the Roche Cobas 6000 for creatinine and e-GFR were 0.8 (0; 8.5) and 98 (9; 153). The regression equations for Creatinine and e-GFR were NSPPP = Cobas 6000 and NSPPP = +1.019 x Cobas 6000 -1.3 . Creatinine and e-GFR correlation coefficients were 0.99 and 0.895. Bland-Altman analysis for the parameters, the median difference and the upper and lower limit were 0 (-0.286; 0.276) and 0 (-29.9; 33,6).

Conclusions: The results of the values; NSPPP show that the device exhibits sufficient performance for routine use in clinical laboratories.

Keywords: Blood gas analyzer, creatinine measurement, e-GFR, method comparison, plasma creatinine, serum creatinine

OP100

EVALUATING THE PERFORMANCES OF VARIOUS MACHINE-LEARNING SOLUTIONS TO UTILISE THE INTERLEUKIN-6 TEST REQUESTS

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Objectives: This study aims to develop novel machine-learning algorithms that can predict interleukin-6 (IL-6) results and manage inappropriate IL-6 test requests.

Methods: This retrospective study included all IL-6 test results from the Health Science University, Ankara Education and Research Center, between January 1, 2022, and June 30, 2024. Patients without accompanying CRP and hemogram results were excluded. A total of 4142 patient records were analysed, categorising patients into two groups based on an IL-6 cut-off value of 7 pg/mL. The dataset initially contained 22 variables, which were reduced after feature selection using Pearson correlation, variance inflation factor (VIF), Boruta, and recursive feature elimination (RFE) methods. In the end, nine features were identified as the most significant. CRP, Hb, and NEU were the most critical variables. Six machine learning models were trained using standardised data and SMOTE to address class imbalance. The models were evaluated based on different metrics, such as accuracy. Statistical analyses were performed using R and Python.

Results: According to the IL-6 cut-off value, 17.5% of patients were classified as negative and 82.5% as positive in the dataset. Random Forest performed the most robustly, achieving an accuracy of 0.87 and a sensitivity of 0.87. Support Vector Machine and XGBoost models also performed well, with accuracies of 0.81 and 0.86, respectively, but with varying trade-offs in specificity and NPV.

Conclusions: The ML models developed based on low-cost and frequently requested routine tests could predict IL-6 positivity or negativity and might be used to decrease the rate of inappropriate test requests.

Keywords: Test overutilisation, machine learning, rest request, interleukin-6

OP101

EVALUATION OF MACHINE LEARNING ALGORITHMS AND CLASSICAL METHODS FOR CALCULATED TRANSFERRIN

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Objectives: Transferrin(Tf) can be both measured(mTf) and calculated(c-Tf) in medical laboratories. Our study aimed to evaluate the predictive accuracy of transferrin results obtained through machine learning(ML) algorithms,assessing these findings from both statistical and clinical perspectives.

Methods: The study included a total of 1,338 patients who underwent simultaneous measurements of transferrin(mTf),iron,total iron-binding capacity(-TIBC),and C-reactive protein(CRP) using the Roche Cobas 6000 analyzer.Patients with elevated CRP levels(>5 mg/L) were excluded from the study(225 patients).For the ML algorithms,data from 890 patients with mTf results(80%) were used as the training set,while data from 223 patients(20%) served as the test set.The ML algorithms employed included random forest,gradient boosting,ridge regression,and huber regression models.The best-performing ML algorithm(TfP) was compared to two classical calculation methods:the transferrin formula used in our laboratory,"0.007*Iron (µg/dL)+0.007* TIBC(µg/dL)"(cTf-1),and the transferrin calculated using multiple linear regression analysis(cTf-2).Performance evaluations for cTf-1,cTf-2,and TfP were conducted using Passing-Bablok regression analysis,Bland-Altman plots,sensitivity,specificity,positive predictive value (PPV),and F-score,with mTf results serving as the reference.

Results: The best-performing ML algorithm was ridge regression.Using the training set,cTf-2 was formulated as:cTf-2=0.008 *Iron(µg/dL)+0.008* TIBC(µg/dL)-0.019.The Passing-Bablok regression equations relative to mTf results were 0.868x+0.124 for cTf-1, 0.996x+0.111 for cTf-2, and 0.939x+0.153 for TfP. The Bland-Altman median differences (lower-upper limits) for cTf-1, cTf-2, and TfP were -0.21(-0.697 to 0.277),0.139(-0.350 to 0.628),and 0.022(-0.463 to 0.506),respectively.Sensitivity,specificity,PPV,and F-scores for cTf-1,cTf-2, and TfP were 0.65, 0.95, 0.65, 0.65; 0.73, 0.96, 0.73, 0.73 and 0.77, 0.99, 0.91, 0.83 respectively.

Conclusions: The transferrin predictions obtained using the Ridge Regression ML model were shown to be statistically and clinically more accurate than those calculated using the cTf-1 and cTf-2 methods.

Keywords: Transferrin, machine learning, artificial

intelligence, multiple linear regression

OP102

PREDICTING SERUM OSMOLALITY RESULTS WITH MACHINE LEARNING ALGORITHMS

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Objectives: The various formulas have been published to calculate plasma osmolality (OSM). Our aim is to investigate the validity of prediction models developed using Machine learning (ML) algorithm and calculated osmolality (c-OSM) formulas by comparing them with measured osmolality(m-OSM).

Methods: 511 people with measured sodium (Na), potassium (K), glucose (Glu) and urea test results(Cobas 6000, Roche)were included in our study. For ML, all patients were divided into training set 80% and test set 20%.Various models from ML algorithms such as random forest, gradient boosting, ridge regression, Huber regression and extra trees regression were used. c-OSM-1, c-OSM-2, c-OSM-3 and ML-OSM is calculated with "2*(Na+K)+(Glu/18)+(Urea/6)", "2*(Na) +1.15*(Glu/18) +(Urea/6)" formulas, multiple linear regression analysis and ML algorithms, respectively. c-OSM performances were evaluated according to m-OSM results with Passing-Bablok regression analysis,Bland-Altman plots, sensitivity, specificity, positive predictive value (PPV) and F score.

Results: The best ML algorithm, was selected as Huber Regression,. The training set was used for c-OSM-3 and the formula "(1.366*Na)+(2.378*K)+(0.153*Urea)+(0.063*Glu)+78.459" was obtained. Passing-Bablok regression equations were 1.01x+3.15 for c-OSM-1; 1.01x+3.99 for c-OSM-2; 0.89x+32.47 for c-OSM-3; 0.89x+33.23 for ML-OSM. Differences between Bland-Altman medians (Lower-upper limit) for c-OSM-1, c-OSM-2, c-OSM-3 and ML-OSM were respectively; 7.9(-5.9 – 21.7); -0.01(-13.8- 13.8); -0.39(-12.6-11.8); -0.70(-12.9- 11.5). Sensitivity, specificity, PPV and F score were 0.46, 0.95, 0.97, 0.63 for c-OSM-1, respectively; 0.69, 0.86, 0.79, 0.74 for c-OSM-2; 0.77, 0.86, 0.77, 0.77 for c-OSM-3; 0.75, 0.86, 0.77, 0.76 for ML-OSM.

Conclusions: OSM results obtained from ML models with Huber regression and multiple linear regression gave more accurate results both statistically and clinically.

Keywords: Serum osmolality, machine learning, artificial intelligence, multiple linear regression

OP103

DETERMINATION OF INTRA- AND INTER-LABORATORY REFERENCE CHANGE VALUES FOR HEMOGLOBIN A1C

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Objectives: Patients may apply to many centers for health care.Therefore, it is a challenge to evaluate test results obtained from different laboratories.It is essential to evaluate serial hemoglobin A1c(HbA1c) results showing long-term glucose control in diabetes mellitus patients.This study aimed to determine intra- and inter-laboratory reference change values(intra-lab, inter-lab RCVs) of HbA1c.

Methods: Analytical imprecision(CV_A) was obtained from internal quality control results(HbA1c KON (Archem Diagnostics, İstanbul, Türkiye)) between January-June 2024 for intra-lab RCV and from all participants' data of external quality assessment(EQA) program(KBUDEK, İstanbul, Türkiye) for the same six-month period for inter-lab RCV.Biological variation data of HbA1c (within-subject BV:CV_I and between-subject:CV_G) were obtained from the EFLM database.The individuality index(II) was calculated using the CV_I/CV_G formula.Positive and negative RCVs were calculated with a logarithmic approach.

Results: The 6-month mean CV_A values were 3.2% and 11.9% for intra-lab and inter-lab, respectively. The CV_I was 1.2%, and the II was 0.2.Positive and negative RCVs were 8.3% and -7.7% for intra-lab, and 31.8% and -24.1% for inter-lab, respectively.

Conclusions: The results of HbA1c are appropriate to evaluate with RCV due to high individuality.When evaluating consecutive HbA1c results, whether they were analyzed in the same laboratory should be considered, and intra- or inter-lab RCV should be selected as appropriate. However, inter-lab RCV was considerably higher than intra-lab RCV.This increase may be due to different methods, reagents, and instruments in EQA.Also, lyophilized EQA samples may show commutability issues.Ultimately, the intra- and inter-lab RCVs determined in the study can guide evaluating serial HbA1c results.

Keywords: Reference change value, intra-laboratory, inter-laboratory, hemoglobin A1c, biological variation

OP104

THE IMPACT OF THE FEBRUARY 6, 2023 EARTHQUAKE ON LABORATORY TEST NUMBERS AND DIVERSITY, AND THE ROLE OF TRAINING IN PREVENTING LABORATORY ERRORS

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Objectives: On February 6, 2023, the Maras-Hatay earthquakes severely impacted a large region in Türkiye. This study aimed to assess how the earthquake affected test numbers, diversity, sample repeats, and rejection rates in medical biochemistry laboratories in Antakya, and to evaluate the role of personnel training in these parameters.

Methods: Data from the Hospital Information Management System (HIMS) were categorized into three periods: the 12-month pre-earthquake period (Group I), the 5-month Container laboratory period following the earthquake (Group II), and the 9-month normalization period after relocating to the main building (Group III). Changes in sample numbers were analyzed using CUSUM, while ANOVA was used to compare test numbers, rejection rates, and repeat rates. The impact of structured personnel training on lab errors during post-earthquake normalization was assessed using Student's t-test and Mann-Whitney U test.

Results: During the Container lab period (Group II), sample numbers, test count, and diversity were significantly lower than in both the pre-earthquake (Group I) and post-normalization periods (Group III) ($p<0.001$). By the 12th month post-earthquake, these values had not returned to pre-earthquake levels. The sample rejection rate in Group II was lower than in the other periods, with clotted samples being the main rejection reason in all groups (68.5%, 38.6%, and 50%). The test repeat rate significantly decreased in the post-training period (9.75 ± 1.13) compared to pre-training (6.35 ± 0.65) ($p<0.001$).

Conclusions: It was determined that personnel training significantly contributed to the normalization process after the earthquake by reducing laboratory error rates.

Keywords: Earthquake, laboratory errors, personnel training

OP105

DEFINING ELIGIBLE DELTA CHECK ANALYTES AND CONFIGURATION OF RCV-BASED THRESHOLDS

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Objectives: Delta checks are widely used in clinical laboratories as a patient-based quality assessment tool to detect errors associated with specimen mix-up, sample integrity, analysis, or reporting problems.

Delta checks are also an important component of autoverification procedures that improve laboratory efficiency. y. The aim of the study is to define favorable analytes and set the delta check rules for routine use.

Methods: To select the analytes proper for delta check application, the individuality index (II) were calculated from the EFLM biological variation database for 40 hematologic and frequently requested biochemistry measurand. 26 tests with an individuality index of equal or less than 0.6 were identified. Reference Change Value (RCV) calculation was done for these 26 tests.

Results: In conformity with RCV calculations, MCV and CRP have the lowest and highest value of 3.2% and 93.85%, respectively. This result, which emphasizes the low intra-individual variation of MCV, is consistent with other studies.

Conclusions: The adoption of delta check rules modified to the population served by each laboratory enhances the effective use of the laboratory and facilitates the detection of errors.

Keywords: Biological Variation, Delta Check, RCV

OP107

THE BECTON DICKINSON PREANALYTICAL QUALITY CHECK TRAINING PROGRAM EFFECTIVELY REDUCES PREANALYTICAL ERRORS IN A HOSPITAL SETTING.

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Objectives: The preanalytical phase of laboratory testing is pivotal in ensuring accurate results and improving patient outcomes. With its crucial objectives, this study assessed the impact of Becton Dickinson's Preanalytical Quality Check training program on reducing preanalytical errors within a general hospital environment.

Methods: We meticulously conducted an initial observational study involving the phlebotomy of 74 patients across various hospital departments, including wards, emergency departments, and outpatient services. Following implementing the BD Preanalytical Quality Check training program, a second observational study was conducted after a washout period of one month with 73 patients to assess improvements. Among other metrics, we checked 16,400 chemistry tubes for hemolysis, 1,010 EDTA tubes for clotting, and 150 citrate tubes for fill volume. Comparison of proportions with $p<0,05$ was considered a significant difference.

Results: Statistical analysis revealed significant improvements in several preanalytical areas post-training, including syringe usage, patient identification, hand hygiene, disinfection practices, order of draw, tube inverting, collection labeling, and healthcare worker safety. Transportation and specimen quality metrics showed marked improvement, such as hemolysis in the emergency lab (reduced by half to 13.2%), fill volume, and sample clotting. However, we observed no significant changes in the proper formation of gels and the presence of red cells in samples.

Summary: This study's findings underscore the practical benefits of the BD Preanalytical Quality Check training program in reducing preanalytical errors, enhancing healthcare quality, and demonstrating its value in improving patient care.

Keywords: Preanalytic, Becton Dickinson, Training

OP108

EVALUATING THE PREDICTIVE ACCURACY OF FIVE COMPUTATIONAL TOOLS FOR SCN2A MUTATION CLASSIFICATION

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Objectives: Voltage-gated sodium channels, essential for cell depolarization in neurons, are composed of beta subunits and a pore-forming alpha subunit. Mutations in these channels, specifically in the SCN2A gene encoding the voltage-gated sodium channel alpha subunit 2 (NaV1.2), are linked to conditions like infantile epileptic encephalopathy, benign (familial)

infantile seizures, and autism spectrum disorder/intellectual disability. These mutations necessitate genetic screening for accurate diagnosis, prognosis, and treatment. Genetic testing often identifies variants classified as pathogenic, benign, or variants of unknown significance (VUS). In silico tools help determine the clinical significance of these variants, making their predictive accuracy crucial. This study evaluated the performance of five in silico tools (SIFT, PROVEAN, PolyPhen-2, FATHMM, Mutation Taster) for classifying SCN2A gene variants.

Methods: Using a dataset of 165 SCN2A variants, precision metrics were derived (specificity, sensitivity. accuracy, and MCC) based on the confusion matrix for binary classification.

Results: Due to the unbalanced dataset (156 pathogenic and 9 benign variants), the performance ranking based on MCC values was taken in to consideration. This has led to the evaluation of predictive capacity as PROVEAN > Mutation Taster > SIFT > PolyPhen-2 > FATHMM. Among these in silico tools, the results highlight a relatively better predictive performance of PROVEAN (MCC=0.577) in SCN2A variant classification, indicating a moderate correlation.

Conclusions: Our results suggest that the selected in-silico tools are not optimal for accurate variant classification. This underscores the need to choose and integrate computational methods carefully to achieve consensus and improve accuracy for SCN2A variant classification.

Keywords: SCN2A gene, mutation, predictive accuracy, neurogenetics, computational methods, in silico tools

OP109

FLOW CYTOMETRIC DIAGNOSIS OF ACUTE MONOBLASTIC LEUKEMIA: A CASE REPORT

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Objectives: Acute monoblastic leukemia is a myeloid leukemia in which at least 20% of the peripheral blood or bone marrow contains blasts and the majority of leukemic cells are of monocytic lineage. This case report aims to demonstrate the importance of MPO negativity and CD64 positivity, which are the most specific features in the flow cytometric diagnosis of acute monoblastic leukemia.

Methods: A 59-year-old male patient applied to the Etlik City Hospital Hematology Clinic with complaints of fatigue and frequent infections. Laboratory tests revealed anemia (6.2 g/dL), leukocytosis (58300/µL), thrombocytopenia (24000/µL), and elevated erythrocyte sedimentation rate (107 mm/hour). A flow cytometry examination was requested with a preliminary diagnosis of acute leukemia, and an acute leukemia panel was performed on the patient's bone marrow sample.

Results: After analysis of dot plots in flow cytometry, 8% lymphocytes, 5% granulocytes and 76% atypical cell population extending to the monocytoid region were observed in the CD45/SSC plot. CD33, CD56, CD99, CD11b, CD44, CD38, HLA-DR, CD4 and CD64 immunomarkers were detected as positive in atypical cells. However, MPO, CD34, CD117 and CD14 immunomarkers were detected as negative. Due to the immunophenotype of neoplastic cells, the patient was diagnosed with acute monoblastic leukemia (AML-M5, according to previously FAB classification).

Conclusions: Analysis of this case and the literature on acute monoblastic leukemia has revealed the importance of flow cytometry for diagnosis and treatment. The importance of flow cytometry in diagnosing acute monoblastic leukemia in MPO negative cases has been emphasized once again.

Keywords: Flow cytometry, Acute monoblastic leukemia, CD64

OP111

SYNTHESIS OF NOVEL FLUORESCENT CALIX[4]ARENES-BENZIMIDAZOLE DERIVATIVES, DETERMINATION OF CELL DEATH MECHANISMS AND MITOCHONDRIA-TARGETED BIOIMAGING

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Objectives: The aim of the study is to design and synthesize a series of new fluorescent Calix[4]arene-benzimidazole derivatives that are not available in the world literature, and to reveal the anticancer effects of these compounds in cancer cells through proliferation, apoptosis and imaging studies.

Methods: Some of the compounds obtained were synthesized by methods in literature studies, and the rest were synthesized by modifying previous methods. MTT method was used for cell proliferation and Annexin V was used for apoptosis studies. For Confocal imaging, cell were treated with DAPI and MitoTracker dyes.

Results: Three new fluorescent Calix[4]arene-benzimidazole (CB5(a-c)) compounds and the comparative compound (CB5-R) were successfully synthesized and their structures were confirmed by NMR, IR spectroscopy. As a result of the MTT test, it was determined that CB5-a (3.5 ***μM***) and CB5-c (2.34 ***μM)*** compounds were the most effective compounds against MCF-7 cells and CB5-b (8.38 ***μM)*** against HT-29 cells. Apoptosis analyses revealed that these compounds inhibited the proliferation of cancer cells. The comparison compound (CB5-R) was shown to have less cytotoxic effects on cells than other synthesized fluorescent compounds. It was proven by confocal microscopy that the obtained cationic compounds target the negatively charged mitochondrial membrane of the cancer cell.

Conclusions: It has been proven by studies that the compounds have anticancer properties, but to understand the mechanism, more comprehensive studies such as enzyme inhibition and pharmacokinetic studies can be conducted. We believe that the newly synthesized calix[4]arene-benzimidazole derivatives will form the basis for future anticancer therapeutic drug studies on this subject.

Keywords: Benzimidazole, Calixarene, Anticancer, Apoptosıs, Bioimaging

OP112

TARGETING THE KYNURENINE PATHWAY IN THE PANCREATIC DUCTAL ADENOCARCINOMA IN-VITRO MODEL

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Objectives:KYNU encodes an enzyme called kynureninase, which is involved in the kynurenine pathway. This study aimed to evaluate the potential of high tumoral KYNU mRNA expression level as a diagnostic and prognostic biomarker in PDAC. Additionally, it was aimed to evaluate the effects of Ro-61-8048 and 3-Hydroxy hippuric acid (3-HHA) treatments targeting the kynurenine pathway on an in vitro model of pancreatic cancer.

Methods: The TCGA PAAD data was utilized to determine the clinicopathological significance of high KYNU mRNA expression in PDAC. Effects of Ro 61-8048 and 3-HHA on cell viability, apoptosis, cell cycle, cell migration, and intracellular NAD+/NADH ratio in the PANC-1 cell line were evaluated by using crystal-violet cell viability assay, flow cytometry, wound-healing assay, and spectrophotometry, respectively.

Results: KYNU mRNA levels were higher in PDAC tumor tissues than in normal pancreatic tissues. Tumoral high KYNU mRNA expression was associated with decreased overall survival in PDAC patients. KYNU mRNA level was correlated with TNM staging. Ro 61-8048 and 3-HHA single treatments inhibited cell viability and migration in PANC-1 cells, however, did

not change the percentage of apoptotic cells and did not cause significant cell cycle arrest. In addition, the treatments did not significantly affect the intracellular NAD+/NADH ratio.

Conclusions: The results indicate that the tumoral KYNU mRNA level has the potential to be a diagnostic and prognostic biomarker in PDAC. The significant effects of 3-HHA and Ro 61-8048 treatments on cell viability and migration in PANC-1 cells deserve further confirmation in advanced in vivo studies.

Keywords: Pancreatic cancer, KYNU, Kynurenine, Kynureninase, Ro 61-8048, 3-Hydroxy hippuric acid

OP113

ROLE OF CERAMIDE, ERK AND NF-kB SIGNALING IN THE ANTIPROLIFERATIVE EFFECTS OF 7-KETOSITOSTEROL IN BREAST AND LIVER CANCER CELLS

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Objectives: This study aimed to investigate the effect of 7-Ketositosterol (7-KSS), on sphingomyelin/ceramide levels and apoptosis in human breast MCF-7 and liver HepG2 cancer cells.

Methods: The anti-proliferative effects of 7-KSS treatment were evaluated in different concentrations and periods. MTT analysis was used to investigate cell viability while LCMS/MS was employed to measure sphingomyelins (SMs), ceramides (CERs), and sphingosine-1-phosphate (S1P). For the evaluation of phosphorylated 44/42 ERK1/2 and NF-B p65 protein levels, Western blotting and immunofluorescence were performed respectively. TUNEL staining and annexin-V as well as propidium iodide labeling by flow cytometry were used for apoptosis assessment.

Results: Treatment with 7-KSS significantly reduced the survival of cells and S1P, p-44/42 ERK1/2 and p-NF-κB p65 protein levels in cancer cells compared to controls. A significant increase was observed in the intracellular amount of C16-C24 CERs and apoptosis in cancer cells incubated with 7-KSS.

Conclusions: 7-KSS stimulated ceramide accumulation and apoptosis, while reducing cell proliferation by downregulating S1P, p-44/42 ERK1/2, and p-NF-κB p65 protein levels.

Keywords: 7-Ketositosterol, ceramide, apoptosis, ERK

OP114

THE EFFECT OF GALLIC ACID ON LIPID METABOLISM IN RATS WITH EXPERIMENTAL COLON CANCER

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Objectives: Colorectal cancer is the third most common cancer type in men and the second most common cancer in women worldwide. 1,2-dimethylhydrazine (DMH) is a potent carcinogen metabolized in the liver, and it is a colon-specific carcinogen that targets DNA. Gallic acid (GA) is a polyhydroxyphenolic compound that has anti-inflammatory and anti-mutagenic properties and shows cytotoxicity against cancer cells.

Methods: In our study, 6-8 week old male Wistar rats are used in the experimental groups; DMH was administered subcutaneously into the right thigh at 30 mg/kg body weight once a week for the first 10 weeks. GA was administered orally at 50 mg/kg/day for 20 weeks. The study included 6 groups and covered a 20-week study period. Results: Routine lipid profile parameters and SREBP-1 levels were analyzed in samples taken from rats. Although the serum SREBP-1 levels were higher in the DMH-only group compared to the other groups, no significant difference was found between

the groups. When we look at the comparison of serum lipid profile parameters; it was observed that total cholesterol, triglyceride, HDL-C and LDL-C levels were significantly higher, especially in the control group compared to the groups receiving DMH+GA and first DMH and then GA. No significant difference was observed in CRP levels between the groups.

Conclusions: The pathways we evaluated in our research related to lipid metabolism differed significantly among groups and future researches needed to develop new treatment strategies targeting lipid metabolism. This work has been supported by Ankara University Scientific Research Projects Coordination Unit under grant number THD-2022-2540.

Keywords: Colon Cancer, Gallic Acid, Lipid Profile, SREBP-1

OP115

CANNABINOMIMETICS INDUCE FERROPTOSIS VIA LIPID ACCUMULATION AND UP-REGULATED TRANSFERRIN RECEPTOR GENE EXPRESSION IN HUMAN GLIOBLASTOMA CELLS

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Objectives: Glioblastoma is a highly metastatic tumor of the central nervous system with poor survival rates and insufficient treatment options. CP55-940 (CP) and WIN 55212-2 (WIN) are synthetic cannabinomimetics with various biological effects. Ferroptosis is an iron-dependent cell death and has been considered as an alternative mechanism to eliminate cancer cells that evade apoptosis. In the present study, the effect of cannabinoid derivatives in ferroptotic pathways was investigated in glioblastoma cells for the first time.

Methods: The effect of CP and WIN in U118MG,T98G glioblastoma and L929 healthy cells were evaluated by MTT test. Iron and lipid content were quantified with colorimetric assays and visualized by confocal microscopy with/without ferroptosis inhibitor, deferoxamine. Lipid peroxidation was determined with TBARS method. The mRNA expression of transferrin (TFR) was detected with RT-qPCR.

Results: CP (16 µM) reduced the viability of U118MG and T98G cells to 52.84±1.82 and 72.14±3.89%, respectively, while IC50 of WIN was found 8 µM in both glioblastoma cells, with significantly less toxicity in L929. The observed cytotoxicity was reversed by deferoxamine (250 µM) and both compounds increased intracellular iron levels (162.52±1.04%), lipid content (160.95±5.45%), significantly ($p<0.05$). TBARS assay indicated that lipid peroxidation was also induced by both compounds up to 160.90±2.22% and RT-qPCR analysis demonstrated that CP and WIN upregulate TFR expression by 2 and 6-fold, respectively.

Conclusions: The present study demonstrated for the first time that CP and WIN induce ferroptosis. In conclusion, synthetic cannabinoids may be considered for their potential contribution in the treatment of glioblastoma.

Keywords: Cannabinoids, Ferroptosis, Glioblastoma

OP116

EFFECTS OF DEGUELIN ON ANTI-CANCER AND MITOCHONDRIAL ENZYMES IN TWO DIFFERENT NON-SMALL CELL LUNG CANCER CELL LINES

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Objectives: The aim of this study is to compare the anti-tumorigenic and energy metabolism effects of Deguelin(DEG) with the standard chemotherapeutic agent Docetaxel(DTX) in small cell lung cancer(SCLC) cell lines A549 and H1299.

Methods: IC25 and IC50 concentrations of DEG and DTX were determined by the MTT assay.Following cell lysis,crude mitochondrial pellets were obtained

through increasing centrifugal force steps.To assess the effects on migration, wound healing assays were conducted, and for evaluating tumorigenic capacity,-Soft Agar Colony Formation(Spheroid-3D) Analysis was performed.Mitochondrial differences were assessed through analysis of NADP/IDH,MDH, and GDH enzymes.Statistical analysis of the data was performed using SigmaStat software.

Results: In the A549 cell line, at the time of wound closure in the control group, wound closure percentages were 77.9% for DEG50/2+DTX50/2,69.38% for DEG50,62.84% for DEG25,68.22% for DTX50, and 67.9% for DTX25.In the Soft Agar Colony Formation analysis, spheroid diameters in the DTX group were significantly larger than those in other groups($p<0.001$).Statistical significance was observed between the Control group and other groups for NADP/IDH and MDH values($p<0.001$,$p<0.003$).In the H1299 cell line, at the time of wound closure in the control group, wound closure percentages were 77.2% for DEG50/2+DTX50/2,68.3% for DEG50,58.1% for DEG25,65.86% for DTX50, and 68.32% for DTX25. In the Soft Agar Colony Formation analysis, spheroid diameters in the DTX group were significantly larger compared to other groups($p<0.001$).Significant differences were found between the Control group and other groups for NADP/IDH and MDH values($p<0.004$,$p<0.001$).

Conclusions: The study suggests that Deguelin and Docetaxel exhibit synergistic anti-metastatic activity and affect enzyme metabolism,indicating significant therapeutic potential for Deguelin.

Keywords: Deguelin, Mitochondria, Migration, energy metabolism

OP117

EFFECT OF SALVIA CADMICA BOISS. VAR. CADMICA EXTRACT on PROLIFERATION AND APOPTOSIS in HUMAN BREAST CANCER CELL LINES

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Objectives: Breast cancer is the most common type of cancer among women and the second most frequently diagnosed cancer worldwide. Salvia, a large genus of the *Lamiaceae* family, is important in the pharmaceutical, food, and cosmetic industries with its rich phytochemical content.

In this study, the in vitro anticancer effects of the methanol extract of *Salvia cadmica Boiss. var. cadmica*, found in Türkiye's flora, on MCF-7, MDA-MB-231 breast cancer cell lines, and HEK-293 cell line were investigated.

Methods: *S. cadmica boiss. var. c.*, used in our study, was collected from Konya province, methanol extracts were obtained, and these extracts were applied to MCF-7, MDA-MB-231, and HEK-293 cell lines. Proliferation analysis was performed by MTT method using doses between 700-1200 µg/ml for MCF-7 cells and 400-900 µg/ml for MDA-MB-231. Apoptosis analysis was performed in the Cytoflex device.

Results: IC_{50} doses were calculated for MCF-7 and MDA-MB-231 cell lines using the % cell viability/concentration graph. IC_{50} values obtained at 48 hours are as follows: MCF-7; 1050.55 µg/ml, MDA-MB-231; 487.54 µg/ml. The determined IC_{50} doses were applied to the HEK-293 cell line, and the viability rates at 24 hours were 87.94%, 86.89%, 60.73%, and 80.01% at 48 hours, respectively. Regarding the IC_{50}s applied to the cells for apoptosis analysis, MCF-7 cells showed 4.27% early apoptosis and 86.89% late apoptosis; MDA-MB-231 cells showed 72.22% early apoptosis and 1.16% late apoptosis.

Conclusions: *Salvia cadmica Boiss. var. cadmica* methanol extract significantly induced apoptosis by suppressing proliferation in MCF-7 and MDA-MB-231 breast cancer cell lines.

Keywords: Breast cancer, Proliferation, Apoptosis, S

cadmica boiss var cadmica

OP118

INVESTIGATION OF THE EFFECTS OF ANTIMICROBIAL PEPTIDES AND VITAMIN D IN BREAST CANCER

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Objectives: Breast cancer is the most common cancer in women. In recent years, there have been studies on the effectiveness of cathelicidins, one of the antimicrobial peptides, especially in breast cancer. Cathelicidin expression is regulated by a rather complex mechanism. Under normal conditions, vitamin D induces the release of cathecillin from human neutrophils via Neutrophil Elastase (NE). Elafin, on the other hand, inhibits cathelicidin as a Neutrophil Elastase inhibitor. However, the effect of these molecules on tumor progression is unclear. In our study, we aimed to investigate the effects of vitamin D and Elafin on cathelicidin in breast cancer patients.

Methods: Cathelicidin, Elafin and Vitamin D Receptor levels in the pre- and post-operative blood samples of control patients and patients diagnosed with breast cancer were analyzed by western blot method.

Results: According to our findings, it was observed that cathelicidin levels were especially high and elafin levels were low in the preoperative group. Since an inflammatory environment occurs in the presence of tumor, there is an increase in vitamin D receptor and elafin in the postoperative group.

Conclusions: It was thought that the low Elafin in the preoperative group caused vitamin D to secrete more Cathelicidin and increased the progression of the tumor, but the formation of cathelicidin was inhibited due to the increase in Elafin levels in the postoperative period. Thus, it was concluded that kathelicidin, which has an effect on the development of breast cancer, can be controlled by Elafin and Vitamin D receptors.

Keywords: Vitamin D Receptor, Breast Cancer, Cathelicidin, Elafin

OP119

FOX GENE FAMILY EXPRESSION LEVELS ARE SIGNIFICANTLY DECREASED IN PDL-1 GENE SILENCED COLON CANCER CELL LINE

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Objectives: Since FOX proteins have important effects on the cell, changes in the expression of these proteins are associated with physiological or pathological processes such as aging, angiogenesis, cancer, and diabetes. This study aimed to investigate the expression levels of the *FOX* (*FOXO1, FOXO3, FOXP1, FOXP2*) gene family in colon cancer (HT-29) and healthy colon epithelial (CCD-18Co) cell lines by silencing the *PD-L1* gene using siRNA.

Methods: HT-29 and CCD-18Co cell lines were grown in appropriate culture media. The PD-L1 gene was silenced in these cell lines with the help of siRNA. RNA was isolated from *PD-L1* gene silenced cell lines according to the kit protocol. cDNA was synthesized from the obtained RNAs according to the kit protocol. Expression levels of genes belonging to the FOX gene family and the PD-L1 gene were analyzed in the RT-PCR device.

Results: *PD-L1* gene was silenced by 99.8% and 95.0% in HT-29 and CCD-18Co cell lines, respectively. The expression of *FOX* gene family was found to be significantly reduced in *PD-L1* silenced HT-29 cell

line. In the PD-L1 gene silenced CCD-18Co cell line, expression levels of *FOXO1* and *FOXO3* genes were found to increase, while expression levels of *FOXP1* and *FOXP2* genes were found to decrease.

Conclusions: As a result, *PD-L1* gene was successfully silenced in HT-29 and CCD-18Co cell lines. *FOX* gene family expression levels were found to be statistically significantly decreased in HT-29 colon cancer cell line. This decrease, supported by further studies, may shed light on gene therapy.

Keywords: Colon cancer, PD-L1, FOX gene family

OP120

LONG-TERM IMPACT OF PRENATAL STRESS ON CHOLINERGIC GENE EXPRESSION: A RAT MODEL STUDY

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Objectives: Prenatal stress (PS) can affect the developing brain of the offspring and induce neurodegeneration. The cognitive dysfunctions occurring in Alzheimer's Disease are associated with neurodegeneration of cholinergic system. We aimed to investigate the changes in the expression levels of acetylcholine esterase (AChE), choline acetyl transferase (ChAT), muscarinic cholinergic receptor 2 (ChRM2), nicotinic α7 cholinergic receptor (ChRNA7) proteins mediate cholinergic neurotransmission in offspring by establishing a PS model in pregnant rats with dexamethasone.

Methods: In study, pregnant rats were given 1 ml/kg/day saline, 0.1 mg/kg/day or 0.2 mg/kg/day dexamethasone i.p. between the 14-21 days of gestation to prepare control, D-100 and D-200 groups. Male offsprings were decapitated (n=3) three months after birth. Total RNA was isolated from the hippocampuses and cortexes and cDNA was synthesized. Changes in mRNA expressions of AChE, ChAT, ChRM2, ChRNA7 genes were analyzed by real-time PCR and calculated according to the $2^{-\Delta\Delta CT}$ method. Statistical evaluations were performed by ANOVA and Tukey tests. $p<0.05$ was considered significant.

Results: AChE and ChRM2 expressions in the cortex, ChAT and ChRNA7 expressions in both hippocampus and cortex in PS groups were significantly decreased compared to the control ($^{a,b,c,d}p<0.05$). No significant difference was found in AChE expression between groups in the hippocampus. Significant differences were detected in ChRNA7 expressions in the hippocampus of D-100 and D-200 groups ($^{e,f}p<0.05$).

Conclusions: In conclusion, the expressions of proteins enable cholinergic neurotransmission were altered by PS. Our findings are important in terms of indicating that PS may predispose to neurodegeneration processes by affecting the cholinergic system.

Keywords: Prenatal Stress, Neurodegeneration, Cholinergic Neurotransmission

OP121

EFFECTS OF MEDICAL OZONE THERAPY AND *Lavandula angustifolia* OIL TREATMENT ON XENOBIOTIC METABOLISM ENZYME EXPRESSION IN LIVER DAMAGE INDUCED BY CCl4

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Objectives: This study aims to investigate the effects of *Lavandula angustifolia* oil (LAO) and medical ozone therapy (MOT) on the expression of genes involved in xenobiotic metabolism (*CYP1A1, CYP1A2, CYP2B1, CYP3A1)* and apoptosis (*BCL2*) in an acute

liver injury model induced by CCl4.

Methods: The study was conducted on 20 male Wistar rats, aged 8-12 weeks and weighing 250-500 g acute liver injury was induced using CCl4, and the rats were then divided into four groups (n=5/per group). Group 1 received physiological saline via gavage, Group 2 was treated with LAO, Group 3 with MOT, and Group 4 with a combination of LAO+MOT. After treatment, rats were sacrificed, and liver tissues were collected for total RNA isolation. Using cDNA synthesized from the RNA samples, the expression levels of *CYP1A1, CYP1A2, CYP2B1, CYP3A1, BCL2* were determined by qPCR, employing the $2^{-\Delta\Delta Ct}$ method.

Results: A significant reduction in *CYP1A1* gene expression was observed in both Group 2 and Group 3, with approximately a 2.3-fold decrease compared to Group 1 ($p<0.05$). However, no significant differences were observed in the expression levels of the other genes analyzed among the groups.

Conclusions: The data suggest that MOT and LAO treatments significantly reduce *CYP1A1* expression in liver tissue following CCl_4-induced liver damage. Given the role of *CYP1A1* in xenobiotic metabolism and the potential DNA damage caused by its metabolic by-products, MOT and LAO may play a role in reducing the adverse effects of CCl4-induced liver damage.

*This project has been supported by TÜBİTAK 2209-A program.

Keywords: CCl4, liver damage, CYP1A1, Lavandula angustifolia oil, medical ozone therapy

OP122

CAN URINARY LONG NON CODING RNA H19 BE USED AS A PREDICTIVE BIOMARKER IN CHILDREN WITH URETEROPELVIC JUNCTION OBSTRUCTION?

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Objectives: We aimed to investigate the urinary exosomal long non-coding (lnc) RNA H19 levels in patients with unilateral antenatal hydronephrosis and to determine whether changes in urinary biomarker levels could be useful for both predicting the need for surgical intervention due to ureteropelvic junction obstruction (UPJO) and postoperative surgical success.

Methods: The study included 22 pediatric patients with clinically demonstrated UPJO. All patients in this group had unilateral hydronephrosis, and underwent open pyeloplasty (Pyeloplasty group). A total of 44 urine samples (pre- and post-operative) were taken from these patients. The first control group included 23 patients with non-obstructive hydronephrosis [non-obstructive dilation (NOD) group], whereas second control group included 20 healthy children. One urine sample was taken from each of children in these control groups. Urinary exosomal LncRNA H19 expression was quantified by qRT-PCR methods. For statistical analyses, Pearsons's Chi-Squared, Mann-Whitney U tests, Wilcoxon, and ROC analysis were used where appropriate.

Results: Preoperative urinary exosomal LncRNA H19 levels were significantly higher than postoperative levels (p=0,009), NOD (p=0,044), and control groups (p=0,016). Postoperative urinary exosomal LncRNA H19 levels decreased and were similar to control groups. The cut-off value of urinary exosomal LncRNA H19 to predict patients requiring pyeloplasty was found to be 4.35 with 48.0 % sensitivity, 88.0% specificity (AUC=0.669).

Conclusions: Urinary exosomal LncRNA H19 levels may be used as an indicator for both prediction of surgical intervention need and postoperative surgical success in UPJO. Further studies are needed to test this hypothesis using successful and unsuccessful treatment groups.

Keywords: Ureteropelvic Junction Obstruction, NOD, LncRNA H19, qRT-PCR

OP123

INVESTIGATION OF BACTERIAL EXPRESSION AND IN VITRO FIBRIL FORMATION OF PRO-VASOPRESSIN MUTANTS

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Objectives: Amyloid diseases are characterized by the formation of fibrillar amyloid aggregates.Mutations in the arginine vasopressin hormone(AVP) cause misfolding of the protein, which is implicated in the development of a rare disease known as autosomal dominant neurohypophyseal diabetes insipidus (ADNDI).The aim of this study is to produce and purify G45C, 207_209delGGC,-G88V,C98X,C104F,E108D-1 and E108D-2 mutant pro-vasopressin proteins using bacterial expression systems and to demonstrate their ability to spontaneously form fibrils in vitro under oxidative conditions. Methods: All mutations were introduced in the C-terminal 6-His-tagged pET21b expression vector using PCR-based site-directed mutagenesis and restriction fragment exchange strategies.Constructs were verified by DNA sequencing.The mutant AVPs were expressed in *E. coli* BL21(DE3) following incubation with 1 mM IPTG.Mutant proteins were isolated from bacteria using the Ni-NTA chromatography and proteins were dialyzed for purification. Samples were stained with 1% uranyl acetate and analyzed using transmission electron microscope (TEM)(TÜBİTAK SGAB Project No:118S688,-Hacettepe University BAP Project No:19929). Results: All mutants of pro-vasopressin were expressed in *E.coli* and isolated from inclusion bodies.The proteins were solubilized using urea and purified under reducing conditions.After dialysis, fibrillar structures were detected in the supernatant by TEM.Notably,mutant AVP precursors were observed to spontaneously form fibrillar aggregates under oxidizing conditions. Conclusions: In this study,we demonstrated that pro-vasopressin mutants associated with ADNDI were produced and purified using bacterial expression systems.It was shown that these mutant proteins spontaneously formed fibrillar structures under oxidative conditions after the removal of reducing agents.These results are crucial for understanding the formation and stabilization of amyloid aggregates in pro-vasopressin mutants.

Keywords: AVP, Aggregate, Fibril, Bacterial Expression

OP124

INVESTIGATION OF EXPRESSION LEVELS OF UCA1 AND APPAT LNCRNAS IN CLINICAL ATHEROSCLEROSIS PATIENTS

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Objectives: This study aimed to assess the potential contributions of long non-coding RNA (lncRNA) urothelial cancer associated 1 (UCA1) and atherosclerotic plaque pathogenesis associated transcript (APPAT) to the progression of atherosclerosis by analyzing their expression levels in tissue and blood samples.

Methods: In patients who performed coronary artery bypass grafting (CABG) (n=30), the coronary artery and left internal mammary artery (LIMA) samples were obtained. Blood samples were also collected from these patients and healthy individuals (n=30). Total RNA was isolated from tissue and blood samples. cDNA synthesis was performed and expression levels of UCA1 and APPAT were determined by quan-

titive real-time polymerase chain reaction (RT-qPCR). GAPDH was used as housekeeping gene.

Results: When the expression levels in blood samples were analysed between the patient and control groups, UCA1 and APPAT were downregulated in the patient group (p=0.000, p=0.025, respectively). Although UCA1 and APPAT expression levels were downregulated in coronary compared to LIMA tissues, no statistically significant. However, LIMA UCA1 expression was significantly higher than blood (p=0.005). Coronary APPAT expression was significantly lower in the patient group compared to blood (p=0.0019).

Conclusions: Based on the available data, it is proposed that reduced expression levels of UCA1 and APPAT may contribute to the development of atherosclerosis. Additionally, higher expression levels of UCA1 in LIMA compared to blood may be associated with resistance to atherosclerosis, while lower expression levels of APPAT in coronary compared to blood may be involved in the progression of atherosclerosis. Further study needed to fully comprehend the mechanisms.

Keywords: Atherosclerosis, lncRNA, APPAT, UCA1

OP125

MATRIX METALLOPROTEINASE-9 EXPRESSION LEVELS IN PATIENTS WITH UNIPOLAR AND BIPOLAR DEPRESSION: A PROMISING NEW TARGET

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Objectives: Converging evidence underscores the involvement of Matrix Metalloproteinases (*MMPs*) in psychiatric disorders. *MMPs* are now known to influence a wide range of processes, including inflammation, synaptic plasticity, neuronal migration, and the maintenance of the blood-brain barrier. Inflammation is implicated in the pathogenesis of depression, and may exhibit distinct differences between unipolar (UD) and bipolar depression (BD), with *MMPs* potentially playing a significant role. Here we investigated *MMP-9* gene expression levels of individuals with UD and BD depression compared to healthy controls.

Methods: We investigated *MMP-9* expression levels in RNA samples extracted from blood samples of individuals with UD (n=20), BD (n=16) and HC (n=19) using real-time quantitative PCR (RT-qPCR). Blood samples were obtained from the individuals with UD and BD patients diagnosed according to DSM-5 criteria. Statistical analysis included Mann-Whitney U test and Spearman correlation analysis to examine relationships between diagnosis and *MMP-9* expression levels.

Results: *MMP-9* gene expression level was higher in healthy controls than in individuals with unipolar and bipolar disorder ($p<0.05$). Females (mean = 0,253) with unipolar disorder showed higher *MMP-9* expressions than males (mean = 0,22) ($p = 0.012$).

Conclusions: Our findings highlight significant differences in *MMP-9* gene expression levels between individuals with bipolar disorder, unipolar disorder, and healthy controls. Although this is the first study with Turkish population, *MMP-9* pathway might be a promising target to identify the complex etiological nature of depressive disorder. In the future studies, achieving more robust conclusions would necessitate by increasing the sample size and including remitted patients.

Keywords: MMP-9, bipolar disorder, major depressive disorder, gene expression, extracellular matrix,

synaptic plasticity

OP126

MMP-9 GENE EXPRESSION LEVEL IN BIPOLAR DISORDER: EVALUATING RELATIONSHIPS WITH CLINICAL FEATURES AND CHILDHOOD TRAUMATIC EXPERIENCES

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Objectives: The objective of this study was to compare the expression levels of the MMP-9 gene, a known contributor to neuroinflammation and neuronal damage, between individuals with bipolar disorder and healthy controls. Additionally, the study aimed to investigate the relationship between MMP-9 expression, clinical features, and childhood trauma.

Methods: All participants (n=39) were assessed according to DSM-5 diagnostic criteria. Whole RNA was purified from the blood samples of both groups, and cDNA was synthesized. The expression of the MMP-9 gene was quantified using real-time q-PCR. The relationships were analyzed using the Mann-Whitney U test and Spearman correlation analysis. This work was supported by a grant from İnönü University Research Fund (#FBA-2022-2914 to CA).

Results: The statistical analyzes revealed that MMP-9 gene expression was not significantly different between patients with bipolar disorder and healthy controls (p>0,05). Additionally, MMP-9 expression was not influenced by clinical features (p>0,05) or childhood traumatic experiences (p>0,05) in the studied sample.

Conclusions: Our findings revealed no significant difference in MMP-9 gene expression between individuals with bipolar disorder and healthy controls. Even though the negative result may be due to the small sample size, our findings do not support any association of MMP-9 with the pathophysiology and clinical features of bipolar disorder.

Keywords: Bipolar disorder, childhood trauma, gene expression, matrix metalloproteinase-9

OP127

EVALUATING PLASMA LEVELS OF RAMP2 AND CTR PROTEINS IN FIBROMYALGIA

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Objectives: Fibromyalgia is a disease characterized by widespread pain throughout the body. The calcitonin receptor (CTR) protein a G protein coupled receptor (GPCR) known as CALCR, plays a role in regulating calcium homeostasis. Receptor activity modifying protein 2 (RAMP2) is a chaperone protein that regulates the activity of Family B GPCRs and interacts by binding to the glucagon receptor. RAMP2 and

CTR protein levels and their functional significance have never been investigated in fibromyalgia. In this study, we aimed to examine RAMP2 and CTR protein levels in fibromyalgia patients and healthy controls.

Methods: The study included 89 individuals with fibromyalgia in the patient group and 89 healthy individuals in the control group. A form containing demographic information was administered to the individuals and venous blood was collected from these individuals. RAMP2 and CTR plasma protein levels were measured using ELISA method. ROC Curve analysis was performed to determine the concentration levels of these proteins. The interactions of these proteins were bioinformatically analyzed in STRING v 11 protein-protein interaction database.

Results: The age, gender and body mass index of the individuals in all groups were found to be parallel. RAMP2 and CTR plasma protein levels were significantly higher in patients with fibromyalgia compared to the control group ($p< 0.001$).

Conclusions: According to bioinformatic analysis, RAMP2 and CTR proteins were found to interact with each other. In conclusion, RAMP2 and CTR proteins are associated with fibromyalgia and may be a biomarker.

Keywords: Fibromyalgia, RAMP2, CTR, ELISA, bioinformatic analysis

OP129

RETROSPECTIVE DETERMINATION OF IMMUNOPHENOTYPE PROFILES OF PATIENTS DIAGNOSED WITH ACUTE LEUKEMIA BY FLOW CYTOMETRY

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Objectives: This study aims to retrospectively evaluate the antigen expression profiles determined by flow cytometry and the genetic results of patients diagnosed with acute leukemia in the Hatay region between 2021-2023.

Methods: Bone marrow samples from 108 acute leukemia patients were collected in EDTA tubes and analyzed by flow cytometric method with specific antibodies (cMPO, cCD79aCD34, CD117, CD38, CD13/33, CD19, CD22, CD10, CD1a, CD3, CD4, CD5, CD7, CD8 and CD10). Antigen expressions were determined as percentages. Genetic mutations were assayed using the FISH method and serum LDH activity levels measured by spectrophotometrically.

Results: MPO, CD117, and CD34 were positively detected in 84%, 93%, and 68% of 82 AML patients, respectively. Aberrant expression of CD4 (%31) and CD7 (%29) was observed in AML patients. cCD79a, CD10, CD19, and CD22 were positively detected in all B-ALL patients (n=20), while cTDT was positive in 95%. Aberrant expression of CD33 was present in 50% of these patients. CD3, CD4, and CD1a were positively detected in 66% of T-ALL patients, while CD8, CD5, and CD7 were positive in 100% of cases. Aberrant expression of CD10 was observed in 50% of these patients. The most common genetic mutations were t(8;21) AML1/ETO translocation for AML and t(9;22) BCR/ABL1 translocation for ALL. LDH values were significantly higher in ALL patients, while sedimentation values were significantly higher in AML patients ($p=0.021$; $p=0.015$, respectively).

Conclusions: Flow cytometry is an important method in the diagnosis of acute leukemia and should be used in conjunction with genetic tests.

Keywords: Flow Cytometry, AML, ALL, Leukemia

OP130

METABOLIC PROFILING REVEALS INSIGHTS INTO BLADDER CANCER PATHOGENESIS AND RECURRENCE

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Objectives: Bladder cancer is a malignancy associated with abnormal cell growth in the bladder lining. The precise molecular mechanisms driving the disease have not been completely elucidated. This study aimed to identify metabolic differences between bladder cancer patients and healthy controls, as well as between patients with and without cancer recurrence, to gain insights into the molecular mechanisms of the disease and its recurrence.

Methods: The study enrolled a total of 102 participants, including 82 individuals diagnosed with bladder cancer (BC) and 20 healthy individuals serving as controls. Based on cystoscopy and pathology results indicating the presence or absence of tumor recurrence, the bladder cancer patients were categorized into two groups: 29 experienced tumor recurrence, while 41 did not. Metabolic profiling of the serum was performed using ultra-performance liquid chromatography coupled with quadrupole time-of-flight mass spectrometry (UPLC Q-TOF/MS). Data acquisition, classification, and identification were achieved with the mass profiler professional and XCMS (https://xcmsonline.scripps.edu).

Results: Down regulations were determined in 11-Hydroxyandrosterone and PGE2, on the other hand upregulations were found in (±)12-HETE, 5α-Dihydrodeoxycorticosterone and 21-Hydroxypregnenolone in patients compared to the healthy controls. Down regulation was found in terms of 11-Hydroxyandrosterone in recurrence positive patients compared to the negative patients. Highest area under curves were determined in (±)12-HETE and PGE2 in the discrimination of bladder cancer and recurrence.

Conclusions: Understanding the roles of steroid hormone and arachidonic acid metabolism in bladder cancer can provide insights into the disease's molecular mechanisms. This knowledge may lead to new therapeutic and diagnostic strategies, potentially improving patient outcomes.

Keywords: Bladder cancer, metabolamics, steroid, arachidonic acid, ±12-HETE, PGE2

OP131

EVALUATION OF SERUM DICKKOPF-3 LEVELS IN PATIENTS WITH PANCREATIC ADENOCARCINOMA

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Objectives: Dickkopf-3 (DKK3: Dickkopf WNT signaling pathway inhibitor 3) is a protein involved in processes like development, stem cell differentiation, tissue homeostasis, immunomodulation, oxidative stress, and inflammation. The specific receptors and effectors are not yet fully defined. It can function as both an oncogene and a tumor suppressor depending on the context. It is expressed in pancreatic stellate cells, it has been reported to support chemotherapy resistance, tumor growth, and metastatic spread via NF-κB activation in vitro. Our aim is to examine the levels of DKK3 in patients with pancreatic adenocarcinoma.

Methods: The sample size was calculated as 52 people using the G Power program, with a 5% α error probability, 80% power, and a high effect size (0.80) based on previous studies. The study included 44 control individuals and 44 patients diagnosed with pancreatic adenocarcinoma. DKK3 levels were measured using the Enzyme-Linked ImmunoSorbent Assay. Statistical analyses were performed using SPSS v.21.

Results: The average age was 65.5 years for the patient group and 60.7 years for the control group, with no significant difference in gender distribution. No significant difference was found in DKK3 levels between the groups when analyzed using the Mann-Whitney U test (U=919, p=0.683).

Conclusions: Our study found that DKK3 levels did not differ significantly between the patient and control groups, which is inconsistent with previous in vitro studies. This discrepancy suggests that there may be context-specific factors influencing DKK3 expression in pancreatic cancer. Further research is needed to explore these factors and clarify role of DKK3 in cancer prognosis and therapy.

Keywords: Dickkopf family, DKK-3, tumor marker, oncogene, tumor suppressor

OP132

NOVEL SCHIFF BASE CONTAINING MACROHETEROCYCLES: CDKN1A AND CSNK1A1 GENES PROFILES IN SAOS-2 OSTEOSARCOMA CELLS

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Objectives: The aim of our study was to investigate the activity of the schiff base containing compound on osteosarcoma cell line (SAOS-2) in terms of anticancer activity as well as its effect on gene expression profiles involved in Wnt pathway.

Methods: In this study, we aimed to determine the effect of a newly synthesized heterocyclic compound containing a Schiff base on the expression levels of *CSNK1A1* and *CDKN1A* genes in the Wnt pathway on the SAOS2 osteosarcoma cell line. Specific concentrations of the compound (100µg/ml0.5µg/ml), were applied to Saos2 cells for 24, 48 and 72 hours and cytotoxicity was observed by 3(4,5dimethylthiazol2yl)2,5diphenyltetrazolium bromide (MTT) method. IC50 doses were calculated. The IC50 dose was reapplied to the seeded cells for 48 hours. RNA isolation and cDNA synthesis were performed. Gene expression analysis was analyzed by RTPCR. *GAPDH* was used as the internal control gene.

Results: Compared to cells without compound application, *CSNK1A1* gene expression increased 1.51fold and *CDKN1A* gene expression decreased 0.85fold in compoundapplied cells.

Conclusions: Accordingly, changes in the expression of these genes were found to be significant in SAOS2 cells.

Keywords: Anticancer Activity, CDKN1A, CSNK1A1, Schiff Base, SAOS-2

OP133

EFFECT OF SECONDARY METABOLITES OBTAINED FROM PROBIOTIC BACTERIA ON MIRNA EXPRESSION IN BREAST CANCER CELLS BY IN VITRO CO-CULTURE

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Objectives: Breast cancer is one of the most common types of cancer among women. In recent years, there has been hope in understanding the molecular pathology of cancer and developing targeted therapies due to the functions of microRNAs. When their expression is irregular, miRNAs play a role in disease mechanisms such as tumor formation. The anticancer activity of some possible probiotic bacteria has been reported in various literatures. *Lactobacillus* strains in

particular stand out as beneficial microbiota elements. The aim of this study is to evaluate the cytotoxic effect of secondary metabolites in the supernatants of probiotic microorganisms on the MCF-7 cell line, a breast cancer cell, by miRNA expression.

Methods: *L. rhamnosus* strain and MCF-7 cell line were used in our study. The cytotoxicity of secondary metabolites was determined by the MTT method. miR21 and miR125b were investigated in miRNA expression.

Results: According to the obtained data, it was observed that probiotics had a proliferative effect on the healthy fibroblast cell line, which was the control group, and a significant cytotoxic effect on MCF-7 cell lines. In addition, when miRNA expressions were evaluated, it was determined that increased miR21 and decreased miR125b expressions during the cancer process had the opposite effect with the application of secondary metabolites belonging to probiotics.

Conclusions: With the new pharmaceuticals obtained, shelf life and viability problems that limit the use of probiotics will be eliminated. In addition, they can be used as safer alternatives for individuals with suppressed immune systems.

Keywords: Probiotic, secondary metabolites, Breast cancer, MCF7

OP134

INHIBITION OF ESTROGEN-DEPENDENT PROLIFERATION IN BREAST AND OVARIAN CANCER CELLS BY SPARSTOLONIN B

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Objectives: Estrogen hormone has an important role in breast and ovarian cancer by increasing cell proliferation. Sparstolonin B is a polyphenol which has menstrual cycle regulatory effects, anti-inflammatory and immunomodulatory properties. The time and dose dependent effect of Sparstolonin B on cell viability and proliferation was investigated in breast, ovarian cancer and healthy human fibroblasts with and without the presence of estradiol hemihydrate.

Methods: Human breast cancer (MCF-7), human ovarian cancer (OVCAR-3) and human fibroblast (BJ) cell lines were treated with estrogen (1-100 nM) and/or sparstolonin B (3,125-50 µM) between 16-48 hours. Cell viability was assessed by MTT analysis, while cell proliferation was demonstrated by Proliferating Cell Nuclear Antigen (PCNA) measurement via ELISA and immunofluorescence microscopy. Apoptotic cells were demonstrated by the TUNEL method.

Results: Estrogen (10 nM, 48 hours) significantly increased proliferation in MCF-7 breast cancer and Ovcar-3 ovarian cancer cells (up to 270%),but did not have a significant effect on BJ fibroblasts. Sparstolonin B (25 µM, 24 hours) significantly reduced cell viability in MCF-7 and Ovcar-3 (down to 25-27%) without harming healthy fibroblasts. It also inhibited estrogen-induced proliferation and significantly reduced apoptosis in these cancer cells.

Conclusions: In this study, antiproliferative activity of SsnB application was demonstrated in breast and ovarian cancer cells subjected to estrogen-dependent proliferation. The fact that the applied SsnB concentration did not have a toxic effect on healthy fibroblast cells supports the development of this agent as a potential therapeutic in estrogen-dependent cancer types.

Keywords: Sparstolonin B, Breast Cancer, Ovarian Cancer, Estrojen proliferation

OP135

MATERNAL SERUM LEVELS OF FOXO1 AND SIRT2 IN PREGNANCIES WITH EARLY AND LATE-ONSET PREECLAMPSIA

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Objectives: Sirtuins and FoxO1 are reported to be important in the pathophysiology of preeclampsia. This study aimed to investigate whether serum FoxO1 and C concentrations differ between preeclampsia and normal pregnancy. Also to compare these markers in early and late-onset preeclampsia.

Methods: This cross-sectional study was conducted on 27 women with early-onset preeclampsia, 27 women with late-onset preeclampsia, and 26 healthy normotensive pregnant controls. Maternal serum levels of FoxO1 and SIRT2 were measured with the use of an enzyme-linked immunosorbent assay kit.

Results: The mean maternal serum FoxO1 levels were significantly lower both in early-onset (9.1±3.8vs.29.1±3.2,p<0.001) and late-onset preeclampsia 2.6±1.6vs.29.1±3.2,p<0.001) than the normotensive pregnancies. The mean maternal serum FoxO1 level of late-onset preeclampsia was significantly lower than the early-onset preeclampsia group (2.6±1.6vs. 9.1±3.8, p<0.001). The mean maternal serum SIRT2 levels were significantly lower both in early-onset (4.5±2.1vs.6.3±0.9,p<0.001) and late-onset preeclampsia (2.1±0.6vs. 6.3±0.9,p<0.001) than the healthy pregnancies.

Conclusions: FoxO1 and SIRT2 may be biomarkers for early detection of pre-eclampsia and potential therapeutic targets in the pathophysiology of pre-eclampsia.

Keywords: FoxO1, SIRT2, PREECLAMPSIA

OP137

EFFECTS OF MODIFIED DIET PATTERNS ON TRYPTOPHAN METABOLITES IN INDIVIDUALS WITH TYPE 2 DIABETES

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Objectives: Type 2 diabetes (T2DM) is characterized by insulin resistance and pancreatic β-cell dysfunction. The kynurenine pathway (KP) plays an immunomodulatory role as a result of free tryptophan (TRP) catabolism, leading to the production of active metabolites. The aim of study was to determine the effects of lunches with different carbohydrate and fat ratios on KP metabolites in T2DM patients.

Methods: 33 T2DM patients were included in the study. On the first day (Group 1), serum samples were taken from the patients within 3-4 hours after breakfast (hour 0) and again at 2 and 3 hours after lunch. One week later, samples were taken in a similar manner after a lunch with different carbohydrate and fat ratios (Group 2). After the samples were subjected to appropriate pretreatment, they were analyzed on the LC-MS/MS device.

Results: When Group 1 (0 and 3 hours) and Group 2 (0 and 2 hours) were compared in terms of KYN levels, it was found to be significant; [(p=0.001), (p=0.041)]. When compared according to Trp levels, there was significance in Group 1 (2 and 3 hours) (p=0.02). Kynurenic acid levels were significant for Group 1 (0 and 3 hours) (p=0.000). When insulin and KYN levels were compared, a negative correlation (p=0.018) was observed in Group 2, and a positive correlation (p=0.02) was observed when 3-OH anthranilic acid was compared.

Conclusions: In this study, significant differences were found in the levels of TRP, KYN, and kynurenic acid in individuals with T2DM after two meals containing different carbohydrate and fat ratios, depending on time.

Keywords: Kynurenine Pathway, Nutrition, Tryptophan

OP138

RETROSPECTIVE ANALYSIS OF MONOCLONAL GAMMOPATHIES: PREVALANCE AND ISOTYPE DISTRIBITION IN A LARGE PATIENT COHORT

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Objectives: The immunofixation electrophoresis (IFE) is the standard method used to confirm the presence of monoclonal proteins for the diagnosis and treatment. In our study, we retrospectively analyzed the results of serum immunofixation electrophoresis of patients with the suspicion of monoclonal gammopathy (MG).

Methods: We analyzed 8300 IFE results from patients referred to Dr Lütfi Kırdar City Hospital between January 2023 and March 2024. After excluding recurrent results, the final sample size was 5757. IFE test were performed on the SEBIA Hydrasis Jel Electrophoresis and the results were assessed for frequency and type of MG.

Results: A total of 779 (%13.5) patients (408 males [52%],371 females [48%]) were diagnosed with MG. Among these patients, the median (2.5^{th}–97.5^{th} percentile) age was 67.5 years for males and 68.2 years for females. The distribition of isotypes was as follows: IgG kappa in 303 patients (38.9%), IgG lambda in 185 (23.7%), IgA kappa in 56 (7.2%), IgA lambda in 76 (9.8%), IgM kappa in 49 (6.3%), IgM lambda in 29 (3.7%), IgD lambda in 6 (0.8%), free kappa in 16 (2.1%) and free lambda in 36 (4.6%).

Conclusions: The detection rate of MG was 13.5%, with IgG kappa being the most common subtype and IgD Lambda the least frequent. Our study provides important data on the prevalence of MG and highlights the significance of IgD typing. The presence of rare types like IgD Lambda draws attention to the need for comprehensive evaluation in suspected MG cases.

Keywords: Monoclonal Gammopathies, immunofixation electrophoresis

OP139

CYTOTOXIC EFFECT OF AVOCADO LEAF EXTRACT ON HUMAN BREAST CANCER CELL AND NORMAL MOUSE FIBROBLAST CELL

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Objectives: Active phytochemicals in fruit and vegetables can help prevent many chronic diseases such as diabetes, Alzheimer's, cardiovascular diseases and cancer, thanks to their antioxidant, antimicrobial and anticancer properties. In this sense, the avocado (*Persea americana*) has attracted attention due to its rich content, especially in the cosmetic industry and its use in complementary medicine. The objective of the study is to evaluate the efficacy of aqueous avocado leaf extract (ALE) on cancer and normal cell viability depending on time, concentration and cell type.

Methods: The avocado leaves were collected from İzmir (Aegean region, Türkiye). The leaves were dried, ground and then extracted in aqueous medium. The effect of ALE on the cell metabolic activity of normal mouse fibroblast (L929) and human breast cancer (MCF-7) cell lines was evaluated. The cancer and fibroblast cell lines were incubated with different concentrations of ALE ranging from 1 µg/ml to 1000 µg/ml for 24-72 hours and then cell viability was measured.

Results: The cell lines exhibited a dose-dependent response. The cellular response to ALE differed depending on the cell type. Compared to the L929 cells, the metabolic activity of the MCF-7 cells showed a further reduction, which could indicate low proliferation.

Conclusions: Our results showed that ALE had different cytotoxic effects based on cell type. However, further studies are required to determine its anticancer potential. The results suggest that avocado, which is mostly consumed as a food, might also be beneficial when its leaves are used as an adjunct herbal remedy in cancer treatment.

Keywords: Avocado, cytotoxicity, bioactive compounds, breast cancer cell, mouse fibroblast cell

OP140

ROLE OF LRRC17, CATHEPSIN-K, TRACP-5B AND SOME BONE BUILDING MARKERS IN DIAGNOSIS OF POSTMENOPOZAL OSTEOPENIA AND OSTEOPOROSIS: RELATIONSHIP WITH FRAX

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Objectives: The study aimed to determine how some selected bone formation markers, as well as new parameters that may be related to bone turnover, TRACP-5B, Cathepsin-K and LRRC17, change in osteopenia and osteoporosis, and whether they can distinguish osteopenia and osteoporosis from both healthy individuals and each other.

Methods: Ninety volunters were divided control (n=20), osteopenia (n=35) and osteoporosis (n=35) groups accordİng to their BMD lumbar (L1-4) T scores. Bone turnover markers were measured by ELISA method.

Results: TRACP-5B, LRRC17, P1CP, P1NP, Osteocalcin and B-ALP values in osteoporosis and osteopenia groups were higher than in the control. Osteocalcin in the osteoporosis group was higher than in the osteopenia group ($p<0.001$), while Cathepsin-K levels in the osteopenia group were higher than in the control ($p=0.012$). In addition, TRACP-5B, LRRC17, P1NP, osteocalcin, B-ALP, P1CP and Cathepsin-K biomarkers were successful parameters in distinguishing patients from healthy volunteers (AUC values:0.98, 0.97, 0.96, 0.95, 0.93, 0.74 and 0.71, respectively). In differentiating osteoporosis from osteopenia, it was observed that B-ALP, Osteocalcin, P1NP, LRRC17, TRACP-5B, P1CP and Cathepsin-K biomarkers had AUC values of 0.92, 0.72, 0.66, 0.65, 0.65, 0.60 and 0.56, respectively. Also, there was a positive and moderate correlation between TYRMOF and TRACP-5B, Osteocalcin and LRRC17 levels (r values:0.403, 0.471 and 0.415, respectively). Additionally, multiple regression analysis showed that Osteocalcin and Cathepsin-K were among the factors that positively affected TYRMOF.

Conclusions: Data suggested that TRACP-5B, LRRC17 and P1NP had very good performance in distinguishing patients (osteopenia-osteoporosis) from healthy controls, and also B-ALP had a very good performance in distinguishing osteoporosis from osteopenia.

Keywords: DXA, FRAX, Bone Turnover Markers, Postmenopausal Osteoporosis, Osteopenia

OP141

EVALUATION OF SERUM SODIUM DISORDERS IN OUTPATIENTS AND INPATIENTS

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Objectives: The aim of this study is to assess serum sodium levels in outpatients and inpatients by figuring out their prevalence, gender/age distribution, and associated diseases.

Methods: We performed a retrospective study of serum sodium levels including 970 outpatients and 92 inpatients, 575 women and 487 men, mean age 55 ± 19 years, from January 2023 to June 2024. Our study was approved from the Ethics Committee of Catholic Hospital "Our Lady of Good Counsel".

Results: Hyponatremia was found in 33 cases of total patients, with a prevalence of 2.6% in outpatients and 8.7% in hospitalized patients, with men 2-fold more likely to develop hyponatremia then women, and 80% of cases with hyponatremia in outpatients suffer from hypertension. Hypernatremia was found only in outpatients, with a prevalence of 1.4%, without gender differences, with the most frequent diagnosis hypertension in 57%, followed by healthy men performing moderate to hard physical activity with 21%.

Conclusions: Hyponatremia is the most common and important electrolyte disorder that requires the special attention of clinicians.

Keywords: Hyponatremia, Hypernatremia, Inpatients, Hypertension

OP142

USE OF THE FLOW CYTOMETRY IN THE DIAGNOSIS OF ACUTE MEGAKARYOBLASTIC LEUKEMIA IN A PATIENT WITH DOWN SYNDROME: A CASE REPORT

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Objectives:Acute megakaryoblastic leukemia(AML-M7) is diagnosed by microscopic examination of bone marrow smear,flow cytometric examination and pathological examination.Flow cytometry is very valuable in providing rapid diagnosis.

Methods: A 1-year-old male patient was referred to outer center hospital from primary health care center due to rash and pallor on his body.Due to low hemoglobin and platelet levels and high LDH in laboratory examinations performed at this hospital,patient was evaluated by pediatric hematology department and was referred to our hospital with prediagnosis of acute leukemia due to presence of many blasts in peripheral blood smear.It was learned from his medical history that he had Down syndrome. Bone marrow aspiraiton was performed.Bone marrow smear showed numerous blasts and occasionally large-sized cells with cytoplasmic protrusions consistent with megakaryoblast appearance.In flow cytometric examination,a 25.6% cell population in CD45-dim and a 15.9% cell population in CD45 negative regions were observed. CD33,CD34(partial),CD117, CD44,CD45RA,CD7, CD64(partial),CD13,CD9(partial), CD36,CD61(partial),CD42a were detected as positive in CD45-dim cells.CD44,CD9(partial), CD36,CD61(partial) were detected as positive in CD45 negative cells.It was observed that in CD45-dim and negative cell groups there were platelet precursor cells and maturation patterns of platelets were not normal.Following a consultation with pediatric hematology department,AML-M7 was primarily considered.It was decided that other HLA-DR negative leukemias should also be excluded.Pathology result was compatible with AML-M7 and follow-up and treatment was planned as AML-M7.

Results: In diagnosis of patient with AML-M7,it was observed that flow cytometry result of bone marrow aspiration and pathology result of bone marrow aspiration/biopsy were compatible.

Conclusions: Flow cytometry is a valuable and rapid diagnostic method that supports diagnosis of AML-M7.

Keywords: Acute megakaryoblastic leukemia, AML-M7, flow cytometry

OP143

ANALYSIS OF SAMPLE REJECTION RATES BY SHIFT TIMING AND DEPARTMENTAL PRACTICES IN A CLINICAL SETTING

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Objectives: We aimed to assess sample rejection rates (SRRs), identify reasons for rejection, and evaluate the impact of working hours.

Methods: Working hours were categorized into three groups: Group 1 (00:00 - 08:00), Group 2 (08:00 - 16:00), and Group 3 (16:00 - 23:59). We calculated SRRs for each group, identified rejection reasons

and their frequencies for the total number of rejected samples, and analyzed SRRs by department (Outpatient, Inpatient, Emergency Department). Statistical comparisons were conducted using the Chi-square test, with a significance level of $p<0.05$.

Results: In 2023, the overall SRR was 1.2%. SRRs for each group were 1.9% for Group 1, 1.7% for Group 3, and 0.6% for Group 2. There were statistically significant differences (χ^2: 71486.762, $p<0.001$). The primary reasons for rejection were hemolyzed specimens (45.4%), insufficient specimens (26.9%), and clotted specimens (12.2%). Statistically significant differences were observed in the frequency of hemolyzed samples (52.0% for Group 1, 45.9% for Group 3, and 36.3% for Group 2), insufficient samples (28.2% for Group 2 and Group 3, and 24.6% for Group 1), and clotted samples (14.8% for Group 2, 11.7% for Group 3, and 10.6% for Group 1). SRRs by the department were: Inpatient: 1.9%, Emergency Department: 1.6%, and Outpatient: 0.4%. There were also statistically significant differences (χ^2: 98155.207, $p<0.001$).

Conclusions: The study found that SRRs were higher during out-of-hours and on-call shifts. Outpatient services demonstrated better adherence to blood collection procedures compared to other departments, which appeared to prioritize blood collection less during shifts.

Keywords: Sample rejection rates, preanalytical error, blood collection procedures, phlebotomy

OP144

6-HYDROXY-L-NICOTINE IMPROVES MEMORY IMPAIRMENT IN ALZHEIMER'S DISEASE MODEL MOUSE (5xFAD)

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Objectives: 6-hydroxy-L-nicotine (6HLN) is a nicotinic derivative from the nicotine metabolism within *Paenarthrobacter nicotinovorans* that possess cognitive-improving abilities and antioxidant properties, eluding the side-effects of nicotine, the parent molecule. The present study examined the effects of 6HLN on cognitive impairments in 5XFAD transgenic mice with five familial Alzheimer's disease (AD) mutations.

Methods: 6HLN (0.3 mg/kg and 0.6 mg/kg, b.w., i.p.) was administered daily to 5XFAD mice for 7 days and 30 min before behavioral testing. Cognitive function was evaluated using Y-maze and radial arm maze tests, while anxiety-depressive-like behaviors were assessed by elevated plus maze and forced swimming tests.

Results: To elucidate the possible mechanism underlying the memory-improving effects of 6HLN in 5XFAD mice, Aβ1-42 and DNA fragmentation levels in mice hippocampus were evaluated. Vehicle-treated 5XFAD mice exhibited hippocampus-dependent memory deficits compared to non-transgenic mice, which were reversed in 6HLN-treated 5XFAD mice. In addition, reduced hippocampal Aβ1-42 and DNA fragmentation levels in 6HLN-treated 5XFAD mice compared to non-transgenic mice were noticed, indicating the positive effects of 6HLN on cognitive function.

Conclusions: 6HLN could be considered a promising protective compound against AD.

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Keywords: 6-hydroxy-L-nicotine, 5xFAD transgenic mice, Alzheimers disease

OP145

A MACHINE LEARNING STUDY: PREDICTION OF COVID-19 PROGNOSIS USING BASELINE BIOCHEMICAL TEST RESULTS

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Objectives: Along with image processing in radiodiagnostics and clinical pathology applications combining clinical laboratory results and artificial intelligence are another promising area in medical sciences. In this context, we developed several models to predict the prognosis of out- and in-patient follow-up along with in-hospital mortality risk profiles in a sample of COVID-19-proven patients.

Methods: Routine biochemical and hematological test records of 8036 patients (6035 out-patient, 2001 in-patient and 316 death) at admission were retrospectively analyzed by machine learning algorithm Classification and Regression Tree (CART) using electronic health records of a local pandemic hospital in Bursa, Türkiye.

Results: CART revealed that the most effective parameters predicting out- or in-patient follow-up were CRP >31.45 mg/L, LDH >305.50 IU/L, and Ca^{+2} ≤8.225 mg/dL with accuracy 80.8%, sensitivity 91.4% and specificity 48.8%, respectively. Urea >62.65 mg/dL, LDH >359.5 IU/L, CRP >73.45 mg/dL and cTnI >33.39 pg/mL were the most effective predictors of all case mortality with accuracy 96.8%, sensitivity 99.5% and specificity 30.1% respectively. On the other hand, cTnI >33.06 pg/mL, urea >65.5 mg/dL, LDH >435.50 IU/L, and neutrophil count >5.78 x103/µL were the predictors of in-hospital mortality with accuracy 87.7%, sensitivity 96.2%, and specificity 42.1% respectively.

Conclusions: Our results revealed that machine-learning based CART algorithm is able to discriminate high-risk patients accurately at admission in all case and also may predict in-hospital mortality risk and its most effective parameters with their cut-off values. In conclusion machine-learning applications seem useful for modeling nonlinear relationships in large data sets with various variables like laboratory test records.

Keywords: Artificial intelligence, Machine learning, CART algorithm, COVID-19

OP147

EFFECTS OF ELLAGIC ACID ON HEMATOLOGIC PARAMETERS IN ISOPROTERENOL-INDUCED MYOCARDIAL INFARCTION

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Objectives: Ellagic acid, a bioactive compound found in many fruits, is reported for its antioxidant properties and ability to neutralize free radicals. Studies also highlight its anti-inflammatory, anti-atherogenic, and neuroprotective effects. Myocardial infarction causes inflammation that stimulates the bone marrow, leading to the release of immature blood cells and alterations in blood cell levels. The aim of this study was to evaluate the effects of ellagic acid(EA) on hematologic parameters in isoproteronol (ISO)-induced myocardial infarction.

Methods: 16 female Wistar-albino rats were divided into 2 equal groups as ISO and EA+ISO. In the EA+ISO group, EA was administered orally for 14 days, and experimental MI was induced by intraperitoneal administration of ISO on days 13 and 14. ISO was administered intraperitoneally to the rats in the ISO group twice at 24 hours intervals. After the second dose of ISO, peripheral blood samples were taken and analyzed in an autoanalyzer. Data were analyzed with SPSS 27.0.

Results: Platelet count(p=0.001), platelet to lymphocyte ratio (PLR) (p=0.001) and SII (systemic immune-inflammation) index (p=0.001) showed statistically significant differences between the groups.

Conclusions: Systemic immune-inflammation index(-SII), which is calculated using platelet, neutrophil and lymphocyte counts together, is a much more important

marker of inflammation and immune response compared to PLO and NLO. Studies have shown that high SII values are associated with poor prognosis in many diseases. In this study, it was shown that administration of ellagic acid in rats caused lower SII index after ISO-induced MI. Accordingly, further studies are recommended to evaluate ellagic acid as an anti-inflammatory and cardioprotective agent.

Keywords: Ellagic acid, Systemic immune-inflammation index SII, Isoproterenol-induced myocardial infarction

OP148

INVESTIGATION OF THE DIETARY INFLAMMATORY INDEX IN HEMATOLOGIC MALIGNANCIES

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Objectives: Epidemiological studies show that cancer is one of the leading causes of death worldwide. The International Agency for Research on Cancer (IARC) reports that lifestyle changes can prevent 30-50% of cancer cases. In recent decades, research into the relationship between inflammation and health has increased dramatically. This increase has coincided with an equally significant focus on the effect of diet in controlling inflammation. The Dietary Inflammatory Index (DII) was created to examine how nutrients and other nutritional elements in people's diets affect inflammation. The aim of this study was to investigate the relationship between the DII and biochemical parameters in individuals diagnosed with hematologic malignancies and healthy individuals.

Methods: The study included 30 healthy subjects without chronic diseases and 32 subjects with a diagnosis of hematologic malignancy. The study data set includes anthropometric measurements, several biochemical parameters, and the subjects' 3-day food records. DII score calculated. Neutrophil, lymphocyte, platelet, neutrophil-lymphocyte, and platelet-lymphocyte ratios were compared with DII scores.

Results: Waist-hip ratio ($p<0.001$) and body mass index ($p=0.002$) showed a statistically significant difference between the patient and control groups. When comparing the patients' DII scores with their inflammatory markers, a significant difference was found in lymphocyte levels ($p=0.045$). However, there was no statistically significant difference between the DII score and the other inflammatory markers. In the healthy group, no statistically significant difference was found between the DII score and the biochemical parameters.

Conclusions: In the study, there was no association found between the DII score and newly diagnosed hematologic malignancies.

Keywords: Dietary Inflammatory Index, Hematologic Malignancies, Inflammation, Nutrition

OP149

EFFECT OF DOXORUBICIN ON ENDOPLASMIC RETICULUM STRESS IN RAT BRAIN TISSUES

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Objectives: Doxorubicin (DOX) is a anticancer drug used in the treatment of many malignant tumors. However, the risk of toxicity on many organs limits the clinical use of the drug. Endoplasmic reticulum stress (ERS) is a state of cells under various stimulations that cause unfolded or misfolded proteins to accumulate in the endoplasmic reticulum. Long-term ERS stimulation can induce cell apoptosis, leading to dysfunction and damage to tissues and organs.

Methods: In this study, the effect of DOX on ERS in cortex, cerebellum and hippocampus tissues of rats was investigated. For this purpose, control and DOX groups (n=8) were formed with 16 male Wistar rats.

DOX was administered i.p. at a dose of 6 mg/kg once a week for 3 weeks. Gene expressions of GRP78 and CHOP as ERS indicators in tissues were determined by RT-PCR method. In addition, BDNF levels were measured with commercial ELISA kit and TBARS levels were determined spectrophotometrically.

Results: In cortex, cerebellum and hippocampus, GRP78 gene expressions were found to be lower in the DOX group compared to the control group, while CHOP gene expressions were found to be higher ($p<0.05$). BDNF levels were significantly lower in the DOX group only in the cortex tissue. While TBARS levels were higher in the DOX group compared to the control group, this increase was significant only in the cerebellum.

Conclusions: DOX differentially affects ERS parameters GRP78 and CHOP in rat brain tissues. DOX also increases oxidative stress and decreases BDNF levels in rat brains.

Keywords: Cerebellum, Cortex, Doxorubicin, Endoplasmic Reticulum Stress, Hippocampus

OP150

DEVELOPING A SIMPLE AND USEFUL FORMULA FOR CALCULATING LDL-CHOLESTEROL, USING MACHINE LEARNING

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Objectives: The Friedewald, Martin/Hopkins, and Sampson equations are widely used for calculating low-density lipoprotein cholesterol (LDL-C). We aimed to develop a new formula using machine learning to find solutions to these equations' error and uncertainty problems.

Methods: In this study, we retrospectively obtained the results from 2838 patients who had total cholesterol (TC), triglyceride (TG), high-density lipoprotein cholesterol (HDL-C), and LDL-C were measured using the Abbott Architect c16000 analyzer. We divided these data into test and train groups. We obtained various equations using machine learning and symbolic regression in the Python programming language.

Results: The following new equation was the most successful.The Yayla formula:Y_LDL-C=TC-(HDL-C) [√TGxTC/100]LDL-C values estimated by Passing-Bablok regression analysis, Friedewald, Sampson, extended Martin/Hopkins, and Yayla formulas were compared with LDL-C values measured in the laboratory. We found a strong linear relationship between the Yayla estimation and LDL-C measurement. In the Bland-Altman analysis, we found that the Yayla formula showed less deviation than the other three formulas and had a narrower confidence interval. When the measured LDL-C values of patients were calculated using the Friedewald, Sampson, extended Martin/Hopkins and Yayla formulas, the RMSE value was found to be 15.75, 12.48, 10.97 and 8.60, respectively.TG levels were 400 mg/dL and above, the Friedewald, Sampson, extended Martin/Hopkins and Yayla formulas, the RMSE value was found to be 54.1, 40.3, 33.9 and 26.3, respectively

Conclusions: The Yayla formula delivered the best performance. Using the Yayla equation, we obtained more reliable results than with the Friedewald, Sampson, and extended Martin/Hopkins equations.

Keywords: LDL-C estimation, Friedewald equation, Yayla equation, Sampson equation, Machine learning

OP152

INVESTIGATION OF ZINC-ALPHA 2-GLYCOPROTEIN LEVELS IN PATIENTS WITH MAJOR DEPRESSIVE DISORDER

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Objectives: Major depressive disorder is the most common mood disorder. Clinicians diagnose major depressive disorder using clinical assessment criteria during interviews, which makes the diagnosis somewhat subjective. Therefore, the search for diagnostic biomarkers is still ongoing. In this study, the role of zinc-alpha-2-glycoprotein levels in the differential diagnosis of major depressive disorder was evaluated.

Methods: The study included 44 patients diagnosed with major depressive disorder and 40 healthy volunteers. The HAM-D scale was applied to the patients after the clinical interview. The ELISA kit (SunRed,-China) was used for zinc-alpha-2-glycoprotein measurement. The kit's sensitivity was 0.48µg/mL, with a measurement range of 0.5-150µg/mL, an intra-study CV of <10%, and an inter-study CV of <12%. The P-value of <0.05 was considered statistically significant.

Results: Zinc-alpha-2-glycoprotein levels were 69.0(19-150)µg/mL in the control group and 32.4(0.5-150)µg/mL in the patient group. A statistically significant and weak negative correlation was found between zinc-alpha-2-glycoprotein levels and HAM D scores(p=0.012,rs =-0.272).

Conclusions: In this study, the relationship between zinc-alpha-2-glycoprotein levels and depression severity in individuals with major depressive disorder was analyzed. Although there was no statistically significant difference between the zinc-alpha-2-glycoprotein levels of patients and control groups, the borderline significance and the negative correlation between HAM-D scores and zinc-alpha-2-glycoprotein levels suggest the need for a more in-depth study with a larger sample group. In conclusion, this study indicates that zinc-alpha-2-glycoprotein levels could be lower in patients with major depressive disorder and may be associated with depression severity. These findings may pave the way for further studies investigating the potential role of zinc-alpha-2-glycoprotein as a biomarker for depression.

Keywords: Zinc-Alpha 2-Glycoprotein, Major depressive disorder

POSTER PRESENTATION ABSTRACTS

PP001

ESTABLISHMENT AND EVALUATION OF REFERENCE CHANGE VALUE-BASED DELTA CHECK FOR COAGULATION TESTS IN ALBANIA

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Objectives: Delta Check is a patient-based quality control tool that detects differences in consecutive test results caused by sample misidentification, sample integrity problems, analytical problems or significant clinical changes. Reference change value (RCV) represents the statistically significant difference between serial results. Our aim was to establish delta check limits for coagulation tests: APTT, PT/INR, Fibrinogen, D-Dimmer and to evaluate their ability to detect misidentified samples.

Methods: This study was conducted in Laboratory Networks, University Hospital Center 'Mother Theresa', Albania in 2024. We collected results of internal quality control IQC (Coefficient of Variation CV_A) over six months. RCVs were calculated for 95% and 99% Confidence Interval using CV_A from IQC and CV_I from biological variation data, according to CLSI EP33. Index of individuality (II) was calculated for each parameter to determine which delta alert would better signalize a misidentification error in our laboratory.

Results: We developed a delta check method based on RCV calculation and adjusted according to our clinical experience. Delta check limits for APTT, PT/INR, Fibrinogen, D-Dimmer were determined. APTT resulted as the most efficient test to detect sample misidentification, with the highest individuality (II=0.4). Delta limits were implemented in the laboratory management information system and were validated for a three months period, with over 25000 coagulation tests performed.

Conclusions: Delta limits were established for APTT, PT/INR, Fibrinogen, D-Dimmer. RCV is an efficient Delta check method which helps improving the performance of coagulation testing. APTT delta alerts have the potential to better detect sample misidentifications in our laboratory.

Keywords: Delta check, RCV, Coagulation tests

PP002

EVALUATION OF THE ANALYTICAL PERFORMANCE OF THE DIRUI BF-7200 PLUS AUTOMATIC HEMATOLOGY ANALYZER

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Objectives: Nowadays, automatic hematology analyzers are used for Complete Blood Count (CBC) and reticulocyte measurement. The aim of this study is to evaluate the analytical performance of the DIRUI BF-7200 Plus automatic hematology analyzer.

Methods: Internal and external quality control materials were used to evaluate the analytical performance of the instrument. For precision and accuracy, KBUDEK and BIO-RAD EQC reference materials were utilised and target values determined for devices using the same method were used to calculate; bias, CV%, and TAE. TAE results were compared with the TEa% limits specified in the CLIA and EFLM 2024 clinical laboratory proficiency criteria. After evaluating the quality control results, the samples arriving at our laboratory in tubes containing K_2EDTA were included in the study.

Results: Before the study, three levels (low, medium, high) of IQC material provided by the manufacturer were run 20 times. It was observed that all three levels of IQC were within ±1 SD for all parameters. The speed of the device was determined to be 113 tests per hour. The CV% values calculated from the results obtained by analyzing the BIO-RAD EQC material for RBC, HB, HCT, MCV, WBC, and PLT were 0,010; 0,088; 0,011; 0,004; 0,022 and 0,030; respectively. The TAE values were found to be 1,138; 0,909; 1,351; 0,952; 2,399 and 6,379; respectively. All samples were

tested three times for repeatability.

Conclusions: The analytical performance of the DIRUI BF-7200 Plus automatic hematology analyzer was found to meet the proficiency criteria of CLIA and EFLM 2024.

Keywords: Complete blood count, analytical performance, quality control, total analytical error, coefficient of variation

PP003

DEVELOPMENT OF ESI-LC-MS/MS METHOD FOR URINARY STEROID HORMONES

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Objectives: In order to understand biological and pathological functions of steroid hormones, it is essential to develop a reliable analytical method that allows comprehensive determination of urinary hormones. The aim of the study is based on simultaneous analysis of clinically relevant 13 steroid hormones by LC-MS/MS which provides simple sample preparation protocol in urine.

Methods: Urine sample was pipetted into a glass tube then internal standard mixture and extraction reagent were added to the tube. The cap of the tube was closed and agitate at room temperature for 7 min. After centrifugation for 5 min, the supernatant was transferred to a new glass tube and left to evaporate under nitrogen stream at room temperature. Finally, the residue was dissolved by reagent and subjected to Agilent HPLC system (consisting of high speed pump-G7120A, column compartment-G7116B and multisampler-G7167B) equipped with Agilent G6470A triple quadrupole mass spectrometer. The total run time was 16 min.

Results: The developed analytical method was validated with respect to bioanalytical validation guideline. All necessary tests were performed in accordance with the criteria in these guidelines. During the validation process, quality control materials were created in the laboratory by spiking with appropriate concentration of the steroid hormones (11-Deoxycorticosterone, 11-Deoxycortisol, 17-α-hydroxyprogesterone, 21-Deoxycortisol, Aldosterone, Androstene-3,17-dione, Androsterone, Corticosterone, Cortisol, DHEAS, Dihydrotestosterone, Progesterone and Testosterone) to the artificial urine matrix.

Conclusions: The measurement of urinary steroid hormones could be beneficial for the diagnosis of hormone-related disorders. The methodology established in the study is also applicable in routine analysis laboratories, focusing on rapid sample preparation (without derivatization), which contributes to reliable results.

Keywords: Steroid Hormones, LC-MSMS, Method Validation

PP004

ASSESSMENT OF FOLATE TESTING ON SNIBE MAGLUMI ACCORDING TO CLSI EP15A3: A VERIFICATION EXAMPLE

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Objectives: This study aimed to evaluate the analytical performance of the folate on Snibe Maglumi X8 analyzers, to assess the consistency of precision with the manufacturer's claims and to examine the bias calculated relative to the target values of the selected reference material.

Methods: We performed our study according to CLSI EP15A3 guidelines. Bio-Rad Unity concentrations (Levels 1, 2, 3) were used as reference material. Precision was assessed with five QC replicates per day over five days, calculating within-run CV% and within-lab CV% for comparison with manufacturer claims. The grand mean from 25 QC replicates was compared with the target value obtained from the peer group mean of laboratories participating in the interlaboratory QC program (Bio-Rad Unity) to estimate bias%. All calculations were performed using the APS calculator (https://hikmetc-apscalculator.streamlit.app/).

Results:The precision study showed an acceptable

within-run and within-lab imprecision for all levels of folate across the three analyzers. However, trueness verification revealed discrepancies for folate at Level 1 on all three analyzers (observed means of 1.73, 1.73, 1.79 versus verification interval 1.27-1.65). Levels 2 and 3 were within verification limits on all instruments.

Conclusions:The precision results were within acceptable limits, confirming the manufacturer's claims. However, the trueness verification revealed that Folate Level 1 was not within the verification limits on all analyzers. As a result, the manufacturer was contacted regarding Folate Level 1. Operational risks were identified, and technical investigations were planned. Test performance will be closely monitored through external quality control and daily internal quality control.

Keywords: verification, bias, precision, folate

PP005

THE EVALUATION OF THE QULITY PERFORMANCE OF ASPARTATE AMINOTRANSFERASE AND ALANINE AMINOTRANSFERASE USING SIX SIGMA METRIC MEASURES

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Objectives: Six sigma measurement is a quality assessment method that shows the number of defective results per million samples.

Methods: In this work, we used the data of commercial control values obtained in two levels of controls in a period of three months for the analyzers Cobas 502 and Cobas pro for the enzymes AST and ALT. Two daily quality controls (PCCC1 and PCCC2) were run over three months. Total percent CV was calculated from routine daily QC. The value for bIas used from "Randox International Quality Assessment Scheme" (RIQAS). To calculate sigma values for TEa taken the proficiency testing criteria of the American Clinical Laboratory Improvement Amendment (CLIA) 2024. The QGI ratio was calculated.

Results: The calculated sigma metrics for AST were 6.4 and 6.0 on Cobas 502 and 5.7 and 10.1 on Cobas pro; for ALT 4.1 and 3.8 on Cobas502 and 6.2 and 8.7 on Cobas pro. Analytical performance for AST, ALT in the Cobas pro is world class for both levels of controls and excellent for AST in level one of control. On the other hand, analytical performance for AST is world class for both control level in Cobas 502, but for ALT sigma grades is marginal for internal quality control in both level in Cobas 502. QGI ratio for control level two for ALT on Cobas502 is <0.8 indicates imprecision in measurement.

Conclusions: We should be introduce Sigma metrics into routine practice, as a tool for decide the frequency of QC run and to detect errors in analysis.

Keywords: six sigma, quality control

PP006

CALCULATION OF MEASUREMENT UNCERTAINTY OF GLUCOSE AND HBA1C TESTS

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Objectives: The measurement uncertainty (MU) defines the range within which the measured test can be found.It can be defined as a statistical parameter that describes the distribution of values reasonably attributed to a measurement.Diabetes mellitus (DM) is a chronic disease with an increasing incidence.Glucose and HbA1c test is an essential of the diagnosis and monitoring of DM.Our aim in this study was to determine the MU for these tests in our laboratory.

Methods: Glucose and HbA1c tests were measured in Roche Cobas 6000 autoanalyzer.The MU was calculated according to the Nordtest guideline.Intra-laboratory reproducibility (uRw) was calculated from the internal quality control results of these tests at two different levels between 01.01.2024 and 01.07.2024. Uncertainty of measurement (Ubias) calculated from 6-month external quality control data.The combined standard uncertainty value was calculated using the standard uncertainty value.Expanded uncertainty was calculated at 95% confidence interval (CI), including all components of uncertainty.

Results: At the %95 CI, expanded MU for HbA1c and glucose were 8.13 and 3.36 respectively.HbA1c internal quality control CV% for level 1 and level 2 were 1.85% and 1.21%,respectively.Glucose internal quality control CV% for level 1 and level 2 were 2.03% and 1.73%,respectively.HbA1c uRw value was calculated as 0.78%, RMSbias 3.99%, uCref 0.16%, ubias 3.99%, uC 4.06%, U 8.13%.Glucose uRw value was calculated as 0.94%, RMSbias 1.39%, uCref 0.09, ubias 1.39, uC 1.68%, U 3.36%.

Conclusions: Clinical laboratory experts should review the concept of MU at certain intervals and increase clinician awareness about the subject, which plays an important role in quality performance.

Keywords: Uncertainty of measurement, HbA1c, Glucose

PP007

DO TRUNCATION LIMITS BASED ON BIOLOGICAL VARIATION FOR LDL CHOLESTEROL PROVIDE BETTER PERFORMANCE FOR PATIENT-BASED REAL-TIME QUALITY CONTROL?

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Objectives: In clinical laboratories, noncommutable traditional IQC materials are not sufficient to detect preanalytical errors and are costly. Patient-based real-time quality control (PBRTQC) overcomes these challenges and helps to detect systematic errors (SE) earlier. This study compares PBRTQC performance using truncation limits (TLs) based on between-subject biological variation (RCVg), TLs corresponding to quantile values (1st-99th and 5th-95th quantiles) and without using TLs.

Methods: 716.202 Low Density Lipoprotein cholesterol (LDL-C) results of outpatients (aged 18 years and older) between May 1, 2018 and May 1, 2024 were used. LDL-C values were calculated using the Friedewald formula (triglycerides≤400) or LDL-C kits (triglycerides>400). Python software language used for simulations. Data were split into training and test datasets in a 1:1 ratio. TLs were applied based on: RCVg, 1st-99th quantiles, 5th-95th quantiles, and without TLs. Control limits (CLs) were determined by moving mean, median or exponentially weighted moving average with different block sizes (BS) for training data after truncation. CLs were set at the 5th and 95th quantiles of all data. Test data were analyzed for biases from -50% to +50% starting from the 100th point of daily 1000-data and the methods applied to the training data were applied. Median number of results until error detection (MNPed) were compared.

Results: The lowest MNPed value was achieved using trimmed RCVg TLs with moving median with 20 BS.

Conclusions: Choosing the optimal PBRTQC method varies by laboratory. Truncation based on RCVg showed advantages over other TLs. Laboratories should simulate various combinations to find the best own PBRTQC method for SE detection.

Keywords: Patient Based Real Time Quality Control, Biological Variation, LDL Cholesterol

PP009

PRECISION AND TRUENESS VERIFICATION OF DHEAS TEST ACCORDING TO CLSI EP15A3

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Objectives: Validation is the testing and documentationof the appropriateness of a measurement procedure for a specified purpose, according to objective criteria. Verificationis the process of confirming an analysis method by applyingpredetermined performance criteria using the laboratory'sequipment and personnel. In this study, we aimed to verify thetrueness and precision of the dehydroepiandrosterone sulfate(DHEAS) test in accordance with CLSI EP15A3 guidelines.

Methods: In this study, the DHEAStest was verified using the Siemens Advia Centaur XP deviceIn accordance with the CLSI EP15A3 guidelines. For this purpose, two different levels of BioRad quality control (QC)samples (Bio-Rad Immunoassay Plus, Control, Level 1 Lot:40441, and Level 2 Lot:40442) were used. For precisionverification of DHEAS, two levels of Bio-Rad QC sampleswere analyzed for five days, with five replicates per day, andthe results were compared with the manufacturer's claims.%Bias was calculated by comparing the overall mean from theprecision study (Levels 1 and 2 QC) with the Bio-Rad Unityinterlaboratory QC program peer group mean.

Results: Within-run CV% and within-lab CV% values forLevel 1 and Level 2 were (2.35%-4.60% and 1,94%-3.06%, respectively), which were below the manufacturer's claims. The %bias values for Levels 1 and 2 were calculated as 3.71% and 5.46%, respectively, which were lower than the optimal bias of 6.60% in the EFLM biological variation database.

Conclusion: Our study found that the DHEAS test demonstrated acceptable precision and trueness, consistent with the manufacturer's claims.

Keywords: EP15A3, DHEAS, Verification

PP010

DETERMINATION OF REFERENCE INTERVALS OF COAGULATION TESTS USING RefineR ALGORITHM

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Objectives: Estimating reference intervals using the direct method is limited by high costs, difficulties in defining a healthy population, and ethical concerns regarding sample collection. Indirect methods, on the other hand, utilize data from laboratory information systems (LIS), which include both normal and abnormal conditions. This study aimed to estimate reference intervals for coagulation tests in adults using LIS data and the *refineR* algorithm, comparing the results with those recommended in the manufacturer's kit.

Methods: Data on prothrombin time (PT) and activated partial thromboplastin time (aPTT) were obtained from a Succeder SF-8100 analyzer (Beijing Succeeder Technology Inc., China) at Yerköy State Hospital between January 2020 and December 2021. The study included individuals aged 18-75, with 9921 data points for PT and 9810 for aPTT. Reference intervals were calculated using the *refineR* package (v1.6.1), and confidence intervals (CIs) were derived from 200 bootstrap iterations.

Results: The reference interval for PT was 11.2-15.8 seconds, with a 90% CI for the lower limit (LL) of 11.1-11.3 seconds and the upper limit (UL) of 15.6-15.9 seconds, aligning with the manufacturer's suggested range of 11-15 seconds. For aPTT, the reference interval was 25.8-41.2 seconds, with a 90% CI for the LL of 25.1-26.1 seconds and the UL of 39.9-41.9 seconds, slightly lower than the manufacturer's recommended range of 27-45 seconds.

Conclusions: The *refineR* indirect reference interval method provided results consistent with the kit for PT, while aPTT showed a lower UL compared to the manufacturer's recommendation.

Keywords: Refine R, reference interval, prothrombin time, activated partial thromboplastin time

PP011

THE PREANALYTICAL ERROR RATES OF ANKARA BILKENT CITY HOSPITAL CENTRAL LABORATORY

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Objectives: Clinical laboratories have a crucial role in the diagnosis, monitorization and treatment of diseases. The total testing procedure is significantly af-

fected by the preanalytical factors. In this study, we aimed to evaluate the preanalytical errors in order to maintain a high quality laboratory performance.

Methods: A retrospective data of 1 year has been screened from Laboratory Information System and the sample rejections belonging to year 2023 are analyzed in terms of rejection rates and causes. The data is evaluated according to the samples sent from different departments and the analytic groups being studied.

Results: The total number of samples admitted to the central laboratory of the Ankara Bilkent City Hospital are 2,647,527 in year 2023. Of this number 35,024 samples (1.32%) are rejected from the central laboratory. 34,376 (1.30%) of the samples are rejected due to preanalytical causes. The mostly encountered preanalytical rejection causes are inadequate sample volume, clotted and hemolysed samples.The majority of the rejected samples belonged to the biochemistry and coagulation groups.

Conclusions: The preanalytical phase of the total testing procedure is the most susceptible stage to erroneous conditions. Therefore focusing on the preanalytical errors and taking corrective actions are of great importance and will improve the accuracy and quality of the test results.

Keywords: preanalytical error, sample rejection, inadequate sample volume, clotted sample

PP012

CLINICAL IMPLICATIONS OF INTERFERENCE IN ELEVATED ALP:A CASE REPORT

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Objectives: Immunological interference in biochemical tests is considered rare. However, if there are discrepancies between laboratory test results and clinical findings or unexplained situations, the possibility of interference should be considered and evaluated. The aim of this study is to emphasize the importance of interference cases and contribute to the accurate investigation of patient etiology. In this way, patients will be relieved from the financial and emotional burden of unnecessary interventions

Methods: A consultation was requested from our department for a patient who presented to the Pediatric Gastroenterology Department at Gazi University Hospital due to elevated ALP levels. Consequently, the patient's serum ALP level was measured using the central biochemistry autoanalyzer. Precipitation with PEG, serial dilution, comparison with the HBT tube, and a method using different antibodies were performed.

Results: The patient was referred to us for consultation due to incidental finding of elevated ALP levels. Consequently, our studies on PEG precipitation, ALP measurement in HBT tubes, and methods using different antibodies have shown interference. In serial dilutions, linearity was disrupted, and findings were in favor of interference in the patient.

Conclusions: Failure to consider interference as a potential cause of elevated enzyme levels can lead to emotional distress for the patient, financial burdens, and unnecessary additional tests and further investigations This example clearly demonstrates how crucial it is for clinical biochemistry specialists to have a thorough understanding of analytical methods and the operational principles of devices when interpreting test results, as it enables accurate detection of interferences and effective collaboration with clinicians

Keywords: False Positive, Error Sources, Clinical Biochemistry

PP013

AMYLASE ELEVATION OR LABORATORY ERROR? EVALUATING FALSE ELEVATIONS

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Objectives: Although immunological interference in biochemical tests is rare, the possibility of interference should be considered and investigated when laboratory results conflict with clinical findings or when unexplained situations arise. The aim of this study is

to highlight the importance of interference in pediatric cases and contribute to the accurate diagnostic process.

Methods: The patient, who presented to the Gazi University Hospital with unexplained amylase elevation from an external center, was admitted to the pediatric ward. Following the consultation requested from our department, PEG precipitation, serial dilution, comparison with HBT, and ACCR (amylase creatinine clearance ratio) tests were performed on the patient.

Results: In a 1 year and 9-month-old male child with suspected falsely elevated amylase, investigations revealed that abdominal ultrasound and fecal fat tests were normal, and the patient, who had no clinical signs suggestive of pancreatitis, had normal lipase and other liver function tests. The patient exhibited isolated amylase elevation. To assess for macroamylase interference, amylase and creatinine levels in serum and urine were measured using our routine autoanalyzer, and ACCR was calculated. Serial dilution and PEG precipitation were also performed. ACCR was found to be 0.22 (<1) and PEG was 3.93% (reference range: 44-79%), indicating macroamylase interference based on these results.

Conclusions: Failing to consider interference as a potential cause of elevated enzyme levels can lead to unnecessary anxiety for patients, additional costs, and excessive testing. This case demonstrates how crucial it is for clinical biochemistry specialists to detect interferences, as it plays a key role in facilitating effective collaboration with clinicians.

Keywords: Enzyme Elevation, Analytical Methods, Biochemical Testing

PP014

RELATIONSHIP BETWEEN GALECTIN-3 AND ASYMMETRIC DİMETHYLARINE IN DIALYSIS PATIENTS

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Objectives: Asymmetric dimethylarginine (ADMA) is an inhibitor of the endogenous nitric oxide synthase. ADMA exits cells into the bloodstream via the cationic amino acid transporter family and is either excreted by the kidneys or eliminated in the liver. Galectin-3 (Gal-3) is a type of protein found in many different cell types in the body. It is expressed on the cell surface and then secreted into biological fluids. The purpose of the study was to evaluate Gal-3 and ADMA levels pre- and post-dialysis and determine the relationship between them.

Methods:Fasting blood samples were collected from hemodialysis patients (n:42) pre- and post-dialysis. After the samples were centrifuged, the serum was transferred to eppendorf tubes Gal-3 and ADMA levels were determined by enzyme-linked immunosorbent assay and liquid chromatography-mass spectrometry, respectively. Mass spectrometric analyses were performed using an Shimadzu LC-20-AD (Kyoto, Japan) coupled with a ABSCIEX API 3200 triple quadrupole mass spectrometer (USA) equipped with an electrospray ion source (ESI) operating in positive mode.

Results: A significant difference was found in ADMA levels pre- and post-dialysis ($P = 0.000$).No significant difference was found in Gal-3 levels pre- and post-dialysis ($P = 0.062$).

Conclusions: Although there is no relationship between ADMA and Gal-3 levels in the serum of kidney patients pre- and post-dialysis , the difference between ADMA levels could be considered as a biomarker that predicts the early assessment and progression of clinical kidney damage.

Keywords: Asymmetric dimethylarginine, dialysis, Galectin-3, liquid chromatography-mass spectrometry

PP015

EFFECT OF LIPEMIA REMOVAL METHODS ON HEMOGLOBIN AND ERYTHROCYTE INDEXES

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Objectives: Lipemia is an important interference in hemoglobin and erythrocyte indexes. The purpose of this study is to examine these parameters in lipemic samples treated with two lipemia removal methods.

Methods: This study was based on lipemic serum samples of patients. Twenty lipemic patients who had two K2-EDTA blood tubes at the same time were included in the study. It was performed by two methods for lipemia removal on tubes with EDTA. In the first method, sample was centrifuged, and the resulting plasma was replaced with an equal amount of saline. In the second method, blood sample was diluted with saline at a ratio of 1:3 (1). CBC analyses were performed by Unicel DXH-800 analyzer. Paired t-tests were used to assess between samples.

Results: Hb values decreased in both the first (14.2±1.48, p=0.004), and second methods (14.1±1.64, p=0.03) compared to Hb values (14.4±1.52) of the lipemic sample. While there was no difference in the first method (85.0±4.2, p>0.05), there was a significant difference in MCV values between the second method (87.0±4.3, p<0.001) and lipemic samples (85.3±3.8). While there was no difference in the second method (29.3±2.1, p>0.05), there was a significant difference in MCH values between the first method (29.0±2.0, p=0.01) and lipemic samples (29.5±2.0). MCHC values decreased in both the first (34.1±0.9, p=0.008), and second methods (33.6±1.0, p<0.001) compared to MCHC (34.5±1.1) of lipemic samples.

Conclusions: This study suggests that both of two methods can be used to prevent lipemia interference on Hb and MCHC results.

Keywords: Lipemia, hemoglobin, MCHC

PP016

COMPARISON OF PLATELET COUNT RESULTS ON TWO AUTOMATED HEMATOLOGY ANALYZERS

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Objectives: Platelet (PLT) count estimation is one of the common and important laboratory investigations to diagnose many diseases. This mini study aimed to compare PLT count estimation by two different hematology analyzers and to evaluate the possibility of their parallel use in routine laboratory practice.

Methods: 50 whole blood samples were processed in this study. Two automated hematology analyzers: Sysmex XT-1800i and Siemens Advia2120 were used for PLT counting. The accuracy and precision of these analyzers were checked. Statistical analysis was performed by MedCalc software.

Results: A shortened analytical evaluation has determined the satisfactory accuracy and precision of the analyzers. The Scatter diagram indicates the diversity of data distribution from low, through normal to high. Bland Altman graph shows that four PLT values were distributed outside of ± 1.96 SD. In Passing-Bablok regression analysis, when comparing Sysmex XT-1800i with Siemens Advia2120, the following results were obtained: y = 8.003597 + 0.913669 x. Intercept a = 8.0036 (95% CI 2.6096 to 19.2517). Slopes b = 0.9137 (95% CI 0.8601 to 0.9561). Result for the slope indicates that there is statistically significant constant error. Cusum's linearity test shows that there is no deviation in linearity (P = 0.99).

Conclusions: Despite the satisfactory accuracy and precision of both hematology analyzers, their simultaneous use for platelet counting is not recommended. A possible source of incompatibility could be different method: fluorescence flow cytometry with optical platelet count (Sysmex XT-1800i) vs flow cytometry (Siemens Advia2120). In addition, future studies with a larger number of blood samples are required for more reliable conclusions.

Keywords: platelet, hematology analyzer, laboratory practice

PP017

THE IMPACT OF PREANALYTICAL ERRORS, MAINLY THE TEMPERATURE CHANGE IN THE DIFFERENCIAL COUNT OF WBC

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Objectives: The majority of errors in laboratory medicine occur in the pre and postanalytical phases of the testing process. Although the causes of these errors are largely common to all laboratory medicine specialties, it is important for the hematology laboratory to understand the particular impact of some on automated counting. Our objectives are to emphasize the importance of preanalytical variables, mainly the temperature change in the differencial count of WBC regarding the accuracy of the result and possible false positive and negative values.

Methods: Analytical experimental study during the period 2023-2024 at the Harrison laboratory. 130 blood samples with K3EDTA were examined, which were measured under different temperature conditions. The first measurement was carried out with samples stored at 0˚C -1˚C just arrived from the refrigerated cans, the second measurement was performed with samples stored at 18-20˚C which were homogenized for 20-30 minutes in the rotator and the end differencial count of WBC by microscopy.

Results: Regression equation for each one-unit increase in temperature, the percentage of eosinophils decreases by 0.76%, the number of leukocytes increases by 0.12%, the percentage of neutrophils increases by 0.75%, the percentage of lymphocytes decreases by 0.02%, the percentage of monocytes increases by 0.01 %, the percentage of basophils increases by 0.02%. In 13 samples was observed destruction of the cellular morphology of the hemogram parameters.

Conclusions: Low temperatures can give false positive results for eosinophils and neutrophils. Periferal blood smear examination had a pivotal role in determining diagnosis and as confirmation of the automatic hematology analyser results.

Keywords: differencial count of WBC, temperature, preanalytics

PP018

EVALUATION OF POSSIBLE KIDNEY DAMAGE IN ALPHA-THALASSEMIA PATIENTS WITH GLOMERULAR FILTRATION RATE

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Objectives: We aimed to assess potential kidney damage in patients suspected of alpha-thalassemia based on estimated glomerular filtration rate (eGFR).

Methods: Between 2022 and 2024, 105 out of 6599 patients were suspected of alpha-thalassemia. Among these patients, 33 individuals with eGFR calculated for renal function evaluation simultaneously with hemoglobin electrophoresis were included in the study. Hemoglobin electrophoresis was performed on whole blood samples (Greiner VACUETTE® 2 ml K3-EDTA) by capillary electrophoresis on a Sebia Minicap, and eGFR was calculated using the CKD-EPI formula. For calculation purposes, creatinine was measured in serum samples (Greiner VACUETTE® 5 ml CAT) on a Roche Cobas c702 analyzer. The eGFR values were categorized below or within the reference range, and the patients' ages were compared. Statistical analysis was performed using the Mann-Whitney U test with a significance level of $p<0.05$ and a confidence interval of 95%.

Results: The median age of the patients was 30 (25 – 43). The median age of patients with low eGFR values (8/33) was 36 (30 – 46), while the median age of patients within the reference range of eGFR values (25/33) was 26 (24 – 40). However, there was no

statistically significant difference in age between the groups (p>0.05).

Conclusions: The study revealed that some patients suspected of having alpha-thalassemia had low eGFR, indicating potential kidney damage. The findings suggest that iron accumulation in tissues due to alpha-thalassemia may have an adverse impact on renal function. Therefore, eGFR could be an early indicator of kidney damage in alpha-thalassemia patients.

Keywords: Alpha-thalassemia, hemoglobin electrophoresis, kidney damage, estimated glomerular filtration rate

PP019

EFFECTS OF PIRIMIPHOS METHYL AND ZINC OXIDE NANOPARTICLES ON FRESHWATER MUSSELS

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Objectives: Pirimiphos methyl (PM) is a broad-spectrum insecticide and acaricide and is used in agricultural applications. Zinc oxide nanoparticles (ZnO NPs) are included in nanofertilizers applied in agricultural fields. This study was aimed to reveal the effects of the pesticide and nanoparticle on lipid peroxidation (MDA) and advanced oxidative protein products (AOPP) in the tissues of mussels for the evaluation and biological monitoring of environmental pollution.

Methods: After two weeks adaptation, the freshwater mussels were placed into aquariums (10 mussels/aquaria). There were two control groups in the study: control and solvent control. The mussels were exposed to PM and ZnO NPs separately and together. After 96h and 21d of exposure, the MDA and AOPP were analyzed in the gills and digestive glands of mussels.

Results: Among the 96h exposure, the AOPP of digestive glands in the groups applied with low concentration PM were significantly lower than the values in the groups applied with low concentration PM and ZnO NPs mixture (P<0.05). Among the 21d exposure, the MDA values of gills of mussels exposed with ZnO NPs were higher than control groups.

Conclusions: The results of this study showed that changes in AOPP and MDA values in digestive gland and gill tissues caused toxic effects of pesticides and nanoparticle on mussels. More significant results were found in the groups where pesticide and nanoparticle mixtures were applied, indicating that these substances create a synergistic effect together.

Acknowledgments: Gülsüm Batmaz Erişmiş was supported by TÜBİTAK 2211-A Domestic Doctoral Scholarship Program 2022/1.

Keywords: Pirimiphos methyl, zinc oxide nanoparticles, MDA, AOPP

PP020

DETERMINATION OF THE TOXIC EFFECTS OF AZOXYSTROBIN ON FRESHWATER MUSSELS

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Objectives: Strobulin group fungicides are among the most frequently used substances against fungi, which are one of the organisms harmful to agricultural products during the production, storage, and distribution of these products. Azoxystrobin, a strobulin compound, is highly used in agricultural areas and pollutes aquatic ecosystems. The study aimed to investigate the acute toxic effects of azoxystrobin on freshwater mussels (*Unio delicatus*).

Methods: After mussels were obtained from fishermen, they were adapted to laboratory conditions for two weeks. Then, they were exposed to 10, 50, 100,

and 250 mg/L concentrations of azoxystrobin for 96h. There were also negative and solvent control groups. At the end of 96h, the gills and digestive glands of the mussels were taken. The oxidative stress parameters, superoxide dismutase (SOD), glutathione peroxidase (GPx) and catalase (CAT), were examined in these tissues.

Results: The SOD activities in the digestive glands and gills of mussels exposed to azoxystrobin increased significantly compared to the negative control group (p<0.05). The CAT and GPX activities in the digestive glands and gills of mussels exposed to azoxystrobin decreased significantly compared to the negative control group (p<0.05).

Conclusion: From the results of this study, we found that azoxystrobin affects the oxidative stress parameters of the digestive glands and gills. This study emphasizes that azoxystrobin has toxic effects on non-target species and further research is needed on its health effects in aquatic ecosystems.

Acknowledgments: **Gülsüm Batmaz was supported by TÜBİTAK 2211-A Domestic Doctoral Scholarship Program 2022/1.**

Keywords: Azoxystrobin, Freshwater mussels, oxidative stress parameters

PP024

URIC ACID IN HEMODIALYSIS PATIENTS AND THE RELATIONSHIP WITH CLINICAL AND LABORATORY INDICATORS

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Objectives: Hyperuricemia (HU) is associated with metabolic comorbidities and has been shown to be a risk factor for cardiovascular disease (CVD) and mortality in the general population. Aim of this study was to show the relationship with clinical conditions and laboratory indicators in haemodialysis (HD) patients.

Methods: This cross sectional single-center study at a tertiary university hospital, included adult haemodialysis patients (age >18 years) on dialysis for over six months. Serum uric acid (SUA) levels before HD sessions were performed using enzymatic (uricase) method. HU was considered SUA>7.5 mg/dl.

Results: 81 HD patients with mean age 53±12 years, 67% male were included. Hypertension and Diabetes Mellitus (DM) was present in 76.8% of patients. Mean time of HD treatment was 6.2±3.9 years, body mass index (BMI) 24.5±3,9 kg/m2, mean serum albumin level 3.9±0,3 g/dl, mean SUA 8.5 ± 1.9 mg/dl. HU patients had statistically significant higher prevalence of comorbidities (41.5% vs. 35.4%, p=0.031); higher BMI (25.5±4.3 vs. 23.3±3.2, p=0.025) and higher serum phosphorus levels (6.5±0.8 vs. 4.3±0.9, p<0.001). There was no significant difference according to HD adequacy in both groups.

Conclusions: Periodic monitoring of UA and factors associated with HU is necessary in HD patients for an optimal management.

Keywords: Serum Uric acid, Hemodialysis

PP025

THE RELATIONSHIP OF PREPTIN LEVEL WITH CARDIOVASCULAR RISK FACTORS IN METABOLIC SYNDROME

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Objectives: Metabolic syndrome is an endocrinopathy in which systemic disorders such as abdominal obesity, glucose intolerance or diabetes mellitus, hypertension, coronary artery disease and dyslipidemia first appear with insulin resistance. It has been suggested that the presence of subclinical cardiovascular diseases in people with metabolic syndrome is also effective in increasing the risk of cardiovascular disease. The rapidly spreading diabetes and metabolic syndrome in the world has directed researchers to investigate the molecules involved in the diagnosis, treatment and

pathogenesis of these diseases.

Methods: We aim to examine the relationship between preptin, a newly discovered peptide, and metabolic syndrome, as well as its association with cardiovascular risk factors. 58 metabolic syndrome patients were included in the study as an experimental group and 30 healthy individuals as control group.

Results: Risk assessment of preptin, age, waist circumference, hip circumference, systolic blood pressure, diastolic blood pressure, glucose, insulin, LDL, HDL, total cholesterol, triglyceride, HOMA-IR, HbA1c, BMI, QUICKI, SCORE was significantly higher in patients with metabolic syndrome compared to the control group. (respectively p=0,000, p=0,000, p=0,000, p=0,000, p=0,000, p=0,000, p=0,005, p=0,000, p=0,000 p=0,008, p=0,000, p=0,033, p=0,001, p=0,043, p=0,000, p=0,000, p=0,000). In the correlation analysis applied to the group of metabolic syndrome patients, a positive correlation was observed between preptin levels and waist circumference, systolic blood pressure, HOMA-IR, and BMI (respectively r=0,324 p<0,005, r=0,293 p<0,05, r=0,332 p<0,05, r=0,308 p<0,05).

Conclusions: Consequently, it has been suggested that due to its high levels in patients with metabolic syndrome, preptin may be a peptide that helps determine cardiovascular risk factors.

Keywords: Metabolic Syndrome, Preptin, Cardiovascular Risk

PP026

RHYTHM OF SERUM MELATONIN, LEPTIN, GHRELIN, CORTISOL AND GROWTH HORMONE IN WOMEN WITH METABOLIC SYNDROME

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Objectives: Disturbances in circadian rhythms are thought to influence the pathogenesis of metabolic diseases. Our goal is to determine and compare daytime and nighttime concentrations of serum melatonin, leptin, ghrelin, cortisol, and growth hormone in women with metabolic syndrome (MetS).

Methods: The study included 66 women with MetS aged 18 to 66. At 3:00 a.m. and at 8:00 a.m the concentrations of serum melatonin and ghrelin (Elabscience BiotechnologyInc, China), leptin and growth hormone (IBL, Hamburg) were measured on a Sirio S microplate reader (SEAC, Italy). Cortisol at 11:00 p.m. and at 8:00 a.m. was determined on an Access 2 (Beckman Coulter, USA). Serum glucose, lipid indicators (Olympys AU 480, Beckman Coulter, USA) and insulin (Access 2, Beckman Coulter, USA) were determined from the blood taken at 8:00 a.m. Results are presented as mean±SEM. P<0.05 was considered statistically significant.

Results: We found that in women with MetS, cortisol at 08:00 a.m. was statistically significantly higher than that at 11:00 p.m. (552.84±250.85 nmol/l vs. 146.85±169.18 nmol/l, P<0.01). Growth hormone at 3:00 a.m. was higher than that at 8:00 a.m. (3.46 ± 6.62 ng/ml vs. 1.49±5.40 ng/ml, P<0.01). We found no statistically significant difference between night and morning melatonin (154.22±90.91 pg/ml vs. 176.08±118.01 pg/ml, P>0.05), leptin (12.56±8.97 ng/ml vs. 16.59±18.74 ng/ml, P>0.05) and ghrelin (1.09±0.76 ng/ml vs. 1.44±1.08 ng/ml, P>0.05).

Conclusions: According to the data from our study, women with MetS have a disturbed night-day rhythm of melatonin and leptin and a preserved rhythm of cortisol and growth hormone.

Keywords: hormones, metabolic syndrome, circadian rhythms

PP028

ARE CHOLINE AND CARNITINE ETIOLOGICAL FACTOR IN NON-ALCOHOLIC LIVER LUBRICATION?

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Objectives: Non-alcohol-related fatty liver disease (NAFLD) is one of the leading causes of chronic liver disease worldwide.Trimethylamine N-oxide (TMAO) is a dietary component belonging to the class of amine oxides with the formula (CH□)□NO.Choline,L-carnitine,betaine, dimethylglycine and ergothionine,which are dietary precursors of TMAO,are first converted into Trimethylamine,which degrades in the mammalian intestine and gives off a fishy odor characteristic of seafood.In accordance with this information, our study aimed to determine whether there is a relationship between NAFLD and TMAO,L-carnitine and choline.

Methods:.A total of 89 individuals,56 patients between the ages of 25-65,33 controls,who came for examination to the Internal Medicine-Gastroenterology outpatient clinic of Selcuk University Faculty of Medicine Hospital and volunteered,were included in the study.TMAO ABSCIEX Api 3200 LC/MS/MS device,L-carnitine,choline ELISA kit were studied in the serum blood from routine blood tests.Routine blood values and demographic data were obtained from the Selcuk University Medical Faculty Hospital HBSY system.All statistical analyses were performed using the statistical programming language R version 4.1.2.

Results: There are significant relationships in serum levels between the patient,control groups.High values were found in serum TMAO($p<0.001$) and choline levels($p<0.004$) in the patient group compared to the control group.There was no significant difference in serum L-Carnitine level($p<0.889$).

Conclusions: As a result,accordingly,according to the data,it is believed that the serum levels of metabolites for sick and healthy individuals are affected by the food sources taken.Further studies with a larger sample number or animal models are needed to clarify whether there is a causal relationship between TMAO,NAFLD, to determine the diagnostic significance of TMAO for this disease.

Keywords: Choline, L-carnitine, microbiota, TMAO

PP030

EVALUATION OF GASTROINTESTINAL HORMONE AND APPETITE AFTER BARIATRIC SURGERY

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Objectives: Obesity is a major health problem whose incidence is rapidly increasing worldwide. Bariatric surgery is often preferred as a fast and permanent method in the treatment of obesity. This study aimed to evaluate the effectiveness of bariatric surgery in the treatment of obesity on some gastrointestinal hormone levels and appetite.

Methods: Twenty five patients who underwent bariatric surgery in accordance with the Obesity and Metabolic Surgery Clinic Protocol of the Ministry of Health and who were followed up and treated preoperatively and postoperatively in the General Surgery Clinic, and 20 controls who were diagnosed with obesity but did not undergo bariatric surgery were included in the study. Ghrelin and cholecystokinin A receptor (CCKAR) parameters were measured in serum samples taken from the control group and the patient group in the preoperative period and in the first month postoperative, when weight loss was most effective. Ghrelin and cholecystokinin A receptor (CCKAR) levels were

analysed by ELISA.

Results: Gastrointestinal hormone levels showed significant differences before and after surgery in individuals who underwent bariatric surgery. After bariatric surgery, ghrelin levels decreased ($p<0.05$), while cholecystokinin levels increased ($p<0.05$).

Conclusions: The biochemical effects of surgical intervention play an important role in the treatment of obesity. Bariatric surgery has been found to promote weight loss by causing significant changes in gastrointestinal hormone levels.

Keywords: Bariatric Surgery, obesity, Ghrelin, Cholecystokinin A receptor

PP031

SERUM ADROPIN LEVELS IN NON-OBESE PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objectives: Adropin, a newly identified peptide hormone, has garnered attention given its potential role in metabolism regulation, especially glucose metabolism and insulin resistance. However, the relationship between adropin and diabetes remains unclear. This study aimed to investigate the relationship between serum adropin levels and metabolic parameters, especially in obese/non-obese patients with type 2 diabetes mellitus (T2DM).

Methods: This study was performed on 163 volunteers aged 40-65 years, 84 patients, and 79 controls, matched for sex, age, and body mass index (BMI). Fasting serum adropin levels were measured by the ELISA method. The results were presented as median (IQR) values.

Results: Adropin levels were significantly lower in the T2DM group [131 (119-149) ng/mL] than in controls [150 (128-213) ng/mL] ($p<0.001$). Serum adropin levels were 128 (114-145) ng/mL in the obese T2DM group and 147 (127-196) ng/mL in the obese control group ($p=0.001$). Serum adropin levels were 134 (123-160) ng/mL in the non-obese T2DM group and 153 (131-263) ng/mL in the non-obese control group ($p=0.002$). Adropin levels showed a significant negative correlation with HbA1c ($r=-0.269$ $p=0.001$) and glucose ($r=-0.196$ $p=0.012$) but not with age, gender, BMI, lipids, insulin, and C-peptide. Regression analysis showed that adropin levels were associated with HbA1c levels ($\beta=-8.701$ $p=0.001$) rather than glucose.

Conclusions: In conclusion, serum adropin levels were found to be decreased in T2DM patients, independent of obesity, and closely associated with glycemic control. A decrease in the serum concentration of adropin, which is associated with metabolic regulation, to a certain level may be an indicator of uncontrolled diabetes.

Keywords: Adropin, Type 2 diabetes, Obesity

PP032

IS OVARIAN RESERVE LOW IN INFERTILITY PATIENTS WITH AUTOIMMUNE THYROIDITIS?

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Objectives: Autoimmune diseases can cause difficulty conceiving and even recurrent pregnancy loss. Autoimmune Thyroiditis is one of these autoimmune diseases. Finding a relationship between decreased ovarian reserve and autoimmune thyroiditis plays an important role in reducing infertility in this group of women. In this study, the ovarian reserve of infertile patients with autoimmune thyroiditis was compared with the ovarian reserve of infertile patients without

known disease.

Methods: A cross-sectional study was conducted with 108 infertile women at Etlik Zübeyde Hanım Women's Health Training and Research Hospital between March 2023 and August 2024. Serum concentrations of anti-Müllerian hormone (AMH), thyroid-stimulating hormone (TSH), thyroxine (T4), prolactin, anti-thyroid peroxidase (anti-TPO) antibodies were assessed. Participants were categorized based on the negative or positive anti-TPO antibodies. The sample size was determined to be 54 cases in each group.

Results: 54 women were analyzed in each group. We did not noticed differences in serum levels of thyroxine (T4), prolactin, age between studied groups (all $P>0.05$). TSH values were significantly higher in the anti-TPO positive group ($p<0.001$). Ovarian reserve characteristics: We observed no difference in serum AMH concentration in women in the anti-TPO positive group compared to the anti-TPO negative group ($P=0.82$).

Conclusions: We evaluated the ovarian reserve of infertile patients with autoimmune thyroiditis and infertile patients without known disease according to serum AMH levels and did not see any difference between the two groups.

Keywords: AMH, Anti-TPO, Autoimmune Thyroiditis

PP033

COMPARISON OF SERUM 17-HYDROXYPROGESTERONE LEVELS IN NEWBORNS BY ELISA AND LC-MS/MS METHODS: AN EVALUATION ON THE DIAGNOSTIC THRESHOLD

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Objectives: Congenital adrenal hyperplasia (CAH) has been included in Türkiye's newborn screening program since 2022. Serum 17-Hydroxyprogesterone (17-OHP) levels are used for screening, with measurements typically done using ELISA. However, for confirmation purposes, more sensitive methods like LC-MS/MS may be required. In newborns, the upper reference value in the literature is 6.3 ng/ml. The values set by the Ministry of Health are 10 ng/ml for term infants and 15 ng/ml for preterm infants. This study aims to compare the 17-OHP levels measured by ELISA and LC-MS/MS in newborns, and evaluate the diagnostic thresholds for both methods.

Methods: In this retrospective study, data from May 2023 to the present were analyzed. Total of 242 independent ELISA tests and 84 independent LC-MS/MS tests were evaluated. Additionally, 22 samples underwent both ELISA and LC-MS/MS testing.

Results: Among the 242 ELISA tests, 7.85% were below the 6.3 ng/mL threshold, 11.57% were below 10 ng/mL, and 26.45% fell below 15 ng/mL. For LC-MS/MS, 97.62% of the 84 tests were below 6.3 ng/mL. The average values were 14.3±3.3 ng/mL for ELISA and 1.45±1.54 ng/mL for LC-MS/MS, showing a significant difference ($p<0.001$). In the 22 dual-tested samples, all were above 10 ng/mL by ELISA, whereas only 2 samples exceeded 6.3 ng/mL with LC-MS/MS ($p<0.001$).

Conclusions: The findings suggest that ELISA may yield higher 17-OHP levels compared to the more sensitive LC-MS/MS method. Therefore, confirmation of elevated ELISA results with LC-MS/MS could be beneficial in clinical decision-making, particularly to reduce false positives in newborn screening programs.

Keywords: Newborn, 17-OHB screening, ELISA, LC-MSMS, adrenal hyperplasia

PP034

EFFECT OF BORIC ACID ON METABOLIC PEPTIDES AND SOME BIOCHEMICAL PARAMETERS IN EXPERIMENTAL DIABETIC RATS

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Objectives: Boron (B) is an element that has recently attracted significant interest and research in many fields, particularly for its effects on energy metabolism. This study aims to evaluate the effects of boric acid (BA) on some newly discovered peptides involved in energy metabolism.

Methods: The effects of 15 mg/kg BA were evaluated in 24 Wistar rats. The groups included a control group, a 15 mg/kg BA group, a streptozotocin (STZ)-induced experimental diabetes group, and an STZ-induced diabetic group treated with 15 mg/kg BA (STZ+15 mg/kg BA). Serum levels of asprosin, nesfatin-1, preptin, insulin, total cholesterol (TC), triglycerides (TG), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), aspartate transaminase (AST), alanine transaminase (ALT), and glucose were analyzed.

Results: In the STZ-induced groups, the elevated glucose, TG, TC, LDL-C levels, and AST, ALT activities were reduced following BA administration ($p < 0.001$). HDL-C levels in the STZ group approached control group values after BA administration ($p < 0.001$). While there was a statistically significant increase in asprosin, nesfatin-1, preptin, and insulin levels following the administration of 15 mg/kg BA to the STZ groups ($p < 0.001$), these levels did not reach those of the control group.

Conclusions: The findings suggest that the biochemical processes associated with STZ-induced diabetes mellitus vary correlationally. This study demonstrated that BA is effective in energy metabolism.

Keywords: Asprosin, Boric acid, Nesfatin-1, Preptin

PP035

RARE INDICATION OF THERAPEUTIC PLASMA APHERESIS; LIPOPROTEIN-X DISEASE: CASE REPORT

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Objectives: Lipoptotein-x(Lp-X) is a type of lipoprotein rich in phospholipids and unesterified cholesterol. It is detected at high levels in the patient's plasma measurement as a secondary to intra/extra hepatic cholestasis or as a primary due to LCAT (lecithin-cholesterol-acyl-transferase)enzyme deficiency

A 40-year-old male patient with known Coronary Artery Disease,Hypertension diagnoses was consulted to the endocrinology clinic with biochemistry test results in the psychiatry service where he was receiving alcohol addiction treatment. (Total cholesterol: 660,HDL:256, non-HDL cholesterol:404 triglyceride:1242 mg/dl LDL-cholesterol:could not be calculated due to high triglyceride levels (434mg/dl at the next day's check-up)AST:258 U/L ALT:203 U/L GGT:1347 U/L CK:596 amylase:92lipase: 144 U/L, serum ethanol:149.7 mg/dl Na: 130mm/L)The patient was diagnosed with "Lipoprotein-X.Plasmapheresis was planned for the patient to protect against possible side effects of hyperlipidemia.

Methods: After the patient's central venous catheterization, 4000cc saline and 8units of 20%albumin were used in lipid apheresis, the procedure was completed without complications. Stage 2-3 hepatosteatosis was detected in the ultrasound examination performed due to cholestasis. Cirrhosis was not observed.

Results: Since the control plasma lipid parameters taken the next day were found to be within the normal reference range a second apheresis session was not deemed necessary, and the use of statin group drugs for prophylactic purposes was not recommended at the patient's discharge. Treating alcoholism, the main cause of cirrhosis, was deemed sufficient.

Conclusions: Lp-X is an LDL-derived cholesterol found in plasma. Its physiological amount is excreted via bile acids. Disease's clinical symptoms and laboratory findings are parallel to cholestasis' findings, and may pseudohyponatremia accompany. The necessity of electrophoresis for definitive diagnosis,invasive procedures and the high cost of treatment are the main difficulties; The need for new, practical biochemical tests for definitive diagnosis is increasing. In this way, this disease, which is rarely seen in the literature, will be discovered more.

Keywords: cholestasis, apheresis, LDL, HDL, lipoproteins

PP036

BIOCHEMICAL AND HEMATOLOGICAL FINDINGS IN MEASLES INFECTION OF ADULT POPULATION

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Objectives: Measles is an eradicated disease in many countries, but sporadic epidemics are possible in some countries. Children are more often infected, but infection can also occur in non-immunized adults. Therefore, the aim of this study was to examine, assess, correlate and evaluate biochemical and hematological parameters in adult patients with measles on hospital admission.

Methods: This cross-sectional study included 112 patients with a confirmed diagnosis of measles. Laboratory results at the patient's admission to the Clinic for Infectious Diseases, Clinical Center of the University of Sarajevo were used for analysis. Biochemical and hematological parameters for patients >18 years were analyzed and presented as mean and standard deviation.

Results: The study included 112 patients, 55 male (49.01%), 37±12,22 years old. Blood count values were for erythrocytes 4,69±0,56, leukocytes 5,55±3,39 and platelets 160,5±63,55. The differential blood count of the patients was for neutrophils 77,9±15,94, lymphocytes 12,3±28,54, monocytes 9,3±4,48, eosinophils 0,4±1,51 and basophils 0,3±0,26. The mean value of the examined biochemical parameters was for CRP 51,65±40,08, AST 113,5±121,17, ALT 138±195,01, CK 179±561,22, LDH 498,5±182,71, amylase 63±28,51 and D-dimer 1,48±1,41. WBC showed significant positive correlations with the absolute number of neutrophils, CRP and NLR and negative correlations with LDH. NLR significantly positively correlates with WBC, neutrophils and CRP and negatively with lymphocytes.

Conclusion: Laboratory diagnostics is important in assessing the condition of adult patients with measles at admission. Characteristic laboratory results indicate neutrophilia, lymphocytopenia, elevated values of CRP, D-dimer and enzymes AST, ALT, CK, LDH and amylase in adult patients with measles infection.

Keywords: measles, laboratory diagnostic, blood count, inflammatory parameters

PP037

EVALUATION OF DIAGNOSTIC TECHNIQUES FOR OCCULT HEPATITIS B VIRUS INFECTION IN BLOOD DONORS

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Objectives: Occult hepatitis B virus infection (OBI) remains a significant risk for transfusion-transmitted infections due to its undetectability, characterized by detectable HBV DNA in individuals negative for hepatitis B surface antigen (HBsAg). Given the low le-

vels of HBV DNA typically present in OBI cases, the sensitivity of diagnostic assays is crucial for accurate detection. The objective was to evaluate OBI diagnostic techniques in blood donors, promoting safe blood transfusions.

Methods: Serological and nucleic acid testing (NAT) results of the blood donors in 2023 were reviewed in this retrospective study. Serological testing utilized chemiluminescent microparticle immunoassays (CMIA) for HBsAg detection, while NAT testing used Reverse Transcription Polymerase Chain Reaction (RT-PCR) and Transcription-Mediated Amplification (TMA) technologies.

Results: Out of 24,198 blood donations, 143 were NAT reactive and HBsAg negative, indicating OBI. Of these, 102 samples tested positive for HBV DNA, 83 through RT-PCR, and 19 via TMA. Both methods demonstrated high sensitivity, specificity, positive predictive values (PPV), and negative predictive values (NPV) exceeding 98% and 99%, respectively. Chi-square analysis revealed no significant difference in sensitivity between TMA and RT-PCR ($p > 0.05$), indicating a similar level of their performance in OBI detection.

Conclusions: Accurate diagnosis of OBI requires highly sensitive analyses, such as RT-PCR and TMA technology, ensuring efficiency and reliability in identifying occult HBV infection among blood donors for transfusion safety. More data will be needed in the future to compare the performance of these technologies in OBI detection.

Keywords: Occult hepatitis B virus infection, diagnostic techniques, HBV DNA, HBsAg, blood donors

PP038

LIVER INVOLVEMENT IN ADULTS INFECTED WITH INFECTED WITH MEASLES- EFFECT ON FIBROSIS 4-INDEX (FIB-4 SCORE)

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Objectives: To determine liver fibrosis in adult measles-infected patients using the $FIB\text{-}4_{Score}$.

Methods: We retrospectively analyzed 104 adult patients during the recent outbreak of epidemic in Sarajevo over a period of 6 months,namely 51 patients in the Health Center(HC)($\bar{X}_{age}$=37.5) and 53 patients ($\bar{X}_{age}$=38.9) undergoing hospital treatment(KCUS). We measured the $FIB\text{-}4_{score}$as a measure of liver involvement using the following equation:$FIB\text{-}4_{score}$=age×AST(IU/L)]/[platelets($\times 10^9$)×√ALT (IU/L)].A $FIB\text{-}4_{score}$ below 1.30 represents low risk, while a $FIB\text{-}4_{score}$ above 2.67 represents high risk for liver fibrosis.Values between 1.30 and 2.67 represent medium risk.Results are presented as median(M) and interquartile range(IQR), and statistical significance was determined at $p<0.05$.

Results: The research showed that measles-infected patients admitted to KCUS had significantly elevated liver enzyme values (AST and ALT),that is,M_{AST}=111.0(IQR=64.2-200.8), and M_{ALT}=156.0(IQR=78.2361.2).Patients admitted to HC had significantly better values of liver enzymes ($p<0.0001$),that is,M_{AST}=26.0(IQR 21.0-36.2), while M_{ALT}=41.0(IQR=27.0-64.5).Statistical significance ($p<0.0001$) was also found in the number of platelets between patients with KCUS and HC. For patients from KCUS $M_{PLT}=177\times10^9$(IQR=132.0-229.0×10^9),and for patients from HC $M_{PLT}=248\times10^9$(IQR=198.5-418.8×10^9), and finally,$FIB\text{-}4_{score}$ showed that patients with HC have low risk for liver fibrosis, due to $M_{FIB\text{-}4}$=0.6(IQR=0.4-1.0), in contrast to patients admitted to KCUS who had medium risk $M_{FIB\text{-}4}$=1.8;IQR=1.1-3.1)($p<0.0001$).

Conclusion: FIB-4score results showed that patients from HC had low risk for liver fibrosis, in contrast to patients admitted to KCUS who had intermediate risk.

Keywords: FIB-4 score, Measles, Liver

PPPP040

THE CONNECTION OF VITAMIN D STATUS AND LIPID STATUS IN PATIENTS WITH COVID-19

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Objectives: Concerning the fact that vitamin D deficiency and hypercholesterolemia may be associated with development and complications of COVID-19, the aim of our study was to assess the status of this vitamin and its conection with lipid status in patients with COVID-19.

Methods: The retrospective study included 90 patients with a diagnosis of COVID-19, treated at the University Clinical Center in Kragujevac, in the second quarter of 2022. Serum concentrations of vitamin D, total cholesterol (CHOL) and LDL – cholesterol (LDL) in all the patients were measured using standard biochemical methods. For the statistical analysis of the obtained data was used the bivariate correlation test.

Results: The research included 90 patients, 53 male (58.89%) and 47 female (41.11%). The average value of vitamin D concentration was 15.29 ± 4.42 ng/mL , whereas the average values of biomarkers of lipid status were as follows: CHOL 5.63±1.40 mmol/L; LDL 3.70±1.19 mmol/L. Using bivariate correlation analysis, it was determined that hypovitaminosis D negatively correlates with concentration of total cholesterol ($r = -0.173$, $p = 0.101$) as well as concentration of LDL ($r = -0.192$, $p = 0.069$). In other words, lower concentration of vitamin D corresponded to higher concentrations of biomarkers of lipid status, but without statisticaly significant relationship.

Conclusion: The assessment of vitamin D deficiency and dyslipidemia is important in the monitoring of patients with COVID-19 in order to apply adequate therapy and prevent the development of complications of this disease.

Keywords: vitamin D, lipid status, COVID 19

PP042

LACTATES IN CEREBROSPINAL FLUID AS A BETTER MARKER THAN GLUCOSE IN MONITORING PATIENTS DIAGNOSED WITH BACTERIAL MENINGITIS.

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Objectives: The examination of cerebrospinal fluid (CSF) is the gold standard in the diagnosis of patients suspected of meningitis. Lactate and glucose levels in the CSF are important markers that aids in the differential diagnosis and monitoring of these patients. The aim of this study is to determine the levels of lactate and CSF/serum glucose ratio in patients diagnosed with bacterial meningitis.

Methods: 50 patients diagnosed with bacterial meningitis during January 2011-2019 were studied. Patients underwent lumbar puncture 4 times to obtain CSF. The first puncture was performed on admission to hospital, the second was performed on day 3, the third

on day 7 and the fourth on day 12 of disease. Lactate and glucose levels were measured on all CSF samples. Glucose levels in the serum were measured 2 hours before pucture. Lactate levels were measured via colorimetry and glucose levels via enzymatic method on Olympus AU-400 analyzer.

Results: On first lumbar puncture, 98% of patients had elevated lactate levels (>35mg/dl) with mean value 110.08mg/dl, whereas the glucose CSF/serum ratio was low in 90% of cases (<0.4) with mean value 0.17. On the second puncture, the mean lactate levels were 53.9mg/dl and the glucose ratio was 0.42. On the third puncture, the mean level of lactates was 36mg/dl and the glucose ratio was 0.55. The levels of lactates between the first, second and fourth puncture were significantly different ($p<0.001$).

Conclusion: The level of lactates in the CSF of patients with bacterial meningitis is a better marker than the glucose ratio in monitoring patients with bacterial meningitis.

Keywords: lactate, glucose, bacterial meningitis, cerebrospinal fluid

PP043

COMPARATIVE ANALYSIS OF TWO IGRA TESTS FOR DETERMINING THE SPECIFIC RESPONSE AGAINST M. TUBERCULOSIS INFECTION

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Objectives: The study of the cell-mediated immune response to specific tuberculosis (TB) antigens is decisive and important especially in patients on biological therapy. We aim to analyze the results of the two most common interferon-gamma (IFNγ) release assays (IGRA) for TB infection diagnosis and follow-up.

Methods: Between 01.01-31.07.2024, 4192 individuals were examined by IGRA in the Ramus laboratory - 3956 with QuantiFERON-TB Gold Plus (QFT-Plus), Qiagen, and 236 with T-SPOT.TB, Oxford Immunotec.

Results: The analysis expectedly showed a prevalence of negative results - 93% and 56% compared to positive - 5% and 27%, respectively, for QFT-Plus and T-SPOT.TB. Low values of borderline and indeterminate results were around and below 1% for QFT-Plus but 6% and 12% for T-SPOT.TB. A total of 3,576 patients on biological therapy were studied with both tests, 51 of which had indeterminate results. T-SPOT.TB indeterminate results were also reduced below 7% because some of them (12/28) were on biological therapy and subsequently became negative. Twenty nine patients were examined with both tests, with a match in 15 persons. Fourteen people demonstrated discrepant results - 12 from the both tests, and 2 - from consequent T-SPOT.TB tests. Time i tervals between examinations and changes in patient outcomes were also analyzed.

Conclusions: Both IFNγ test results are comparable and clinical practitioners could rely on them, especially if the patients are treated with biologics.

Keywords: IGRA tests, QuantiFERON-TB Gold Plus, T-SPOTTB, biological therapy

PP044

NEUTROPHİL-TO-LYMPHOCYTE RATİO AS A RİSK FACTOR FOR DİABETİC FOOT INFECTİON İN INDİVİDUALS WİTH DİABETES

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Objectives: Diabetic foot ulceration is one of the most serious complications of diabetes and 50-60% of these patients progress to diabetic foot infection (DFI). The basis of diabetic wounds and infection is peripheral vasculopathy and peripheral neuropathy caused by

increased oxidative stress and inflammatory processes. In this study, we planned to evaluate the Neutrophil-Lymphocyte Ratio (NLR) in DFI patients.

Methods: 47 patients diagnosed with diabetic foot infection and 42 healthy volunteer controls were included in the study. In addition to routine laboratory tests, DFI lesion severity was performed using PEDIS staging.

Results: In DFI patients, a statistically significant increase ($p<0.001$) was observed in NLR, CRP (C-reactive protein), CRP albumin ratio (CRP/Alb), Procalcitonin (PCT), HbA1c, PEDIS score and osteomyelitis levels. In addition, a correlation was found between NLR and CRP, CRP/Alb, PCT and HbA1c, osteomyelitis, PEDIS staging.

Conclusion: Compared with other inflammatory markers, NLR elevation is a cost-effective and potential inflammatory diagnostic indicator for DFI.

Keywords: Diabetic foot, neutrophil-to-lymphocyte ratio, CRP, Procalcitonin, Diabetes

PP045

PRELIMINARY STUDY ON ESR1 GENE POLYMORPHISMS IN ADVANCED-STAGE FEMALE ALZHEIMER'S PATIENTS

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Objectives: This study aims to investigate the frequency of two single nucleotide polymorphisms (SNPs) in the estrogen receptor alpha (ESR1) gene promoter region in women with AD.

Methods: This study included 67 women diagnosed with advanced-stage Alzheimer's Disease and 62 healthy female volunteers of a similar age range. Total DNA was isolated from blood samples using a commercial DNA isolation kit following the manufacturer's protocol. Genotyping of the 594G>A (rs2228480) and 325C>G (rs2295190) polymorphisms in the ESR1 promoter region was conducted using a specific genotyping kit.

Results: The rs2228480 polymorphism was found to be significantly more prevalent in women with AD compared to the control group ($p < 0.05$). In contrast, no statistically significant difference was observed in the rs2295190 polymorphism between the patient and control groups ($p > 0.05$).

Conclusions: The findings of this study represent a preliminary investigation into the role of estrogen at the biochemical and genetic levels in women with AD. The data generated provides a foundation for further research and contributes to our ongoing study. As personalized treatment strategies continue to evolve, the potential use of estrogen as a therapeutic intervention in AD warrants further exploration.

Keywords: ESR1, SNP, Alzheimers Disease

PP046

FECAL CALPROTECTIN IN IBD DIAGNOSIS: A COMPARATIVE STUDY WITH CRP AND ESR"

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Objectives: Increased fecal calprotectin is a sensitive marker of various types of intestinal inflammation. We investigated correlations between high fecal calprotectin concentration and serum inflammatory markers with different intestinal diseases with diarrhea with/without blood and/or abdominal pain, to test whether the combination of these markers can differentiate potential patients with inflammatory bowel disease.

Methods: The study included 200 random patient with high fecal calprotectin concentration (>150ug/g) and symptoms suggesting bowel disorders from 2019 to 2024.We correlate their fecal calprotectine with CRP and Erythrosedimation rate before, during and at the

end treatment.

Results: Significantly increased inflammatory markers were detected in inflammatory bowel disease, with a correlation between calprotectin and erythrocyte sedimentation rate - ESR only in Crohn's disease patients. To discriminate Crohn's disease patients from patients with intestinal infection and patients with food protein induced proctocolitis, AUC analysis was performed. It revealed that considering ESR and CRP as additional markers to fecal calprotectin significantly improved diagnostic performance

Conclusions: In patient with abdominal pain and/or diarrhea, increased ESR, CRP combined with a high fecal calprotectin level yields additional diagnostic value in screening potential patients with Crohn's disease. As far as differentiation of ulcerative colitis is concerned, low additional diagnostic value was found when high fecal calprotectin was combined with albumin.

Keywords: Intestinal infection, Calprotectin Crohns disease

PP048

THE ROLE OF THE KYNURENINE PATHWAY AND TRIMETHYLAMINE N-OXIDE LEVELS IN PEDIATRIC ATOPIC DERMATITIS CASES

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Objectives: Atopic dermatitis (AD) is the most common pediatric inflammatory skin disease with an annual prevalence of up to 15% and is characterized by intense pruritus and recurrent eczematous lesions. A genetic dysfunction of the skin barrier with increased transdermal water loss, immune dysregulation, and dysbiosis characterizes the condition. Our study aims to investigate the effects of tryptophan-kynurenine pathways and Trimethylamine N-oxide (TMAO) levels on the disease in pediatric patients aged 0-3 years diagnosed with AD.

Methods: This study compared tryptophan and TMAO levels in the serum of 39 pediatric patients aged 0-3 years with atopic dermatitis and 30 healthy controls by high-performance liquid chromatography.

Results: From statistical analysis, significant differences were observed in 3-OH kynurenine, kynurenine, and kynurenic acid levels between the patient and control groups ($p<0.05$). However, no statistically significant difference was found between the two groups regarding TMAO, tryptophan, and 3-OH anthranilic (ANT) acid levels ($p>0.05$). Correlation analysis revealed a positive correlation between TMAO and 3-OH ANT acid ($r=0.256$, $p=0.032$). A significant positive correlation was also between tryptophan and 3-OH ANT acid ($r=0.395$, $p=0.001$).

Conclusions: This study revealed that 3-OH kynurenine, kynurenine, and kynurenic acid levels in the tryptophan-kynurenine pathway in pediatric patients aged 0-3 years with atopic dermatitis showed significant differences compared to the control group. These metabolic changes may play a role in the pathogenesis of the disease. Furthermore, the positive correlations between TMAO and 3-OH ANT acid and between tryptophan and 3-OH ANT acid suggest that these metabolites may be potential biomarkers in atopic dermatitis.

Keywords: Atopic dermatitis, Kynurenine, TMAO, Infants, Inflammation

PP049

INVESTIGATION OF SERUM ISCHEMIA MODIFIED ALBUMİN LEVELS IN FAMILIAL MEDITERRANEAN FEVER

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Objectives: Familial Mediterranean Fever (FMF) is an autosomal recessive autoinflammatory disease characterized by periodic fever accompanied by abdominal

pain, pleuritis, arthritis, erysipelas-like skin lesions, and recurrent self-limiting attacks. Albumin changes the structure of its N-terminal end under ischemic/oxidative stress conditions. This variant of albumin has been named ischemia-modified albumin (IMA). We aimed to measure serum IMA levels in FMF patients and compare them with a control group of healthy individuals without any diagnosis of inflammatory rheumatism.

Methods: This study includes 120 FMF patients and 40 healthy control subjects. IMA was measured using Perkin Elmer Lambda 25 UV/Vis, US, on a spectrophotometer tuned to 470 nm. Statistical analysis was performed using IBM SPSS Statistics 26.0

Results: The relationship between control and FMF IMA, Creatinine, and eGFR was statistically significant (p=0.000, 0.050, 0.045 respectively). When the relationship between duration of illness and IMA, LY%, was analyzed, a negative correlation was found (p=0.000, p=0.029, respectively). A positive correlation was found between duration of illness and NE% (p=0.033). A positive correlation was found between FMF IMA and HGB (g/dL) and creatinine (mg/dL) (p=0.033, p=0.014, respectively).

Conclusions: Serum IMA level was significantly increased in the FMF patient group compared to the control group. Based on this result, IMA is associated with FMF, and IMA's potential importance as a biomarker is emphasized. Further research is required to elucidate the precise roles of IMA in FMF pathology and explore their potential as therapeutic targets or diagnostic indicators in clinical settings.

Keywords: Oxidative stress, FMF, IMA, spectrophotometer

PP050

EVALUATION OF TRIMETHYLAMİNE N-OXIDE SERUM LEVELS IN ISCHEMIC CEREBROVASCULAR DISEASE

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Objectives: Trimethylamine N-oxide (TMAO) is a metabolite generated as a waste product derived from the gut microbiota associated with cardiovascular disease. TMAO plays a role in the development of atherosclerosis plaque, which is one of the causative factors of stroke events. Stroke is the second leading cause of death and the third leading cause of disability worldwide. The present study aimed to investigate the serum levels of TMAO in patients with ischemic stroke.

Methods: This study included 30 cerebral stroke patients and 30 healthy control subjects. TMAO was measured using AB SCIEX API 3200 LC-MS/MS method. Statistical analysis was performed using IBM SPSS Statistics 26.0

Results: Our results showed that serum levels of TMAO were statistically significantly higher in the ischemic stroke patients than in the control group [729 (113-3980) vs. 301 (88-671) ng/ml, p=0.000] respectively. In the exploratory analysis, we observed a positive correlation between TMAO and blood pressure [r2=0.437, p=0.002] for systolic and [r2=327, p=0.025] for diastolic pressure.

Conclusions: Serum TMAO level was significantly increased in the ischemic stroke patient compared to the control group. Based on this result, Higher TMAO levels were associated with an increased risk of stroke in hypertensive patients. Our finding, if further confirmed, calls for a carefully designed clinical trial to further evaluate the role of higher TMAO levels on outcomes in hypertensive patients. Further research is required to elucidate the precise roles of TMAO in ischemic stroke and explore their potential as therapeutic targets or diagnostic indicators in clinical settings.

Keywords: Hypertension, Ischemia, LC-MSMS, TMAO

PP052

VITAMIN B12 STATUS OF BULGARIAN PREGNANT WOMEN – A PROSPECTIVE STUDY

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Objectives: Vitamin B12 deficiency or insufficiency has been associated with an increased risk of adverse pregnancy outcomes. The aim of this prospective study was to assess the vitamin B12 status of Bulgarian pregnant women.

Methods: 259 women (mean age 30.51±5.35 years) with normal pregnancy (Group I, n=167), gestational diabetes mellitus (Group II, n=43), and pre-eclampsia (Group III, n=49) were tested. Serum levels of total (TB12) and active (AB12) B12 were determined using commercial kits (Access Vitamin-B12 and Architect Active-B12, respectively). Serum methylmalonic acid (MMA) was measured by in-house developed and validated liquid-chromatography mas-spectrometry method.

Results: The medians (IQR) of TB12 (pmol/L) were for Group I: 150.0 (120.0-202.0); Group II: 171.0 (128.0-231.0); Group III: 141.0 (116.5-176.0), p=0.0281 between groups II and III. The medians (IQR) of AB12 (pmol/L) were for Group I: 61.0 (42.2-83.1); Group II: 77.3 (48.7-108.6), Group III: 54.2 (40.8-89.6), p=0.0257 between groups II and I and p=0.0458 between groups II and III. MMA did not show any significant changes between groups. A difference in attitudes towards vitamin B12 supplementation was observed in the three groups (c2=16.81, p=0.0021) with the highest proportion of non-supplementation (about 60%) found in women with pre-eclampsia. Vitamin B12 deficiency (AB12<35pmol/L or AB12=35-50pmol/L and MMA>300nmol/L) was found in 22.8% and insufficiency (AB12>50pmol/L and MMA>300nmol/L) in 10.4%.

Conclusion: The more reliable tests to assess vitamin B12 status (AB12 and MMA) show that the prevalence of vitamin B12 deficiency or insufficiency among Bulgarian pregnant women was comparable to those seen in developed countries.

Keywords: methylmalonic acid, total vitamin B12, active vitamin B12, vitamin B12 status

PP053

FACTORS INFLUENCING ADJUSTED RISK FOR PREECLAMPSIA: A BULGARIAN CROSS-SECTIONAL STUDY

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Objectives: Preeclampsia (PE) is a complex multisystem disorder posing significant risks to both mother and fetus, where accurate prediction is crucial for improving pregnancy outcomes. We aimed to evaluate markers for PE risk assessment.

Methods: We analyzed 381 pregnant women with relevant medical history data: mean age 30 years (18-43), all with one fetus. We tested maternal serum: free beta human chorionic gonadotropin (FBHCG), pregnancy associated plasma protein-A (PAPP-A) and placental growth factor (PlGF) via B·R·A·H·M·S Fast Screen pre I plus 3.1, KRYPTOR (Thermo Fisher Scientific).

Results: Active smokers were 24.1%, 36.7% of women were with body mass index (BMI)>25, 1.6% with previous arterial hypertension (AH), and 10 with diabetes. Twenty-two (5.8%) patients out of 291 presented recorded medical data of having a mother with documented PE. The mean levels of FBHCG, PAPP-A and PIGF were 43.28±1.51 IU/ml, 5.39±0.17 IU/ml, and 47.93±1.61 pg/ml, respectively. Software algorithm for prenatal screening identified 8 women (2.1%) with adjusted risk (AR) for PE at 34th week (AR<1:70), 35 (9.2%) at 37th week (AR<1:70) and 21 (5.5%) at 40th week (AR<1:15). Normal BMI was associated with lower risk for PE compared to obese women (P<0.001) at week 34 (AR 1:39,950 vs. 1:11,539, resp.), week 37 (AR 1:2468 vs. 1:967, resp.) and week 40 (AR 1:276 vs. 1:136, resp.). We found higher risk for PE in patents with diabetes (p>0.05) and previous AH, significant at week 40 (AR 1:7, p<0.001).

Conclusion: AR for PE correlated with the biochemical parameters and BM, diabetes and AH.

Keywords: preeclampsia, prenatal screening, risk assessment, adjusted risk, AR

PP054

SERUM AMH AS AN INDİCATOR OF OVARİAN RESERVE ACROSS DIFFERENT AGE GROUPS IN POLLOG: A RETROSPECTIVE ANALYSIS

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Objectives: Antimülerian hormone (AMH) is a dimeric glycoprotein and is clinically useful as a control parameter for ovarian reserve. AMH levels have a linear line of correlation with age, therefore the main objective of this study is to evaluate the serum concentration of AMH as an indicator of the ovarian reserve in different ages of the female gender in the region of Pollog.

Methods: The study is retrospective and was carried out in the period January, 2022-March, 2024. The study included a total of 728 female patients (16-56 years), who were divided into three groups: Group 1 <20 years with an average age of 17.29±1.113; Group II: 21-40 years with an average age of 32.13±4.900 and Group III: >41 years with an average age of 44.63±3.005. Serum was used as biological material, analyzed using the ELFA technique in the Vidas analyzer.

Results: Furthermore from the processing of this data, it was found that the average value of AMH in Group I is 2.65±2.71; in Group II it is 3.66±2.95, while in Group III mean of AMH is 0.85±1.35. A significant statistical difference is observed between Group 1 vs. Group 3, where the value of p is 0.0005, a significant difference is also observed between Group 2 vs. Group 3, with a value of $p < 0.0001$.

Conclusions: AMH levels show that as age increases, the AMH level decreases. AMH levels, in relation to age, are key indicators for assessing ovarian reserve which is crucial for pregnancy planning and infertility treatment.

Keywords: Antimüllerian hormone, reserve ovarian, age, female

PP057

EVALUATION OF PROSTATE SPECIFIC ANTIGEN RAPID TESTS

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Objectives: The aim of this study was to evaluate prostate specific antigen rapid tests, which can be useful in the screening of prostate cancer or benign prostatic hyperplasia, and can also reduce the cost of quantitative assays.

Methods: Samples were collected and tested over a period of two months using both qualitative and quantitative assays. Two independent observers interpreted the rapid tests based on immuno-chromatography. Conventional quantitative tests were performed using Chemiluminescence immunoassay. The results of the qualitative tests were compared to those of the quantitative assays. We evaluated the performance criteria of the rapid tests: sensitivity, specificity, positive predictive value and negative predictive value. The analysis of concordance between the tests was carried out using the Kappa parameter (Cohen's Kappa: k) which was interpreted using the thresholds of Landis and Koch (1977).

Results: Seventy-five samples were tested and the two independent observers provided the same results. Sensitivity, specificity, positive predictive value and negative predictive value were: 91.66 %, 95.23%, 78.57% and 98.36% respectively. The kappa parameter was 0.79, indicating strong concordance between the two tests.

Conclusions: This kit of rapid tests has good performance criteria. The concordance of these tests with

quantitative assays is strong. This makes these tests a valuable, fast and easy tool for primary screening of prostate cancer or benign prostatic hyperplasia at a low cost.

Keywords: prostate specific antigen, evaluation, rapid tests, quantitative assay

PP058

DEVELOPMENT OF A POINT-OF-CARE VERTICAL FLOW TEST SYSTEM CONTAINING AuNPs FOR THE DIAGNOSIS OF ADALIMUMAB and ANTI-ADALIMUMAB

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Objectives: Adalimumab (ADL) is an anti-TNF-alpha monoclonal antibody. While ADL is generally well-tolerated, not all patients respond to treatment, and its effectiveness can diminish. Therefore, evaluating ADL/anti-ADL blood levels is crucial. This study aims to develop a rapid, cost-effective, easy-to-use point-of-care test system using gold nanoparticles (AuNPs) for qualitative analysis.

Methods: AuNPs synthesized using the Turkevich method were characterized by TEM, FTIR, and Zeta Potential analysis. AuNP/ADL bioconjugates were obtained through physical adsorption methods. In the vertical flow test, ADL solutions at concentrations of 0.5-1 mg/mL were prepared for two separate membranes with pore sizes of 0.45 µm and 0.20 µm, respectively, and 5-10 µL of anti-ADL (0.5-1 mg/mL) was applied onto them. After 15 min, 100 µL of AuNP/ADL (0.5-10 µg/mL) was added to each membrane, and color changes were observed.

Results: The average size of the characterized AuNPs was 21.18 nm. The AuNP/ADL bioconjugates synthesized with 10 µL of ADL were characterized by TEM and FTIR. In the vertical flow test, colored spots formed due to ADL/anti-ADL binding, confirming the test's functionality. To determine cross-reactivity, blood samples without ADL or anti-ADL were tested, with anti-ADL added to the ADL test and vice versa, confirming specificity.

Conclusions: The synthesized bioconjugate reliably interacted with the target analyte, generating signals on diagnostic membranes. Developing accurate and specific assays to measure anti-drug antibody responses is crucial for assessing the efficacy of monoclonal antibody-based therapies.

Acknowledgments: This study was supported by the Scientific Research Projects Unit of Nevsehir Haci Bektas Veli University (Project No: GAP23F02).

Keywords: Gold Nanoparticles, Adalimumab, Immunosorbent Techniques

PP059

RAPID ELECTROCHEMICAL DETERMINATION OF ALKALINE PHOSPHATASE ACTIVITY USING IONIC SOLID-MODIFIED SCREEN-PRINTED CARBON ELECTRODES

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Objectives: Alkaline phosphatase (ALP) is a significant biomarker for various diseases, including cancer and bone disorders. Current clinical methods for ALP determination require large, non-portable, and expensive devices. This study aims to develop a rapid, cost-effective, and portable electrochemical method for ALP activity detection, suitable for point-of-care testing.

Methods: Screen-printed carbon electrodes (SCPE) were modified with a Nafion matrix containing hexadecyl imidazolium-4-bromide, an ionic solid synthesized for the first time for this purpose. ALP activity was measured using differential pulse voltammetry (DPV) by catalyzing the dephosphorylation of p-nitrophenyl phosphate (PNP) to electroactive p-nitrophenol. Various concentrations of ionic solid were tested to optimize sensor performance, and the response of

the modified electrodes was compared to unmodified ones.

Results: The optimal amount of ionic solid for electrode modification was determined to be 5 mg, which yielded the highest sensitivity. The method demonstrated a linear detection range for ALP between 25 and 800 U/L, covering both normal and pathological levels, with an R^2 value of 0.991. Sensitivity increased by 25% with the ionic solid-modified electrode compared to unmodified electrodes. Repeatability and recovery tests showed excellent precision, with coefficients of variation below 5% and recovery rates between 95-103%.

Conclusions: The optimized electrochemical sensor offers a rapid, sensitive, and cost-effective method for ALP activity determination, suitable for point-of-care testing. The use of the novel ionic solid in electrode modification significantly improved sensor performance.

Keywords: Alkaline phosphatase, electrochemical sensor, point-of-care, ionic solid

PP060

ANALYTICAL PERFORMANCE EVALUATION OF A POINT-OF-CARE TESTING (POCT) GLUCOMETER DEVICE

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Objectives: Point-Of-Care Testing (POCT) Glucometer devices are widely used in hospitals. In this study, we aimed to evaluate the analytical performance (AP) for the POCT Bioject plus BG-709 (Hangzhou Electronics,China) glucometer.

Methods: This study was performed in the Department of Medical Biochemistry, SBU Ankara Training and Research Hospital. Five glucometers of the same brand, a measuring strip(Bioject Plus, BS-602) and three levels of quality control material(Bioject CS-201) were used in the study. Precision, bias and method comparison studies of glucometers were performed according to the Clinical and Laboratory Standards Institute (CLSI) POCT 12 A3 guideline. For method comparison,73 patients with a hematocrit value of 30-45% were included. The hexokinase method was used as a reference method (Cobas 701(Roche Diagnostic, U.S.A)). Statistical analyses were performed with SPSS ver.26 and Excel Analyze-it package programs.

Results: Intra-study and inter-study %CV values for the 3 levels of control samples used in the study were respectively Level 1 (glucose:38 mg/dL): 1.33-2.08, Level 2 (glucose:130 mg/dL): 1.03-1.79, Level 3 (glucose:325 mg/dL): 0.73-2.09.Regression equation was serum glucose=-5.11+1.01*Bioject plus, correlation coefficient was 0.997. The difference between the medians in Bland-Altman analysis (lower-Upper LoA:-19.4-15.9) was -1.8. 97% of glucometer results met CLSI standard criteria. When capillary and venous plasma results were evaluated with Clark Error Plot, 100% of the data were in zone A.

Conclusions: The Bioject Plus glucometer AP was found to meet the requirements of the standard used. We think that analytical performance studies are important for every laboratory in the selection phase of the devices in order to use glucometers safely.

Keywords: POCT, glucose, method comparison, analitical performance

PP061

INVESTIGATING THE ROLE OF GFAP AND UCHL-1 IN NEURO-BEHÇET'S DISEASE-ASSOCIATED NEUROINFLAMMATION

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Objectives: Behçet's Disease (BD) is a multisystem autoimmune vasculitis affecting both large and small vessels, with unknown etiology. Central nervous system involvement is termed as Neuro-Behçet's disease,which can lead to inflammation of the brain or

spinal tissue,or the blood vessels supplying them. BD primarily affects regions along the Silk Road, with the highest prevalence in Türkiye (80–300 per 100,000) and neurologic involvement occurs in 4% to 49% of cases. This study aims to explore the potential relation between serum levels of two neuromarkers, GFAP (Glial fibrillary acidic protein) and UCHL-1 (Ubiquitin C-terminal hydrolase L1), and the brain inflammation caused by Neuro-Behçet's disease.

Methods: The levels of GFAP and UCHL-1 in plasma samples from four patients (aged 25–55 years) diagnosed with Neuro-Behçet's disease were measured using the CMIA method by Abbott Architect i1000SR immunoassay analyser. Measuring IL-6 levels using the ECLIA method by Roche Cobas 6000 autoanalyzer and CRP levels with the latex-enhanced immunoturbidimetric method using the Wide Range CRP kit by Siemens Advia Chemistry XPT system assessed inflammation.

Results: The mean ± standard deviation values were 127 ± 68.8 pg/mL for UCHL-1 (reference range: 44.7–226.8 pg/mL), 11.9 ± 2.6 pg/mL for GFAP (reference range: 6.6–70.9 pg/mL), 8.45 ± 8.3 mg/L for CRP (reference range: < 5 mg/L), and 4.4 ± 4.6 pg/mL for IL-6 (reference range: < 7 pg/mL).

Conclusions: No correlation was observed between the general inflammation markers CRP and IL-6 and the novel neuromarkers UCHL-1 and GFAP.

Keywords: GFAP, UCHL-1, neurodegenerative process, Neuro-Behçets disease

PP062

EVALUATION OF SHORT-CHAIN FATTY ACIDS AND FECAL CALPROTECTIN LEVELS IN PATIENTS WİTH CELIAC DİSEASE.

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Objectives: Celiac disease(CeD) is an immune-mediated condition characterized by small intestinal enteropathy, systemic symptoms related to malabsorption and/or immune activation. Short-chain fatty acids (SCFAs), have been shown to have many positive health effects. The amount of SCFAs formed from dietary fibre by the colonic microbiota depends on the substrate available and is reflected in blood. Fecal calprotectin has been shown to be an accurate surrogate marker of gastrointestinal inflammation disease. Objective is to compare serum SCFA and fecal calprotectin concentrations in subjects with celiac disease and controls.

Methods: SCFAs in serum measured using ELİSA kits and calprotectin assayed by SMC technology. 50 Celiac patients and 30 healthy volunteers will be included in the study.

Results: Although its concentration was low in the patient group, there was little variation in serum SCFAs between CeD and healthy controls (P>0.5). We found that fecal calprotectin values are higher at the onset of CeD compared with the control population

Conclusions: While low SCFAs levels in celiac patients indicate insufficient consumption of dietary fibers, high fecal calprotectin indicates intestinal inflammation.

Keywords: gluten free diet, Calprotectin, Celiac disease

PP064

ANTI-NUCLEAR ANTIBODIES DETERMINATION – MATCHES AND DISCREPANCIES BETWEEN DIFFERENT METHODS FOR DETECTION

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Objectives: The gold standard for anti-nuclear antibodies (ANA) screening is indirect immunofluorescence (IIF) on HEp-2 cells and confirmation and identification by an immunoassay - immunoblot and/or ELISA. We aim to compare the results for specific autoantibo-

dies assessed by the three methods.

Methods: We examined samples of 48 people - 5 men and 43 women, at mean age of 46 years. ANA screening IIF was performed on HEp-2 cells (ByoSystems) and evaluated by EUROStarIII Plus; immunoblot - by Ana Profile 3 plus DFS70 (EUROIMMUN); and ELISA against SS-A, SS-B, Scl-70 and dsDNA-N-cX - EUROIMMUNE kits, and RNP/Sm, Jo-1 and AMA-M2 - Orgentec kits.

Results: IIF and immunoblot results showed a match in 40 patients and a mismatch in 2 individuals. In 4 people, in addition to the main findings, there was also a positive staining of other cell structures, whom autoantibodies are not represented on the immunoblot, and two patients with no ICAP-defined fluorescent pattern - anti-Ro52. A high expression of anti-SS-A, Ro-52, CB and AMA-M2 was observed. Immunoblot and ELISA showed a significant moderate correlation (r =0.5 - 0.7) for detecting anti-nucleosomes NUC, Jo-1 and AMA-M2, strong for anti-SS-A and SS-B (r = 0.7 - 0.9) and very strong for anti-RNP/Sm and Scl-70 (r > 0.9). Congruence between ELISA and immunoblot results varied from 50-88% depending on the antigen type, with the highest observed for SS-A.

Conclusion: Immunological methods for ANA determination exert different sensitivity and clinical relevance, but they have complementary results with good correlation and congruence.

Keywords: ANA, anti-nuclear antibodies, indirect immunofluorescence, immunoblot, ELISA

PP065

EVALUATION OF DNA REPAIR CAPACITY AND THE IMPACT OF VITAMIN D SUPPLEMENATION ON DNA REPAIR IN SYSTEMIC SCLEROSIS

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Objectives: Systemic sclerosis (SSc) is a rare autoimmune disease marked by fibrosis of the skin and internal organs, with increased oxidative stress and associated DNA damage. This study evaluates the baseline DNA repair capacity in SSc patients and examines the effect of vitamin D supplementation on key DNA repair pathways (BER and NER) by analyzing the gene expression levels of critical repair proteins.

Methods: This study included 50 SSc patients, 40 of whom received intensive intramuscular and oral vitamin D supplementation for 6 months, and 30 healthy controls. Gene expression levels of OGG1, APE1, XPC, and XPA were measured in cDNA samples from these individuals using RT-PCR, with reevaluation of the DNA repair proteins in the supplemented patients after 6 months.

Results: Gene expression of APE1, OGG1, and XPA was significantly higher in healthy controls compared to SSc patients (p-values: 0.005, 0.013, and 0.001, respectively). Post vitamin D supplementation, OGG1 and APE1 expression levels significantly increased in SSc patients (p-values: 0.012 and 0.033), while XPC and XPA showed an upward trend without reaching statistical significance.

Conclusions: This study provides novel insights into the diminished DNA repair capacity in SSc patients compared to healthy individuals and highlights the potential of vitamin D supplementation to enhance BER and NER pathway activity. These findings contribute to understanding the molecular underpinnings of SSc and suggest potential therapeutic benefits of vitamin D in managing oxidative DNA damage in this patient population.

Keywords : DNA REPAIR, BER PATHWAY, NER PATHWAY, VITAMIN D, SYSTEMIC SCLEROSIS

PP066

ANALYSIS OF MONOAMINES NEUROTRANSMITTERS BY HPLC-DAD

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Objectives: Monoamine Neurotransmitter metabolism plays a role in neurodegenerative/neurological diseases such as Alzheimer's, Parkinson's and depression. Therefore, monitoring the levels of dopamine (DA) and DA metabolites, that is 3,4-dihydroxyphenylacetic acid (DOPAC) and homovanillic acid (HVA), is a good method to evaluate the severity and progression of the disease. We modified ultra high performance liquid chromatography-the diode-array detector (DAD) analyse method for Monoamines Neurotransmitters.

Methods: DA, DOPAC,HVA analysis was performed by Shimadzu UHPLC/DAD. The chromatographic separation was performed using a Inertsil ODS-3 (150 mm x 4.6 mm x 5 µm) reversed-phase analytical column and column temperature was maintained at 30°C. The isocratic method was selected and the mobile phase consisted of, 40mmol/L ammonium formate buffer solution containing 20% acetonitrile. Total run time was 10 min with a flow rate of 1 ml/min. Wavelengths of 280 nm for all molecules were chosen.

Results: The calibration curve for DA, DOPAC and HVA method was between 1–300 ug/mL concentration range. The method showed excellent linearity with regression coefficients 0.999 for DA and 0.999 for DOPAC and 0.998 for HVA.

Conclusions: A simple and easy to apply HPLC/DAD method has been developed for measuring for Monoamine Neurotransmitter.

Keywords: Dopamine DA, 3-4dihydroxyphenylacetic acid DOPAC, homovanillic acid HVA, HPLCDAD

PP067

COMPARISON OF BLOOD GAS AND COMPLETE BLOOD COUNT HEMOGLOBIN MEASUREMENTS

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Objectives: Blood gas analysis (BGA) is a widely ordered test especially in critical care settings such as emergency department, intensive care unit, operating rooms and pediatrics. BGA is of great importance as it reflects tissue perfusion, acid-base status, hemoglobin and electrolyte balance. Our aim was to compare hemoglobin results from BGA and hematology device.

Methods: 43 whole blood samples and concurrent arterial blood samples were used for determination of haemoglobin (HGB) in Sysmex XN5000 and Radiometer ABL800 FLEX BGA. Results were compared with Bland-Altman and Passing-Bablok analysis.

Results: Regression equation was calculated as Sysmex HGB = -0,233411 + 0,974184 ABL800HGB. Correlation coefficient was 0.878. Slope and intercept values were found as 0,9742 (0,8868 to 1,041) and -0,2334 (-1,1123 to 0,9264), respectively

Conclusions: According to Bland-Altman analysis, a proportional bias (%4.4) might occur with increasing concentrations of hemoglobin. It will be more useful to evaluate both hematology and blood gas results especially in higher levels.

Keywords: Blood gas analysis, comparison, hemoglobin, whole blood count

PP068

INVESTIGATION OF THE EFFECT OF INTENSIVE EXERCISE PROTOCOL PLANNED WITH ADAPTED WEEKS WITH ANTIOXIDANT SUPPLEMENTATION ON BLOOD GASES PARAMETERS

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Objectives: High intensity interval exercise (HIIT) is used to accelerate metabolism, increase aerobic and anaerobic capacity, improve cardiovascular health and promote fat burning. This study aims to reveal the possible effects of CoQ10 supplementation on this effect by examining the relationship between HIIT and recovery in depth.

Methods: The rats in the exercise groups in the study were adapted to the treadmill for the first 3 days, aerobic adaptation for the next 3 days, anaerobic adaptation for the next 4 days and then HIIT for 2 days and were adapted to the treadmill and HIIT protocol was applied. The HIIT program continued for 4 weeks and supplements were given. Blood was taken from the tail artery to evaluate the blood gas parameters of the rats. Before starting the experiments of all groups and during the experiment; 100 µl blood samples were taken into capillary tubes at the 5th and 10th minutes after the end of the exercise and pO_2, PCO_2 and lactate parameters were mesured on blood gases analyser.

Results: Significant differences were observed in both the groups and weekly and minute-based evaluationsof pO_2, PCO_2 and lactate values.

Conclusion: Regulation of HIIT with CoQ10 supplementation showed a curve on blood gases that accelerated preparation for the next exercise and positively affected recovery.

Keywords: High Intensity Interval Exercise, Coenzyme Q10, Recovery, Blood Gases

PP069

EVALUATION OF PERFORMANCE CHARACTERISTICS OF NOVA STAT PRİME PLUS BLOOD GAS ANALYZER

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Objectives: We aimed to evaluate the analytical performance characteristics of the Nova Stat Profile Prime Plus (Nova Biomedical, Waltham, MA, USA) blood gas analyzer and compare it with the Radiometer ABL800 FLEX (Radiometer South Africa Pty Ltd, Gauteng) blood gas analyzer.

Methods: In the study, analytical performance of Nova Prime Plus was performed using CLSI (Clinical Laboratory Standards Institute) EP15 A3 and method comparison was performed using CLSI EP9 A3 standards. A method comparison study was performed with ABL 800 FLEX using 69 patient samples. Blood samples were collected in heparinised Sarstedt (Sarsted AG and Co. Germany) blood gas injectors. Statistical analyses were performed with SPSS ver 26 (IBM SPSS, USA) and Excel Analyse-it software program.

Results: In our study, within-run %CV values for normal and high internal quality control samples were <1% for pH, pCO2, sO2, Htc, O2Hb, COHb, metHb, HHb, TBil, Na, K, Cl, iCa, iMg, Glu, Lac and <1.85% for pO2, Hb, HbF. The %CV values of these parameters were <2.68% on the ABL800 FLEX analyzer. In Bland-Altmann analysis, difference between the means and medians was below 5% except for TBil (21%). In the comparison of all tests, the r value ranged between 0.684-0.983 ($p<0.001$). However, $r=0.110$ for TBil ($p=0.368$).

Conclusions: In the method comparison study of ABL800 FLEX and Nova Prime Plus blood gas

analyzers, all tests were compatible except TBiI. We think that the analytical performance of Nova Prime Plus blood gas analyzer is sufficient for routine studies.

Keywords: Blood gas, Analytical performance, method comparison

PP071

CORRELATION BETWEEN CA 19-9, HER2 AND PARAMETERS OF INFLAMMATION IN PATIENTS WİTH PANCREATIC CANCER AND COLORECTAL CANCER

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Objectives: Carbohydrate antigen 19-9 (CA19-9) has a high diagnostic value in patients with gastrointestinal cancer, while the significance of human epidermal growth factor receptor 2 (Her2) in malignancies other than breast cancer has not yet been fully investigated. The aim of this study was to investigate the association between CA19-9 and Her2 with inflammatory parameters in cancer patients.

Methods: Serum samples from 17 patients with pancreatic cancer (PC) and 23 patients with colorectal cancer (CRC) were analyzed. CA19-9 and feritin were determined by chemiluminescence, Her2 by ELISA kit and CRP by immunoturbidimetric method.

Results: Among PC patients, the proportion of women was 59% and 41% of men, while among CRC patients 39% were women and 61% were men. CA19-9 levels were not statistically significantly different by gender (19.80 (5.30-444.2) and 28.8 (3.65-85.20) for women and men, respectively, P=0.607), as were Her2 levels (5752 (4153-6631) and 5627 (4426-7366) for women and men, respectively, P=0.861). Ferritin and CRP levels were statistically significantly higher in patients with PC compared to CRC (P<0.001 and P=0.002, respectively). CA19-9 and Her2 levels were not significantly different between PC and CRC patients, although Her2 levels were borderline significantly higher in PC compared to CRC (P=0.060). Serum Her2 levels were significantly negatively correlated with CRP levels (P=0.006). Ferritin levels showed no statistically significant correlation with CA19-9 and Her2 levels.

Conclusions: There is a correlation between elevated levels of tumor markers and the increase of inflammatory biomarkers in patients with PC and CRC.

Keywords: tumor markers, gastrointestinal cancer, inflammation

PP072

INVESTIGATE THE POTENTIAL OF SILICON (IV) PHTHALOCYANINE AS A PHOTODYNAMIC THERAPY AGENT FOR A549 CELL LINE

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Objectıves: Cancer is a global health concern that reported 10 million cancer-related deaths occurred in 2022. Photodynamic therapy (PDT) is one of the alternative cancer treatment methods. This method is a promising new option with a lower side effect profile, minimal invasiveness, feasibility, and high selectivity. The objective of this study was to investigate the potential of a synthesized silicon (IV) phthalocyanine (GsB-SiPc) for use in DT.

Methods: The photostability and ct-DNA binding properties of GsB-SiPc were examined using a UV-Vis spectrophotometer and agarose gel electrophoresis. On the other hand, plasmid DNA nuclease/photonuclease effects were investigated using agarose gel electrophoresis (light irradiation: 15, 30, and 60 min, 17.5 mW/cm^2, white). Finally, cytotoxic and phototoxic properties of GsB-SiPc were examined using MTT assay on human lung carcinoma (A549) cell lines for

24 h. Methylene blue was used as a positive control.

Results: The results showed that GsB-SiPc had 75.21 ± 6.09% photostability after 1 h of light exposure. Gs-B-SiPc bound to ct-DNA via groove modes. In DNA nuclease/photonuclease studies, the compound did not show any damage in the dark while it had remarkable photonuclease effects depending on the light dose. MTT results claimed that GsB-SiPc showed more significant phototoxicity than its cytotoxicity at 50 and 100 µM against A549 cells ($p < 0.001$).

Conclusions: In light of this information, GsB-SiPc had the potential to be a PDT agent for lung cancer treatment according to its photostability, DNA interaction, and phototoxicity results. Further studies should be conducted to support this hypothesis.

Keywords: cancer, DNA interaction, photodynamic therapy, photostability

PP073

THE INVESTIGATION OF CELL VIABILITY AND ANTIOXIDANT EFFECTS OF AN ISOCYANATE SUBSTANCE ON COLON CANCER CELL LINE

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Objectives: Isothiocyanates are compounds naturally found in plants such as broccoli, cabbage and cauliflower belonging to the Brassicaceae family. They are very important for the health of organisms because they have various biological effects such as anticancer and antioxidant activities. The effects of sulforaphane, one of these substances, have been examined in cancer model studies such as prostate, breast and lung cancer. This study aimed to examine the antioxidant effect of sulforaphane on colon cancer.

Methods: The CaCo-2, one of the colon cancer cell lines, was used in the study. In the first part of the study, using the MTT method, one of the cell viability methods, the 24-hour average inhibition concentration value of sulforaphane was determined as 181.8 µM. In the second part of the study, the antioxidative effect of sulforaphane was examined by MDA, glutathione and AOPP methods using sublethal concentrations (18.2 µM and 1.82 µM).

Results: Glutathione values of low concentration applied sulforaphane groups showed a significant decrease compared to the glutathione values of the control groups ($p<0.05$). The MDA values of the sulforaphane groups applied at low concentration showed an increase compared to the MDA values of the control groups. There was a decrease in AOPP values in the sulforaphane applied groups due to the increase in concentration. .

Conclusıons: The results of this study showed that sulforaphane caused an antioxidant effect in the colon cancer cell line.

Acknowledgment: This study is supported by Çankırı Karatekin University Scientific Research Projects Unit with code FF100522L07.

Keywords: CaCo2, isothiocyanates, sulforaphane, antioxidant activities

PP074

SERUM LACTATE DEHYDROGENASE LEVELS AND THEIR RELATIONSHIP WITH STAGE AND TUMOUR DEVELOPMENT

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Objectives: Lactate dehydrogenase (LDH) is a key glycolytic enzyme that reflects enhanced anaerobic glycolysis and metabolic reprogramming in tumour cells and likely plays an essential role in tumour proliferation, invasion, and metastasis. The study aimed to determine serum LDH levels in patients with breast (BRC) and colorectal cancer (CRC) and assess their relationship with disease stage and progression.

Methods: The study included patients with BRC and CRC (70 vs 33) undergoing dispensary examinations and hospitalization in the Oncology Centre. TNM classification, stage, previous therapy, last PET-CT for metastasis assessment, dynamics of tumour mar-

kers (TM), CRP, and cancer outcome were extracted from medical documentation. LDH was determined using a biochemical analyzer BS 200E, using an enzyme-kinetic method. We performed standard statistical analysis (descriptive, correlation and ROC). P<0.05 was considered statistically significant.

Results: Patients were divided into four groups according to the clinical stage of the disease. LDH values were statistically significantly highest in stage IV patients, and there was a moderately strong positive correlation between enzyme levels and tumour stage. Changes in LDH were associated with higher levels of CRP, TM and disease progression, respectively. LDH levels did not show a statistically significant difference in the carcinomas studied or the different pathological subtypes of BRC (ER, PR or Her-2). The diagnostic reliability of LDH for distinguishing metastatic from non-metastatic patients at a cutoff of 248U/L was AUC=0.813; p<0.0001.

Conclusion: The easy and routine determination of LDH provides additional valuable information on cellular malignant transformation and may serve to follow up patients with BRC and CRC.

Keywords: LDH, BCR, CRC

PP075

DIAGNOSTIC USEFULNESS OF CA 15-3 AND CA 125 IN BREAST CANCER SCREENING IN CORRELATION WITH OBESITY

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Objectives: Objectives are evaluation of sensitivity and specificity of CA 15-3 and CA 125 in breast cancer screening, compare their serum levels in breast cancer patients versus healthy individuals, and analyze correlation with obesity.

Methods: This cross-sectional study involved 400 female participants—200 with diagnosed breast cancer and 200 healthy controls. Serum levels of CA 15-3 and CA 125 were measured using CLIA method. Sensitivity, specificity, and predictive values were analyzed using SPSS software.

Results: Results showed CA 15-3 levels significantly elevated in breast cancer patients (M: 34 U/mL) compared to controls (M: 10 U/mL), with sensitivity of 78% and specificity of 85%. CA 125 also showed higher levels (M: 18 U/mL) in breast cancer patients versus controls (M: 9 U/mL), with sensitivity of 62% and specificity of 80%. Both markers correlated with advanced breast cancer stages and obesity.

Conclusion: Combination of CA 15-3 and CA 125 demonstrate diagnostic potential in breast cancer screening, with CA 15-3 being the more effective marker. These findings support integration of this tumor markers combination into screening protocols for early detection of breast cancer but they are more useful in advanced disease.

Keywords: breast cancer, tumor markers, CA 15-3, CA 125, screening

PP076

CORRELATION BETWEEN BENIGN BREAST DISEASE, AGING, AND BREAST CANCER RISK

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Objectives: Aims are to examine the correlation betwe-

en the occurrence of benign breast diseases and aging with assessment of breast cancer risk among women with BBD and analyze the combined effect of aging and BBD on breast cancer risk in Sarajevo Canton.

Methods: A retrospective case-control study was conducted involving 400 women who underwent breast cancer screening. Participants were categorized into those with diagnosed BBD and those without. Data collected included age, presence of benign breast diseases, and subsequent breast cancer diagnosis. Statistical analyses utilized Chi-square tests and logistic regression models.

Results: Among the participants, 300 had BBD, with the highest incidence in women aged 60-80 ($p < 0.01$). The risk of developing breast cancer was nearly threefold higher in women with BBD compared to those without ($p < 0.001$). Furthermore, older age correlated with increased breast cancer diagnoses ($p < 0.001$).

Conclusion: The findings indicate a significant correlation between aging, benign breast diseases, and breast cancer risk. Monitoring women with BBD, particularly as they age, is crucial for early detection and intervention, highlighting the need for tailored screening approaches in at-risk populations.

Keywords: breast cancer, tumor markers, aging, benign breast diseases, risk factors

PP077

COMPARISON OF THE PHENOLIC, FLAVONOID CONTENT, ANTIOXIDANT CAPACITY AND ANTI-TUMOR EFFECTS OF EXTRACTS OBTAINED FROM CITRUS AURANTIUM

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Objectives:The aim was to compare the phenolic and flavonoid contents, and antioxidant capacities of three Citrus aurantium (CA) extracts obtained with different solvents(Methanol-Water, Ethyl acetate-Water;Water and Ethyl acetate-Water;Ethyl acetate)and to evaluate their effects on pancreatic,thyroid and prostate cancer cells by comparing them to Docetaxel(DOCE).

Methods: The CA shells were dried at 50ºC in an oven and ground.To remove fat-soluble substances and enhance the extraction of polar compounds,pre-extraction with hexane using a Soxhlet apparatus was performed.Hexane was removed by evaporation and the material was lyophilized.Then,extraction was carried out using Methanol-Water(4:1) and Ethyl acetate-Water(7:3) solutions with a Soxhlet apparatus.The solvents were removed by an evaporator and the extracts were lyophilized.Since the Ethyl acetate-Water extraction separated into two phases,a total of three different extracts were obtained.The phenolic content was determined using the Folin-Ciocalteu method,the flavonoid content was measured by the spectrophotometric method used by Quettier and the antioxidant capacity was determined using the ABTS method.Further experiments continued with the Ethyl acetate-Water;Water extract. The anti-tumorigenic effects were evaluated on pancreatic(PANC-1),thyroid(CAL-62) and prostate(PC-3) cancer cell lines using MTT,Wound Healing and Soft Agar Colony Formation Assays(SACFA).

Results:The phenolic contents of the CA,Methanol-Water,Ethyl acetate-Water;Water and Ethyl acetate-Water;Ethyl acetate extracts were 22.17±2.20, 22.01±1.14 and 20.75±1.54 µg/mL, respectively. Flavonoid contents were 2.34±0.26, 2.36±0.38 and 3.46±0.31 µg/mL, respectively.Antioxidant capacities were 3.09±0.25, 1.25±0.19 and 2.20±0.1 mmol Trolox Equivalent/L, respectively.Lowest IC50 doses were observed in the Ethyl acetate-Water;Water extract. In Wound Healing Analysis, CA50(Ethyl acetate-Water;Water IC50dose)was most effective in PANC-1 cells.In CAL-62 cells, the combination group was more effective, while in PC-3 cells,CA50 showed similar effects to DOCE50.SACFA revealed fewer and smaller spheroids in CA50 groups compared to Control groups($p<0.005$).

Conclusions: Despite the lowest antioxidant capacity in Ethyl acetate-Water;Water extract. it showed effec-

tiveness at lower concentrations.CA likely acts through oxidative stress pathways, demonstrating inhibitory effects on invasion,migration and tumorigenesis.

Keywords: Citrus aurantium, Cancer cell lines, Phenolic content, Flavonoid content, Antioxidant capacity

PP078

INVESTIGATION OF THE ANTITUMORIGENIC ACTIVITY OF TOTAL PHENOLIC AND FLAVONOID CONTENTS OF RHEUM RIBES IN BREAST CANCER CELL LINES

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Objectives: The study aimed to investigate the antitumorigenic effect of two different extracts (Ethanol, EtOH·H2O(70:30)) obtained from the plant *Rheum ribes* (RR) by determining their total phenolic and flavonoid contents and antioxidant capacities in breast cancer cell lines (MCF-7,MDA-MB-231).

Methods: Rhizome (R), Shoot (S) and Seed (T) extracts of RR, which was supplied fresh from the Eastern Anatolia region in season, were prepared using Ethanol and EtOH·H2O(70:30). Extraction yields were calculated, total phenolic content of RR was determined by the Folin-Ciocalteu method and total flavonoid content was determined by Quettier's spectrophotometric method. Antioxidant capacity was examined using the DPPH (2,2-diphenyl-1-picrylhydrazyl) and ABTS ((2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid)) methods. Further analyses focused on the EtOH·H_2O extract due to its inhibitory concentration and high phenolic, flavonoid and antioxidant contents. The IC_{25} and IC_{50} concentrations of RR's EtOH·H_2O extracts and the standard chemotherapeutic drug Docetaxel (DTX) were determined using the MTT method in MCF-7 and MDA-MB-231 cell lines.

Results: Higher extraction efficiency was observed in Sh and R extracts prepared with EtOH·H_2O(70:30). The extracts prepared with EtOH·H_2O(70:30) had statistically significantly higher phenolic and flavonoid contents compared to ethanol extracts ($p<0.05$). Total phenolic contents of R, Sh and S parts in EtOH·H_2O(70:30) extracts were found to be 72.63±6.69, 82.23±6.45 and 25.94±2.80 mg GAE/g extract, respectively; and total flavonoid contents were found to be 5.64±0.42, 8.21±1.63 and 5.89±0.37 mg QE/g extract. Similarly, a statistically significant higher antioxidant activity was observed in the EtOH·H_2O(70:30) extracts ($p<0.05$). The lowest effective IC_{50} concentration was obtained from the R part of the EtOH·H_2O(70:30) extract in both cell lines.

Conclusion: Based on the total phenolic and flavonoid contents and antioxidant activity, we suggest that extracts with high phenolic and flavonoid content may have antitumorogenic effects in breast cancer cell lines by managing oxygen radicals.

Keywords: Rheum ribes, Phenolic Compounds, Antioxidant, Breast Cancer

PP079

COMPARATIVE EVALUATION OF MORINGA OLEİFERA LEAF AND SEED EXTRACTS ON OVARIAN CANCER CELL LINES: AN IN-VITRO AND IN-SILICO ANALYSIS

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Objectives: In this study we evaluated the anticancer activity potential of *Moringa oleifera* (MO) in ovarian cancer. The leaves and the seeds of this plant, the "tree of life", were separately used to obtain their extracts, and we tested them on ovarian cancer cell lines, OVCAR-3 and CAOV-3. Additionally, we analyzed *in-silico* the bioactive compounds such as Pterygospermin that are known to be found in this plant.

Methods: Maceration is used as the extraction method, and the solvent is ethanol. According to this method, MO leaves and seeds were incubated with ethanol separately to gain the extracts that were prepared through filtration and evaporation. Ovarian cancer cells were incubated with extracts for 72 hours and then analyzed for their anticancer activities through the Sulforhodamine B method. Docking and ADME prediction were performed to investigate the compounds' potential as anticancer agents.

Results: The IC_{50} values, 14.3 ± 0.8 (OVCAR-3) and 14.1 ± 2.1 (CAOV-3), that were obtained with the MO seeds were significantly lower compared to olaparib (30 ± 7.7 (OVCAR-3); 37.3 ± 1.9 (CAOV-3) and carboplatin (23.1 ± 4.8 (OVCAR-3); 19 ± 1.4 (CAOV-3), two FDA approved drugs for ovarian cancer. Pterygospermin binds efficiently to key proteins. *In-silico* and *in-vitro* findings demonstrate the anticancer potential of MO seed extract. However, the results obtained with the leaf extracts were not significant.

Conclusion: These *in-vitro* and *in-silico* findings suggest that *Moringa oleifera* could potentially serve as a supplementary treatment for ovarian cancer. We can consider *Moringa-oleifera*- complemented therapies to be full of promise for ovarian cancer patients.

Keywords: Moringa oleifera, ovarian cancer, anticancer activity, cytotoxicity

PP080

COMBINED EFFECT OF GEMCITABIN AND DUBERMATINB (TP-0903) ON APOPTOTIC MARKERS IN PANC-1 CELL LINE

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Objectives: Pancreatic cancer is considered as one of the aggressive malignancies due to poor prognosis and resistance to standard chemotherapeutic agents such as gemcitabine (GEM). TP-0903 is one of the Axl inhibitors that is a member of the Receptor Tyrosine Kinases family. In this study, the combined effect of GEM and TP-0903 on apoptotic markers in Panc-1 cell line was investigated.

Methods: Panc-1 cells were treated with GEM, TP-0903 and their combination. SRB test was performed to determine the cytotoxic effect. Quantitative analysis of expression levels of apoptotic markers Bcl-2 and Caspase-3 were determined by TaqMan RT-PCR method.

Results: In the Panc-1 cell line, the cytotoxic effects of 0.5µM GEM and 20nM TP-0903, when applied individually, were compared with their combined application. After 72 hours of incubation, the combined treatment exhibited a higher cytotoxic effect compared to GEM and TP-0903 applied separately. However, no significant changes were observed in Bcl-2 and Caspase-3 expression levels after 24, 48, and 72 hours of incubation with GEM, TP-0903, or the GEM+TP combination.

Conclusions: These findings suggest that Panc-1 cells may possess resistance to cell death through apoptotic pathways under certain conditions. Investigations into alternative cell death pathways may provide further insights into the underlying mechanism of the observed cytotoxic effect.

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Keywords: PANC1, GEMCITABIN, DUBERMATINB, APOPTOSİS, RT-PCR

PP082

EVALUATION OF INFLAMMATORY HEMATOLOGICAL RATIOS (NLR, PLR, MLR AND LMR) IN ATHEROSCLEROSIS PATIENTS

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Objectives: Atherosclerosis is a chronic inflammatory disease in which the rupture of unstable atherosclerotic plaque, narrowing or blockage of blood vessels caused by platelet aggregation and thrombosis leads to acute cardiovascular disease. Recent research has emphasized the potential significance of inflammatory hematological ratios, including the neutrophil/lymphocyte ratio (NLR), platelet/lymphocyte ratio (PLR), monocyte/lymphocyte ratio (MLR) and lymphocyte/monocyte ratio (LMR) in in various diseases. In this study, we aimed to investigate these inflammatory haematological ratios in patients with clinical atherosclerosis undergoing coronary artery bypass grafting (CABG).

Methods: In our study, 50 patients who were decided to undergo CABG surgery were included in the patient group and 50 healthy (no history of cardiovascular disease) individuals were included in the control group. Neutrophil, lymphocyte, platelet and monocyte values in routine haemogram samples of these individuals were obtained from hospital data. NLR, PLR, MLR and LMR values were calculated from these data. Mann-Whitney U test was used for comparison between groups. Statistical significance level was accepted as $p<0.05$.

Results: Comparing the inflammatory haematological ratios between the patient and control groups revealed that the patient group had higher levels of NLR, PLR, and MLR, whereas the healthy control group had higher levels of LMR ($p< 0.001$).

Conclusions: NLR, PLR and MLR parameters are not only accessible and cost-effective, but may also be noninvasive biomarkers reflecting the degree of systemic inflammation. Elevated NLR, PLR, and MLR levels may suggest a poor prognosis in atherosclerosis. However, studies with larger samples and evaluation with other cardiovascular biomarkers are needed.

Keywords: Atherosclerosis, NeutrophilLymphocyte, PlateletLymphocyte, LymphocyteMonocyte, MonocyteLymphocyte

PP083

CLINICAL VALUES OF SYSTEMIC INFLAMMATORY INDICES IN PATIENTS WITH RHEUMATOID ARTHRITIS AND SYSTEMIC LUPUS ERYTHEMATOSUS

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Objectives: There are many studies showing that blood cell-based inflammatory markers (SII (Systemic Immunity-Inflammation Index), SIRI (Systemic Inflammation Response Index), NLR (Neutrophil-to-Lymphocyte Ratio), PLR (Platelet-to-Lymphocyte Ratio), MLR (Monocyte-to-Lymphocyte Ratio), RPR (Red Cell Distribution Width Platelet Ratio)) play an important role in inflammation in autoimmune diseases such as rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE). Our aim was to investigate the relationship between systemic inflammatory indices and disease in RA and SLE patients.

Methods: The study included 51 RA patients, 33 SLE patients and 52 healthy controls. Analyses were performed using the formulas (Platelet x Neutrophil) /

Lymphocyte in the SII index, (Neutrophil x Monocyte) / Lymphocyte in the SIRI index, Neutrophil / Lymphocyte in the NLR index, Platelet / Lymphocyte in the PLR index, Monocyte / Lymphocyte in the MLR index, and Erythrocyte Distribution Width (RDW) / Platelet in the RPR index, and comparison of the 3 groups was performed by Kruskal-Wallis test.

Results: There was a statistically significant difference ($p<0.05$) between the groups for the SII, SIRI, NLR, MLR and RPR indices, whereas no significant difference was observed for the PLR index ($p=0.146$).

Conclusions: Blood-based markers of inflammation are effective biomarkers that can be used to assess disease activity in RA and SLE. High levels of SII, SIRI, NLR, PLR, MLR and RPR may be associated with increased inflammation, poorer prognosis and more severe disease activity in RA and SLE. These indices may also be useful in monitoring response to treatment.

Keywords: systematic inflammatory index, rheumatoid arthritis, systemic lupus erythematosus

PP086

EFFICACY OF HPV MOLECULAR TESTING AND PAP TESTS IN DETECTING PRECANCEROUS CERVICAL CHANGES

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Objectives: HPV is a group of more than 200 related viruses, some of which are spread through vaginal, anal, or oral sex. In 50% of the cases, those infections are related to high-risk HPV type. In our study we tried to identify different types of HPV and the cervical cell changes checked by PAP test, that can be caused by HPV.

Methods: In our cohort study we collected laboratory findings, HPV DNA tests, PAP tests, and biopsy in some cases, for 208 patients, presented for screening in a private clinic in Tirana, for 5 years (from 2019 to 2024).

Results: All patients, according to HPV testing (typing/genotyping) resulted in: 25% negative, 25% positive with high-risk, and 50% positive with low risk. High-risk types were: HPV16(n=35), 18(n=22), 31(n=10), 33(n=6), 35(n=9), 39(n=8), 51(n=16), 52(n=16), 56(n=14), 58(n=19) and 59(n=7). Low risk types were: HPV6 (n=25), 11(n=2), 66(n=6) and 111(n=1). Patients negative in biopsy were HPV positive low risk. Positive in biopsy were patients with HPV 16, 18, 35 and 58 types. PAP test results showed that all patients HPV positive have cell changes, ASCUS 72%, ASC-H 18%, L-SIL 12%, H-SIL-2% (only 1 patient positive for 5 types of HPV 16,18, 35,66,6).

Conclusions: Screening tests are used to check for a disease or condition when there are no symptoms. HPV molecular testing and PAP test can, together, detect cervical cell changes early, before they develop into cervical cancer.

Keywords: high-risk HPV, molecular testing, PAP test, cervical cell changes

PP088

ASSOCIATION OF IL6 GENETIC VARIANT RS1800795 WITH RHEUMATOID ARTHRITIS: A CASE–CONTROL PRELIMINARY STUDY

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Objectives: Interleukin-6 (IL-6) plays a pivotal role in the development and clinical manifestation of rheumatoid arthritis (RA). The *IL6* rs1800795 (G>C) variant was linked to IL-6 production. Recent studies have reported the rs1800795 variant as a significant disease risk factor in Asians but studies among the European populations reported conflicting findings, leading to ambiguities in the results. We aimed to explore the association of *IL6* gene variant rs1800795 (G>C) with

RA risk and clinical manifestation in Bulgarian RA patients.

Methods: *IL6* rs1800795 polymorphism was investigated by amplification refractory mutation system-PCR (ARMS-PCR) in 84 female RA patients and 43 healthy individuals in the Bulgarian population. Disease activity in patients was assessed by the DAS28-CRP score. Statistical analysis of the data was done with SPSS v.21.

Results: We observed a higher frequency of GG-genotype among RA patients than controls (50% vs. 30.2%; p=0.033), respectively the GG genotype was associated significantly with an increased risk of developing RA [OR=2.308, 95% CI (1.059-5.028); p=0.033]. In addition, the genotype distribution was significantly different between RF-positive and RF-negative RA patients (chi2=8.751; df=2; p=0.014). The carrying of G-allele (GG+CG) was associated with RF positivity [OR=7.538, 95%CI (1.657-34.289); $p_{corrected}$=0.013] and there were no significant differences in the genotype distribution of the rs1800795 between case subgroups according to the RA activity, onset, disease duration or disability.

Conclusions: The *IL6* gene variant rs1800795 (G>C) might be a risk factor for RA predisposition in the Bulgarian population, but further study expansion is needed.

Keywords: -174 GC polymorphism, IL-6, autoimmunity, inflammation

PP090

MOLECULAR CARDIAC ADAPTATIONS IN EXTREME HYPOXIA-RESISTANCY

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Objectives: Hypoxia results from inadequate oxygen levels and is a therapeutic challenge in cardiovascular diseases. Compared to mice, rats, or humans, blind mole rats (BMRs) exhibit remarkable hypoxia resistance. The aim of this study is to understand the cardiac mechanisms of the superior hypoxia resistance of BMRs using *in vivo* approaches and to focus on metabolic changes that potentially contribute to hypoxia tolerance in BMRs.

Methods: To reveal signaling pathways of BMR in comparison to mice, both BMRs and mice were subjected to controlled hypoxia and survival data were collected. Metabolomics assay and immunoblotting analysis were performed in the heart tissues. In addition, the oxidative phosphorylation (OXPHOS) assay was conducted to evaluate reactive oxygen species (ROS) levels in mitochondrial extracts.

Results: BMRs showed superior anoxia resistance and increased survival rate *in vivo* when compared to mice. Mitophagy-related proteins (p-ULK, Beclin 1, FUNDC1) were found to be significantly increased in anoxia-exposed hearts compared to normoxic BMR hearts, while there was no difference in the expressions of mouse hearts. Spermidine, spermine, L-glutathione, and alpha-GPC metabolites, which have antioxidant properties and many of which are associated with mitophagy activation, were elevated in anoxic BMR hearts. In addition, ROS levels were decreased in the mitochondrial complexes of anoxic BMR hearts.

Conclusions: This study uncovers important cardiac molecular and mitochondrial adaptations in hypoxia-resistant BMRs. The results suggest that targeting mitochondrial networks could be a promising strategy for developing therapies against hypoxia-related heart conditions.

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Keywords: blind mole rat, heart, hypoxia, metabolomics, oxidative stress

PP091

THE EFFECTS OF PROLONGED FASTING ON ENERGY METABOLISM AND MITOCHONDRIAL FUNCTIONS IN ALZHEIMER'S DISEASE MODEL APPLIED HT22 CELLS

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Objectives: Mitochondrial dysfunction is known to be a significant factor contributing to neurodegeneration in Alzheimer's disease(AD). However, while glucose metabolism is impaired in AD, no changes are observed in ketone metabolism. Therefore, ketones may present alternative therapeutic approaches for neurodegenerative diseases like Alzheimer's, which exhibit impaired glucose metabolism. This study aims to detect the metabolic effects of prolonged fasting under pathological conditions and preserve neuronal function.

Methods: The pathological Alzheimer's disease model was simulated in-vitro by applying 10μM Aβ(1-42) to HT22 cells. A fasting model was created using EBSS medium, and 5mM beta-hydroxybutyrate(βOHB) was administered. Using immunofluorescence techniques, Aβ formation in the cells was examined on confocal microscopy. Metabolic parameter measurements were conducted from cell medium and lysates, including beta-hydroxybutyrate, glucose, lactate, lactatedehydrogenase, and aminoacids. For mitochondrial function analysis, citrate-synthase enzyme activity was measured.

Results: The beta-hydroxybutyrate(βOHB) positively influenced the viability of experimental groups ($P<0.5$), while Aβ(1–42) exhibited toxic effects on HT22 cells, which are mitigated by βOHB application. The higher citrate synthase activity is observed in the βOHB-control group and βOHB-fasting group. In groups with Aβ1–42 and βOHB, enzyme activity is increased compared to the without βOHB groups ($p<0.1$). Additionally, the cells incubated with βOHB utilize both glucose and ketones during energy metabolism, leading to increased mitochondrial activity during ketone utilization.

Conclusions:These findings suggest that while the damage caused by amyloid-beta is attenuated by the addition of ketones, complete recovery is not achieved. The findings may encourage the development of alternative interventions to preserve neuron function in many neurodegenerative diseases.

Keywords: Prolonged fasting, Ketone bodies, Alzheimers disease, HT22 cell lines, Mitochondrial fuctions

PP092

EVALUATION OF ATG5 EXPRESSION LEVEL ON T98G CELLS AFTER ISOFLAVONE USAGE

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Objectives: Glioblastoma is highly resistant to chemotherapy, partly due to genetic changes and increased autophagy in cancer cells. Some flavonoids, natural dietary compounds with anti-cancer properties, are being studied as potential treatments due to triggering autophagy in cancer cells. In this study, expression level of ATG5 which is one of the autophagy-related genes was investigated in T98 glioblastoma cells after the treatment with Biochanin A, an isoflavone.

Methods: MTT experiment were performed for Biochanin A usage. According to results, T98G cells were treated with 100 uM Biochanin A for 48 hours. Total RNA isolation and cDNA synthesis were performed for both control and Biochanin A-treated cells. The difference of expression level of ATG5 was analyzed. Beta actin was used.

Results: ΔΔCt value of ATG5 gene was calculated and according to the results, Biochanin A treatment non-significantly increased ATG5 expression level in T98 glioblastoma cells.

Conclusions: Dietary compounds like may show their effects on cancer cells through the several pathways. An isoflavone Biochanin A has a chemo sensitizing effect which is mediated by autophagy inhibition. We found that Biochanin A had an effect on expression level of ATG5 but it is not significant. ATG5 regulates cell growth between normal and starvation conditions. Therefore, these studies about the effect of Biochanin A on glioblastoma cells may be valuable and may have a potential for developing new treatment strategies.

Keywords: Biochanin A, T98G, Autophagy, ATG5

PP093

INSR MIGHT BE A POSITIVE PROGNOSTIC BIOMARKER IN RENAL CLEAR CELL CARCINOMA

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Objectives: It has been reported that insulin receptor expression may be associated with positive prognosis in kidney renal clear cell carcinoma (KIRC). In this context, we aimed to comprehensively examine the role of *INSR* in KIRC by using public databases containing large patient cohorts.

Methods: The study was conducted using the following web tools: Expressions using one-way ANOVA by TCGA and GTEx in normal data with GEPIA2, overall survival (OS) using the Log-rank test and GEPIA2 by dividing the patients according to the median value, promoter methylation and cancer stage expression differences by TCGA using Welch's T-Test in UALCAN, Gene changes by KIRC (TCGA, PanCancer Atlas) via cBioportal, Immune cell infiltration relationships via TIMER by purity-corrected partial Spearman's rho.

Results: Our findings in the KIRC cohort regarding *INSR* were as follows: There was higher expressions in tumors ($p<0.05$). High *INSR* expressions was associated with improved OS (Logrank $p=4.6e{-}05$, Hazard Rate (high) =0.53). Tumor samples had higher promoter methylation levels (p= 2.86104473445903E-13). There were lower expressions in stage 4 than stages 1,2 and 3 (p=1.16619999990242E-07, p=3.339600E-02, p=2.579500E-02, respectively) and in stage 3 than stage 1 (p=9.005400E-04). Deep deletion was found in one patient and missense mutation (L680P) was found in one patient. Positive correlations were found between *INSR* expressions and the following cells: CD8+ T, CD4+ T, Neutrophil, Macrophage and Dendritic Cell.

Conclusions: INSR might be a positive prognostic biomarker in KIRC. Its possible anti-tumorogenic role may be contributed by its effect on the tumor microenvironment.

Keywords: Insulin receptor, Renal clear cell carcinoma, Tumor immune infiltration

PP094

NANOPARTICLES DERIVED FROM NIGELLA SATIVA AS A COMPLEMENTARY THERAPY FOR HYPERTENSION

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Objectives: This research is carried out to evaluate the effect of oral administration of nano-based particles derived from black seed on cardiac disease in hypertensive rat models induced by N(gamma)-nitro-L-arginine methyl ester (L-NAME).

Methods: Black seed were subjected to ultrasonic irradiation treatment to produce nano-based particles. The nano-based particles derived from black seed were orally administrated to the hypertensive and control rats (n=5) to investigate their cardioprotective roles. After 5 weeks, the blood samples from each group were collected for biochemical analysis.

Results: Ultrasonic irradiation for black seed produced nano-based particles that were clustered in weak and irregular with internal cavities with nano particles. Epicatechin was found as the predominant phenolics in all extracted phenolics from sonicated black seed. This study revealed that oral administration of sonicated black seed was significantly decreased the systolic (P <0.001), diastolic (P <0.001), mean arterial blood pressure (P <0.001), total cholesterol, low-density lipoprotein, alanine aminotransferase, and aspartate aminotransferase.

Conclusions**:** Administration of non sonicated or sonicated black seed may improve the cardiac function in hypertensive rats via lowering the systolic, diastolic, and mean arterial pressure, improving the lipid profile and liver markers, and modifying the levels of profibrotic markers, suggesting a potential protective role as a functional food for prevention of cardiac disease.

Keywords: Hypertension, Nigella sativa, Nano particles

PP095

NANO PARTICLES-DERIVED ROYAL JELLY EXERTS ANTI-DIABETIC PROPERTIES

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Objectives: Diabetes mellitus is a serious health problem that has been associated with high rates of cardiovascular disease-related death and morbidity. In the last century, the most concerned part of consumers, the food industry, and researchers was to produce functional food with pharmaceutical and nutraceutical properties. This study aims to determine the physical, molecular, and biochemical properties of royal jelly (RJ) in diabetic rats.

Methods: RJ was subjected to ultrasonic irradiation to produce nanoparticles and then biological, molecular, and morphological properties were evaluated. Diabetes was induced in male Wistar rats by streptozotocin (STZ) injection at a dose of 60 mg/kg for 3 consecutive days. Non-sonicated (NS) and sonicated RJ (1g/kg/day) were orally administered to the rats for four weeks after the STZ injection. Blood samples from all rat groups were collected for biochemical analysis including a lipid profile, liver enzymes, and creatinine.

Results: Ultrasonic irradiation of RJ produced nanoparticles that have rough smaller, thin, irregular, and multilayered structures. Oral administration of S-RJ in diabetic rats significantly increased the diastolic pressure, total cholesterol (P <0.001), low-density lipoprotein (P <0.001) along with a decrease in the levels of blood glucose, and alanine aminotransferase (P <0.001). Additionally, NS-RJ significantly increased the level of triglycerides and decreased the level of alanine aminotransferase in diabetic rats.

Conclusions: Administration of S-RJ or NS-RJ may improve the fasting blood glucose level in diabetic rats, suggesting a potential protective role as a functional food in as functional food for prevention of cardiac disease.

Keywords: Streptozotocin, Nano particles, Royal Jelly, Antidiabetics

PP097

INVESTIGATION OF THE PROTECTIVE EFFECTS OF GOLD NANOPARTICLES COATED WITH QUERCETIN/POLYETHYLENEIMINE AGAINST OXIDATIVE STRESS IN SENSORY NEURONS

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Objectives: The basis of most neurological diseases is the accumulation of free radical molecules. Quercetin (Q) is a polyphenolic bioflavonoid molecule and it has strong antioxidant effects. There are some challenges in the clinical use of Q, such as low solubility, instability, poor bioavailability and limited blood-brain barrier penetration. Gold nanoparticles (AuNPs) are biocompatible, stable, and highly popular metallic nanomaterials that can be easily synthesized in various shapes and sizes. The use of Q conjugated with AuNPs can overcome the mentioned difficulties. The aim of this study was to synthesize two various sized AuNPs ($AuNP_{20}$ and $AuNP_{50}$) coated with Q and polyethyleneimine (PEI), investigation of the protective effects against oxidative stress in mice sensory neurons *in vitro*.

Methods: For the synthesis of AuNPs, a slightly modified Turkevich synthesis method and seeding-growth method were used. All the necessary physicochemical characterizations of the AuNPs were carried out after modification with Q and PEI, respectively by physical adsorptions. After oxidative stress induced using H_2O_2 in the neurons, cell viability studies and intracellular ROS measurements were performed.

Results: The Q/PEI coated AuNPs varying in size and surface charge/chemistry were synthesized successfully. The PEI surface modification increased the biocompatibility and stability of the AuNPs. The antioxidant property of Q was preserved after conjugation with AuNPs. PEI surface coating led to an increase in the antioxidant activity of all AuNPs groups.

Conclusions: This study indicates that synthesized gold-nanoconjugates (AuNPs-Q-PEI) with different sizes could be a useful potential nanoplatform for the treatment of neurodegenerative diseases.

Keywords: Quercetin, Gold nanoparticle, DRG sensory neurons, Nanotoxicity, Oxidative stress

PP099

THE LEVEL OF OXIDATIVE STRESS MARKERS IN PATIENTS WITH CHRONIC PERIODONTITIS BEFORE AND AFTER NON-SURGICAL TREATMENT

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Objectives: Chronic periodontitis (CP) is the most prevalent oral inflammatory disease. It has been thought that oxidative stress is involved in the etiology and pathogenesis of several oral diseases, including periodontitis. Saliva acts as the first defensive line against free radicals. The aim of this study was to determine the activity of oxidative stress markers: malon dialdehide (MDA) and 8–hydroxy-2-deoxyguanosine (8-OH-2dG) and antioxidant enzymes: superoxid dismutase (SOD), glutathione peroxidase (GPx), and total antioxidant status (TAS) in saliva of patients with CP before and after non surgical medical treatment.

Methods: A total of 40 patients with chronic periodontitis, in the period of exacerbation, were inroled in the study. Unstimulated whole saliva was collected from each subject in the Salyvette (Sarstedt, Germany) between 9.00-10.00 a.m. After collection, saliva was centrifuged for 10 minutes at 4000 rpm and frozen at -80ºC until analysis. The level of oxidative and antioxidant parameters was determined using commercial test kits based on spectrophotometric and enzyme-linked immunoassay (Randox Laboratories Ltd. and Abcam, United Kingdom and JaICA, Japan).

Results: Statistical processing data revealed significantly higher values of MDA, 8-OHdG, GPx and TAS ($p<0.01$) in saliva of patients with CP before medical treatment compared to values after treatment.

Conclusion: Based on the obtained results it may be concluded that chronic inflammation present in CP patients, may have a significant impact on the values of oxidative stress and antioxidant parameters.

Keywords: chronic periodontitis, oxidative stress, saliva

PP100

BIOAVAILABILITY OF GSH-COATED FEB NANOPARTICLES: IMPACTS ON OXIDATIVE STRESS AND TRACE ELEMENT METABOLISM

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Objectives: Iron-based magnetic nanoparticles (NPs) have been extensively used in biomedical applications such as cancer detection and therapy, drug targeting and delivery, magnetic resonance imaging, hyperthermia, etc.

Methods: Here, we report the synthesis and glutathione (GSH) coating of iron boride (FeB) nanoparticles for biomedical applications.

Results: Synthesized FeB NPs showed a ferromagnetic property and exhibited a saturation magnetization (M_s) of 45.8 emu/g with a small coercivity (H_c= 1000 Oe). TEM images of GSH-coated FeB NPs (FeB@GSH) exhibited well-dispersed nanoparticles with sizes below 30 nm. These NPs were further investigated in nanotoxicity and biocompatibility experiments using different types of healthy and cancer cells, including 293T, HeLa, 3T3, MCF7, HCT116, and CFPAC-1. Cytotoxicity of the FeB@GSH treated cells was studied between 0-300 µg NPs/mL dose after 24 h incubation, and no significant difference has been observed between control and treated cells, indicating toxicity. Nanotoxicity experiments have been performed with selected cell lines such as 3T3, 293T, and CFPAC-1. Antioxidant enzymes were measured to evaluate oxidative stress and cell growth metabolisms. Additionally, ion release and mineral metabolism addressing nanotoxicity were investigated via ICP-MS.

Conclusion: No changes were observed between the treated and control groups. In this study, we showed that highly biocompatible FeB@GSH NPs could be a potential candidate for biomedical applications such as medical imaging or drug delivery systems.

Keywords: GSH coating, oxidatives stress, ROS, biocompatibility, ferromagnetic nanoparticles

PP101

INVESTIGATION OF THE PROTECTIVE EFFECTS OF MISTLETOE EXTRACT ON DISTANT ORGAN DAMAGE IN A RAT AORTIC ISCHEMIA-REPERFUSION MODEL

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Objectives: In aortic surgery, ischemia caused by clamping of the abdominal aorta causes distant organ damage in many tissues. The aim of our study is to investigate the protective effects of the methanol extract obtained from mistletoe (ME) collected from almond trees and heparin (HEP) against distant organ damage in a rat aortic IR model using biochemical methods in serum and lung, kidney and intestinal tissues.

Methods: In the study, 45 male/female wistar albino rats aged 6-10 weeks were divided into 6 different groups (control, sham, IR, IR+ME, IR+ME+HEP, IR+HEP). In the 7-day experiment, 400 mg/kg/day extract was administered to ME groups, and a single dose of 500 u/kg heparin was administered to HEP groups 60 minutes before laparotomy. 60 min ischemia was provided with cross-clamp in IR groups, followed by 120 min reperfusion. Oxidative stress, met-

hylarginine, ischemia modified albumin (IMA), free thiol, total thiol and disulfide levels were analyzed in serum and tissue samples, and oxidative stress indexes (OSI) and disulfide/free thiol, disulfide/total thiol ratios were calculated.

Results: In terms of oxidative stress indices and IMA levels, no significant decreases were observed in serum and tissue samples in the ME and HEP groups compared to the IR groups. While there were significant decreases in asymmetric dimethylarginine levels in lung tissues in the ME, ME+HEP and HEP groups, respectively (p=0.0001;p=0.0003;p=0.0001), compared to the IR group.

Conclusions: We believe that the issue can be better elucidated through comprehensive studies planned with different doses of ME, HEP and longer experimental periods.

Keywords: Aortic surgery, ischemia-reperfusion, mistletoe extract, heparin, distant organ damage

PP102

ERYTHROMYCIN INTERFERENCES WITH LABORATORY TEST RESULTS

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Objectives: Erythromycin is known as a macrolide antibiotic and an inhibitor of CYP3A, and it can cause interferences that affect laboratory tests.

Methods: A 6-year-old male kidney transplant patient, got chicken pox, the flu and infections of the respiratory system. Our patient was referred to Infection Clinic of our Clinic Centre, and laboratory investigation was done: serum C-reactive protein (CRP) 57.1 mg/L (reference range 0.0-5.0 mg/L), Procalcitonin (PCT) 1.09 ng/mL (reference range 0.05-0.5 ng/mL), 31 U/L aspartate aminotransaminase AST (reference range 21-44 U/L); 27 U/L alanine aminotransaminase ALT (reference range 16-32 U/L); 10.4 umol/L bilirubin (reference range 1.7-20.5 umol/L) and 102.30 ug/L cyclosporine (CsA) (reference range 75-150 ug/L). In the therapy, he received a 120 mg infusion of cyclosporine, a 600 mg infusion of acyclovir, and a 100 mg infusion of amphotericin B over 24 hours. Erythromycin suspension syrup was given at 60 mg twice a day. The laboratory tests were done using Alinity (ABBOTT).

Results: After 7 days of therapy, laboratory tests were done: decrease 4.9 mg/L (CRP) and 0.4 ng/mL PCT; increase 61 U/L (AST); 50 U/L (ALT); 62.2 umol/L (bilirubin); and 372.60 ng/mL (CsA). Then, after 3 days, when erythromycin suspension syrup was temporarily stopped, AST, ALT, bilirubin and CsA were in the reference range.

Conclusions: In cases where erythromycin and CsA are coadministered, CsA metabolism is reduced, hepatic metabolism decreases, and plasma concentrations of CsA increase. Erythromycin causes biological interference in hepatic function, increasing serum levels of bilirubin, as well as the hepatic enzymes.

Keywords: Erythromycin, Cyclosporine, enzymes, bilirubin, interferences

PP103

CA-19-9 BIOMARKER INTERFERENCE: A CASE STUDY ON THE IMPACT OF HETEROPHILE ANTIBODIES AND CROSS-METHOD COMPARISONS

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Objectives: Carbohydrate antigen 19-9 (CA-19-9) is a biomarker that is frequently increased in gastrointestinal cancers. In 2015, a 39-year-old female with a medical background of arrhythmia, two ablations, and a pacemaker, arrived at our hospital with symptoms of

pelvic pain. She had frequent checkups. CA-19-9 level was raised, but radiological and clinical evidence did not corroborate it. Elevated levels seen from 2015 to 2024, in comparison to the normal results from another center indicated potential interference in the measurements.

Methods: Despite our rising CA 19-9 values with Siemens Advia Centaur XP (Munich, Germany), the patient sample was processed with heterophile antibody blocking tubes (HBT) and polyethylene glycol (PEG) precipitation due to the obtaining of normal results at different centres at Roche Cobas (Basel,Switzerland). After sample preparation, samples analysed with Advia Centaur XP.

Results: With HBT, the value decreased from 241.05 U/ml to 58.8. Following PEG application, it decreased from 241.05 U/ml to 1.2. 0.88% improvement in PEG precipitation was achieved. The data showed the presence of heterophile antibodies in the patient.

Conclusions: Immunoassay procedures are susceptible to interference. Various devices may employ distinct antibodies, and previous interventions can potentially activate heterophile antibodies. The fact that recovery was so high in PEG precipitation proves the accuracy of our hypothesis. This case underscores the necessity of conducting cross-method comparisons and maintaining open lines of communication with doctors in order to prevent inaccurate results caused by interference.

Keywords: CA19-9, heterophile antibody, interference, immunassay

PP104

ACQUIRED HEMOPHILIA A IN THE POSTPARTUM PERIOD: A CLINICAL CASE REPORT

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Objectives: Acquired Hemophilia A (AHA) is a rare bleeding disorder characterized by the development of autoantibodies against coagulation factor VIII (FVIII) in individuals without a history of hemophilia. Although AHA is associated with autoimmune diseases, malignancies, and pregnancy, its etiology remains unknown in 50% of cases. AHA typically presents with bleeding into the skin, muscles, and soft tissues, while hemarthrosis is rare. We aim o present a clinical case of AHA in a 29-year-old woman during the postpartum period (PP).

Methods: Coagulation parameters were measured on a Sysmex-CS2500 analyzer, using the one-stage method for FVIII activity and the Nijmegen-modification of Bethesda-clot assay for FVIII inhibitors.

Results: A woman in the PP presented with cutaneous-muscular bleeding. Laboratory results showed prolonged APTT (114.3s), decreased FVIII activity (1%), and a significant inhibitory titer against FVIII (>100BU). Despite initiating therapy to eliminate the inhibitor, the patient developed a large retroperitoneal hemorrhage. Recombinant factor VII was added to the treatment, effectively controlling the bleeding and enabling the surgical removal of the hematoma. Corticosteroid treatment was resumed after the acute bleeding was controlled.

Conclusion: Managing AHA during the PP is challenging due to its rarity and diagnostic complexity. Early recognition and appropriate treatment are crucial for favorable outcomes. Patients with AHA typically present with bleeding symptoms, prolonged APTT, decreased FVIII activity, and the presence of FVIII inhibitors. Treatment involves bypass agents to control acute bleeding and immunosuppressive therapy to eliminate inhibitors. Emicizumab, a factor VIII-mimicking monoclonal antibody, is a promising treatment, but further studies are needed to evaluate its efficacy in AHA patients.

Keywords: Acquired Hemophilia A, Postpartum period, FVIII inhibitors

PP105

CHALLENGES OF DETERMINING THE BLOOD COUNT IN PREMATURE BABIES AND NEWBORN INFANTS - case report

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Objectives: One of the biggest challenges in hematology laboratories is differentiation of blood cells in premature babies and newborns in general. The reason for this is presence of erythroblasts, which hematological analyzers, due to their morphology, often count as leukocytes. Our objectives are to compare the results of hematological analyzers in blood analysis of premature babies.

Methods: The blood of premature baby was analyzed on three hematology analyzers (Sysmex XN 3100, Coulter DX 900 and Quintus), with special reference to the presence of erythroblasts. To confirm the presence of erythroblasts, a peripheral blood smear examination was performed using automatic digital microscopy.

Results: The number of leukocytes (x10^9/L), erythrocytes (x10^{12}/L), platelets (x10^9/L) and erythroblasts (%) was determined. The Quintus results are: leukocytes 9.73; erythrocytes 3.44; platelets 44, no additional warnings. The Coulter analyzer results are: leukocytes 4.90; erythrocytes 3.71; platelets 10, NRBC 24.8%, gives warning about the presence of erythroblasts. Sysmex results are: leukocytes 5.35; erythrocytes 3.68; platelets 8.0, NRBC 50.7%, with warning of the presence of erythroblasts. Automated digital microscopy examination of the peripheral smear in preclassification showed 70.0% NRBC. After reclassification were found erythroblasts: acidophilic 79.0%, polychromatophilic 45.7%, basophilic 3.7%.

Conclusions: Blood samples of newborns, especially premature ones, should be used on hematological analyzers, which have the possibility of their determination. If the laboratory does not have such analyzer, a microscopic examination of the peripheral blood smear should be performed and manual correction of leukocytes number should be performed, if erythroblasts are present.

Keywords : erythroblasts, premature babies, blood count

PP106

INTERFERENCE OF MONOCLONAL ANTIBODY DRUGS IN ELECTROPHORESIS TESTS: CASE REPORT

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Objectives: Interference is a major concern in clinical laboratories, as their reports significantly impact the decisions made by clinicians.Electrophoresis tests are also susceptible to interference. Monoclonal antibody drugs used in the treatment of patients can significantly interfere with serum IFE tests, which play an important role in diagnosing the disease.

Methods: 51-year-old female patient has been under follow-up for two years with a diagnosis of multiple myeloma. While previous electrophoresis tests were negative, the most recent serum immunofixation electrophoresis (IFE) test showed a weakly positive monoclonal IgG kappa band. Given the patient's prolonged remission, the weak positivity, the presence of a band in a typical localization for monoclonal drug interference, and the inconsistency with serum free light chain tests, monoclonal drug interference has been considered the primary possibility. Later, upon further review, we found that the patient was receiving Daratumumab treatment for multiple myeloma according to the health board medication reports. We also contacted the clinician and confirmed that the patient was using the drug.

Conclusions: With the growing prevalence and widespread use of monoclonal antibody drugs, interfe-

rence from these medications will increasingly complicate the diagnosis and monitoring of electrophoresis tests. Laboratory specialists must be aware of interferences, know how to handle them, and contact the clinician as needed.

Keywords: Interference, İmmünfixation electrophoresis, Multıpl myelom, Daratumumab, monoclonal antibody

PP109

LABORATORY PERSPECTIVE TO ELEVATED 24-HOUR URINE CORTISOL: A CASE REPORT

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Objectives: Cushing's syndrome (CS) is a relatively rare diseases caused by chronic excessive exposure to glucocorticoids due to various etiologies and alterations in cortisol circadian rhythm, with an annual incidence of 0.2–5.0 per million people. In about 70% of cases, CS is caused by an adrenocorticotropic hormone (ACTH)-producing pituitary tumor. Hypercortisolism leads to increased morbidity and mortality because if not promptly diagnosed and treated. The aim of this case was to identify the protocols of laboratory to measurment 24-hour urine cortisol.

Methods: A 40-year-old female patient with plasma ACTH elevation (123 pg/ml) (reference range: 7,2-63,3 pg/ml) and serum cortisol (27,1 µg/dl) (reference range: 6,2-19,4 µg/dl) was transferred to our endocrinology and metabolic diseases department with cushing's syndrome suspicion. Contrast-enhanced pituitary MRI revealed a 4*3mm nodular lesion in the left posterior pituitary.

Results: In the patient who forgot to add the 24-hour urine preservative, urinary cortisol was measured as 6.98 µg/day by LC-MS/MS. Then, when boric acid (10gr) was used as a 24-h urine preservative, the patient's urinary cortisol was measured as 96.33 µg/day (reference range: 3,5-45 µg/day) by LC-MS/MS. The patient's diagnosis was thus confirmed.

Conclusions As a clinical biochemistry specialist, it is important to ask whether the patient is using urine preservatives to determine the urinary cortisol level in patients with cushing's syndrome to prevent misdiagnosis.

Keywords: Cushings syndrome, 24-Hour urinary cortisol, ACTH

PP110

LABORATORY PERSPECTIVE TO RARE URINE CRYSTALS: A CASE REPORT

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Objectives: Trimethoprim-sulfamethoxazole, a member of the sulfonamide family, is a rare cause of drug-induced calculi. Cases of sulfonamide crystalluria have rarely been reported. Sulfamethoxazole is converted to N-acetyl-sulfamethoxazole (NASM) and excreted by the kidneys. NASM may form crystals in urine, especially in acid urine, that may even induce a crystalline nephropathy. The aim of this case report is to emphasize the importance of taking a comprehensive approach when assessing cases with crystalluria, including considering the patient's clinical condition and the medications they are taking.

Methods: A 6-year-old female patient with dysuria and pollakiuria symptoms was applied to the pediatrics department. Urinalysis showed 3+ Leukocyte Esterase, 1+ Blood. No crystals has been observed in urine sediment microscopy. The urine culture identified 80,000 colonies of Klebsiella, and oral antibiotic treatment (Bactrim® 400/800 mg 30 tablets) as two tablets daily has been started. After 6 days of treatment, the patient returned for a follow-up urine sample.

Results: The Urinalysis was negative for both leukocyte esterase and blood. Urine sediment microscopy revealed geometric-shaped, sharp-cornered crystals. The urine pH of 5.5 and serum uric acid level of 4.3 mg/dL made struvite and uric acid crystals unlikely,

respectively. After conducting a thorough literature review and checking patient's medical history we concluded that these crystals were consistent with sulfamethoxazole crystals.

Conclusions: This case underscores the necessity of a thorough evaluation of both the patient's clinical status and their medication history when analyzing urine sediment. Awareness of potential drug-induced crystalluria is vital for accurate diagnosis and effective patient management.

Keywords: Urinary crystals, Sulfamethoxazole crystalluria, Urine microscopy, Drug crystalluria

PP111

ACUTE PANCREATITIS AS A RARE DIAGNOSTIC CLUE FOR MULTIPLE MYELOMA: A CASE REPORT

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Objectives: Acute pancreatitis (AP) is a severe inflammation of the pancreas commonly associated with gallstones or alcoholism. However, rare underlying conditions can be the cause of AP. We present the case of a patient where AP revealed multiple myeloma, highlighting the need to consider unusual underlying diagnoses in atypical cases of AP.

Methods: A 49-year-old patient, admitted to the emergency for asthenia, malaise, dyspnea and vomiting. Examination showed, a respiratory rate of 19 breaths per minute. The abdomen was soft with tenderness in the epigastric region.

Results: Laboratory investigations revealed acute functional renal failure (urea 16 mmol/L, creatinine 237 µmol/L, urine sodium/potassium ratio = 1), hypercalcemia at 4.17 mmol/L, an inflammatory syndrome and hypochromic microcytic anemia at 6.23 g/dL. Lipase levels were elevated, 50 times the normal rang. Although acute pancreatitis was suspected. Given the deterioration in her general condition, anemia, renal failure, and renal ultrasound showing normal kidneys with poor corticomedullary differentiation, multiple myeloma was suspected. This diagnosis was confirmed by protein electrophoresis (Sebia Capillarys) revealing hyperproteinemia at 141 g/L with a monoclonal band of IgG Kappa.

Discussion: AP is a potentially fatal disease with a mortality rate of 13% . Given the dangers of misdiagnosing pancreatitis, awareness of unusual presentations is paramount. Multiple myeloma, often being discovered incidentally during a biological workup. AP secondary to hypercalcemia caused by multiple myeloma or pancreatic involvement in Kahler's disease is rare.

Conclusions: AP can mask a malignant hematologic condition with a poor prognosis. This underscores the importance of conducting a thorough etiological workup, especially in the absence of gallstones.

Keywords: pancreatitis, multiple myeloma, hypercalcemia

PP112

WHAT CAN WE DO WHEN UNEXPECTED INCREASED SERUM TSH LEVEL IS OBSERVED IN CORE LABORATORIES?

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Objectives: Macro-TSH forms when monomeric TSH complexes with anti-TSH antibodies and is considered biologically inactive. Immunoassay kits, however can not differentiate macro-TSH from TSH and may lead to falsely-elevated results. Here, we describe macro-TSH in a 4-year-old boy with clinically unexpected isolated TSH elevation.

Methods: The patient had no signs or symptoms of hypothyroidism and physical examination was normal. TSH, fT3, fT4 were measured by DXI-800 (Beckman Coulter, CLIA). For method comparison, the same pa-

rameters were confirmed by Architect İ2000 (Abbott Diagnostics, CMIA). All measurements except TSH (30,632 mIU/L) were within normal reference range, therefore macro-TSH was considered. Linearity, Heterophilic Blocking Tube studies (Scantibodies), Polyethylene Glycol (PEG-4000) precipitation were performed to confirm macro-TSH. TSI, TG, Anti-TPO, Anti-TG levels were also determined.

Results: Repeated test results were as the following: TSH: 29.232 uIU/mL, fT3: 6.79 pmol/L, fT4: 13.53 pmol/L. To confirm the accuracy of the results, method comparison was performed by CMIA method, similar results were found. In the linearity study, the patient sample was diluted between 1/2-1/100; linear result was obtained. HBT was applied to exclude heterophil antibody interference, similar TSH value was obtained. Serum TG, TSI, Anti-TPO, Anti-TG were also measured, found to be within the reference range. To exclude macromolecule interference, the patient serum was precipitated with PEG and the recovery% for serum TSH was found to be 8.21%.

Conclusions: Our results confirmed the presence of macro-TSH in this patient, with a PEG recovery value of 8.21%. Special laboratory techniques in common with close dialogue between the physician and the laboratory can help diagnosis.

Keywords: Macro-TSH, Immunoassay, HBT testing, Method comparison, PEG precipitation

PP114

LABORATORY INFLAMMATORY PARAMETERS IN THE PEDIATRIC POPULATION WITH MEASLES INFECTION

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Objectives: Measles is a highly contagious infectious disease that can often occur in unvaccinated children and their spread is very easy, especially in kindergartens and schools, where children spend a lot of time. Therefore, with the aim of preventing complications caused by measles, it is important to monitor laboratory parameters that indicate the prognosis of the infection. The aim of the study was to assess and correlate laboratory inflammatory parameters in pediatric patients and to evaluate findings at hospital admission.

Methods: The study examined laboratory findings of pediatric patients (< 18 years) who were admitted to the Clinic for Infectious Diseases, Clinical Center of the University of Sarajevo. Evaluation of laboratory parameters included determination and correlation of biochemical inflammatory parameters.

Results: The study included 170 pediatric patients, aged 3±4,52 and predominantly male 93 (54,7%). Biochemical parameters showed the following mean values: C-reactive protein 21,9±67,91, aspartate transferase 60,5±480,61, alanine transferase 23±269,97, creatin kinase 80,5±199,41, lactate dehydrogenase 560±623,53, AST/ALT 2,44±1,04 and amylase 45±36,77. Gender showed a positive correlation with amylase. Age significantly positively correlated with AST, ALT, CK and AST/ALT. AST showed a significant positive correlation with ALT, CK and LDH, while ALT positively correlated with AST, CK, LDH and AST/ALT. De Ritis ratio correlates negatively with ALT and positively with amylase.

Conclusion: In our study, we observed elevated values of CRP, AST, ALT, AST/ALT, CK, LDH and amylase in pediatric patients with measles infection. Therefore, it is important to determine these inflammatory parameters at the hospital admission.

Keywords: pediatric patients, measles, inflammatory parameters

PP118

EVALUATION OF ANEMIA PARAMETERS IN OBESE BOSNIAN ADOLESCENTS

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Objectives: Obesity is linked to a variety of complications, including anaemia, both of which have been increasing worldwide. This study aimed to examine the relationship between hematological indicies and obesity in pubertal children in B&H with no iron deficiency.

Methods: The research was conducted at the Clinical Center of the University of Sarajevo on 95 obese children and 70 non-obese healthy peers, aged 11-17 years, with no other underlying conditions. The values of iron and hematological indicies: red blood cells (RBC), hemoglobin (Hgb), hematocrit (Hct), MCV, MCH and MCHC were determined for all study subjects according to standard laboratory procedures. Non-parametric tests were used in analysis and p=0.05 was considered significant.

Results: The groups were gender matched. Group with obese children were older than normal weight peers (14.40+/-2.31 compared to 13.5+/-1.92 years). Median (IQR) values of BMI, RBC, Hgb, and Hct were significantly lower in obese children compared to group of children with normal body weight, p<0.001 for all. (IQR) values of iron, MCV, MCH and MCHC showed no difference between obese children compared to non-obese group, with p>0.05 for all. Additionally, we found significant negative corrleations between BMI and: RBC (rho=-0.298, p=0.001), Hgb (rho=-0.215, p=0.016) and Hct (rho=-0.295, p=0.001). There were no significant correlations found between BMI and: iron, MCV, MCH and MCHC.

Conclusions: Hematological parameters differ significantly between obese and non obese pubertal children, and they are indicative of anemia development even with normal values of iron.

Keywords: obesity, children, anemia

PP119

HEMATOLOGİCAL AND BİOCHEMİCAL PARAMETERS İN INDİVİDUALS WİTH METHAMPHETAMİNE USE DİSORDER: "A CROSS-SECTİONAL COMPARATİVE STUDY."

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Objectives: This study aimed to explore differences in hematological and biochemical parameters between individuals with Methamphetamine Use Disorder (MUD) and healthy controls.

Methods: The study included 43 adult male patients with MUD and 27 adult male controls from Erzurum City Hospital's AMATEM outpatient clinic. Psychiatric assessments were conducted, excluding additional psychopathologies. Sociodemographic data were collected, and after 12 hours of fasting, routine biochemistry and hemogram samples were obtained.

Results: Among patients, 39.5% had primary education, and 30.2% were unemployed. Patients had significantly lower Body Mass Index (BMI) compared to controls (p=.004). Leukocyte, neutrophil, plateletcrit, and platelet levels were significantly higher in patients. Triglyceride and total iron binding capacities were elevated, while iron and TSH levels were lower in patients. A significant positive correlation was found between methamphetamine dosage and platelet levels, NLR (neutrophil-lymphocyte ratio), PLR (platelet-lymphocyte ratio), and a negative correlation with mean platelet volume and iron levels.

Conclusions: Methamphetamine is known to alter immune responses. Our study found higher leukocyte and neutrophil levels in MUD patients. Increased platelet and plateletcrit levels suggest heightened platelet activity, important in inflammation. Lower BMI, reduced iron levels, and higher total iron binding capacity in patients may be linked to inadequate nutrition and appetite loss due to methamphetamine use. Additionally, decreased TSH levels in patients align with literature suggesting methamphetamine disrupts

the hypothalamic-pituitary-thyroid axis. Methamphetamine use negatively impacts physical health, contributing to significant healthcare burdens. Long-term follow-up is recommended to reduce morbidity and mortality.

Keywords: Methamphetamine use disorder, inflammation, body mass index, biochemical parameters

PP120

DEVELOPMENT OF A LIQUID CHROMATOGRAPHY-TANDEM MASS SPECTROMETRIC METHOD FOR THE DETERMINATION OF HYDROCHLOROTHIAZIDE

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Objectives: Hydrochlorothiazide (HCTZ) is responsible for the reabsorption of electrolytes in the renal tubules, facilitating an increase in sodium and chloride excretion and thus leading to a decrease in plasma volume. The antihypertensive activity of HCTZ begins within 2 hours after oral administration and peaks at approximately 4 hours. We aimed to develop a rapid, specific, and reproducible sensitive method for quantitatively determining hydrochlorothiazide in serum.

Methods: Our approach was meticulous. We took 300 µl of sample into ependorf tubes, added 100 µl of carbamazepine (100 ng/mL) and 600 µl of methanol as an internal standard, and then vortexed the mixture for 30 seconds before centrifuging at 14000 rpm for 10 minutes. The supernatants were carefully collected in clean glass tubes and dried at 40°C under nitrogen gas. The dried residues were dissolved in 250 µL of a precise mixture of methanol: water (20:80, %v/v).

Results: Linearity for hydrochlorothiazide was in the range 500-1000 ng/ml. The total run time was 10 minutes. The precision value was less than 8.0%, and accuracy results ranged from 94.8% to 110.6%. Extraction recovery ranged from 91.7% to 102.0%, and matrix effect values were less than 11% for all analytes. In freeze-thaw and long-term (frozen at -20 °C for 45 days) stability studies, the analyte was within ±15% of the actual concentration.

Conclusion: In conclusion, we have successfully developed a rapid, cost-effective, simple, robust, reproducible LC-MS/MS method for quantitatively determining hydrochlorothiazide. This method, with its high precision and accuracy, is a significant contribution to the field of biochemistry and pharmacology.

Keywords: Hydrochlorothiazide, TDM, LC-MSMS

PP121

DEVELOPMENT OF LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETRIC METHOD FOR CAPECITABINE

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Objectives: Capecitabine, an antineoplastic agent of the fluoropyrimidine class, is converted to the pharmacologically active fluorouracil via a sequential three-step enzymatic process. This mechanism allows capecitabine to specifically target tumors, potentially enhancing selectivity and reducing systemic toxicity. While it decreases overall toxicity, capecitabine can cause common side effects including diarrhea, fingerprint loss, tingling, pain, unusual hand sensations, swelling, redness, sores in the hands and feet, oral mucositis, and fatigue. Monitoring drug levels is essential to ensure effective dosing and manage these side effects. To facilitate this, a rapid, simple, and validated LC-MS/MS method for measuring capecitabine levels has been developed in this study.

Methods: 250 µL of the sample was mixed with 100 µL internal standard and 800 µL acetonitrile. Mixture was vortexed for 30 seconds and centrifuged at 14.000 rpm for 10 minutes. Supernatant was transferred to clean glass tubes and evaporated under nitrogen gas at 40°C. The residues were then dissolved in 200 µL water:acetonitrile (50:50,v/v%) mixture. Finally, 20 µL of the solution was injected.

Results: For capecitabine, the linear range was established as 50-20.000 ng/mL (r^2 >0.997). Limit of Detection (LOD) and Limit of Quantification (LOQ) were determined to be 50 and 150 ng/mL, respectively. The total run time and retention time were 5 and 2.63 minutes, respectively. Both intra- and inter-assay variability were below 10%. The mean recovery was 96.9%, and matrix effect values were under 11.8%.

Conclusions: A rapid, economical, simple, accurate, and sensitive method was developed for capecitabine. The method may be used for routine analysis of capecitabine.

Keywords: Adverse effect, capecitabine, Therapeutic drug monitoring, tandem mass, LC-MSMS

PP126

COMPARISON OF KEYU-2800 DEVICE WITH ROCHE COBAS 6500 IN TERMS OF METABOLIC ANALYTES

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Objectives: Urine analysis is the most requested test after biochemistry profile and hemogram tests. In this study, we aimed to evaluate the analytical performance criteria of the qualitative measurement results of the KEYU-2800 device in terms of chemical strips.

Methods: This study was conducted in the Medical Biochemistry Department of Ankara Education and Research Hospital.The results of 118 patients were included for method comparison. The results of the patients in their routine requests were obtained from the Roche Cobas 6500 device, which is accepted as the reference method, and were classified qualitatively as a 2x2 table.Microsoft Excel was used for statistics. Sensitivity, specificity, positive predictive value, negative predictive value and Cohen Kappa coefficient were calculated separately for each chemical strip analyte.

Results: Sensitivity-specificity-positive predictive value-negative predictive value-Cohen kappa coefficient for nitrite were 1-0.99-0.8-1-0.88, respectively. Sensitivity-specificity-positive predictive value-negative predictive value-Cohen kappa coefficient for glucose were 0.82-1-1-0.97-0.89, respectively. Sensitivity-specificity-positive predictive value-negative predictive value-Cohen kappa coefficient for urobilinogen were 1-1-1-1-1, respectively. Sensitivity-specificity-positive predictive value-negative predictive value-Cohen kappa coefficient for bilirubin were 1-0.88-0.07-1-0.11, respectively. For leukocyte, sensitivity-specificity-positive predictive value-negative predictive value-Cohen kappa coefficient was 0.86-0.71-0.82-0.76-0.58, respectively. For protein, sensitivity-specificity-positive predictive value-negative predictive value-Cohen kappa coefficient was 0.9-0.73-0.54-0.95-0.52, respectively. For hemoglobin, sensitivity-specificity-positive predictive value-negative predictive value-Cohen kappa coefficient was 0.97-0.96-0.92-0.98-0.92, respectively. For ketone, sensitivity-specificity-positive predictive value-negative predictive value-Cohen kappa coefficient was 1-1-1-1-1, respectively.

Conclusions: In terms of method comparison, the two devices were evaluated to be compatible with each other. When the laboratory conditions for the Keyu-2800 device were considered, it was determined that it was deemed sufficient in terms of clinical performance.

Keywords: Cohen kappa coefficient, complete urine test, device comparison, chemical strip analysis

PP127

COMPARISON OF PROTEİN AND ALBUMIN RESULTS IN QUANTITATIVE AND DIPSTICK ANALYSIS OF URINE

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Objectives: It is important that qualitative and semiquantitative analyses undergo validation process. Our study aimed to evaluate the compatibility between dipstick and quantitative urine analysis results for albumin and protein.

Methods: The study included retrospective results of

366 patients examined with both analysis methods. Albumin, protein and creatinine tests were measured in spot urine by the Cobas 6000 analyzer. Albumin/creatinine ratio (ACR)<30 mg/g and protein/creatinine ratio (PCR)<150 mg/g were considered negative. In dipstick analysis, albumin and protein were studied with the Keyu-2800 analyzer and were accepted as negative and positive. Microsoft Excel was used for statistics. Data was prepared as a 2x2 table comparing the test result to the reference method. Cohen kappa coefficient (κ), % positive agreement (%PPA) and % negative agreement (%PNA) were calculated.

Results: Median (25%-75%) ACR were 8,3 mg/g (4,5-14,5) for negative group and 151,5 mg/g (67,7-697,8) for positive group. Median (25%-75%) PCR were 96,4 mg/g (73,6-116,5) for negative group and 265,5 mg/g (194,3-754,1) for positive group. The percentages of positive results for PCR and ACR were 36.9% and 28.4% and positive results in dipstick analysis were 22.4% and 37.7% for protein and albümin, respectively. For ACR-dipstick and PCR-dipstick albumin and protein results; κ, %PPA and %PNA were found to be 0.570, 60.6%, 92.7% and 0.868, 97.5%, 92.3%, respectively.

Conclusion: The compatibility of the results were evaluated as weak-moderate for albumin and strong for protein. In dipstick analysis, it was determined that the analytical performance of these tests was sufficient for the validation process.

Keywords: Kappa coefficient, Urine protein-to-creatinine ratio, Urine albumin-to-creatinine ratio, Urine dipstick test

PP128

COMPARISON OF FREEZING POINT DEPRESSION and CONDUCTIVITY OSMOMETRY METHODS FOR URINE SAMPLES

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Objectives: Osmometry measures the concentration of solute particles affecting osmotic pressure in a solution, for determining osmolality of biological samples to evaluate electrolyte imbalance. The recommended method for osmometers is 'Freezing Point Depression,' though 'Conductivity' methods are also used in automated urine analyzers. URIT US-2000 is an automated urine analyzer used for chemistry, microscopy and conductivity based osmometry. In this study, we compared the results of URIT US-2000 with Gonotec Osmomat 3000 (GO-3000) and Advanced Instruments 3300 Micro Osmometer (AI-3300-MO) both based on 'Freezing Point Depression'.

Methods: Osmometry results of URIT US-2000 were compared both with GO-3000 (n=20) and AI-3300-MO (n=40). The results were evaluated with statistical analyses, conducted using MedCalc v20. Normality and Cusum tests were applied and corresponding analyses were made.

Results: For comparison of GO-3000 and URIT US-2000, Passing Bablok regression was used; y=1,38x-222,9 and r=0,9703 (Pearson) (p<0,0001). Bland Altman analysis test results were -7% bias, all data were within LOA and minimum TAE limits. Also 'Concordance Correlation Coefficient' has been calculated (r=0,9088) and showed moderate agreement. To compare AI-3300-MO and URIT US-2000, Passing Bablok regression was used; y=1,305x-106 and r=0,95 (Spearman) (p<0,0001). According to Bland Altman analysis, bias was -2,6%, all data were within LOA and minimum TAE limits. Also 'Concordance Correlation Coefficient' has been calculated (r=0,9136) and showed moderate agreement.

Conclusions: 'Freezing Point Depression' and 'Conductivity' methods showed minimal acceptable agreement in our study, though further research including more samples is needed to improve the 'Conductivity' method and establish more reliable CVi / CVg values for urine osmolality.

Keywords : Osmometry, Freezing point depression, Conductivity, Urine samples

PP129

IN SILICO MOLECULAR DOCKING OF NICOTINE AND NICOTINIC DERIVATIVES TO β-AMYLOID PEPTIDE

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Objectives: Alzheimer's disease (AD), a major cause of dementia, is a progressive neurodegenerative disorder. A major feature of AD pathology is the senile plaque composed of aggregated amyloid-β (Aβ) peptide. Nicotine (NIC) was reported to improve memory, learning and attention and it was suggested that may promote the breakdown of amyloid fibrils, interfering with the accumulation of Aβ plaques. However, NIC's side-effects limited its therapeutic use in AD. *In vivo*, it has been shown that NIC derivatives, cotinine (COT) and 6-hydroxynicotine (6HNIC), improve memory and reduce anxiety and oxidative stress in the brain of various animal models of AD. Here, we aim to investigate the interactions between NIC, COT and 6HNIC and different β-amyloid fragments.

Methods: Using a set of *in silico* tools, NIC, COT and 6HNIC have been tested for their ability to bind three types of Aβ peptides fragments: 1-40 (PDB ID 1BA4), 1-42 (PDB ID 1IYT) and 25-35 (PDB ID 1QWP). The data visualization was performed using Pymol and the interaction between ligands and the receptor's amino acids was assessed using Ligplot+.

Results: Our data showed that, of all ligands used, 6HNIC exhibited the lowest binding energy in all Aβ peptide fragments, thus suggesting a higher affinity to Aβ compared to NIC and COT. Moreover, our simulations revealed that all ligands interact with key amino acid residues in Aβ peptide, thus preventing its aggregation.

Conclusions: These findings might increase the potential of 6HNIC and COT as neuroprotective drugs with applications in AD therapy.

Keywords: Alzheimers disease, nicotine, 6-hydroxynicotine, cotinine, amyloid beta, molecular docking

PP130

ANTI-AMNESIC EFFECTS OF THE CITRUS RETICULATA ESSENTIAL OIL AGAINST SCOPOLAMINE-INDUCED MEMORY DECLINE IN ZEBRAFISH BRAIN

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Objectives: The *Citrus* genus is known for its contribution to medicinal activities. The present study examined the anti-amnesic effects of petitgrain essential oil (PGEO) in the scopolamine-given zebrafish (*Danio rerio*) model of cognitive impairments.

Methods: The chemical constituents of PGEO were analyzed by gas chromatography/mass spectrometry (GC/MS) method. Anxiety-like behavior and memory were assessed in zebrafish by the novel tank diving test (NTT), Y-maze test, and novel object recognition test (NOR). Additionally, the activity of acetylcholinesterase (AChE) and the extent of the brain oxidative stress were explored. In conjunction, *in silico* forecasts were used to determine the pharmacokinetic properties of the principal compounds discovered in PGEO, employing platforms such as SwissADME, Molininspiration, and pKCSM. Over 19 days, zebrafish (Tubingen strain) received PGEO (25, 150, and 300 µL/L) before induction of cognitive impairment with scopolamine immersion (SCOP, 100 µM).

Results: The results show that PGEO compounds can cross the blood-brain barrier without causing hepatotoxicity. Administration of PGEO did not cause noticeable changes in the behavior and antioxidant status of native zebrafish. However, it had significant effects on SCOP-induced amnesia, suggesting potential as a natural intervention for cognitive and behavioral di-

sorders.

Conclusions: The findings provided evidence that PGEO possesses the capability to enhance memory by AChE inhibition, alleviate SCOP-induced anxiety during behavioral tasks, and diminish brain oxidative stress.

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Keywords: essential oil, scopolamine, memory, oxidative stress

PP131

NEUROPROTECTIVE EFFECTS OF ETHANOL EXTRACTS FROM SOLANUM MACROCARPON PLANT IN A ZEBRAFISH MODEL OF DEMENTIA INDUCED BY SCOPOLAMINE

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Objectives: This study aims to investigate the neuroprotective potential of ethanol extracts derived from the Solanum Macrocarpon plant (SMEE) in a zebrafish model of dementia induced by scopolamine (Scop).

Methods: SMEE, recognized for its antimicrobial, antioxidant, and anti-inflammatory characteristics, was administered in doses of 1, 3, and 6 µg/L to zebrafish over a period of 23 days prior to exposure to scopolamine immersion (SCOP, 100 µM) for the purpose of inducing cognitive decline. The investigation employed various behavioral assessments such as the Novel Tank Diving Test (NTT), novel approach test, Y-Maze, and Novel Object Recognition (NOR) to evaluate cognitive function and levels of anxiety. Furthermore, levels of acetylcholinesterase (AChE) activity and brain oxidative stress were quantified.

Results: The administration of EMEE enhanced memory and reduced SCOP-induced anxiety in behavioral tasks. It also decreased brain oxidative stress by inhibiting AChE activity.

Conclusions: These findings suggest that Origanum majorana essential extract has potential therapeutic benefits for improving memory impairment and reducing oxidative stress associated with cognitive disorders, including Alzheimer's disease (AD).

Keywords: Neuroprotection, Zebrafish, Solanum Macrocarpon, Ethanol Extracts

PP132

ASSOCIATION BETWEEN ANXIETY/DEPRESSION AND SALIVA CHROMOGRANIN A AMONG PHYSICIANS

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Objectives: The medical profession is a stress factor for burnout, symptoms of anxiety and depression as a result of work for long hours, work-life conflict and challenges in patient-centered care. The anxiety usually results from excess stressors that most authors identify as traditional in the medical profession – work-related factors, individuall characteristics and organizational factors. The Chromogranin A (CgA) is promising salivary biomarker of stress, anxiety or depression. The aim of this study was to investigate the associations between anxiety/depression and saliva Chromogranin A levels in physicians working 24-hour shifts under emergency conditions/ in emergency departments.

Methods: The study included 55 physicians - specialists in internal medicine, surgery, pathology, and traumatology. The symptoms of anxiety and depression were by the State-Trait Anxiety Inventory and the Zung Depression Scale. Saliva CgA levels were analyzed by ELISA kit.

Results: Regarding the State-Trait Anxiety Inventory 80.5 % of physicians showed a positive score (≥40) for S-anxiety and T-anxiety scale. In relation to the depression scale, 12 % had mildly depressive states and 1.8 % had moderately depressive states. The anxiety physicians's group had significantly higher saliva CgA level than that in the no-anxiety group (median 20.8 vs 13.5 pmol/l, $P < .001$). In bivariate correlation saliva CgA level analysis, were positively associated with anxiety ($r = 0.798$, $P < 0.001$), but not significantly associated with depression.

Conclusions: Saliva CgA was associated with anxiety in physicians working under emergency conditions. It can be considered as the indicator for the evaluation of work stress.

Keywords: saliva chromogranin A, stress, anxiety, physicians

PP133

IMPACT OF NEURODYNAMIC MOBILIZATION TECHNIQUES ON MUSCLE DAMAGE AND BRAIN- DERIVED NEUROTROPHIC FACTOR LEVELS IN DELAYED ONSET MUSCLE SORENESS

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Objectives: Brain-Derived Neurotrophic Factor(BDNF) emerges as a significant neurotrophin crucial for structural and physiological changes in brain plasticity.This study aimed to explore the effects of neurodynamic mobilization(NM) techniques on muscle damage and BDNF levels in delayed onset muscle soreness(DOMS).

Methods: Thirty-two healthy sedentary male volunteers were randomized into NM(n=16) and placebo NM(n=16) groups. Initial assessments were conducted before participants underwent femoral nerve NM and placebo NM techniques,three times a week for three weeks, comprising three sets of ten repetitions each session.Three days after the interventions concluded, secondary assessments were conducted, followed immediately by a protocol to induce DOMS in the quadriceps femoris muscle of the dominant lower extremity.DOMS was induced using an isokinetic dynamometer with 30 sets of 10 eccentric knee extensions.Initial assessments were repeated post-DOMS induction at 24, 48, and72 hours, focusing on serum markers of muscle damage and BDNF levels, as well as pain, pressure pain thresholds, normal joint range of motion, muscle strength, and performance parameters.

Results: Statistical analysis showed significant group*time interactions between the two groups in measures of pain intensity during activity(η^2: 0.165-0.110), pressure pain thresholds(η^2: 0.219-0.162), active knee flexion NEH(η^2: 0.097), and single-leg hop distance(η^2: 0.156), indicating substantial effect sizes($p< 0.05$).Participants in the NM group demonstrated faster recovery rates in serum markers of muscle damage, pain intensity, and KF eccentric muscle strength.Additionally, an increase in BDNF levels was observed in the NM group.

Conclusions: Understanding the interplay between BDNF and neurodynamic mobilization offers insights into potential mechanisms influencing neural health. These findings underscore the potential therapeutic implications of NM techniques in mitigating neural damage and facilitating recovery processes.

Keywords: Delayed onset muscle soreness, muscle mobilization, muscle damage, BDNF, pain

PP135

COMPARISON OF THE ABBOTT JAFFE AND BECKMAN COULTER ENZYMATIC CREATININE METHODS

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Objectives: The aim of the study is to compare two methods used for measuring creatinine levels in serum, the Jaffe and enzymatic methods, and to determine if there is a statistically significant difference between them.

Methods: Two methods for measuring creatinine levels in serum, Jaffe methods in Abbott Alinity ci and enzymatic methods in Beckman Coulter Olympus, were used on a group of 70 adult patients (female=29, male=41) who were hospitalized in UKC RS in April 2023.

Results: Using SPSS 29.0. and MedCalc 22 package programming for statistical data analysis, the methods were compared, and it was found that the methods correlated with a correlation coefficient of r = 0.9969 ($p<0.0001$). Using a t-test ($p = 0.3053$), no statistically significant difference was found between the methods.

Conclusion: Two methods for measuring creatinine levels in serum, Jaffe and enzymatic, were compared, and no statistically significant difference was found between them. A statistically significant correlation of 0.99 between the two methods was found.

Keywords: creatinine, Jaffe, enzymatic methods

PP137

LOW IMMUNOGLOBULIN E FLAGS AND IMMUNE DYSREGULATION

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Objectives: All antibodies are immunoglobulins, but it is not certain that all immunoglobulins possess antibody function. Low IgE found during investigations for allergy may be a marker for other immunodeficiency. In order to distinct allergy condition from immunodeficiency the serum concentrations of IgE are evaluated and compared with other total immunoglobulins IgA, IgM, IgG.

Methods: A total of 262 patients at an age 3 to 81 ys. with allergy sensitization were evaluated. The patients were divided into two groups based on IgE levels: low IgE≤ 0,34 IU/ml and IgE> 0,34 IU/ml.

Results: One hundred eighty-seven patients (71%) displayed an IgE concentration of ≤0,34 IU/ml. In 75 (29%) IgE> 0,34 IU/ml for certain allergens were detected. IgM and IgG concentrations in patients with IgE≤ 0,34 IU/ml (1,2±0,9 g/L and 11,2±3,0 g/L) was significantly different than in patients with IgE>0,34 IU/ml (1,1±0,6 g/L and 11,7±2,7 g/L). But there was no significant difference for IgA level between the two groups with IgE≤ 0,34 IU/ml (2,1±1,1 g/L) and IgE> 0,34 IU/ml (2,1±1,0 g/L). Based on the date low IgE results was associated with low IgG and IgM.

Conclusions: These results suggest that patients with allergic inflammation may have antibody deficiency and allergy may not be the cause of inflammation. Further research to investigate will help to guide the patients for their therapeutic treatment.

Keywords: immunoglobulin E, immunodeficiency disorder, markers for immunodeficiency, allergy tests

PP139

EVALUATION OF MEASUREMENT UNCERTAINTY FOR ETHANOL TEST

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Objectives: Ethanol test results are critical to crimical decision making. Therefore, it is extremely important for laboratories to produce reliable results. Measurement uncertainty provides information about the limits at which the measured value may vary as a result of random effects in a measurement. The aim of this study is to calculate the measurement uncertainty of the ethanol test.

Methods: The measurement uncertainty was calculated using the internal and external quality control data for ethanol test according to the Nordtest (NT TR 537) guide. In our study, we used 37 low-level and 37 high-level internal quality control data and four-month external quality control data.

Results: The in-laboratory reproducibility (uRW) value was calculated as 2.39%, the external quality control uncertainty component (u(bias)) value as 3.96%, combined standard uncertainty (uc) value was calculated as 3.27% and the measurement uncertainty value of ethanol as ±6.55% at a 95% confidence interval (multiplied by the k factor and the expanded uncertainty value (U) was found.

Conclusions: According to the obtained ethanol measurement uncertainty value, there is no ethanol results low or high.

Keywords: Bias, ethanol, measurement uncertainty

PP141

INVESTIGATION OF THE EFFECT OF ALPHA MELANOCYTE STIMULATING HORMONE ON OLFACTORY MECHANISMS AND POSSIBLE TREATMENT IN PERIPHERAL OLFACTORY DISORDER

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Objectives: In this study, we investigated the effects of Alpha Melanocyte Stimulating Hormone(α-MSH) on neurogenesis and NGF, BDNF, IL-10 expressions in olfactory epithelium(OE) in peripheral olfactory disorder and investigated the possible role of α-MSH in olfactory mechanisms and treatment.

Methods: To model an odor disorder, 48 rats were divided into two groups: one received intranasal 10% zinc sulfate, the other intranasal saline. Each group was further divided, with half receiving α-MSH (5 mg/kg) and the others saline intraperitoneally, followed by euthanasia on days 4 and 21. Olfactory function was assessed via buried food and odor discrimination tests at baseline (T0), after treatment (T1), and before euthanasia (T2). Blood samples were analyzed by ELISA, and nasal tissues were examined by immunohistochemistry.

Results: The 21-day α-MSH treatment(OD+α-MSH group) in rats with olfactory disorder (OD) resulted in an increase in ASCL1+,GAP-43+,OMP+ immunoreactivities and OE thickness and had positive effects on OE neurogenesis. On day 21, IL-10 immunoreactivity in the OD+α-MSH group showed a non-significant increase compared to the OD group and a significant increase compared to the control group($p < 0.05$). There was no increase in NGF+ and BDNF+ immunoreactivity in the OD+α-MSH group compared

to the OD group. In the OD+α-MSH group, better results were obtained in odor tests, especially on day 21.

Conclusions: 21-day α-MSH treatment may positively affect OE neurogenesis by increasing stem cells, immature neurons and mature neurons in OE. The effect of α-MSH on OE neurogenesis may be direct and/or indirect through its anti-inflammatory effects.

Keywords: odor disorders, ±-MSH, Neurogenesis

PP143

EVALUATION OF THE PERFORMANCE OF CREATININE AND CYSTATIN-C BASED CKD-EPI 2021 AND EKFC GFR CALCULATIONS: A PRELIMINARY STUDY

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Objectives: We aimed to compare the glomerular filtration rates (GFR) calculated using creatinine-based (eGFRcr) and cystatin C-creatinine-based (eGFRcr-cys) calculations according to Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) and the European Kidney Function Consortium (EKFC) (eGFR-ekfc) equation in adults.

Methods: The study included individuals with simultaneous creatinine and cystatin C results from the Medical Biochemistry Laboratory at Ankara Bilkent City Hospital. Creatinine was measured using a colorimetric method (Atellica CH, Siemens Healthineers) and cystatin C using a nephelometric method (BN ProSpec, Siemens Healthineers). eGFRcr and eGFRcr-cys were calculated based on CKD-EPI, while eGFR-ekfc was calculated according to EKFC. GFR results were classified into six groups based on KDIGO classification. Group and method comparisons were analyzed using Analyse-it (Trial, Version 6.15.4).

Results: A total of 234 patients (49 females/ 185 males) with a mean age of 36,8 (18-77) years were included. The mean creatinine and cystatin C levels were 1,11±0,42 mg/dL and 1,04±0,48 mg/L, respectively. eGFRcr, eGFRcr-cys, and eGFR-ekfc results were 87±24, 88±34, and 80±19 ml/min/1.73 m², respectively. The correlation coefficients for eGFRcr and eGFR-ekfc compared to eGFRcr-cys were 0.798 and 0.808, respectively, while eGFRcr and eGFR-ekfc had a correlation of 0.983. Bland-Altman analysis showed mean (limit of agreement) results of -1,0 (-41,8-39,7) for eGFRcr and -8 (-50,7-34,7) for eGFR-ekfc. Passing-Bablock analysis provided the equations eGFRcr = 23,82 + 0,7134 * eGFRcr-cys and eGFR-ekfc = 32,86 + 0,5447 * eGFRcr-cys.

Conclusions: Our study found that eGFRcr, eGFRcr-cys, and eGFR-ekfc were consistent with each other, but further studies with larger sample sizes are required.

Keywords: chronic kidney disease, creatinine, glomerular filtration rate, estimation, Cystatin C

PP146

APOPTOSIS IN NEPHROTOXICITY

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Objectives: Kidneys are frequently exposed to toxic substances and various drugs.In this study, it was aimed to investigate the protective effect of Nigella sativa oil(NSO) with its apoptotic aspects,on the acute damage caused by a single dose of CCI4 in the kidney.

Methods: Healthy 32 Wistar rats were divided into four groups.Control group (Group I, n=6),Group NS (Group II, n=6).Group CCl4 (Group III, n=10),Group CCl4+NS(Group IV, n=10), Group I and III, 0.4ml/kg olive oil (ip) injection was performed daily for 14 days once a day. Group of II and IV NS for 14 days at 0.4 ml/kg (ip) applied. 1 hour after administration 14th day carbon tetrachloride 1 ml/kg (ip) applied at III and IV groups. 24 hours after the end of the experimental period blood samples were taken from rats and tissue samples were fixed in formaldehyde. Urea, Creatinine levels were measured spectrophotometrically, Caspase-3, Caspase-8, Caspase-9,Tunel,FasL activities were examined immunohistochemically and M30 levels measured as biochemical parameter with ELI-

SA, were used to show apoptosis.

Results: Anova test was used and $p<0.05$ was considered statistically significant. When immunohistochemical findings were evaluated, it was seen that apoptotic cells were increased in the CCl4 groups, and decreased in the groups given NSO along with CCl4.Difference between groups was found to be significant ($p<0.05$). The difference in M30 levels between the groups was found to be insignificant ($p>0.05$).

Conclusions: In our study, it was observed that CCl4 triggered apoptosis through the intrinsic pathway in acute nephrotoxicity and NSO prevented apoptosis by preventing cellular damage and protected the kidneys against toxic damage.

Keywords: APOPTOSIS, NEPHROTOXICITY, CCI4

ORAL FULL TEXTS

OP047

TRENDS IN ALCOHOL AND SUBSTANCE USE AMONG PATIENTS AT CITY HOSPITAL: A RETROSPECTIVE STUDY

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Introduction

Substance and alcohol abuse are significant global public health issues that impact individual physical and mental health, disrupt family dynamics, and destabilize communities. These forms of abuse are linked to an array of chronic diseases, mental health disorders, and higher mortality rates. The World Health Organization (WHO) reports that alcohol alone contributes to over 3 million deaths each year, accounting for 5.3% of all global deaths [1]. Additionally, substance abuse incurs substantial societal costs, including increased healthcare expenditures, criminal activity, and productivity losses, which collectively present a multidimensional burden on society [2,3]. Understanding local trends in substance use is essential for developing targeted, effective interventions. Demographic, cultural, and socioeconomic factors influence substance use behaviours by region. Examining specific population trends allows researchers and policymakers to design prevention and treatment programs that address unique regional challenges [4,5].

Age, gender, and educational attainment significantly impact substance use patterns. Research indicates that younger individuals are more prone to higher levels of alcohol consumption and related negative consequences. Additionally, males and those with lower educational attainment are more likely to engage in heavy drinking and experience adverse outcomes [6-8].

This study focuses on data from Basaksehir Cam and Sakura City Hospital in Istanbul, Türkiye. As a major metropolitan area with diverse socioeconomic demographics, Istanbul presents a complex environment for studying substance abuse patterns.

Materials And Methods

Study Design and Data Collection

This study employed a retrospective analysis of hospital application records collected between January 1, 2020, and August 31, 2024. Data were sourced from the records of Basaksehir Cam and Sakura City Hospital, Istanbul, Türkiye, focusing on patient demographics such as gender, age, and substance use patterns. A total of 258 patients aged 11 to 77 years were included in the analysis, representing both adolescent and adult populations.

Sample Collection and Testing

Blood Samples for ethanol testing: For blood alcohol level testing, samples were drawn into vacuum tubes containing sodium fluoride (gray- tube, Vacuette® Greiner tubes) to stabilize the samples [9]. Following collection, blood samples were centrifuged at 4000 rpm for 10 minutes to separate plasma, which was subsequently analyzed.

The ethanol concentration in the blood was measured using the Ethanol Gen. 2 kit on a Cobas 8000 Modular Analyzer System (Cobas®, Mannheim, Germany), employing an enzymatic method based on alcohol dehydrogenase activity. The cut-off limit for a positive result was set at 10.1 mg/dL, with values exceeding this threshold considered alcohol-positive.

Urine Samples for Substance Screening: Urine samples were collected due to their efficacy in detecting drug metabolites. The screening was performed using the Thermo Scientific Indigo Plus analyzer, utilizing immunoassay techniques to identify the presence of specific drugs [10]. A total of nine substances were screened, five of which are required by the Ministry of Health [11], including benzodiazepines, cannabinoids, amphetamines, and other commonly abused drugs.

Substance Types and Screening Parameters

The study monitored polysubstance use, defined as the simultaneous or sequential use of multiple substances. Specific substances screened included benzodiazepines, cannabinoids, and amphetamines, among others. Distinct patterns were observed, with benzodiazepines frequently detected in alcohol-positive cases, while amphetamines were commonly found in alcohol-negative cases.

Data Analysis

Data were processed and analyzed using IBM SPSS statistical software version 16.0. Frequency and percentage distributions were calculated across demographic categories, including age, gender, and substance use patterns. Statistical analysis focused on identifying trends and correlations between alcohol and other substances, as well as variations across gender and age groups.

Results

Alcohol and Substance Use Prevalence Table 1 includes a total of 258 patients analyzed, of whom 14% (n=36) were alcohol-positive, and 86% (n=222) were alcohol-negative. A cumulative 339 substance screening tests were conducted, with 40 tests applied to alcohol-positive cases and 299 to alcohol-negative cases. The demographic profile revealed that the average age of alcohol-positive individuals was 33.1 ± 11.7 years, while the alcohol-negative group had a slightly lower mean age of 31.8 ± 11.5 years. Gender distribution showed that 75% of alcohol-positive and 77.2% of alcohol-negative cases were male, indicating a higher incidence of substance use among males across both groups. Analysis by the requesting departments showed that the Psychiatric Male Department accounted for the highest proportion of cases in the alcohol-positive group at 33.3%, followed by psychiatric consultations (30.6%) and the Psychiatric Female Department (16.7%). Similarly, in the alcohol-negative group, the primary departments remained consistent, with 33.8% in the Psychiatric Male Department, 23.5% in psychiatric consultations, and 14.6% in the Psychiatric Female Department.

Table 1. Basic Descriptive Characteristics of the Cases: January 1, 2020, and August 31, 2024

	Alcohol positive (n=36)	Alcohol negative (n=222)
Age Mean ± SD	33.1 ± 11.7	31.8 ± 11.5
Median (minimum-maximum)	31.5 (12 - 69)	29 (11 - 77)
Age <18 n (%) *	5 (13.9)	13 (5.9)
Sex n (%) *		
Male	27 (75.0)	171 (77.2)
Female	9 (25.0)	51 (23.8)
Polysubstance Use n (%) *	4 (11.1)	59 (26.6)
Units Requesting Tests n (%) *		
Psychiatric Male Department	12 (33.3)	75 (33.8)
Psychiatric Consultation	11 (30.6)	52 (23.5)
Psychiatric Female Department	6 (16.7)	32 (14.6)
Adult Emergency Department	1 (2.8)	26 (11.7)
Emergency Psychiatry	1 (2.8)	16 (7.2)
Pediatric Emergency	5 (13.8)	12 (5.4)
Intensive Care	-	7 (3.2)
Pediatric Psychiatric Consultation	-	1 (0.4)
Psychiatric Outpatient Detox Clinic	-	1 (0.4)

n=number , SD = Standard Deviance ,*=Column Percentage

The yearly distribution of alcohol-positive and alcohol-negative cases is given in Figure 1 that depicts the annual distribution of alcohol-positive and alcohol-negative cases throughout the study period (2020-2024). The prevalence of alcohol-positive cases remained consistent over the years, maintaining approximately 14% of the total cases. This stable trend suggests a persistent pattern of alcohol-related issues among the patient population. A significant increase has been observed in the alcohol-negative group over the years. Figure 2, the substance abuse by gender in the alcohol-positive group, illustrates substance use distribution among male and female patients within the alcohol-positive group, focusing on specific substances. Polysubstance use was noted in 11.1% of alcohol-positive cases, with benzodiazepines identified as the most commonly used substance at 60% prevalence across 40 tests conducted for 36 alcohol-positive cases. Ethyl glucuronide was the second most frequently detected substance at 25%, followed by cannabinoid-THC (10%). Notably, while both genders exhibited similar preferences for the top two substances, cocaine ranked as the third most frequently used substance among males, suggesting gender-specific variations in secondary substance preferences. In Figure 3, the substance abuse by gender in the alcohol-negative group presents the distribution of substance use by gender among alcohol-negative cases, highlighting the incidence of polysubstance use and the prevalence of specific substances. Polysubstance use was significantly higher in the alcohol-negative group at 26.9%. Among males, benzodiazepines were the most commonly detected substance, present in 32% of cases, followed by amphetamines (30.7%) and cannabinoid-THC (17.5%). In female alcohol-negative cases, benzodiazepine use was notably higher (49.3%), with amphetamines (21.1%) and cannabinoid-THC (15.5%) also prevalent. These results indicate that benzodiazepines are the preferred substance across genders, although females in the alcohol-negative group show a higher tendency toward benzodiazepine use than their male counterparts.

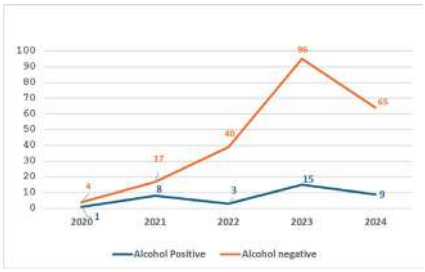

Figure 1: Alcohol positive and alcohol negative drug users by year.

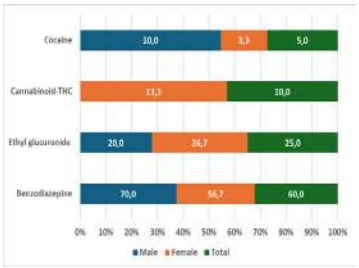

Figure 2: Substance abuse by gender in the alcohol-positive group

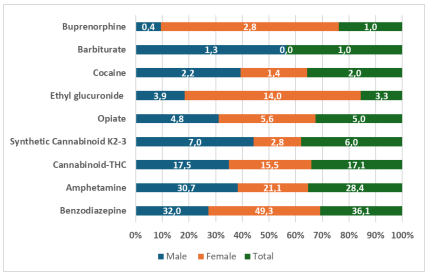

Figure 3: Substance abuse by gender in the alcohol-negative Group

The substance abuse by age group in the alcohol-positive group categorizes substance use by age in the alcohol-positive group, underscoring patterns in adolescent versus adult usage in Figure 4. In patients under 18, ethyl glucuronide was the most frequently detected substance, which may point to age-specific access or preferences for this substance among younger individuals. Conversely, in older alcohol-positive patients, benzodiazepines emerged as the most commonly used substance, reflecting a shift in substance choice with age. In Figure 5, the substance abuse by age group in the alcohol-negative group provides a breakdown of substance use by age within the alcohol-negative group. Among individuals under 18, benzodiazepines were the predominant substance, with a 50% prevalence rate, aligning with trends observed in older age groups. In contrast, substance preferences among adults were more varied, with higher proportions of amphetamines and cannabinoids detected in comparison to the younger cohort. This trend highlights an increased diversity in substance use with age within the alcohol-negative group, indicating different exposure or choice factors across age demographics.

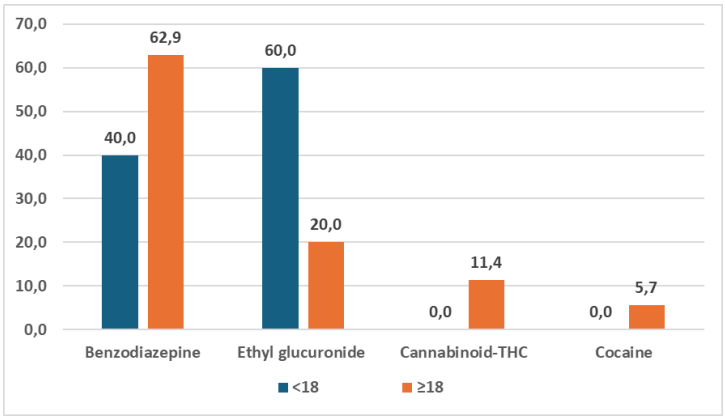

Figure 4: Substance abuse by age group in the alcohol-positive group

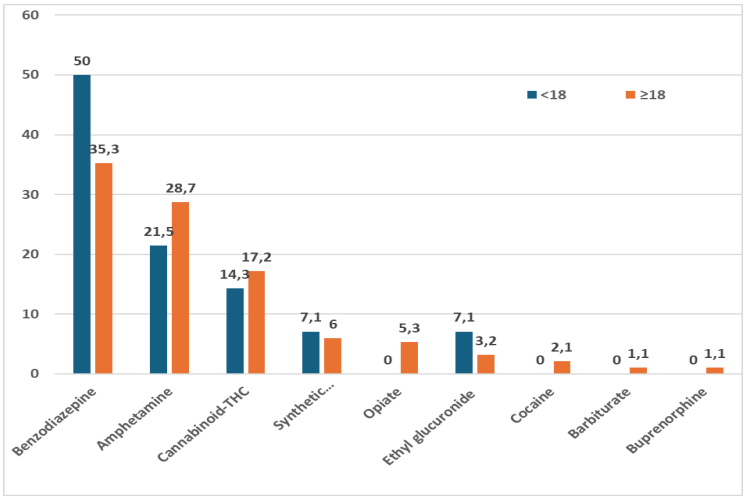

Figure 5: Substance abuse by age group in the alcohol-negative group

Discussion

This retrospective study provides valuable insights into the trends of alcohol and substance abuse among patients at Basaksehir Cam and Sakura City Hospital from 2020 to 2024. The findings reveal a consistent prevalence of alcohol and substance abuse across demographic groups, with higher incidence among males and a notable presence of substance use among adolescents. Key findings include:

1. **Gender Differences**: Males demonstrated a higher prevalence of substance use across both alcohol-positive and alcohol-negative groups, indicating potential gender-specific factors influencing substance abuse trends.

2. **Polysubstance Use**: Polysubstance abuse was notably more prevalent in the alcohol-negative group than in the alcohol-positive group, with benzodiazepines as the most frequently used substance across both categories.

3. **Age-Related Patterns**: The average age for substance use was in the early 30s for both groups. However,

younger individuals, particularly those under 18, demonstrated distinct substance preferences, with ethyl glucuronide in alcohol-positive cases and benzodiazepines in alcohol-negative cases.

4. **Substance Preferences**: Benzodiazepines were the most common substance across all demographics, followed by amphetamines and cannabinoids, indicating a pattern of substance choice that may warrant targeted intervention and prevention strategies.

These results underscore the importance of tailored prevention programs addressing gender and age-specific substance use patterns. Emphasizing education and early intervention for younger populations and providing resources to manage benzodiazepine use could contribute to more effective substance abuse management and prevention within this population.

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OP057

COMPARISON OF TWO TUBES' STABILITY FOR COMPLETE BLOOD COUNT PARAMETERS: APPROACHING DIFFERENT METHODS

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Introduction:

Clinical laboratories are relevant for in-patient diagnosis, follow-up, and treatment and have a 70% role in clinic outcomes. Total test processes have three important phases: preanalytical, analytical, and post-analytical. The literature revealed that many errors occurred more in the preanalytical phase than in the other parts of the process [1, 2].

In the preanalytical phase, errors could be classified as controllable and uncontrollable. Age, gender, drug medicine, smoking, obesity, and pregnancy might be evaluated as uncontrollable. Clinicians should evaluate laboratory results considering the patient's clinic/natural situation. Laboratory professionals should be aware of controllable errors. Continuous training and technological involvement can avoid unnecessary test requests, barcoding errors, inappropriate sampling, and transport. Reducing laboratory errors is also cost-effective and minimizes the risk of patient hazard by avoiding repeated hospitalization [1-3].

In medical laboratory practice, we have been using different commercial blood tubes. Blood tubes contain different additives. Complete blood count (CBC) tubes mostly contain K2 or K3 ethylene dimethyl tetra acetic acid (EDTA) with no gel. Three different blood cell analysis and their relatives were done from the blood drawn into this tube [4].

Different blood tube providers suggest that laboratory professionals use these tubes with minimum interference. In practice, we should choose the most appropriate blood tube in a way that will minimally interact with the blood cells inside. For selecting the most suitable commercial tubes, we must use statistical comparison methods to reveal the differences [5-7].

In our study, we aimed to demonstrate the stability of the new tube Sarstedt S-Monovette by evaluating the concordance between the two tubes through differentiation, using different statistical approaches. The routinely used Bland-Altman and Intraclass correlation coefficient (ICC), we aimed to reveal the compatibility of the analytes studied in different tubes with Deming regression and Passing-Bablok regression approaches.

Methods

Phlebotomists drew at least 3 ml of venous whole blood samples from 35 patients, whose voluntary consent was obtained, into each EDTA tube. One tube was BD Vacutainer® EDTA, and the other was Sarstedt S-Monovette commercial tubes. A complete blood count was performed on the Mindray Cal 8000 systems based on optical density and impedance methods. While the BD Vacutainer® EDTA was analyzed once, Sarstedt tubes were kept at room temperature, and CBC was performed again on the same autoanalyzer at 4 and 8 hours.

We accepted BD Vacutainer® EDTA as a reference tube in our laboratory routine. All data collected and comparison between the reference tube and Sarstedt tubes 0th, 4th, and 8th results. In addition, Sarstedt's 0th, 4th, and 8th results were compared.

Ethical Committee:

The study was approved by the Non-Invasive Clinical Research Ethics Committee of the Faculty of Medicine in Pamukkale University (Decision No:60116787-020/54453).

Statistical analysis:

SPSS 25.0 (IBM SPSS Statistics 25 software (Armonk, NY: IBM Corp.)) was used for intraclass correlation coefficient and Linear regression calculations, Jamovi software version 2.6.2 was used for Bland Altman graphs and "Deming" package with RStudio (2024.04.2 version) was used for regression analyses (Passing Bablok and Deming)) [8-11].

In our study, the Shapiro-Wilk test was used to examine the distributions of measurements. High ICC values were examined based on whether they were above 0.975. Linear regression analysis was used to determine the significance of Bland Altman graphs, and graphs were used to investigate the fits. Systematic and proportional biases were examined in all models using Deming and Passing Bablok regression methods. $p \leq 0.05$ value was considered statistically significant.

Reliability is defined as the repeatability or consistency of repeated measurements. The most common type of reliability in medical research is the intra/interrater reliability. The main purpose of these studies is to evaluate the agreement between repeated measurements from the same subject or the measurements of two or more different raters on the same subject. When the measurements are continuous, the intraclass correlation coefficient (ICC) is used to evaluate the intra/inter-rater reliability [12].

Bland and Altman introduced the Bland-Altman (B&A) plot to describe agreement between two quantitative measurements. They established a method to quantify agreement between two quantitative measurements by constructing limits of agreement. These statistical limits are calculated by using the mean and the standard deviation (s) of the differences between the two measurements. They used a graphical approach to check the assumptions of normality of differences and other characteristics [13].

Deming regression is an extension of simple linear regression to handle random measurement errors in variables X and Y. Therefore, Deming regression considers both X and Y subject to measurement error, whereas simple regression allows only variable Y to be measured with error. Variables X and Y in Deming regression may involve repeated measurements or maybe single measurements taken from each subject (14).

Passing-Bablok regression for method comparison is a robust, nonparametric method for fitting a straight line to two-dimensional data where both variables, X and Y, are measured with error. It is useful when you have two devices that should give the same measurements, and you want to compare them [15].

Results

In our study, the compatibility between tubes was examined using different approaches according to the normality of the distributions. If both variables are normally distributed and there is harmony, the ICC value is expected to be high, the Bland Altman Plot is significant, and there will be no systematic or proportional bias in the Deming regression results. If one or both variables do not show a normal distribution, and if there is harmony, it is expected to obtain more objective results with the Passing-Bablok regression approach.

When examinations are performed between Reference– 0th Sarstedt S-Monovette, The White Blood Cell (WBC) examination shows no normal distribution in both tube values. Proportional differences were detected in the Deming regression results, but no systematic difference was detected. However, it was observed that there were both system-

atic and proportional differences in the Passing-Bablok results.

In the hemoglobin (HGB) examination, it was observed that both tube values were normal. It was seen that the ICC value was lower than 0.975. In the Bland Altman chart, it was seen that there was harmony between the tubes. It was determined that there was no systematic or proportional difference in the Deming regression results. However, while there was no proportional difference in the Passing Bablok results, it was observed that there was a systematic difference.

In the mean corpuscular volume (MCV) examination, one of the tubes shows a normal distribution, while the other does not. The results show that the ICC value is lower than 0.975. The Bland Altman chart shows no harmony between the tubes. No systematic and proportional differences were detected in both Deming regression and Passing Bablok regression results.

In the mean corpuscular hemoglobin (MCH) examination, it was observed that both tube values were normal. Looking at the results, it was seen that the ICC value was higher than 0.975. In the Bland Altman chart, it was seen that there was harmony between the tubes. No systematic and proportional differences were detected in both Deming regression and Passing Bablok regression results (Table 1).

When examinations are done between Reference–4th Sarstedt S-Monovette, WBC examination shows no normal distribution in both tube values. The ICC value was higher than 0.975. In the Bland Altman chart, there was no harmony between the tubes. While there was no systematic difference in the Deming regression results, a proportional difference was determined. However, there was both a proportional and a systematic difference in the Passing Bablok results.

In the MCV examination, one of the tubes showed a normal distribution, while the other did not. The results show that the ICC value is lower than 0.975. The Bland Altman chart shows no harmony between the tubes. Deming and Passing Bablok regression results detected no systematic and proportional differences.

In the platelet (PLT) examination, it was observed that both tube values were normal. It was seen that the ICC value was lower than 0.975. In the Bland Altman chart, it was seen that there was harmony between the tubes. It was determined that there was no systematic or proportional difference in the Deming regression results. However, while there was no systematic difference in the Passing Bablok results, it was observed that there was a proportional difference (Table 1).

When examinations are made between Reference– 8th Sarstedt S-Monovette, in the WBC examination, there is no normal distribution in both tube values. It was seen that the ICC value was higher than 0.975. In the Bland Altman chart, it was seen that there was no harmony between the tubes. While there was no systematic difference in the Deming regression results, it was determined that there was a proportional difference. While there was no systematic difference in the Passing Bablok results, it was observed that there was a proportional difference.

In the HCT examination, both tube values were normal. The ICC value was lower than 0.975. There was harmony between the tubes in the Bland Altman chart. In the Deming regression results, there was both a systematic and a proportional difference. No systematic or proportional differences were detected in the Passing Bablok results.

In the MCV examination, one of the tubes shows a normal distribution, while the other does not. The results show that the ICC value is lower than 0.975. The Bland Altman chart shows no harmony between the tubes. No systematic and proportional differences were detected in either Deming regression or Passing Bablok regression results.

In the MCH examination, it was observed that both tube values were normal. It was seen that the ICC value was higher than 0.975. In the Bland Altman chart, it was seen that there was harmony between the tubes. No systematic

and proportional differences were detected in both Deming regression and Passing Bablok regression results (Table 1).

When the Sarstedt S-Monovette 0th and 4th tubes were compared, all parameters except MCHC revealed 0,975 ICC values. In the PLT examination, Bland-Altman's chart showed harmony between the tubes. It was determined that there was no systematic or proportional difference in the Deming regression results. However, while there was no systematic difference in the Passing-Bablok results, it was observed that there was a proportional difference (Table 2).

When the Sarstedt S-Monovette 0th and 8th tubes were compared, all parameters except MCHC revealed 0,975 ICC values. In the PLT examination, it was observed that both tube values were normal. It was seen that the ICC value was higher than 0.975. In the Bland Altman chart, it was seen that there was harmony between the tubes. It was determined that there was no systematic or proportional difference in the Deming regression results. However, it was observed that there was both a systematic difference and a proportional difference in the Passing-Bablok results (Table 2).

When the Sarstedt S-Monovette 4th and 8th tubes were compared, all parameters except MCHC revealed 0,975 ICC values. In the RBC examination, one of the tubes shows a normal distribution, while the other does not show a normal distribution. It was seen that the ICC value was higher than 0.975. In the Bland Altman chart, it was seen that there was no harmony between the tubes. It was determined that there was no systematic or proportional difference in the Deming regression results. However, while there was no proportional difference in the Passing- Bablok results, it was observed that there was a systematic difference.

In the HGB examination, it was observed that both tube values were normal. It was seen that the ICC value was higher than 0.975. It was seen in the Bland Altman chart that there was no harmony between the tubes. No systematic and proportional differences were detected in either Deming or Passing-Bablok regression results.

In the HCT examination, it was observed that both tube values were normal. It was seen that the ICC value was higher than 0.975. In the Bland Altman chart, it was seen that there was no harmony between the tubes. It was determined that there was no systematic or proportional difference in the Deming regression results. However, while there was no proportional difference in the Passing- Bablok results, it was observed that there was a systematic difference (Table 3).

Discussion:

Our study compared some CBC parameters in two blood tubes even though they were normal or non-normal distributions. We evaluated the compatibility between each CBC parameter. On account of their clinical importance, we chose WBC, HGB, HCT, MCV, MCH, MCHC and PLT. Putra and his colleagues compared HBG, RBC, HCT, MCV, MCH, RDW, and WBC parameters similar to ours in their study. We compared these parameters in two different commercial tubes, but they analysed CBC with tubes that contained other additives, heparin, sodium citrate and EDTA [16].

When we evaluated WBC and MCV in Reference and 4th Sarstedt S-Monovette, we revealed a proportional difference in PLT with Passing-Bablok.

Karakoyun and his colleagues revealed that various blood collection tubes (BCTs) with different contents may cause clinically important differences in various biochemical parameters [6]. When we need a new tube for our laboratory, we must compare it with the current tube. Literature agrees that there should be a comparative study before we buy it.

Classically, we evaluated compatibility by using ICC or analysing Bland-Altman graphics. Even though some parameters showed good compatibility between two tubes or had high ICC values, Passing-Bablok or Deming-regression models suggested systematic or proportional bias present.

Similar to the results obtained in many studies on method comparison, our research determined that the results of the Passing Bablok regression, which is a robust method, gave more reliable results than other method comparison methods [17]. In our study, it was concluded that the Passing Bablok regression approach has many advantages over other method comparison methods, especially since it is not affected by the normality assumption.

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Table 1: Comparison reference tube values with Sarstedt S-Monovette 0th, 4th and 8th

				ICC	Bland Altman	Deming Regression		Passing Bablok	
		Distribution x	Distribution y	>0,975	Linear Reg (p<0,05)	Systematic Bias	Proportional Bias	Systematic Bias	Proportional Bias
Ref - 0	WBC	nonnormal	nonnormal	x	Incompatible	ND	PD	SD	PD
	RBC	nonnormal	normal	-	Compatible	ND	ND	ND	ND
	HGB	normal	normal	-	Compatible	ND	ND	SD	ND
	HCT	normal	normal	-	Compatible	ND	ND	ND	ND
	MCV	nonnormal	normal	-	Incompatible	ND	ND	ND	ND
	MCH	normal	normal	x	Compatible	ND	ND	ND	ND
	MCHC	normal	normal	-	Compatible	ND	ND	ND	ND
	PLT	normal	normal	-	Compatible	ND	ND	ND	ND
Ref - 4	WBC	nonnormal	nonnormal	x	Incompatible	ND	PD	SD	PD
	RBC	nonnormal	normal	-	Compatible	ND	ND	ND	ND
	HGB	normal	normal	-	Compatible	ND	ND	ND	ND
	HCT	normal	normal	-	Compatible	ND	ND	ND	ND
	MCV	nonnormal	normal	-	Incompatible	ND	ND	ND	ND
	MCH	normal	normal	-	Compatible	ND	ND	ND	ND
	MCHC	normal	normal	-	Compatible	ND	ND	ND	ND
	PLT	normal	normal	-	Compatible	ND	ND	ND	PD
Ref - 8	WBC	nonnormal	nonnormal	x	Incompatible	ND	PD	ND	PD
	RBC	nonnormal	normal	-	Compatible	ND	ND	ND	ND
	HGB	normal	normal	-	Compatible	ND	ND	ND	ND
	HCT	normal	normal	-	Compatible	SD	PD	ND	ND
	MCV	nonnormal	normal	-	Incompatible	ND	ND	ND	ND
	MCH	normal	normal	x	Compatible	ND	ND	ND	ND
	MCHC	normal	normal	-	Compatible	ND	ND	ND	ND
	PLT	normal	normal	-	Compatible	ND	ND	ND	ND

x: ICC >0,975; ND: No difference; Systematic difference; PD: Proportional Difference

Table 2: Comparison of Sarstedt S-Monovette 0th and 4th – 8th tubes

		Distribution x	Distribution y	ICC	Bland Altman	Deming Regression		Passing Bablok	
				>0,975	Linear Reg (p<0,05)	Systematic Bias	Proportional Bias	Systematic Bias	Proportional Bias
0 -4	WBC	nonnormal	nonnormal	x	Compatible	ND	ND	ND	ND
	RBC	nonnormal	normal	x	Compatible	ND	ND	ND	ND
	HGB	normal	normal	x	Compatible	ND	ND	ND	ND
	HCT	normal	normal	x	Compatible	ND	ND	ND	ND
	MCV	nonnormal	normal	x	Compatible	ND	ND	ND	ND
	MCH	normal	normal	x	Compatible	ND	ND	ND	ND
	MCHC	normal	normal	-	Incompatible	ND	ND	ND	ND
	PLT	normal	normal	x	Compatible	ND	ND	ND	PD
0 -8	WBC	nonnormal	nonnormal	x	Compatible	ND	ND	ND	ND
	RBC	nonnormal	normal	x	Compatible	ND	ND	ND	ND
	HGB	normal	normal	x	Compatible	ND	ND	ND	ND
	HCT	normal	normal	x	Compatible	ND	ND	ND	ND
	MCV	nonnormal	normal	x	Compatible	ND	ND	ND	ND
	MCH	normal	normal	x	Compatible	ND	ND	ND	ND
	MCHC	normal	normal	-	Compatible	ND	ND	ND	ND
	PLT	normal	normal	x	Compatible	ND	ND	SD	PD

x: ICC >0.975; ND: No difference; Systematic difference; PD: Proportional Difference

Table 3: Comparison of Sarstedt S-Monovette 4th and 8th tubes

		Distribution x	Distribution y	ICC	Bland Altman	Deming Regression		Passing Bablok	
				>0,975	Linear Reg (p<0,05)	Systematic Bias	Proportional Bias	Systematic Bias	Proportional Bias
4-8.	WBC	nonnormal	nonnormal	x	Compatible	ND	ND	ND	ND
	RBC	nonnormal	normal	x	Incompatible	ND	ND	SD	ND
	HGB	normal	normal	x	Incompatible	ND	ND	ND	ND
	HCT	normal	normal	x	Incompatible	ND	ND	SD	ND
	MCV	nonnormal	normal	x	Compatible	ND	ND	ND	ND
	MCH	normal	normal	x	Compatible	ND	ND	ND	ND
	MCHC	normal	normal	-	Compatible	ND	ND	ND	ND
	PLT	normal	normal	x	Compatible	ND	ND	ND	ND

x: ICC >0.975; ND: No difference; Systematic difference; PD: Proportional Difference

OP058

EVALUATING SERUM FREE LIGHT CHAIN MEASUREMENT AND REFERENCE CHANGE VALUE IN THE MONITORING OF MONOCLONAL GAMMOPATHY

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Introduction

Many laboratory techniques are available for the screening, identification, and quantification of monoclonal immunoglobulins. These techniques vary in cost, convenience, and sensitivity [1]. Serum protein electrophoresis (SPE) is the first-line test, especially for screening M-proteins. Immunofixation electrophoresis (IFE) and free light chain (Kappa and Lambda light chains) measurements are important laboratory tests used to diagnose and follow up multiple myeloma and other plasma cell malignancies. Both tests have advantages and disadvantages and can assist in diagnosing the disease from different perspectives. However, IFE is a much more sensitive method than SPE, as it can detect small M-proteins and identify the heavy and light chain subtypes of M-proteins. The IFE test indicates the presence of monoclonal proteins but does not directly provide information about the stage of the disease [1].

Additionally, if there is a very low level of immunoglobulin in the serum, serum-free light chain (SFLC) measurement is the most sensitive and useful method. Kappa and Lambda light chains are measured turbidimetrically or nephelometrically, and the reference range for the kappa/lambda ratio is 0.26–1.65 [2]. However, this method is not sensitive in distinguishing between polyclonal or monoclonal increases in the presence of high gamma levels [3]. In suspected patients, serum protein electrophoresis and SFLC analyses are performed. If the serum protein electrophoresis result is suspicious, an IFE analysis is conducted to confirm monoclonal immunoglobulinemia [4]. In medical laboratories, the reference change value (RCV) is used to assess whether the difference between two consecutive results from a patient is significant. The RCV is calculated based on the individual's within-subject variation, or CVI, which includes physiological fluctuations in the blood and the analytical variation of the analyzers, or CVA [5]. This study aims to determine the sensitivity and specificity of the SFLC test in patients under diagnosis and follow-up for remission or relapse, as well as in newly diagnosed patients, by comparing it with IFE results.

Materials and Methods

Patients who underwent IFE and SFLC analyses at Uşak Training and Research Hospital between July 2023 and August 2024 were screened through the Laboratory Information System. CVA values obtained from the internal quality controls of the SFLC tests were used. CVI values were sourced from The European Federation of Clinical Chemistry and Laboratory Medicine Biological Variation (EFLM BV) database, and calculations were conducted using the EFLM BV RCV calculator [6]. The study was approved by the Uşak University Non-Invasive Clinical Research Ethics Committee (Approval number: 451-451-16).

The study was conducted by dividing patient results into two groups. For patients who were not in follow-up and were newly admitted, they were divided into two groups: IFE-negative and IFE-positive. The sensitivity and specificity of SFLC results were determined.

For follow-up patients, results were analyzed based on IFE results to determine the rates of detection (sensitivity, specificity, positive predictive value, and negative predictive value) of post-treatment relapse, persistent positivity/negativity, and remission when using the calculated reference change value for SFLC levels.

The Helena Biosciences IFE-4 was used for IFE analysis, and for SFLC, Trimero Diagnostic Free Light Chains Kappa and Lambda reagents for turbidimetry on the Bioanalysis Chemistry Autoanalyzer were used. The reference

range for Kappa was 3.3–19.4 mg/L, for Lambda was 5.7–26.3 mg/L, and for the Kappa/Lambda Ratio was 0.26–1.65. The Excel Analyse-it program was used for statistical analysis.

Serum-free light chain results (kappa, lambda, kappa/lambda ratio) were classified according to the reference range and compared to IFE results. RCV values for SFLC levels were calculated. By examining the follow-up patient results, the sensitivity and specificity outcomes were compared based on the evaluation of SFLC results according to the reference range and RCV values. In the evaluation of diagnosed follow-up patients, the existing light chain type in the patient's diagnosis was used as the basis (if the patient had a monoclonal gammopathy involving the lambda light chain, the lambda result was assessed according to the RCV result). In determining whether patients were in remission (where the result is expected to be lower than the previous result), RCV down values were used, while in cases of recurrence, RCV up values were applied.

Results

This study evaluated 254 IFE and paired SFLC results from 143 patients. Fifty patients had repeated results. The RCV values for increases and decreases in kappa and lambda ranged between 26.5% and 39.9% (Table 1). Among the follow-up patients, 9 entered remission, 1 experienced a relapse, and the condition of 40 patients remained unchanged during the follow-up period. The detection of changes in patients with altered conditions during follow-up using the kappa/lambda ratio and/or RCV is presented in Table 2. The sensitivity and specificity of the kappa/lambda ratio using the reference range were 50% and 78%, respectively, while the sensitivity and specificity of SFLC evaluation using RCV were 80% and 50%, respectively. For patients not in follow-up and unable to use RCV due to lack of previous results, 24 out of 93 (25.8%) tested positive by IFE. The kappa/lambda ratio demonstrated a sensitivity of 46% and a specificity of 90%.

Table-1: CVI, CVG, CVA, RCVup, RCVdown values of Kappa and lambda light chains

	CVI	CVG	CVA	RCVup	RCVdown
Kappa	5.9	14.6	12.00	36.10	26.50
Lambda	5.6	21.9	13.41	39.90	28.50

CVI: Within-Subject Biological Variation; CVG: Between-Subject Biological Variation; CVA: Analytical Variation; RCVup: Reference Change Value (Increase); RCVdown: Reference Change Value (Decrease)

Table 2: The detection of changes in patients with altered conditions during follow-up using the kappa/lambda ratio and/or RCV

Patients	**Kappa/ Lambda (0.26-1.65)**	**Lambda Reference Range**	**Kappa Reference Range**	**Lambda RCV % (36.1 up, 27 down)**	**Kappa RCV % (40 up, 28.5 down)**
1 (Remission) IgA Lambda	+			+	
2 (Relapse) IgG Kappa					+
3(Remission) IgG Kappa biclonal					
4 (Remission) IgG Kappa	+				+
5 (Remission) IgG Lambda		+		+	
6 (Remission) IgG Kappa					+
7 (Remission) IgG Lambda	+			+	
8 (Remission) IgG Lambda					
9 (Remission) IgG Kappa	+				+
10 (Remission) IgG Kappa	+				+

RCVup: Reference Change Value (Increase); RCVdown: Reference Change Value (Decrease)

Discussion

In multiple myeloma, a negative IFE result is considered part of a complete response to treatment, marking a state of remission [7]. However, it is well-documented that nearly all patients with multiple myeloma will eventually experience relapse or develop resistance to treatment as their disease progresses [8]. This emphasizes the need for highly sensitive and specific tools to closely monitor disease status, particularly in follow-up settings where early relapse detection is vital for timely therapeutic interventions.

This study highlights the significant utility of SFLC testing and the RCV in monitoring monoclonal gammopathies, specifically focusing on their sensitivity and specificity. While the kappa/lambda ratio, a traditional metric, demonstrated a sensitivity of only 50% for detecting disease changes, incorporating RCV markedly improved sensitivity to 80%. This increase emphasizes the limitations of reference range-based assessments.

The high sensitivity of RCV offers practical advantages for early relapse detection, leading to earlier interventions and potentially improved patient outcomes. Unlike traditional reference range methods, which may fail to detect initial disease progression sensitively, RCV allows a better understanding of patient status by tracking individual variations over time. This improvement aligns with previous research showing that RCV and metrics like within-subject biological variation and analytical variation enable a more precise and clinically relevant evaluation of changes in disease markers [9].

Despite these promising findings, the study does have some limitations. For example, SFLC testing may not always effectively distinguish between polyclonal and monoclonal increases, which could reduce its specificity in certain clinical scenarios. Furthermore, as this study was conducted in a single center, the generalizability of these results to other populations remains uncertain. Future studies involving diverse patient groups and larger sample sizes would provide a more comprehensive evaluation of RCV's clinical benefits, potentially leading to standardized use across various clinical settings.

Conclusions

Given the relatively low sensitivity of the kappa/lambda ratio evaluating with reference range, its use for follow-up purposes may not be advisable. The use of RCV values appears more meaningful in patient follow-up, as sensitivity is important for early detection of relapse.

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OP063

VERİFİCATİON OF THE REPEATABILITY OF THE D-DIMER ASSAY

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Introduction:

Method or device validation is a highly important issue for clinical laboratories. Before reporting patient results using a new method, it is necessary to validate that method [1,2]. According to the International Vocabulary of Metrology, validation is defined as 'confirmation that the specified requirements are suitable for the intended use.' Similarly, verification is defined in the same dictionary as the 'provision of objective evidence that a given item fulfils specified requirements' [3]. The Clinical and Laboratory Standards Institute (CLSI) has published various clinical laboratory method evaluation guidelines. One of these, titled EP15-A2: User Verification of Performance for Precision and Trueness, aims to calculate the performance data of a method or test planned to be implemented in the laboratory [4]. This ensures that information on the accuracy and precision of the test is obtained before reporting patient results, and the performance data specified by the manufacturer are tested and verified [4]. Verification is a critical precondition in ensuring reliable, high-quality laboratory test results and increasing patient safety. The term verification includes the provision of objective evidence that a measurement procedure/measuring system meets the manufacturer´s performance criteria. As an essential requirement, it is included in the International Standard ISO 15189 and intended specifically to guide the management of quality systems in clinical laboratories [4,5].

D-dimer is a fibrin degradation product formed through plasmin-mediated breakdown, consisting of two fibrin D domains covalently linked by factor XIII during the clotting process [6]. When combined with clinical pre-test probability, D-dimer measurement serves as a critical non-invasive diagnostic tool for excluding venous thromboembolism and pulmonary embolism and assisting in diagnosing disseminated intravascular coagulopathy [6]. The demand for quick results and the ability to analyze D-dimers alongside routine coagulation tests on the same analytical platform has made latex-enhanced particle immunoturbidimetric assays increasingly appealing to laboratory professionals [7]. Evaluating the analytical performance of any D-dimer assay is essential before integrating it into routine clinical use. This study aims to verify the repeatability of the D-dimer assay performed on the Roche Cobas 8000 autoanalyzer in our laboratory per the EP15-A2 Guideline.

Methods

This study was conducted at Afyonkarahisar Health Sciences University, Biochemistry Laboratory. Verification of performance for precision study has been made with automated latex-enhanced particle immunoturbidimetric on the Roche Cobas autoanalyzer (Roche Diagnostics, Mannheim, Germany).

Overview of the Protocol:

The study was carried out as described in EP15-A2 guidelines [4]. This protocol was completed within 5 days. D-Dimer assay was used with 2 levels of internal quality controls (Level 1 and Level 2) 3 times and was repetitive for 5 consecutive days. There are generally two types of precision data provided by the manufacturer: Repeatability (within-run precision) (σr)(same measurand performed under the same measurement conditions) and within-laboratory precision (σl). This study evaluated only repeatability (within-run precision) (σr). As a limitation of this research, we did not study within-laboratory precision (σl).

Calculation of Precision Estimates;

Repeatability (Within-Run Precision): The following example relates to the verification of the performance of the D-Dimer assay, a five-day protocol. For this example, the results of two levels are shown (Table 1 and Table 2).

$$s_r = \sqrt{\frac{\sum_{d=1}^{D}\sum_{i=1}^{n}(x_{di} - \bar{x}_d)^2}{D(n-1)}}$$

Where: D = total number of days, n = total number of replicates per day, xdi = result for replicate r on day d, $\bar{x}d$ = average of all replicates on day d.

Repeatability Verification Value:

A verification value was calculated using the formula below to determine whether the calculated within-run precision values are consistent with the %CV values stated in the manufacturer's product insert. If the calculated value is less than or equal to the verification value, the repeatability is considered to be consistent with the manufacturer's data.

In order to compare the estimated repeatability to a claimed value, we can calculate the critical or verification value using the equation:

Where: σ (7) r is the claimed repeatability, C is the 1-α/q percentage point of the Chi-square distribution, α is the false rejection rate, and q is the number of levels tested, v is the degrees of freedom, and in this instance, is equal to D•(n-1).

Results

The within-run precision values (within-run, Sr) determined within the scope of this study were calculated according to the formulas specified in the EP15A2 guideline for the D-dimer assay results in Table 1 and Table 2. First, the averages of results obtained from three repetitions per level throughout the day were calculated separately for each level. For each test repeated three times, the value of each repetition was subtracted from the calculated daily average, and the square of the difference was taken. The variance for that day was calculated by dividing the sum

of these squared differences by (n-1). The standard deviation (SD) was determined by taking the square root of the five-day average of the calculated variances. In other words, the within-run mean standard deviation was obtained.

As shown in Table 3, the within-run precision value (within-run, Sr) was smaller than the verification value calculated for both levels of the D-dimer test.

Table 1. D-dimer level 1 results according to EP15-A2 guideline

	Run 1	Run 2	Run 3	Run 4	Run 5
Replicate 1 (x_1)	0.90	0.86	0.89	0.91	0.88
Replicate 2 (x_2)	0.90	0.88	0.88	0.87	0.92
Replicate 3 (x_3)	0.88	0.92	0.89	0.90	0.92

Table 2. D-dimer level 2 results according to EP15-A2 guideline

	Run 1	Run 2	Run 3	Run 4	Run 5
Replicate 1 (x_1)	3.78	3.78	3.75	3.73	3.82
Replicate 2 (x_2)	3.74	3.74	3.78	3.78	3.86
Replicate 3 (x_3)	3.78	3.75	3.75	3.80	3.89

Table 3. D-dimer assay within-run precision and verification values

D-dimer assay (µgFEU/mL)	Average concentration	Sr (within-run precision)	Verification Value
Level 1	0.89	0.020	1.39
Level 2	3.78	0.027	2.86

Discussion

EP15-A2 is typically employed to confirm that a method meets the performance specifications provided by the manufacturer [4]. As a result, the imprecision estimates calculated should be compared to the manufacturer's stated values. If the repeatability and within-laboratory standard deviations are lower than or equal to those specified by the manufacturer, the method's precision is deemed consistent with the claim, and no additional calculations are necessary. However, if the observed values exceed the manufacturer's specifications, a statistical test must be conducted to assess whether the difference is statistically significant [8]. In our study, the level 1 within-run precision value (Sr =0.020) was within verification limits for D-dimer level 1=1.19. The level 2 within-run precision value (Sr=0.027) was within verification limits for level 2=3.58.

This study aimed to evaluate within-run precision through experimental testing. However, a limitation of the study is that within-laboratory precision was not assessed. The results provided satisfactory within-run precision of latex-enhanced particle immunoturbidimetric on an autoanalyzer. The precision values of the D-dimer stated by the manufacturer need to be verified.

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OP066

COMPARISON OF HbA1c MEASUREMENT METHODS: BORONATE AFFINITY CHROMATOGRAPHY vs. CAPILLARY ELECTROPHORESIS

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Introduction

Hemoglobin A1c (HbA1c), also known as glycohemoglobin or glycosylated hemoglobin, is an important biomarker for monitoring long-term blood glucose control. HbA1c reflects the average blood glucose level over a period of about 2-3 months and is, therefore, a more stable indicator than daily blood glucose measurement methods. HbA1c is formed by the binding of glucose to hemoglobin in red blood cells and is produced over the 100-120 days the cells are alive [1]. International health authorities such as the World Health Organization (WHO) and the American Diabetes Association (ADA) recognize HbA1c levels of 6.5% and above as a key criterion for the diagnosis of diabetes. The ability of HbA1c to reflect long-term glycemic status makes it an important clinical decision-making tool for both the diagnosis of diabetes and the monitoring of blood glucose control. High HbA1c levels indicate poor blood glucose control and are associated with an increased risk of diabetes-related complications such as cardiovascular disease [2].

Accurate and reliable measurement of the HbA1c value is of great importance for diabetes management and preventing complications. Nowadays, several HbA1c measurement methods have been developed based on different analytical principles, each offering different advantages and disadvantages. Boronate affinity chromatography (BAC) is based on the principle of specific binding of boronates, which react with glucose, to glycohemoglobin and is generally considered the "gold standard" [3]. Due to its high specificity and sensitivity, it is particularly preferred in laboratories with high sample volumes. On the other hand, capillary electrophoresis (CE) is based on the separation of proteins in an electric field and offers a different approach to HbA1c detection. This method is known for its analytical accuracy and ability to provide rapid results. There are alternative approaches, such as turbidimetric and enzymatic methods, but BAC and CE are among the most commonly used [4].

Some studies have shown that there can be considerable differences in HbA1c measurement between the analytical methods used [5]. Therefore, harmonization and comparability of HbA1c results obtained from different methods emerge as an important requirement. This study aimed to compare the performances of the BAC method, which is accepted as the gold standard in HbA1c measurement, and the CE method.

Materials and methods

This study included 152 patient samples collected for routine clinical laboratory analysis. Inclusion criteria were based on patients in whom HbA1c was determined as part of clinical management to assess blood glucose status. Patients were not restricted by age, gender or medical history. Samples were anonymized and analyzed without revealing the identity of the patients by ethical guidelines, and HbA1c levels were measured using two different analytical methods in this study. The first method, BAC, was performed using the Trinity Premier Hb9210 system, strictly following the manufacturer's protocols. This method utilizes boronate affinity chromatography, which has a unique ability to selectively bind glycosylated hemoglobin, making it a highly specific and accurate approach for measuring HbA1c in the clinical setting. The second method, CE, used the Sebia Capillarys 2 Flex Piercing System. CE separates hemoglobin variants based on electrophoretic mobility, providing an accurate and reliable alternative

for HbA1c measurement. Both methods are widely accepted in clinical practice and offer different analytical approaches to assess blood glucose control [6].

Patients were categorized according to their HbA1c values based on clinical evaluation criteria. Patients with an HbA1c value below 5.7% were classified as normal, indicating normoglycemia. Patients with an HbA1c value between 5.7% and 6.4% were categorized in the prediabetes group, indicating an increased risk of developing diabetes. Finally, patients with an HbA1c value of over 6.5% were classified in the diabetes group, corresponding to a diabetes diagnosis. This classification was based on the criteria established by the ADA, which are commonly used in the clinical diagnosis and treatment of diabetes.

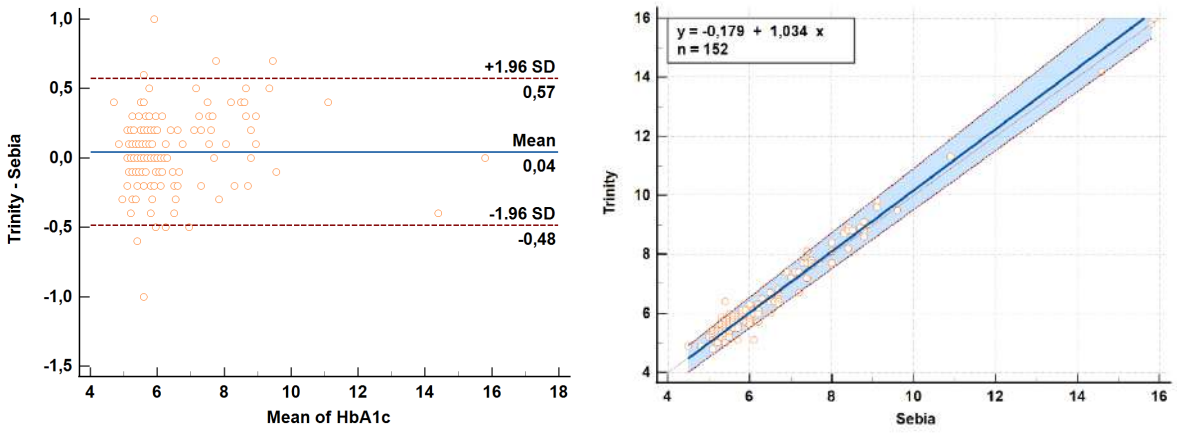
MedCalc statistical software (ver. 20.011) was used for data analysis. Various analyzes were performed to compare the two methods. The kappa test was used to assess the agreement between the methods. A kappa value of over 80% was considered high agreement. Passing-Bablok regression analysis was applied to examine the linear relationship between the two methods, and the slope and axes close to 1 and 0, respectively, were interpreted as high-accuracy indicators. Bland-Altman analysis visualized the mean differences and limits of agreement between the methods and determined the proportion of samples within the 95% confidence interval.

Results

In 152 patient samples, the mean HbA1c values determined by boronate affinity chromatography and capillary electrophoresis were 6.28% and 6.33%, respectively. The measurement ranges were 4.5% - 15.8% for boronate affinity chromatography and 4.8% - 15.8% for capillary electrophoresis. The mean difference between the two methods was not statistically significant ($p > 0.05$), indicating a high similarity of the HbA1c measurements.

According to the Bland-Altman analysis, the mean difference (i.e. the overall difference between the two methods) is relatively small, approximately 0.04. The 95% confidence interval limits are +0.57 and -0.48, with most measurements falling within these limits (Figure 1a). The proportion of data outside the limits of the agreement is less than 5%. This indicates a generally good agreement between the two methods.

According to the Passing-Bablok regression analysis, the slope indicating the method's accuracy is close to 1, and the intercept is near 0 (Figure 1b). These results show that both methods are consistent and similar in terms of accuracy.



(a) **(b)**

Figure 1: (a) Bland-Altman plot examination for calculating the absolute difference between methods, (b) Passing-Bablok regression analysis of Trinity and Sebia for HbA1c.

The kappa value was 80.73% in the comparison, and the data was divided into three groups according to the clinical decision values. This implies a high level of consistency across categories.

Discussion

The increasing prevalence of diabetes worldwide has led to the need to optimize diagnostic and therapeutic approaches. In this context, regular and careful monitoring of patients has become more important than ever [1]. In this context, our study focused on comparing BAC and CE methods.

In this study, it was found that BAC and CE methods showed high agreement in HbA1c measurement. The fact that there was no significant difference between the mean HbA1c values suggests that these methods provide comparable results in clinical decision-making processes.

The high specificity of BAC [3] plays a crucial role in avoiding false positive and negative results, especially in diabetes management. On the other hand, the CE method represents an important alternative in different clinical contexts due to its ability to provide rapid results and differentiate hemoglobin variants. Especially in populations where hemoglobinopathies or rare hemoglobin variants are prevalent, CE offers a significant advantage [5, 6]. Our study confirmed the BAC and CE methods' high concordance with Bland-Altman and Passing-Bablok analyses. CE-based systems such as Capillarys 2 offer high accuracy with coefficients of variation below 4%, according to the literature [5, 7]. The literature often emphasizes that the variation between HbA1c measurement methods can reach a level that can influence clinical decisions. In a multicenter study by Marinova et al. comparing CE and BAC methods, it was reported that these two methods showed high agreement, and BAC was considered the gold standard for improving reliability [5]. Similarly, Huang et al. came to results confirming the agreement between BAC and CE methods and stated that CE is an important alternative in terms of speed and practicability [6]. Muhtaroglu et al. compared BAC with immunoturbidimetric inhibition in a study of 412 samples. Bland-Altman analysis between the two methods showed a mean relative difference of 1.4%, while Passing-Bablok analysis showed good agreement [8]. Our results support these findings and emphasize the contribution of the methods to clinical decision-making.

The fact that this study was conducted at a single center and with a limited sample is an important limitation in terms of generalizability. In addition, HbA1c is known to be influenced by various health conditions (such as acute and chronic blood loss, hemolytic anemia, splenomegaly, iron, folate, and B-12 deficiencies) and demographic factors (ethnicity, age, and gender, etc.) [9]. In the future, multicenter studies in larger populations will more comprehensively evaluate the efficacy of HbA1c measurement methods in different clinical conditions.

Conclusions

This study confirms the high level of agreement and accuracy between BAC and CE in HbA1c measurement. These results underline the potential of both methods to support clinical decisions regarding blood glucose control reliably.

While BAC is still considered the gold standard and particularly valued for its high specificity, CE is characterized by its fast turnaround time and ability to detect hemoglobin variants. This capability makes CE particularly advantageous in clinical settings where hemoglobinopathies are prevalent.

Future studies with larger and more diverse populations could further validate these results and explore the applicability of these methods in different clinical contexts to ensure their optimal integration into routine practice.

Research ethics: None.

Informed consent: None.

Author contributions: All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Competing interests: Authors state no conflict of interest.

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OP088

THE ROLE OF OSTEOACTIVIN IN BONE METABOLISM

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Introduction

The protein osteoactivin (OA) was discovered in bone tissue 10 years ago. Recently, several studies have indicated the significant role of osteoactivin in the differentiation and functioning of various types of cells, including bone-forming osteoblasts and osteoclasts [1]. Osteoactivin/Glycoprotein NMB (GPNMB/OA) is a transmembrane, highly glycosylated glycoprotein produced by osteoblasts. Its expression is associated with accelerated differentiation of osteoblasts and matrix mineralization [2]. The initial osteoactivin (OA) identification was first recorded in studies on an osteoporosis-based animal model [3]. Osteactivin protein and mRNA are localized in different tissues and cells: in Kupffer cells of the liver, myocytes in muscle, lymphoid tissue (where antigen-presenting cells (APCs) are expressed by melanocytes), bone marrow macrophages, dendritic cells, endothelial cells and bone, where they are secreted in osteoblasts, osteoclasts and osteocytes [4-6]. Studies conducted by Saffadi, Abdelmaged et al. involved a fracture model in rats: it was revealed that on the 3rd and 10th days after fracture, the expression of OA mRNA in the bone marrow increased compared to the femur of healthy rats. Interestingly, the secreted OA protein was also found in the new matrix of cartilage and osteoid tissue [7, 8]. These results suggest that OA plays a positive regulatory role in bone formation and can be used to treat fractures [4, 9].

Material and methods.

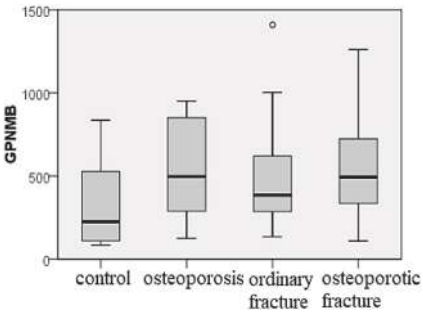
The study involved the blood of 68 patients aged 45-83 years who were treated in the Traumatology Department of the Scientific-Research Institute of Traumatology and Orthopedics of the Republic of Azerbaijan from 2018 to 2019. All patients were initially informed, and afterwards, blood samples were collected from patients in line with ethical rules (Protocol No. 07 dated 27.06.2019). The study included patients who had osteoporosis diagnosis in anamnesis and frequent osteoporotic fractures, as well as signs of osteoporosis and related complaints. The diagnosis was confirmed by densitometry and X-ray. The control group consisted of 14 people without a diagnosis of osteoporosis. All 68 patients were divided into 4 groups: Group I – control group; Group II – 14 patients with osteoporosis; Group III – 15 patients with non-osteoporotic fractures; Group IV – 25 patients with fractures associated with osteoporosis. To study the dynamics in all groups (except the control group), blood sampling for each patient was carried out in 3 stages: during the initial appeal, 10 days after the start of treatment and a month later. The concentration of OA in the blood serum was determined by the ELISA method on the immunoassay analyzer “Mindray MR- 96A” using a set of reagents from the company “Boster”. Comparison of figures in the comparable groups was performed with the dispersion tests (ANOVA-test, Fisher’s criterion-F) and Kruskall-Wallis H, statistical accuracy of change in the dynamics – with the Wilcoxon test- W, statistical significance of the difference between the indicators – with Pearson’s chi-squared χ^2 test with the use of SPSS 26 statistical package.

Results

Figure 1 shows the levels of osteoactivin in the studied groups for 1 month. The concentration of osteoactivin was higher in all groups compared to the control. The highest content of OA was recorded in the group of patients with fractures associated with osteoporosis. The median was approximately the same in groups II and IV. The obtained data are provided in Table 1. It shows the minimum and maximum levels of OA, the mean value (M±m), and the comparison of the initial indicators for each group with indicators after 10 days and over 1 month. Thereby, when

there was a growth in indicator, whereas in one patient there was a decline (p_w=0.011). Throughout 1 month, 12 out of 14 patients showed growth compared to initial levels, whilst the remaining two patients had a decrease in this indicator (p_w=0.026, $p<0.05$).

Figure 1.Osteoactivin level (OA) in the studied groups.



In a group of patients with fractures associated with osteoporosis, the comparison of concentration of OA in the first and subsequent 10 days showed a decline in 12 out of 25 patients and an increase in 13 patients (p_w=0.716). Comparison of initial concentrations with concentrations after 1 month revealed the same result (p_w=0.840, $p<0.05$). In the group of patients with fractures not associated with osteoporosis, the content of OA in the first and subsequent 10 days changed by a statistically significant value. An increase in this indicator was observed in 15 patients (p_w=0.001). Collation of OA concentrations in blood serum on the first day and after 1 month returned a similar result (p_w=0.001, $p<0.05$).

Table 1. Dynamics of osteoactivin (OA) indicators in groups

Indicator (pg/mL)	Groups	n	M±m	Min.	Max.	P_H	P_w
OA(1)	I	14	323. 4±66. 8	84. 9	836. 3		
	II	14	537. 6±80. 9	125. 3	951. 6		
	III	15	498. 5±87. 1	135. 2	1409. 5		
	IV	25	582. 8±71. 9	109. 0	1581. 5		
OA(2)	I	14	323. 4±66. 8	84. 9	836. 3	0.005	
	II	14	806. 5±266. 1	145. 3	4059. 5		0. 011
	III	15	766. 7±113. 2	331. 4	2063. 5		0. 001
	IV	25	613. 0±58. 2	201. 5	1162. 2		0. 716
OA(3)	I	14	323. 4±66. 8	84. 9	836. 3	0.000	
	II	14	794. 0±214. 0	162. 5	3325. 4		0. 026
	III	15	902. 6±109. 9	298. 2	2133. 3		0,001
	IV	25	633. 7±75. 1	144. 8	1726. 5		0.840

Note: The statistical significance of differences is indicated in the p_w-dynamics of intragroup indicators within the Wilcoxon test and p_H according to the Kruskall -Wallis test. Group I – control group, Group II – patients with osteoporosis, Group III – patients with non-osteoporotic fractures, Group IV – patients with osteoporotic fractures. OA(1) refers to the first sample, OA(2) sample in 10 days,and OA(3) sample collected in 1month.

A statistically significant difference in the level of osteoactivin was observed in the group of patients with osteoporosis and those with non-osteoporotic fractures ($p<0,05$). An increase in osteoactivin levels was observed in 90% of patients with osteoporosis and 100% with non-osteoporotic fractures. However, in individuals with osteoporotic fractures, an increase in OA concentration in blood serum was observed in 52% of patients within 1 month of recovery. Still, the result was not statistically significant ($p>0,05$).

Conclusions.

It is possible to monitor the metabolic process in bones and cartilage during the recovery period of patients with osteoporosis and non-osteoporotic fractures by monitoring the serum dynamics of OA. However, more extensive and long-term research is required to monitor the dynamics of OA during the full recovery of osteoporotic fractures.

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OP105

DEFINING ELIGIBLE DELTA CHECK ANALYTES AND CONFIGURATION OF RCV-BASED THRESHOLDS

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Introduction

In clinical laboratories, delta checks are patient-based quality control tools designed to detect changes between sequential test results from the same patient. By identifying results that fall outside the expected biological variation, delta checks serve as indicators of possible errors or misidentifications [1]. Traditional quality control (QC) methods focus on population-based parameters, but delta checks allow a more patient-centered approach. This methodology is especially relevant as laboratories adopt automated processes and barcode systems for sample identification; however, delta checks remain essential for catching errors that automation might miss [2].

The Individuality Index (II) and Reference Change Value (RCV) are two critical parameters in determining suitable analytes for delta checks. II quantifies the degree of individuality of an analyte, indicating how much an analyte varies within an individual compared to between individuals. Analytes with low II values are generally stable and more reliable for delta checks. RCV, on the other hand, represents the threshold beyond which changes in analyte values are considered clinically significant. This study presents a systematic approach to select delta check analytes based on II values and configure RCV-based thresholds for effective error detection.

Materials and Methods

This study was conducted at Aydin Public Health Laboratory in June 2024. Six months of data were used for the analytical calculations. The analyzers are Mindray BC6000 (Mindray, Shenzhen, China) for hematology parameters which are HB, HCT, MCV, PLT, RBC, RDW, MCH, MCHC; Mindray BS 2000 (Mindray, Shenzhen, China) for biochemistry measurands which are Albumin, Total protein, ALP, ALT, AST, CK, CRP, Iron, Transferrin, Direct Bilirubin, Total Bilirubin, Phosphate, GGT, Glucose, HDL, Total Cholesterol, Triglyceride, Ca, Cl, Na, K, Creatinine, Urea, Uric acid, LDH; Abbott Architect i2000 (Abbott Diagnostics, Abbott Park, USA) using chemiluminescent microparticle immunoassay for analytes Ferritin, TSH, Free T3, Free T4, B12, Total PSA; and Bio-rad D□100 (Bio□Rad Laboratories, Hercules, CA, USA) for HbA1c measurements.

Analyte Selection and Individuality Index Calculation

A preliminary list of 40 analytes frequently requested in clinical laboratories was compiled, focusing on common hematological and biochemical markers. The Individuality Index (II) for each analyte was calculated using biological variation data from the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) Biological Variation Database (3). The II was calculated to determine the degree of stability within individuals over time. Analytes with an II value less than or equal to 0.6 were identified as candidates for delta checks, as they exhibit lower within-subject variation, making them more reliable indicators for detecting significant changes.

Equation 1: $II = \sqrt{(CVI^2 + \mathbf{CVA}^2)}/CVG$

When CVA < CVI/2, then the equation can be simplified to;

Equation 2: II= CVI / CVG

Where: CVA represents analytical variation, CVI represents within-subject biological variation, and CVG represents between-subject biological variation.

RCV Calculation

For the selected analytes, RCV was calculated using the following formula:

Equation 3: $RCV = \sqrt{2} \cdot Z \cdot \sqrt{(CVA^2 + CVI^2)}$

This formula helps quantify the acceptable range of change between sequential test results, enabling laboratories to establish delta check thresholds specific to each analyte. By setting these RCV-based thresholds, the laboratory can flag results that exceed the calculated range, thus improving the detection of sample misidentifications and other errors.

Results

Of the 40 analytes analyzed, 26 were identified as eligible for delta check rules based on their II values. The results show that MCV, with an RCV of 3.2%, has a very low intra-individual variability, making it an ideal candidate for delta checks. CRP displayed the highest RCV at 93.85%, indicating significant variability within individuals and thus less suitable for delta checks. Table 1 shows the results of the calculations.

Table 1. The analytes and their CVI and CVG are according to the EFLM Biological Variation

Database, CVA from our laboratory, Individuality Index and Reference Change Value calculation.

ANALYTE	CVI	CVG	II	CVA	II*	RCV
Albumin (g/L)	2.50	4.10	0.61			
Total protein (g/L)	2.60	3.50	0.74			
ALP (U/L)	6.00	21.00	0.29	3.05	0.32	18.66
ALT (U/L)	11.40	35.20	0.32	2.15		32.16
AST (U/L)	8.60	19.40	0.44	1.95		24.44
CK (U/L)	14.10	32.90	0.43	2.25		39.58
CRP (mg/L)	33.70	86.40	0.39	3.25		93.85
Iron (ug/dL)	27.60	26.70	1.03			

Transferrin (ug/dL)	3.90	13.90	0.28	1.9		10.81
Direct Bilirubin (mg/dL)	NA	NA				
Total Bilirubin (mg/dL)	20.20	24.60	0.82			
Phosphate (mg/dL)	7.70	10.70	0.72			
GGT (U/L)	8.30	45.20	0.18	0.90		23.14
Glucose (mg/dL)	4.60	8.10	0.57	1.55		13.45
HDL (mg/dL)	5.70	20.00	0.29	2.00		16.74
Total Cholesterol (mg/dL)	5.20	15.30	0.34	1.45		14.96
Triglyceride (mg/dL)	19.70	33.10	0.60	1.80		54.83
Ca (mg/dL)	1.80	2.70	0.67			
Cl (mmol/L)	1.00	1.30	0.77			
Na (mmol/L)	0.50	0.70	0.71			
K (mmol/L)	3.90	5.30	0.74			
Creatinine (mg/dL)	4.40	16.20	0.27	2.70	0.32	14.31
Urea (mg/dL)	13.30	20.60	0.65			
Uric acid (mg/dL)	8.10	22.40	0.36	2.25		23.30
LDH (U/L)	4.40	11.80	0.37	2.05		13.45
HBA1C (%)	1.20	5.40	0.22	1.95	0.42	6.35
Ferritin (ug/L)	12.90	NA				
TSH (mU/L)	17.90	36.10	0.50	5.70		52.07
Free T_3 (pg/mL)	5.1	8.1	0.63			
Free T_4 (ng/dL)	4.8	8	0.60	7.43	1.11	24.53
B12 (ng/L)	7.2	37	0.19	5.60	0.25	25.28
Total PSA (ug/L)	6.8	42	0.16	8.97	0.27	31.19
HB (g/dL)	2.7	6.2	0.44	1.07		8.05
HCT (%)	2.8	5.6	0.50	1.70	0.58	9.08
MCV (fL)	0.8	3.9	0.21	0.83	0.30	3.20
PLT (10^9/L)	7.3	16.3	0.45	4.13	0.51	23.25
RBC (10^{12}/L)	1.5	40	0.04	1.27	0.05	5.44

RDW (%)	1.2	40	0.03	0.97	0.04	4.27
MCH (pg)	0.7	4.6	0.15	1.03	0.27	3.46
MCHC (g/dL)	1	1.4	0.71			

CVA analytical variation, CVI within-subject biological variation, CVG between-subject biological variation, II Individuality Index Calculation with equation 2, II* Individuality Index Calculation with equation 1, NA not available at EFLM Biological Variation Database, RCV reference change value.

After calculating the II for all tests, analytes suitable for delta check applications were further evaluated by calculating their CVA. If the CVI is not less than half of the CVA, an adjusted Individuality Index* (II*) was derived using the equation I. Accordingly, although free T4 is considered suitable for delta check applications based on II values, it was found unsuitable in our laboratory due to a higher CVA value specific to our conditions.

Hematology parameters, except platelet count (PLT, RCV: 23.25%), exhibited RCV values below 10%, indicating suitability for delta check rules.

Discussion

Delta checks remain an indispensable component of quality control in clinical laboratories, particularly for detecting specimen misidentifications and analytical errors that may not be captured through automation or by other methods of quality control. With the introduction of automated systems and barcode-based sample tracking, the primary function of delta checks has shifted from error detection to supplementing automated quality control measures.

Our study highlights the importance of using analytes with low intra-individual variation, as these analytes provide more consistent results over time and improve the accuracy of delta checks. Selecting analytes based on II and configuring RCV-based thresholds allows for a tailored approach, maximizing the delta check's potential for detecting clinically significant changes without generating unnecessary alerts.

In this study the low II values observed in hematological parameters underscore the stability of these analytes within individuals over time, suggesting that deviations beyond the RCV threshold likely indicate errors or clinically significant events. The 2005 International Consensus Group for Hematology Review recommended the use of delta checks for MCV to verify sample integrity and misidentified specimens [4-5]. The present study confirms MCV as an eligible analyte to employ as a delta check application.

Customizing delta check rules to align with the laboratory's specific patient demographics and analyte characteristics enhances both efficiency and accuracy. Although free T4 seems to be a suitable analyte according to the EFLM database, the free t4 test is not appropriate for the delta check application because its CVA is relatively high and its II is more significant than 0.6. Therefore, every laboratory needs to calculate its own II and RCV.

By reducing false alerts and focusing on analytes with low II, laboratories can streamline workflows, reduce time spent on unnecessary investigations, and improve patient safety. Implementing delta checks based on RCV thresholds not only minimizes diagnostic errors but also contributes to resource optimization within the laboratory, a critical aspect in high-throughput environments.

Conclusion

Delta check rules are integral to modern laboratory quality control, especially in settings where patient safety is a priority. By implementing RCV-based thresholds for selected analytes, laboratories can enhance error detection and streamline operations, leading to better patient outcomes. The study provides a structured approach for selecting analytes and establishing RCV thresholds, which can serve as an example for laboratories looking to optimize their delta check procedures. Adopting customized delta check rules ultimately supports laboratories in achieving high operational efficiency and diagnostic accuracy.

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OP141

EVALUATION OF SERUM SODIUM DISORDERS IN OUTPATIENTS AND INPATIENTS

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Introduction

Sodium (Na^+) is the major cation of extracellular fluid. Disorders of Na^+ homeostasis may be due to excessive loss, gain, or retention of Na^+ or due to excessive loss, gain, or retention of water [1]. Sodium disorders are common findings in the inpatient and outpatient settings and are associated with an increased risk of morbidity and mortality [2].

Hyponatremia is the most common and important electrolyte imbalance that can be seen in isolation or, as is most often the case, as a complication of other medical illnesses like heart failure, liver failure, kidney failure, pneumonia, and cancer [3, 4]. Hyponatremia is classified in adults according to serum sodium concentration, as mild (130-134 mmol/L), moderate (125-129 mmol/L), and severe (<125 mmol/L) [5]. The incidence of hyponatremia mainly depends on the patient population and the criteria used to set up the diagnosis, ranging from 15 to 30% among hospitalised patients and with a lower prevalence in the ambulatory setting [6, 7].

Hypernatremia is the other sodium problem strictly defined as a hyperosmolar condition caused by decreased total body water compared to electrolyte content. Hypernatremia is a water problem, not a problem of sodium homeostasis. The development of hyperosmolality from water loss can lead to neuronal cell shrinkage and brain injury. Volume loss can lead to circulatory problems such as tachycardia and hypotension [8]. The severity of hypernatremia is categorized as mild (148-150 mmol/L), moderate (151-154 mmol/L) or severe (≥155 mmol/L) [9]. The prevalence of hypernatremia in hospitalized patients has been reported as 1-4% [10].

We aimed to assess serum sodium levels in outpatients and inpatients by determining their prevalence, gender/age distribution, and associated diseases.

Materials and Methods

Our study is a descriptive and retrospective analysis of outpatients' and inpatients' medical records. We searched the laboratory database of outpatients and inpatients presented to the Polyclinic Father Luigi Monti and Catholic Hospital ''Our Lady of Good Counsel'' Tirana, Albania, to find all patients who had undergone a serum electrolyte analysis between January 2023 and June 2024. We analysed the serum sodium level of all patients, and hyponatremia was diagnosed in patients with a serum sodium concentration of <135mmo/L and hypernatremia with a serum sodium concentration of >145 mmol/L. For all patients, the age, sex, admission diagnosis for inpatients and diagnoses made by specialist doctors for outpatients were recorded.

To maintain the confidentiality of participants' data, we coded the identity of each participant in the study according to the Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans.

The blood samples were collected through venipuncture using BD Vacutainer SST II Advance 3.5 mL tube for serum sodium levels and measured on the Dimension EXL 200 with indirect potentiometric in Integrated Multisensory Technology (IMT). Because of the diluting effect of hyperglycaemia on sodium concentration, the true value of sodium in hyperglycaemic patients is the glucose-corrected sodium [11]. After their collection, we initially organized the data in a database in EXEL, which, for statistical analysis, was imported. Then, the statistical analysis was performed using the program SPSS, version 28.0.1.1 (IBM). We have done descriptive statistics for all variables and studied frequencies. The results of univariate analyses are expressed as means ± standard deviations.

Results

From January 2023 to June 2024, 1062 patients had performed at least a serum sodium test in our laboratory, of which 575 (54%) were women and 487 (46%) were men. The mean age of the patients was 55 ±19 years, with the youngest patient 1 year old and the oldest 96 years old.

The key characteristics of the patients according to an age group classification are summarised in Table 1. Patients were divided into eight age groups: ≤18 years, 19-30 years, 31-40 years, 41-50 years, 51-60 years, 61-70 years, 71-80 years and >80 years. Since the groups had more than 30 outpatients (n>30) and the data were normally distributed, we used the mean to show the central tendency and the SD (standard deviation) to measure the variability.

We found that the dominant age group was 61-70 years, with 22%, and we found the lowest serum sodium level at 123 mmol/L. This age group had the most significant number of hospitalised patients, but the prevalence of hyponatremia in this age group was the second most frequent, at 5.1%, compared to the age group of 71-80 years, which had a prevalence of hyponatremia with 6%. Hypernatremia was more frequent in the age group 19-30 years, with 3.4%, followed by the age group of 71-80 years, with 2.4%.

About the diagnoses, we noticed that in the age group ≤18 years, viral gastroenteritis with symptoms of diarrhoea and vomiting predominated. Most patients up to 50 years old were healthy individuals who came for annual check-ups. With the increase in age, the diagnosis of high blood pressure began to dominate, which in patients over 60 years old was associated with type 2 diabetes mellitus and at ages over 80 years, the main accompanying disease of hypertension was heart failure.

Table1. Descriptive statistics divided by different age groups

		≤18 yrs.	19-30 yrs.	31-40 yrs.	41-50 yrs.	51-60 yrs.	61-70 yrs.	71-80 yrs.	> 80 yrs.
	N	37	88	121	141	194	234	166	81
Natremia	Mean	138.76	139.95	139.69	139.39	139.95	139.25	139.70	139.86
	SD	2.68	2.83	2.53	2.53	2.90	3.27	3.43	2.96
	Min	134	134	131	134	131	123	125	133
	Max	147	150	145	145	147	147	148	148
Sex	F	20	43	64	85	107	127	84	45
	M	17	45	57	56	87	107	82	36
Patients	In	0	5	3	13	14	32	14	11
	Out	37	83	118	128	180	202	152	70
Sodium disorders	Hypo Na+	1	1	1	2	4	12	10	2
	Normal	35	84	120	139	188	220	154	77
	Hyper Na+	1	3	0	0	2	2	4	2
Diagnosis	Lab Test	1	1	11	28	104	122	44	8
	Check-up	9	72	88	69	22	0	0	0
	Surgery	0	4	0	7	5	11	8	4

	Chemotherapy	0	0	0	2	5	13	3	3
	HTA	1	5	9	24	39	52	77	32
	HTA+DM 2	0	0	0	0	8	25	31	19
	HTA+HF	0	0	0	0	0	0	0	15
	Arrythmia	0	2	1	2	3	2	3	0
	Diarrhoea	19	0	1	0	0	0	0	0
	Others	7	4	11	9	8	9	0	0

Yrs.-years, N-number of cases, SD-Standard Deviation, Min- Minimum value, Max-Maximum value, F-Female, M-Male, In-Inpatients, Out- Outpatients, Hypo Na+-Hyponatremia, Hyper Na+- Hypernatremia, Lab Test-Laboratory tests, HTA- Hypertension, High blood pressure, DM2- Type 2 Diabetes Mellitus, HF-heart failure.

Based on the data, 92 patients, 8.7%, were inpatients and 970, or 91.3%, were outpatients. Among hospitalized patients, surgical patients predominated at 43.5% (orthopaedic n=14, oral and maxilla facial n=9, oncologic n=9, general n=7, and neck 1 patients), followed by chemotherapy patients at 29.3% (n=27). Hospitalizations due to internal diseases, including hypertensive crises (n=7), paroxysmal atrial fibrillation (n=3), liver cirrhosis (n=3), supraventricular tachycardia (n=2), pneumonia (n=2), erosive gastritis (n=2), and 1 patient for each sigma diverticulitis, acute pancreatitis, diabetic ketoacidosis, Schmidt Syndrome, and sleeping apnoea, accounted for 26.1% of diagnoses. And 1 patient of cryoablation of kidney tumour.

Among outpatients, for 320 patients, we do not have data on their diagnosis because they were presented to our laboratory only for laboratory tests without consulting our clinicians. Approximately one-third (311) of ambulatory patients were diagnosed with high blood pressure, of which 194 cases had isolated hypertension and 117 were accompanied by other pathologies, of which 81 were type 2 diabetes mellitus, 19 had heart failure (HF), 9 had atrial fibrillation, and 8 had thyroid disease. A further 260 outpatients were healthy individuals who had come for an annual check-up from the insurance companies. Details about medical diagnoses between outpatients are summarised in Table 2.

Table 2. Medical diagnosis between outpatients

		n
Lab Tests		320
Check-up		260
HTA	Alone	194
	DM2	81
	HF	19
	AF	9
	Thyroid disease	8
Heart disease	Blood vessel disease	2
	Arrhythmias	12
	Disease of heart muscle	3
Thyroid disease	Hyperthyroidism	2
	Hypothyroidism	3
	Euthyroid	3
Gastrointestinal tract	Viral gastroenteritis	20
	Others	5
Diabetes Mellitus	Type 1	1
	Type 2	2
Genitourinary tract infections		3
Lipothymia		5
Others		18
Total		**970**

n-number of cases, HTA- Hypertension, DM2- Diabetes mellitus type 2,

HF- Heart failure, AF- Atrial Fibrillation.

Hyponatremia was found in 33 cases, or 3.1%; of these, 8 patients were hospitalized, and 25 were outpatients. Based on these figures, it was noted that the prevalence of hyponatremia in hospitalized patients was 8.7% and in outpatients was 2.6%.

On the degree of hyponatremia, 30 cases or 91%, presented the mild form, 2 cases or 6%, the moderate form and 1 case or 3%, the severe form. The moderate and severe form was seen in hospitalized patients.

The mean age for hyponatremia patients was 63 ±17 years (1-82 years), and two-thirds of them were men.

Regarding the diagnosis of hyponatremia among inpatients, 2 patients were post-surgery, 2 were being treated with palliative chemotherapy, and 4 were hospitalized for internal diseases such as diabetic ketoacidosis, decompensated ethylic cirrhosis, Schmidt Syndrome and erosive gastritis. Among ambulatory patients, the predominant diagnosis was high blood pressure found in 21 outpatients.

In 14 patients, or 1.3% of all outpatients (1.4%), hypernatremia was found.

The median age was 63 years (16-88 years). The gender distribution was equal: 7 women and 7 men. On co-morbidities, 57% suffered from HTA, and 21% were healthy men who performed moderate to strenuous physical activity.

Discussion

Disorders of serum sodium have been studied for several decades, but again, almost every year, new articles are published related to this problem and the clinical importance it has in patient care, mainly hospitalized patients, but not without importance for ambulatory patients.

Our descriptive, retrospective study aims to present our findings about sodium disorders in outpatients and inpatients in our country.

In the 1092 patients that had undergone at least one electrolyte test that we randomly studied, the sex and age distribution was almost the same: 54% women with a mean age of 55 ±18.6 years and 46% men with a mean age of 55 ±19 years. Because of these data, we can say that in our study, we had a homogeneous population which goes in favour of the fact that the testing of sodium levels in the serum does not depend on gender or age, but it is a laboratory test of routine and associated diseases that the patients have [12-13].

We found that patients >60 years of age included 45% of all patients and 62% of hospitalized patients. These data are also supported by patients over 60 years old having one or more co-morbidities.

The prevalence of hyponatremia was higher in the 71-80 age group with 6%, followed by the 61-70 age group with 5.1%, while hospitalized patients >60 years old have a prevalence of 26%, and those ≤ 60years had a prevalence of 9.7%. Our figures are comparable to previous studies, which affirm that the incidence of hyponatremia in older inpatients (≥ 60 years) in a general ward setting was 2.43 times that seen in non-older patients (13-59 years) 26.32% vs 10.85% [14]. Tay et al. measured the electrolytes of 5873 outpatients aged≥ 60 years and found that 6.9% had hyponatremia in at least one blood test [15]. Previous studies on older patients have reported a prevalence of hyponatremia in hospitalized patients of 24.7% [16]. In a retrospective analysis of inpatients, Amit et al. reported that the incidence of hyponatremia in older patients, with a mean age of 73.87 ±6.54 years, was 25.98% [17].

Hypernatremia was more frequent in the age group 19-30 years, with 3.4%, followed by the age group 71-80 years, with 2.4%, while for patients ≤60 years, the prevalence of hypernatremia was 1%. A study from Japan by Imai et al. showed that the prevalence of hypernatremia in the emergency department is more significant in elderly patients than in adults aged 18-64 years (2.6% vs 0.7%, respectively) [18].

We noticed that the age group ≤18 years old predominated the diagnosis of viral gastroenteritis with symptoms of diarrhoea and vomiting. With the increase in age, the diagnosis of high blood pressure began to dominate, which in patients over 60 years old was associated with type 2 diabetes mellitus and at ages over 80 years, the main accompanying disease of hypertension was heart failure. An observational study by Giordano M et al. published in The American Journal of Emergency Medicine that enrolled 7941 patients admitted to the Emergency Department of the Marcianise Hospital at the Second University of Naples showed that gastrointestinal diseases are the most often associated disease in the younger group. The most often associated disease in the middle age group was a current cardiovascular disease. In the elderly group, the often associated diseases were cardiovascular and lung diseases [19].

According to our data, more than 91% of patients who have performed at least one blood test to measure serum sodium levels were outpatients. Among outpatients, 32% of them had high blood pressure treated with two or more antihypertensive drugs like diuretics, angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), calcium channel blockers, and beta blockers. In most of these outpatients, more than 8% have also type 2 diabetes mellitus treated with oral antidiabetic medications. This result suggests clinicians' awareness and updated knowledge about the importance of sodium disorders in different diseases and the adequate follow-up of patients during their check-up controls [15, 20-22].

Many diseases have been related to sodium disorders. Several articles have reported that pneumonia, heart failure, liver cirrhosis, malignant tumours, stroke and other diseases are prone to hyponatremia [23-25]. If we look at the diagnoses of hospitalized patients, we found that 43.5% were surgical patients, where almost one-third had performed orthopaedic surgery, followed by chemotherapy patients with 29.3%. Hospitalizations due to internal diseases, including hypertensive crises, paroxysmal atrial fibrillation, liver cirrhosis, etc., accounted for 26.1% of diagnoses.

In our study, the overall prevalence of hyponatremia was 3.1%, with a mean age of 63 ±17 years, and two-thirds of them were men. The prevalence of hyponatremia in hospitalised patients was 8.7%, and in outpatients was 2.6%. About the degree of hyponatremia among inpatients, 62.5% presented the mild form, 25% the moderate form and 12.5% the severe form, while all the outpatients presented the mild form of hyponatremia. The numbers we have found from studies done over the years and in different countries report different values of hyponatremia. These figures range from 1.72% in the United States of America [26], 5.26% in China [27], 7.7% in the Netherlands [28], 21% in Singapore [29] and 27% in India [30]. This difference may be due to different criteria defining hyponatremia and the population selection protocol. Regarding the degree of hyponatremia, our findings are comparable to two studies from 2019-2020 by Tazmini et al. in Norway [31] and Xu Zhang et al. in China [16].

In our research, hypernatremia was found only in outpatients with a prevalence of 1.4%, and all cases had the mild form of hypernatremia. Numerous European studies report a prevalence of hypernatremia of 1-4.4% [18-19, 28, 31-34].

An interesting finding of our study was that hypernatremia was found in normal individuals performing moderate to strenuous physical activity. The groups most affected by hypernatremia are older adults and children [29]. In our study, these healthy patients' frequent gyms and consume protein supplements primarily to promote muscle strength, function, and possibly size. Studies on the content of these supplements have highlighted that the concentration of sodium in them is higher than the dose recommended by the World Health Organisation [35-36].

In conclusion, sodium disorders in hospitalized patients had a prevalence of 8.7% and in outpatients 4%.

Hyponatremia was the most common sodium disorder seen in our patients. This disorder plays a key role, especially in hospitalized patients, and should receive careful clinical attention. The early detection, diagnosis and treatment strategies are needed to reduce the incidence and severity of hyponatremia, thus improving patient care.

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POSTER FULL TEXTS

PP019

DETERMINATION OF THE TOXIC EFFECTS OF AZOXYSTROBIN ON FRESHWATER MUSSELS

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Introduction

Pesticides are widely used against harmful organisms in agriculture, industry, and the home, but they can negatively impact non-target species. These chemicals can seep into water systems through air dispersion, overland runoff, and underground seepage after application [1].

Fungicides are a key category of pesticides essential to ensuring global food supplies and their distribution is expected to increase [2]. Among fungicides, azoxystrobin (AZX) is a potent and versatile strobilurin fungicide which targets four primary fungal pathogens [3] (Figure 1). The mode of action of AZX is the inhibition of electron transfer in the respiratory pathway in mitochondria, which disrupts metabolism and induces cellular oxidative stress [4].

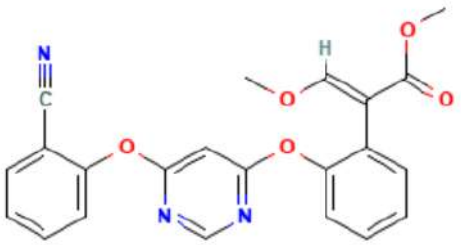

Figure 1. The chemical structure of azoxystrobin [5]

Fungicides such as AZX may threaten aquatic organisms as non-target species in aquatic ecosystems. In intensively cultivated areas, they contaminate aquatic ecosystems through spray application or surface migration [1].

The Unionidae mussels are one of the aquatic species with a cosmopolitan distribution area and are also found in Türkiye. They are preferred model organisms in biomonitoring of ecosystems and toxicology studies [6].

This study aimed to investigate the effects of azoxystrobin on freshwater mussels *Unio delicatus* using superoxide dismutase (SOD), glutathione peroxidase (GPx) and catalase (CAT) parameters and to model the evaluation of biochemical data with integrated biomarker response (IBRv2).

Materials and Methods

Test organisms

Freshwater mussels *Unio delicatus* (mean weight 35.0 ± 2.5 g and mean length 7.2 ± 1.3 cm) were used as model organisms in this study. After being supplied by local fishermen in Hatay, the mussels were brought to Gazi University, Gazi Faculty of Education, Aquatic Animals Production and Research Unit in a cool and humid environment. The mussels were adapted to laboratory conditions for two weeks. During the adaptation period, the mussels were fed daily with fresh green algae in aquariums containing unchlorinated tap water. The laboratory light cycle was

kept constant at 16 (light): 8 (dark).

Exposure design

1 g/L stock solution was prepared using dimethyl sulfoxide (DMSO) prior to exposure experiments using technical grade (97%) AZX (Shenzen Agro Hunter Co., Shenzhen, China) and stored at +4 °C.

At the end of the adaptation period, mussels were placed in 10 L aquariums containing dechlorinated tap water (10 organisms/L). The mussels were exposed to 10 mg/L, 50 mg/L, 100 mg/L, and 250 mg/L AZX concentrations for 96 h. There were also two control groups: control (mussels and aquarium water) and solvent control (mussels, aquarium water and DMSO). After exposure, the mussels were dissected and taken to the digestive gland and gill tissues for biochemical analysis.

Biochemical analysis

Digestive gland and gill tissue samples were homogenized in 140 mM KCl buffer (w:v 1:10) and centrifuged at 7000 rpm for 5 min at + 4˚C [7]. After centrifugation, the supernatant was taken. Antioxidant biochemical parameters SOD (Otto Scientific, Otto 3047, Baran Medical, Gaziantep, Türkiye), GPx (Otto Scientific, Otto 2085, Baran Medical, Gaziantep, Türkiye) and CAT (Elabsicence, E-BC-K031-5) were studied according to commercial kit procedures. Tissue protein measurement was done by the Bradford [8] method.

Integrated biomarker response (IBRv2) was made according to Sanchez et al. [9] method.

Statistical analysis

The results were distributed normally according to the Kolmorgorov-Smirnov normality test. Data were evaluated by One-way ANOVA. The values $p<0.05$ were considered significant. GraphPad Prism 5 was used for the analysis. Microsoft Excel was used for the IBRv2 analysis.

Results

No mussel deaths occurred in the experiments. No statistical differences were found between the control and solvent control groups regarding the antioxidant parameters examined.

The SOD levels from antioxidant enzyme activities in the digestive gland and gill tissues are shown in Figure 2. The significant increase was observed in SOD activities in the digestive gland and gill tissues between control groups and AZX exposure groups ($p<0.05$).

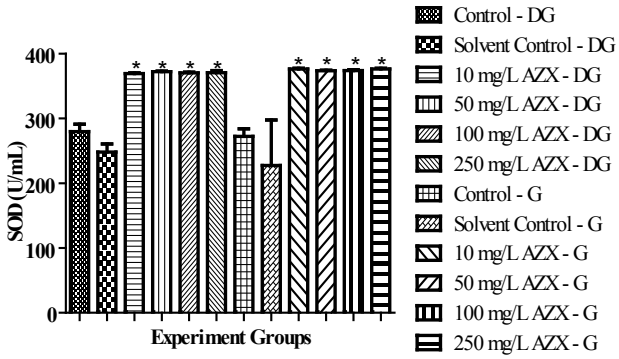

Figure 2. SOD activities in *Unio delicatus* exposed to AZX (DG: digestive gland; G: gill; *: $p<0.05$)

The GPx levels from antioxidant enzyme activities in the digestive gland and gill tissues are shown in Figure 3. The GPx results in AZX-applied groups showed decreases compared to control groups.

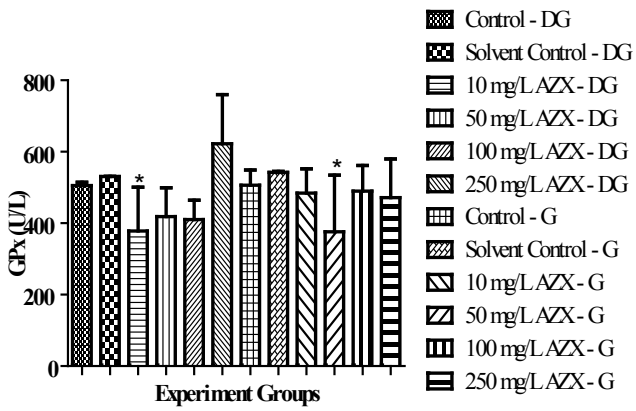

Figure 3. GPx activity levels in *Unio delicatus* exposed to AZX (DG: digestive gland; G: gill; *: p<0.05)

The CAT levels from antioxidant enzyme activities in the digestive gland and gill tissues are shown in Figure 4. The CAT results in AZX-applied groups showed decreases compared to control groups.

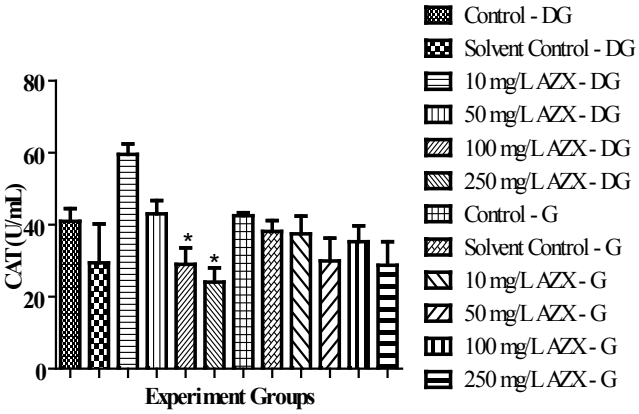

Figure 4. CAT activity levels in *Unio delicatus* exposed to AZX (DG: digestive gland; G: gill; *: p<0.05)

The distinguishability of SOD, CAT and GPx activities in the *Unio delicatus* digestive gland (Figure 5) and gill (Figure 6) tissues was observed with the IBRv2 star plot. While the antioxidant levels in the digestive gland tissue were found to be 41.08 in terms of IBRv2, it was determined as 41.58 in the gill tissue.

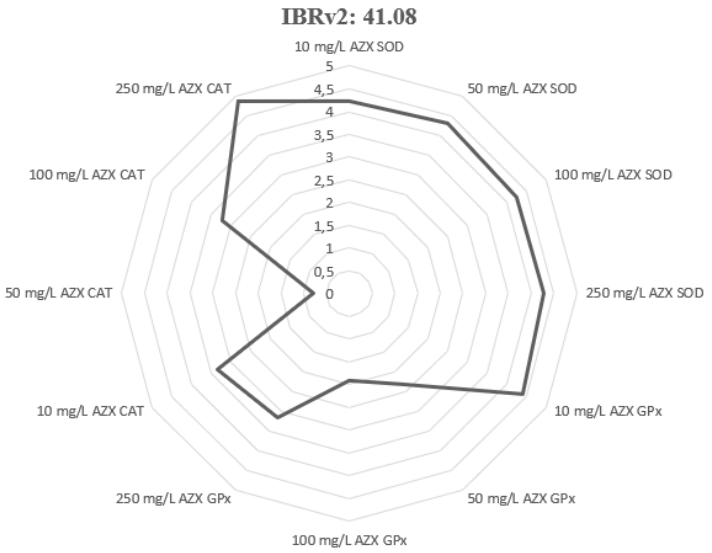

Figure 5. Integrated biomarker response (IBRv2) values of the digestive gland of *Unio delicatus* exposed to AZX

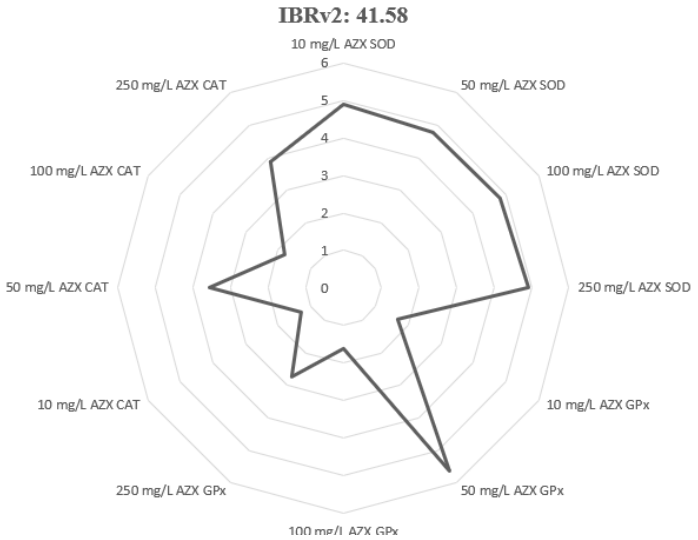

Figure 6. Integrated biomarker response (IBRv2) values of the gill of *Unio delicatus* exposed to AZX

Discussion

In this study, freshwater mussels were used to evaluate the toxic effects of AZX on antioxidant parameters. Bivalves, which exist as benthic filter feeders in aquatic ecosystems, are the aquatic organisms most strongly exposed to the presence of xenobiotics, including pesticides. Freshwater mussels are one of the sensitive groups within aquatic invertebrates and respond strongly to changes in the ecosystem [10].

Oxidative stress occurs in organisms due to an imbalance between producing and removing reactive oxygen species (ROS) within the cell. When ROS levels increase, two types of defence mechanisms emerge. One of these is enzymatic antioxidant systems, and the other is non-enzymatic antioxidants. Substances in both groups protect cells and the organism from oxidative damage. The first line of enzymatic antioxidant defence system in the cell, SOD, uses superoxide anion to produce oxygen and hydrogen peroxide. GPx and CAT produce oxygen and water from hydrogen peroxide [11, 12]. In our study, SOD activity in the digestive gland and gill tissues showed an increase in AZX-applied groups compared to control groups. This significant increase in SOD activity can be explained by its antioxidant catalytic activity, which provides dismutation of the superoxide radical in O_2 and H_2O_2. Similar to our results, SOD activity was reported to increase under pesticide exposure in zebrafish [11], catfish [13].

In this study, the decrease in GPx values indicates a reduction in the body's defence against oxidative stress. While

an increase in GPx values is generally observed in aquatic organisms exposed to pesticides [11, 13], studies also show a decrease in these values [14]. In our study, CAT activity in gill tissues in AZX-applied groups decreased compared to control groups. The reduction in CAT activity in the AZX-applied groups may be due to the fungicide inhibiting the enzyme activity. Like our results, CAT activity was reported to decrease in fish exposed to pesticides [15].

IBRv2 is a tool to analyze the effects of xenobiotic substances using different organisms or biomarkers, resulting in a graphical synthesis [16]. The IBRv2 value being AZX indicates that the *Unio delicatus* mussel species used in this study is one of the bioindicator species that can be used in xenobiotic substance exposure.

In conclusion, the present findings have undoubtedly shown that AZX toxicity can induce oxidative stress in the digestive gland and gills of *Unio delicatus* after 96 h of exposure. The mussels can combat the toxicant by activating antioxidant enzymatic parameters in the digestive gland and gill tissues. The IBRv2 analysis showed that oxidative stress parameters were tissue specific. Globally, this research has provided important new information on the mechanisms of AZX toxicity and has shown the added value of using aquatic organisms as a valuable tool in ecotoxicological studies.

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PP049

INVESTIGATION OF SERUM ISCHEMIA MODIFIED ALBUMIN LEVELS IN FAMILIAL MEDITERRANEAN FEVER

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Introduction

Familial Mediterranean Fever (FMF) develops due to gain-of-function mutations in the MEFV gene encoding a protein called pyrin, which plays a vital role in the regulatory functions of the innate immune system [1].This gene encodes the pyrin protein, which regulates inflammation and cell apoptosis and is mainly expressed in white blood cells and fibroblasts. Although the precise physiological function of the pyrin protein has not yet been fully elucidated, the central hypothesis is that pyrin plays a role in suppressing dysregulated inflammatory responses. Under normal conditions, pyrin suppresses interleukin-1 (IL-1), activates nuclear factor kappa beta (NF-**κB**), and procaspase-1 through pro-proteins. However, mutations in the pyrin protein are thought to trigger a dysregulated pro-protein complex cascade, which is believed to lead to an inflammatory response [2, 3]. Systemic inflammation leads to endothelial dysfunction through oxidative stress. Ongoing chronic inflammation in FMF patients is considered one of the leading causes of atherosclerosis and related ischemic events. In this context, atherosclerosis stands out as an essential cause of morbidity and mortality in FMF patients [4, 5]. Atherosclerotic lesions lead to narrowing of the vessels, hypoxia/ischemia, and oxidative changes. As a result, circulating free albumin is converted into ischemia-modified albumin (IMA) [6]. We aimed to measure serum IMA levels in FMF patients and compare them with a control group of healthy individuals without any diagnosis of inflammatory rheumatism.

Methods and Materials

This study was conducted between January-April 2024 in Konya, Türkiye. Forty controls (aged 22-70 years) and 40 Familial Mediterranean fever patients (aged 18-61 years) admitted to Selcuk University Faculty of Medicine Hospital were enrolled. This research received ethical clearance from the ethics board of the Selcuk University Faculty of Medicine Hospital, under approval number 2023/543, 21.11.2023. A written ethical approval form was obtained from all the participants, and the local ethics committee of Selcuk University approved the study. Participants with chronic diseases, hypertension, coronary heart disease, diabetes mellitus, chronic kidney diseases, and thyroid dysfunction were excluded from this study.

Collection of blood samples

Ten millilitres of the sample were collected from each participant in blood tubes (BD Vacutainer, USA) by veni-

puncture and analyzed within 3 days. The samples were centrifuged at 3500 rpm for 10 minutes at four °C; then, the serum was separated and kept at -80^{0}C until analysis.

Instrumentations

Urea, creatinine, and albumin levels were measured in serum samples obtained from the patients using a Cobas 8000. In the remaining serum samples, IMA was measured using the spectrophotometric method (Perkin et al. 25 UV/Vis). Fibrinogen level was measured using ACL TOP CTS 500, and CRP levels were measured by ZYBIO Z3.

White blood cell count (WBC), hemoglobin (HGB), platelet (PLT), neutrophil (NEU), and lymphocyte count (LYM) values were measured in whole blood samples obtained from EDTA tube using a Mindray BC 6000-2. The erythrocyte sedimentation rate (ESR) was measured by Mindray SC-120.

Chemicals and solutions: Cobalt chloride (CAS Number: 7646-79-9), Dithiothreitol (DTT) (CAS Number: 3483-12-3), Normal saline.

Measurement of Ischemia-Modified Albumin Levels

IMA levels were measured according to the method described by Onmaz et al. [7]. After adding 50 µL 0.1% cobalt chloride to 200 µL serum sample, the reaction mixture was vortexed for 10 seconds and incubated at room temperature for 10 minutes to ensure albumin-cobalt binding. Then, 50 µL of Dithiothreitol (DTT) (1.5 mg/mL) was added to the reaction mixture and incubated at room temperature for 2 min for a colorimetric reaction with non-albumin-bound cobalt. After incubation, 1 mL of isotonic saline solution was added to the reaction mixture to stop the reaction. The blind tube was prepared for each serum sample using the same procedure without adding DTT. The absorbance values of the samples and the blinds were measured on a spectrophotometer (Perkin et al. 25 UV/Vis, US) set at a wavelength of 470 nm, and the difference between the spectrophotometric measurements were expressed as serum IMA levels.

Statistical Analysis

For statistical analyses, IBM SPSS version 26.0 statistical software was used (IBM Corp., Armonk, NY, USA). The accordance of continuous variables to normal distribution was analyzed with the Shapiro–Wilk test. The existence of a statistically significant difference between the groups in terms of continuous variables was assessed for parametric and nonparametric variables, respectively, with Student's t-test and Mann-Whitney U tests. The correlation between the groups was examined using the Spearman correlation test. $p<0.05$ value was accepted as statistically significant.

Results

A comprehensive sample of forty FMF patients and forty control individuals were meticulously included in this study. The detailed demographic and general clinical characteristics of the patients are presented in Table 1. The mean serum IMA level was 0.92 ± 0.214 ABSU for FMF patients and 1.38 ± 0.218 for the control group. There was a statistically significant difference between the mean IMA levels of the FMF and control patients (p=0.000). This difference indicates a potential biomarker for FMF. Additionally, there was a statistically significant difference between the mean FMF patient and Control Creatinine and eGFR levels, respectively (p=0.050, p=0.045).

The study uncovered promising positive correlations between IMA and Hemoglobin and IMA and Creatinine, potentially benefiting FMF patients. The correlation coefficients of the parameters in the FMF are shown in Table 2. There was a statistically positive correlation between the duration of illness and Neutrophil, CRP and a negative correlation with lymphocytes, respectively (rs=0.239, p=0.033 - rs=0.309, p=0.012 - rs=-0.245, p=0.029). There was also a positive correlation between IMA and Hemoglobin and creatinine and a negative correlation with duration of illness, eGFR respectively (rs=0.239, p=0.033 - rs=0.274, p=0.014 - rs=-0.654, p=0.000- - rs=0.307, p=0.006). The Scatter plots illustrate the correlations between IMA and Hemoglobin, GFR, and Creatinine levels shown in Figure 1.

Table 1. The demographical and clinical characteristics and the laboratory findings of the study groups

Parameter	Healthy Control (n=40)	FMF (n=40)	p-Value
Demographical and clinical characteristics			
Age (years)	32.75±10.99	31.4±11.02	0.534
Gender			
Male	25	20	
Female	15	20	
Duration of Illness (years)	-	12.13±7.09	
Laboratory findings			
IMA (ABSU)	1.38 (1.01-2.06)	0.92 (0.57-1.55)	**0.000**
WBC (K/uL)	7.3±1.5	7.5±2.1	0.679
NE %	4.01 (2.1-8.8)	4.4 (2.01-13.8)	0.132
LY %	2.4±0.56	2.2±0.65	0.075
HGB (g/dL)	14.9±1.5	14.2±1.6	0.081
PLT (K/uL)	254.8±50.6	277.7±80.07	0.152
ESR (ml/h)	5.6 (2-21)	9 (2-48)	0.445
Fibrinogen (g/L)	309±59.6	340.6±120.1	0.766
CRP (mg/L)	3.1 (2-14)	10.07 (2-169)	0.100
Creatinine (mg/dL)	0.82 ±0.15	0.76±0.18	**0.050**
eGFR	114.5±13.7	121.4±20.08	**0.045**
Urea (mg/dL)	26.49±5.8	25.04±7.8	0.344
Albumin (g/dL)	4.7±0.35	4.5±0.35	0.256

Data were expressed as mean ± standard deviation. Bold values indicated that statistically significant result (p <.05). FMF familial Mediterranean fever, IMA; ischemia modified albumin, WBC; white blood cell, NE; neutrophils, LY; lymphocyte, HBG; hemoglobin, PLT; platelets, ESR; erythrocyte sedimentation rate, CRP; C-reactive protein, eGFR; estimated glomerular filtration rate. All p values were measured using the Mann-Whitney U test.

Table 2. The correlation coefficients of the parameters in the FMF

Parameters	Duration of illness		IMA	
	r^s	p-value	r^s	p-value
Age (years)	0.086	0.447	0.123	0.277
Duration of illness (years)	1.000	-	-0.654	**0.000**
WBC (K/uL)	0.115	0.309	-0.079	0.487
NE%	0.239	**0.033**	-0.189	0.093
LY%	-0.245	**0.029**	0.087	0.442
HGB (g/dL)	-0.150	0.183	0.239	**0.033**
PLT (K/uL)	0.089	0.434	-0.215	0.055
ESR (ml/h)	0.242	0.059	-0.108	0.402
Fibrinogen (g/L)	0.158	0.290	0.107	0.474
CRP (mg/L)	0.309	**0.012**	-0.105	0.403
Creatinine (mg/dL)	-0.143	0.205	0.274	**0.014**
eGFR	0.093	0.413	-0.307	**0.006**
Urea (mg/dL)	-0.109	0.385	0.177	0.159
Albumin (g/dL)	-0.112	0.355	0.152	0.208

Bold values indicated a statistically significant relationship between laboratory findings ($p < .05$). r^s, Spearman's rho correlation coefficient

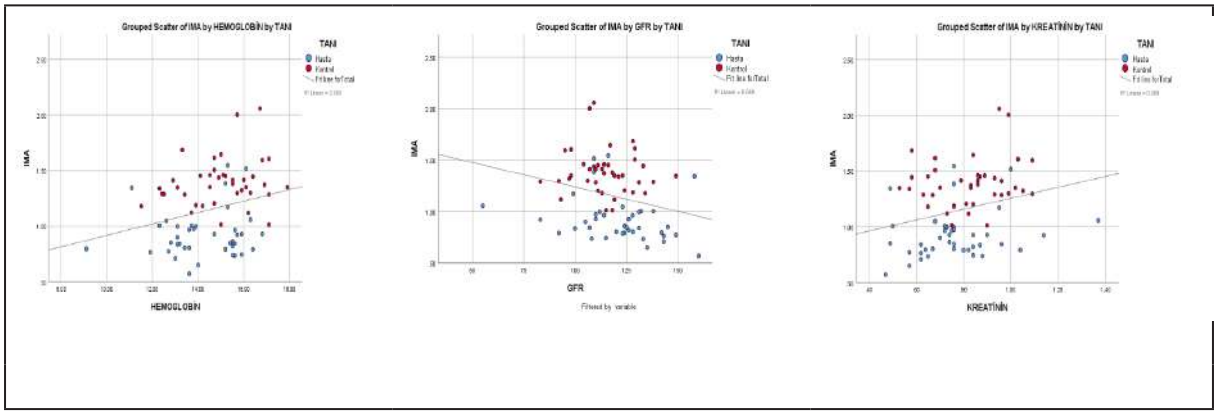

Figure 1. Scatter plots illustrate the correlations between IMA and Hemoglobin, GFR, and Creatinine levels.

Discussion

This study delved into the potential of ischemia-modified albumin (IMA) as a biomarker in familial Mediterranean fever (FMF). We discovered a significant finding by comparing IMA levels between FMF patients and healthy controls and analyzing correlations with various clinical and demographic parameters. The results indicate significantly lower serum IMA levels in FMF patients than controls, suggesting that IMA could serve as a novel and promising biomarker for FMF. This finding, with a statistically significant p-value of 0.000, underscores the importance of exploring IMA's role in the pathophysiology of FMF and its potential as a diagnostic tool, sparking hope for the future of FMF diagnosis.

The elevated IMA levels in the control group may reflect systemic oxidative stress markers unaffected by the chronic inflammatory processes that characterize FMF [8]. This disparity in IMA levels supports previous studies that associate oxidative stress with FMF pathogenesis and highlights the potential for further elucidation of its mechanistic involvement [9]. The observed significant differences in creatinine and eGFR levels (p=0.050, p=0.045, respectively) between FMF patients and controls point to a broader impact of FMF on renal function, which could have clinical implications for managing FMF-related kidney complications.

Correlations between IMA and other clinical parameters were also noteworthy. Positive correlations between IMA and hemoglobin levels (r^s=0.239, p=0.033) and creatinine (r^s=0.274, p=0.014) indicate potential interrelations between oxidative stress markers and metabolic or kidney function in FMF patients. Elevated IMA levels might reflect changes in hemoglobin and creatinine, suggesting an intertwined response to chronic inflammation and oxidative damage in FMF [10]. Conversely, the negative correlations between IMA and both disease duration and estimated glomerular filtration rate (eGFR) (r^s=-0.654, p=0.000; r^s=-0.307, p=0.006) suggest that chronicity of FMF may exacerbate oxidative stress and renal function decline over time, which could have implications for disease progression and management.

The relationship between duration of illness and alterations in neutrophil, CRP, and lymphocyte counts (positive correlation with neutrophil and CRP; negative correlation with lymphocytes) further highlights immune dysregulation in FMF patients. These results align with existing evidence showing that chronic inflammation in FMF can alter immune cell counts and function and may indicate ongoing systemic inflammation even in periods of apparent clinical stability.

Conclusion

In conclusion, this study presents IMA as a potential biomarker for FMF, demonstrating its association with multiple metabolic and clinical parameters. The need for further longitudinal studies to validate these findings and elucidate the precise role of IMA in FMF pathophysiology is urgent and crucial. These studies, with particular attention to its interactions with inflammatory and renal markers, could pave the way for novel therapeutic approaches to mitigate oxidative stress and improve clinical outcomes for FMF patients.

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SERUM METHYLMALONIC ACID AS A VALUABLE BIOMARKER FOR ASSESSMENT OF VITAMIN B12 STATUS IN PREGNANCY

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Introduction

Adequate nutrition during pregnancy is essential for its normal course, optimal fetal development and reduced risk of congenital anomalies [1]. A dietary intake that provides sufficient energy and macronutrient intake such as protein, carbohydrates, and fat but is deficient in micronutrients such as vitamins could negatively affect pregnant women and the development of a foetus [2,3]. Animal products are often absent in modern diets, predisposing to the widespread prevalence of vitamin B12 deficiency or insufficiency [4]. Despite accumulating data on the increasing prevalence of vitamin B12 deficiency, it remains underestimated, particularly in pregnant women and their newborns [5]. Suboptimal levels of vitamin B12 are associated with the risk of neural tube defect, delayed intrauterine growth, impaired early infant neurodevelopment, pre-eclampsia, gestational diabetes mellitus (GDM), preterm birth, etc [6–11].

In the digestive tract, vitamin B12 is transported by three transport proteins: haptocorrin, intrinsic factor and transcobalamin [12,13]. The complex vitamin B12/transcobalamin (holotranscobalamin) is the only fraction of dietary vitamin B12 bioavailable for systemic distribution. In cells, vitamin B12 exists in two active forms – methylcobalamin (cofactor of the enzyme methionine synthase, converting homocysteine to methionine) and 5'-deoxyadenosylcobalamin (coenzyme of methylmalonyl mutase, converting methylmalonyl-CoA to succinyl-CoA). These enzymes are essential for nucleic acid biosynthesis, tricarboxylic acid cycle, and heme biosynthesis [14]. Several circulating biomarkers are used to assess vitamin B12 status [15,16]. Total serum vitamin B12 (TB12) and holotranscobalamin (active vitamin B12, AB12) are considered direct, while methylmalonic acid (MMA) and homocysteine are accepted as indirect or metabolic biomarkers. The disadvantage of TB12 as a biomarker is that it cannot distinguish active and inactive vitamin B12 and is unreliable for assessing intracellular vitamin B12 status. AB12 reflects the intracellular cyanocobalamin levels, although it also has some drawbacks, such as transcobalamin polymorphism, analytical interferences and dependence on vitamin B12 supplementation [17–19]. A disadvantage of homocysteine is its dependency on both vitamin B12 and folic acid deficiency. Therefore, it has limited relevance for assessing vitamin B12 status when determined alone.

Furthermore, homocysteine levels are influenced by various non-specific factors such as thyroid dysfunction, age, gender, and reduced glomerular filtration rate [20]. MMA is unaffected by dietary intake of micronutrients and is one of the most specific markers for vitamin B12 status assessment. Since the above-mentioned biomarkers are affected by different factors, a combination of at least two is recommended to assess vitamin B12 status [21,22].

Vitamin B12 deficiency or insufficiency is an important public health problem [23]. Leading to an increased rate of both pregnancy and childbirth complications, the early detection of vitamin B12 functional deficiency during

pregnancy is a topical issue worldwide. Therefore, the current study aimed to investigate the vitamin B12 status of Bulgarian pregnant women with normal and pathologic pregnancies using a combination of direct and metabolic biomarkers and to examine interrelations with clinical parameters assessing the course of pregnancy and foetal development.

Materials and Methods

Study population

A total of 259 pregnant women (mean age 30.51±5.35 years) were recruited in this observational cross-sectional prospective study. Of them, 210 were outpatient women, enrolled between the 24th and 28th gestation week (GW), and 49 women were hospitalized for preeclampsia (PE) between the 20th – 38th GW (median 34GW, IQR=30-35.5GW and only six were in their second trimester when admitted to hospital). Outpatient participants were divided into two subgroups: Group I comprised 167 healthy pregnant women and served as a control group; Group II consisted of 43 women with GDM, confirmed by a standard oral glucose tolerance test (OGTT) with 75g glucose. The hospitalized PE women formed Group III. The following inclusion criteria were met: age over 18 years, singleton pregnancy, confirmed by ultrasound up to 12th GW, with a known gestation term. Women with multiple pregnancies, unclear terms, pregnancies due to assisted reproduction, arterial hypertension or diabetes mellitus established before pregnancy, and those with chronic and systemic diseases were excluded from the study.

The local Ethics Committee approved the study (Protocol №84/27.06.2019). Written informed consent was given from each participant before entering the study.

Socio-demographic survey

All women completed a questionnaire containing demographic and lifestyle information such as residence, education, marital status, diet, physical activity, body weight at the time of conception, height, intake of medication and supplements, obstetric outcomes of previous pregnancies if any, and family health history.

Anthropometric measurements

The body weight included in the study was measured to calculate gestational weight gain (GWG) [24]. Ultrasonographic data regarding foetal development (biparietal diameter, abdominal circumference, and femoral length) and anthropometric indicators of newborns (weight, length, head circumference) were obtained from maternity ward records and neonatal units. Low birth weight (LBW), as a key indicator of intrauterine growth retardation, is defined by the World Health Organization as a weight under 2500 g at birth [25].

Laboratory testing

Venous blood drawn during routine laboratory testing was used to obtain serum to examine TB12, AB12, and MMA. For outpatient pregnant women, additional EDTA plasma samples were used to measure glucose by the standard glucose hexokinase method during OGTT. TB12 and AB12 were determined by commercial chemiluminescence kits (Access Vitamin B12, Beckman Coulter, USA and ARCHITECT Active-B12, Abbott Laboratories, USA, respectively). MMA analysis was done by in-house developed and validated liquid-chromatography mas-spectrometry method.

Statistical analysis

Data were presented as mean±SD (standard deviation), median and interquartile range (IQR, 25th – 75th percentile) or number (n) and percentage (%), as appropriate. Shapiro-Wilk test was applied to evaluate whether a data set was normally distributed. Standard statistical methods such as descriptive statistics; unpaired Student's t-test for normally distributed parameters and Mann–Whitney U-test for non-normally distributed interval data for comparison of two groups; one-way ANOVA test for normally distributed variables and Kruskal-Wallis test for non-normally distributed data were used when compared more than two groups. For categorical data, the Chi-square test was applied. Data analysis was performed on GraphPad Prism (version 8.0.1), and statistical significance was considered at $p<0.05$.

Results

Characteristics of the studied pregnant women and newborns.

Descriptive analysis of the data collected from questionnaires revealed the baseline characteristics of the pregnant women, presented in Table 1.

Table 1. Baseline characteristics of the pregnant women included in the study.

Variable	Total (n=259)	Group I (n=167)	Group II (n=43)	Group III (n=49)
Age (years)				
mean±SD	30.51±5.35	29.84±4.79	31.25±4.58	32.12±7.14
<35 years – % (n)	84.6 (219/259)	87.4 (146/167)	83.7 (36/43)	75.5 (37/49)
>35 years – % (n)	15.4 (40/259)	12.6 (21/167)	16.3 (7/43)	24.5 (12/49)
Pregnancy order				
First pregnancy – % (n)	47.1 (122/259)	48.5 (81/167)	58.1 (25/43)	32.7 (16/49)
Second pregnancy – % (n)	39.0 (101/259)	37.7 (63/167)	25.6 (11/43)	55.1 (27/49)
≥Third pregnancy – % (n)	13.9 (36/259)	13.8 (23/167)	16.3 (7/43)	12.2 (6/49)
Residence				
City – % (n)	90.3 (234/259)	95.2 (159/167)	90.7 (39/43)	73.5 (36/49)
Village – % (n)	9.7 (25/259)	4.8 (8/167)	9.3 (4/43)	26.5 (13/49)
Education				
High-school – % (n)	43.6 (113/259)	44.3 (74/167)	37.2 (16/43)	46.9 (23/49)
University – % (n)	56.4 (146/259)	55.7 (93/167)	62.8 (27/43)	53.1 (26/49)
Body mass index (kg/m^2)				
mean±SD	23.1±3.93	22.7±3.69	23.1±4.91	24.3±3.66
BMI <24.9 – % (n)	71.4 (185/259)	74.9 (125/167)	74.4 (32/43)	57.1 (28/49)
BMI ≥25.0 – % (n)	28.6 (74/259)	25.1 (42/167)	25.6 (11/43)	42.9 (21/49)
GWG (kg)				
mean±SD	9.68±4.69	8.68±4.78	9.69±4.86	13.91±4.73
Normal GWG – % (n)	59.5 (154/259)	64.7 (108/167)	65.1 (28/43)	36.7 (18/49)
Pathologic GWG – % (n)	40.5 (105/259)	35.3 (59/167)	34.9 (15/43)	63.3 (31/49
Supplementation with Vitamin B12 preparations % (n)	65.25 (169/259)	70.66 (118/167)	72.09 (31/43)	40.82 (20/49)
***Term of birth (GW)**				
mean±SD	37.85±2.26	38.59±1.09	38±2.42	36.12±2.96
Pre-term birth – % (n)	12.5 (32/257)	4.2 (7/166)	7.0 (3/43)	45.8 (22/48)
Term birth – % (n)	87.5 (225/257)	95.8 (159/166)	93.0 (40/43)	54.2 (26/48)
****Season of blood sampling**				
Cold season – % (n)	64.1 (166/259)	64.7 (108/167)	62.8 (27/43)	63.3 (31/49)
Warm season – % (n)	35.9 (93/259)	35.3 (59/167)	37.2 (16/43)	36.7 (18/49)

Group I – women with normal pregnancies; Group II – pregnant women with GDM (gestational diabetes mellitus); Group III – pregnant women with pre-eclampsia; GWG – gestational weight gain; GW – gestation weeks (*Pre-term birth: <37 GW; Term birth: ≥37 GW, **Cold season: November – April; Warm season: May – October)

Neither of the examined women were on a vegetarian nor vegan diet. Consumption of meat products ranged from daily intake to at least 3 times per week.

The anthropometric and echographic data of newborns are given in Table 2.

Table 2. Fetal echographic data and newborns' anthropometry.

Variable	Total newborns (n=257)	Group I (n=166)	Group II (n=43)	Group III (n=48)
AC (mm)	315.1±31.7	323.1±30.4	316.0±22.2	293.1±33.9
FL (mm)	70.7±4.6	71.9±3.1	70.1±4.8	66.9±6.5
BPD (mm)	93.1±5.4	94.5±4.1	92.2±5.1	88.9±7.3
Length (cm)	49.0±3.1	49.7±2.4	48.7±3.4	46.8±4.2
Weight (g)	3105.6±609.8	3228.0±525.5	3091.39±589.22	2693.33±720.32
LBW (g)	2006.0±457.4	2173.0±336.8	2002.0±499.1	1883.0±505.5
n (%)	34/257 (13.2%)	12/166 (7.2%)	6/43 (13.9%)	16/48 (33.3%)

Group I – newborns of mothers with normal pregnancies; Group II – newborns of mothers with GDM (gestational diabetes mellitus); Group III – newborns of mothers with pre-eclampsia; AC – abdominal circumference; FL – femur length, BPD – biparietal diameter; LBW (low birth weight) of newborn was considered below 2500g

Assessment of vitamin B12 status of the studied cohort

Vitamin B12 status was assessed by measuring serum levels of two direct biomarkers, TB12 and AB12, and one metabolic biomarker, MMA. Serum levels of the tested biomarkers revealed non-Gausian distribution according to the Shapiro-Wilk test both for the entire cohort ($p<0.0001$) and for the subgroups ($p<0.0001$, respectively for groups I, II and III). Therefore, the results are presented as medians with their IQR (Table 3).

Table 3. Serum levels of TB12, AB12, and MMA.

Parameter	All pregnant women	Group I	Group II	Group III	P value
TB12 (pmol/L)					0.0959 (GI vs GII)
Median	150.0	149.0	171.0	141.0	0.2228 (GI vs GIII)
IQR	120.0-202.0	120.0-202.0	128.0-231.0	116.5-176.0	**0.0281** (GII vs GIII)
AB12 (pmol/L)					**0.0257** (GI vs GII)
Median	61.0	61.0	77.3	54.2	0.6367 (GI vs GIII)
IQR	43.3-88.3	42.2-83.1	48.7-108.6	40.8-89.6	**0.0458** (GII vs GIII)
MMA (nmol/l)					0.8736 (GI vs GII)
Median	230.8	224.8	212.2	296.5	**0.0448** (GI vs GIII)
IQR	148.4-318.8	134.0-325.5	129.6-315.6	182.9-332.1	0.1006 (GII vs GIII)

TB12 – total vitamin B12; AB12 – active vitamin B12; MMA – methylmalonic acid; GI – Group I, women with normal pregnancies; GII – Group II, pregnant women with GDM (gestational diabetes mellitus); GIII – Group III, pregnant women with pre-eclampsia; IQR – interquartile range; statistical significance was indicated at $p<0.05$.

Women with pre-eclampsia revealed the lowest levels of TB12 and AB12, significantly different from those of GDM women ($p=0.0281$ and $p=0.0458$, respectively). In opposite, their MMA levels were highest and significantly different from healthy controls ($p=0.0448$).

We applied two criteria to determine vitamin B12 status. According to criterion 1, individuals with serum TB12 levels<148 pmol/L and AB12<35 pmol/L were defined as severe vitamin B12 deficient. The second criterion was based on the algorithm proposed by Hannibal et al. [26], whereby all subjects with serum TB12 in the range 148-250 pmol/L, AB12 between 35-50 pmol/L, and MMA levels ≥271 nmol/L were considered as mild vitamin B12 deficient. Pregnant women with TB12 and AB12 levels in 148-250 pmol/L and 35-50 pmol/L, respectively, and serum MMA below 271 nmol/L were defined as vitamin B12 insufficient. The frequency distribution of vitamin B12 insufficiency and deficiency among pregnant women according to the above-mentioned criteria is presented in Figure 1.

Fig. 1. Frequency distribution of vitamin B12 deficiency and insufficiency among studied groups.

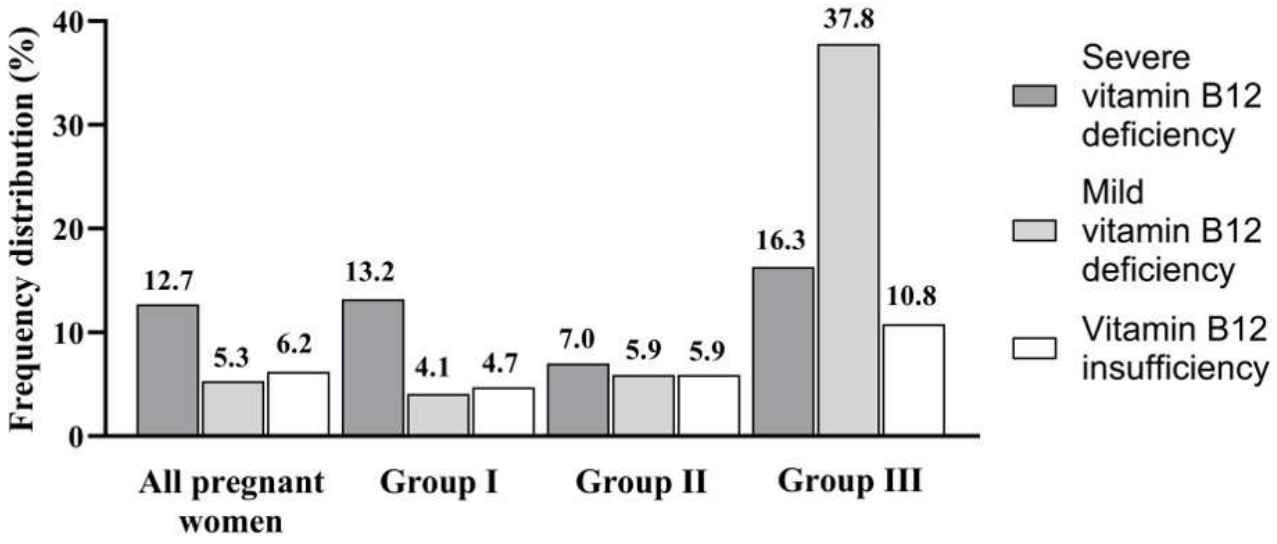

Fig. 1. Severe vitamin B12 deficiency: TB12<148 pmol/L and AB12<35 pmol/L; Mild vitamin B12 deficiency: TB12 in the range 148-250 pmol/L, AB12 in the range 35-50 pmol/L and MMA≥271 nmol/L; Vitamin B12 insufficiency: TB12 in the range 148-250 pmol/L, AB12 in the range 35-50 pmol/L and MMA<271 nmol/L; Group I – women with normal pregnancy; Group II – pregnant women with GDM; Group III – PE pregnant women; TB12 – total vitamin B12; AB12 – active vitamin B12; MMA – methylmalonic acid; GDM – gestational diabetes mellitus, PE – preeclampsia.

The prevalence of severe vitamin B12 deficiency for the entire cohort was 12.7%, ranging from 7% to 16.3% for individual subgroups. Concerning mild vitamin B12 deficiency, the highest incidence was observed in pregnant women with PE (37.8%). The incidence was comparable to that of the study cohort (5.3%) for the other two subgroups. The frequency of vitamin B12 insufficiency ranged from 4.7% to 10.8% in the subgroups and was 6.2% for all studied women. The Chi-square analysis showed a statistically significant difference ($\chi 2=14.23$, $p=0.007$) in the frequency distribution of deficiency and insufficiency observed in the three studied groups of pregnant women.

Vitamin B12 status in relation to vitamin B12 supplementation

According to the recommendations of the Ministry of Health of the Republic of Bulgaria, the recommended daily intake of vitamin B12 for the period of pregnancy is 4.5 μg/day. Therefore, the studied cohort was divided into three groups: without supplementation, supplemented with <4.5 μg/day, and ≥4.5 μg/day (Table 4).

Table 4. Frequency distribution of pregnant women according to the vitamin B12 intake.

Vitamin B12 supplementation	All pregnant women	Group I	Group II	Group III
No intake % (n)	34.75 (90/259)	29.34 (49/167)	27.91 (12/43)	59.18 (29/49)
Below 4.5 µg/day % (n)	18.92 (49/259)	19.76 (33/167)	25.58 (11/43)	10.21 (5/49)
Above 4.5 µg/day % (n)	46.33 (120/259)	50.90 (85/167)	46.51 (20/43)	30.61 (15/49)

Group I – women with normal pregnancies; Group II – pregnant women with GDM (gestational diabetes mellitus); Group III – pregnant women with pre-eclampsia

The Chi-square analysis showed a difference in attitudes towards vitamin B12 supplementation in the three observed groups ($\chi 2=16.81$, $p=0.002$). PE women showed the lowest attitude to supplementation (about 60% of them were not supplemented), whereas the prevalence of no supplementation in women with normal pregnancy and those with GDM was twice as low (about 30%). The daily vitamin B12 intake varied in a wide range – from 0 to 1000 µg with the highest mean intake for GDM women (50.53±209.7 µg), followed by women with normal pregnancy (11.06±77.25 µg). The lowest mean intake was observed for PE women (4.89±10.57).

Next, we examine how the supplementation with vitamin B12 preparations affects the serum levels of the tested biomarkers. Although we did not find significant differences concerning supplementation, a clear trend for a decrease in MMA levels in all groups with supplementation was demonstrated. The increase in AB12 levels was most pronounced in the GDM group (+20.6%), whereas for Group I and III, the elevation was negligible. The supplementation has the least effect on TB12 levels. Most dramatic changes were found for MMA, with the highest extent being in GDM women (42.3%) (Table 5).

Table 5. Serum levels and percentage of variation of the studied parameters according to vitamin B12 supplementation.

Parameter	Group I		Group II		Group III	
	Median (IQR)	D%	Median (IQR)	D%	Median (IQR)	D%
TB12 (pmol/L)						
no supplementation	152.0 (121.0-198.5)	-2.7	166.5 (123.5-237.0)	+2.7	139.0 (107.5-173.5)	+2.2
with supplementation	148.5 (119.8-206.5		171.0 (128.0-231.0)		142.0 (119.8-194.5)	
AB12 (pmol/L)						
no supplementation	58.7 (35.95-83.15)	+5.8	69.50 (48.50-108.6)	+20.6	54.20 (37.55-105.9)	+1.8
with supplementation	61.6 (45.60-83.10)		83.85 (57.63-107.2)		55.05 (43.88-62.75)	
MMA (nmol/L)						
no supplementation	233.5 (153.6-325.5)	-23.4	211.5 (160.2-409.0)	-42.3	259.4 (172.2-312.1)	-34.7
with supplementation	189.2 (117.0-325.5)		148.6 (103.8-323.8)		192.5 (113.5-319.0)	

Group I – women with normal pregnancies; Group II – pregnant women with GDM (gestational diabetes mellitus; Group III – pregnant women with pre-eclampsia; TB12 – total vitamin B12; AB12 – active vitamin B12; MMA – methylmalonic acid; IQR – interquartile range; D% – % of deviation

Vitamin B12 status in relation to pregnancy outcomes

We examined whether serum concentrations of TB12, AB12, and MMA are related to some crucial adverse pregnancy outcomes such as preterm birth (PTB) and low birth weight (LBW). Significant differences in length of pregnancy and birth weight were observed only for MMA (Table 6).

Table 6. Serum levels of tested parameters about pregnancy outcomes.

Pregnancy outcomes	**TB12** (pmol/L) Median (IQR)	**AB12** (pmol/L) Median (IQR)	**MMA** (nmol/L) Median (IQR)
Term birth (n=225)	150.0 (119.0-204.0)	60.4 (43.1-84.9)	224.6 (136.6-316.0)
Preterm birth (n=32)	154.0 (120.0-182.5)	61.8 (43.3-92.5)	306.6 (184.8-383.7)
P value (term vs. preterm birth)	0.844	0.634	**0.041**
NBW (n=223)	149.5 (120.0-202.0)	61.5 (44.5-86.4)	221.5 (135.8-314.6)
LBW (n=34)	156.0 (121.5-186.3)	57.0(42.0-87.5)	296.4 (186.7-425.2)
P value (term vs. preterm birth)	0.797	0.448	**0.025**

NBT – normal birth weight; LBW – low birth weight; TB12 – total vitamin B12; AB12 – active vitamin B12; MMA – methylmalonic acid; statistical significance was indicated at $p<0.05$

Other factors influencing vitamin B12 status

The influence of BMI on serum concentrations of vitamin B12 parameters was also studied. The entire cohort was divided into two subgroups – pregnant women with BMI<25 kg/m2 and those with BMI≥25 kg/m2. We found no statistically significant differences between the two subgroups in serum levels of TB12, AB12, and MMA for the whole cohort and Groups I, II, and III.

Surprisingly, we observed that the season of blood sampling affected serum levels of TB12. The levels were higher when blood sampling was performed during cold months (median 161.50 pmol/L and IQR: 120.75 – 211.00) compared to those measured in blood samples collected in warm months (median 140.00 pmol/L and IQR: 117.00 – 183.000, p=0.05). No significant seasonal variations were established for AB12: 61.00 pmol/L (42.55 – 81.80) vs 60.75 pmol/L (43.67 – 94.40), p=0.3713 and for MMA: 208.57 nmol/L (146.50 – 317.84) vs 216.68 nmol/L (115.82 – 326.95), p=0.61, respectively for cold and warm seasons.

DISCUSSION

Worldwide, the prevalence of vitamin B12 deficiency or insufficiency in pregnancy was assessed mainly by measuring TB12 levels. The heterogeneity of the studies (different methods and cut-offs used; different trimesters of pregnancy) accounts for the high variation in the frequency of vitamin B12 deficiency to a greater extent. Other contributing factors are the population characteristics, such as type of dietary regimen, ethnicity, and socio-economic status. In the USA, the reported incidence is 6% to 25% [27]. In the first decade of the 21st century, the rate of low B12 status (TB12<140.8 pmol/L) in the UK was as high as 20% at 16–18 GW and 40% at the time of delivery [28]. A more recent study on a large multi-ethnic cohort of pregnant women from the UK revealed 42.3% vitamin B12 insufficiency (TB12<220 pmol/l), which is common in early pregnancy (26-28 GW) [29]. For Northwestern Europe, the reported incidence of vitamin B12 deficiency (TB12<148-150 pmol/L) among pregnant women in the second trimester was 6% to 15% [30–32]. Canadian research on pregnant women reported a 10% B12 deficiency

(TB12 levels <148 pmol/L) and 21% with marginal levels (TB12 148-220 pmol/L) at 16 GW, while at 36 GW, they were increased to 23% and 35%, respectively [33]. The prevalence of vitamin B12 deficiency (TB12<148 pmol/L) in South America ranged between 18.6% and 61.34% [34,35]. The highest prevalence of vitamin B12 deficiency (TB12<150 pmol/L) was recorded in India – 80% among rural and 65% among urban pregnant women [36].

The prevalence of severe and mild vitamin B12 deficiency for the entire studied cohort was 12.7% and 5.3%, respectively. The overall percentage of women with suboptimal vitamin B12 levels (deficiency and insufficiency) is 24.2%. Thus, our results are comparable to those found in developed Western countries. The highest incidence of severe and mild vitamin B12 deficiency was found in women with PE, 16.6% and 37.8%, respectively. Most of them (88.8%) were in their third trimester. Several factors are proposed to contribute to MMA elevation in the third trimester of pregnancy: the hormonal changes may act as modulators of MMA concentrations [37]; the increased fat usage as an energy source during late pregnancy may also lead to increased formation of MMA precursors and consequently of MMA independently of vitamin B12 status [21]; changes in cobalamin-binding proteins concentration, and increased demand of the fetus for vitamin B12 [15,38]. The increased prevalence of mild vitamin B12 deficiency was not only due to the marginal values of the direct parameters (TB12=148-250 pmol/L and AB12=35-50 pmol/L) but also to the involvement of MMA, as a functional biomarker, in the assessment of vitamin B12 status. The MMA-based algorithm could more reliably reflect the actual vitamin B12 status, especially during the first two trimesters, and it should be recommended.

Of the study cohort, just over one-third were not supplemented with vitamin B12 preparations (single or multivitamin tablets), with the highest proportion of non-supplementation (about 60%) found in women with pre-eclampsia. In addition, PE women had the lowest daily intake of vitamin B12 supplements (4.89 µg). We indicated a significant effect of supplementation only on MMA levels. The values decreased from -23.4% to -42.3% between groups. Conforming to our findings are the data of a recent interventional study on pregnant women supplemented with 50 µg daily vitamin B12, revealing a 40% decrease in MMA levels [39]. In our study, the reduction in MMA levels was most significant in the GDM group, with the highest frequency of supplementation (72.09%) and the highest average daily intake of vitamin B12 (50.53±209.70 µg). On the contrary, they found a 35% increase in TB12, while we did not observe any changes in TB12 or AB12 levels in response to supplementation. Candyo's research [39] is an interventional and controlled study, supplementing the case group with 50 µg daily vitamin B12, while in our study, the women were taking vitamin B12 as food supplements highly varied in their vitamin B12 content (1.75 µg to 1000 µg). Another recent study reveals that oral vitamin B12 supplementation with a dose equivalent to 14 µg/daily (2x200µg monthly) failed to correct the nutritional deficiencies in Bangladeshi pregnant women [40].

Regarding the associations between vitamin B12 status and pregnancy outcomes, such as preterm birth and low birth weight, significant differences in length of pregnancy and birth weight were observed only for MMA. It was significantly higher in women with preterm birth (p=0.041) and in those with LBW newborns (p=0.025). On the contrary, Choi et al. did not find any associations between MMA levels and any of the maternal and neonatal outcomes. The authors suggested this could be due to the small number of adverse outcomes in their study [38]. Tan et al., in their research, examined the associations between maternal serum TB12, AB12 and MMA and birth outcomes among Canadian women. Despite the suboptimal maternal vitamin B12 status, no associations were observed with birth weight [41]. Similar to our results, Turkish research examining the maternal vitamin B12 status and anthropometric measurements of newborns found no relation between TB12 levels and the baby's birth weight, head circumference, and length [42]. In their systematic review, Sukumar et al. (2016) did not reveal a consistent association between vitamin B12 insufficiency and LBW.

In our study, we have indicated seasonal variation of TB12 with higher serum levels in cold months. An explanation of these findings could be related to seasonal changes in nutritional behaviour. Since the primary sources of vitamin B12 are mainly food products of animal origin, the better vitamin B12 status in winter could be explained by increased intake of foods of animal origin. There is a paucity of data in the literature on the influence of season on

vitamin B12 status. In their study, Tong et al. found significantly higher ($p<0.05$) vitamin B12 serum concentrations during the winter months [44].

This is the first study assessing vitamin B12 status in Bulgarian pregnant women. The strengths of our study include the large sample size and stratification analysis by pregnancy complications. Moreover, we evaluated the utility of two algorithms for assessing the extent of vitamin B12 deficiency during pregnancy. There are some limitations of our study. It is considered that MMA concentration is influenced by renal impairment, which is common in PE women. In our research, we lack information regarding renal status. Therefore, associations with parameters assessing renal function, such as serum urea and creatinine, were not performed. In addition, our study's relatively small sample size of the GDM and PE subgroups could limit the detection of minor differences. Moreover, a recent study on the Irish population, including healthy pregnant women, demonstrated the importance of a cobalamin-independent mechanism in the production of MMA. The authors indicate that SNPs in 3-hydroxyisobutyryl-CoA hydrolase (HIBCH rs291466) are an important determinant of MMA status, regardless of age or renal function [45]. This should also be taken into account when assessing vitamin B12 status.

Conclusions

TB12 is the most commonly used parameter to assess vitamin B status in pregnant women and is influenced by many factors, including season. The inclusion of a functional biomarker such as MMA alongside the direct parameters AB12 and TB12 would add impact to assess the extent of vitamin B12 deficiency. Using such an algorithm could be good practice for the routine evaluation of vitamin B12 status in pregnant women, especially during the first and second trimesters. Further studies are needed to validate these biomarkers and establish reliable cut-offs in larger cohort studies among pregnant women.

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PP075

DIAGNOSTIC USEFULNESS OF CA 15-3 AND CA 125 IN BREAST CANCER SCREENING IN CORRELATION WITH OBESITY

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Introduction

Breast cancer remains one of the leading among women worldwide, representing a significant global health challenge. According to the World Health Organization (WHO), breast accounts for nearly 25 of all cancer cases and 15% of cancer-related deaths in women [1]. Early detection through effective screening methods is crucial in reducing breast cancer-related mortality. Mammography, ultrasound, and magnetic resonance imaging (MRI) are the primary imaging techniques used for breast cancer screening; however, these methods have limitations, particularly in women with dense breast tissue [2, 3]. Thus, additional diagnostic tools, such as tumor markers, are being investigated for their potential to improve breast cancer diagnosis and monitoring treatment response.

Among the various tumor markers studied, CA 15-3 and CA 125 have received considerable attention. CA 15-3 is a glycoprotein antigen that is elevated in many breast cancer patients, particularly those with advanced or metastatic disease [4]. Studies have shown that CA 15-3 levels correlate with tumor burden and can be used to monitor disease progression and response to therapy. However, it lacks sufficient sensitivity and specificity for early detection [5, 6]. Similarly, CA 125, primarily associated with ovarian cancer, has also been explored as a potential marker in breast cancer, especially in cases of metastatic or advanced stages [7, 8]. While CA 125 may have some utility in monitoring, its role in the screening and early diagnosis of breast cancer is less established, necessitating further research to clarify its effectiveness [9].

Beyond tumor markers, environmental and lifestyle factors play an essential role in breast cancer development. Obesity is increasingly recognized as a significant modifiable risk factor for breast cancer, particularly after menopause. The relationship between obesity and breast cancer risk has been extensively studied, with multiple studies suggesting that higher body mass index (BMI) is associated with an increased incidence of breast cancer in postmenopausal women [10, 11]. Obesity leads to alterations in endocrine function, particularly increased levels of estrogen, which are thought to drive the development and progression of estrogen receptor-positive breast cancers [12]. In addition to hormonal changes, adipose tissue in obese individuals produces pro-inflammatory cytokines that may promote the carcinogenesis of breast tissue [13].

Studies have demonstrated that obesity not only increases the risk of developing breast cancer but may also affect prognosis, with obese women showing poorer survival outcomes and a higher likelihood of recurrence after treatment [14, 15]. Furthermore, obesity-related comorbidities, such as type 2 diabetes and cardiovascular disease, may compound the overall health burden in breast cancer patients, leading to more complex treatment management and poorer outcomes [16, 17].

The association between obesity and breast cancer highlights the need for public health strategies focused on weight management, especially in postmenopausal women, to mitigate the risk of breast cancer. Additionally, addressing obesity as part of a broader cancer prevention strategy could lead to improvements in overall health and reductions in cancer morbidity and mortality [18, 19]. Several intervention studies have shown that weight loss, mainly through dietary modifications and physical activity, can help reduce estrogen levels and lower the risk of breast cancer recurrence in women with a history of the disease [20].

Material and Methods

This cross-sectional study aimed to assess the diagnostic utility of the tumor markers CA 15-3 and CA 125 in detecting breast cancer. The study involved a total of 400 female participants, comprising 200 women diagnosed with breast cancer and 200 healthy controls. Participants were selected from various clinical settings, ensuring that the sample represented both early and advanced stages of breast cancer, as well as a diverse age range. The primary objective was to evaluate the serum levels of these tumor markers and determine their potential role in distinguishing between malignant and healthy breast tissue.

Serum levels of CA 15-3 and CA 125 were measured using the chemiluminescent immunoassay (CLIA) method, a highly sensitive and specific technique for detecting low concentrations of biomarkers in blood samples. This method is widely used in clinical settings due to its precision and reliability. CA 15-3 is a glycoprotein antigen commonly elevated in the blood of patients with breast cancer, particularly in those with advanced or metastatic disease [1].

Similarly, CA 125, traditionally used as a marker for ovarian cancer, has also been evaluated in breast cancer studies, as its levels can be elevated in some breast cancer patients, particularly those with more advanced stages of the disease [2].

Data analysis was performed using SPSS (Statistical Package for the Social Sciences) software, a robust statistical test and modelling tool. SPSS was used to perform Chi-square tests for categorical variables and receiver operating characteristic (ROC) curve analysis to assess the overall diagnostic accuracy of CA 15-3 and CA 125 in identifying breast cancer. The ROC curve is a valuable method for determining the trade-off between sensitivity and specificity, providing a visual representation of the marker's ability to accurately classify patients with and without breast cancer across various threshold values.

Results

This study revealed significant differences in the serum levels of CA 15-3 and CA 125 between breast cancer patients and healthy controls. Specifically, CA 15-3 levels were notably elevated in the breast cancer group, with a mean concentration of 34 U/mL compared to 10 U/mL in the control group (Figure 1).

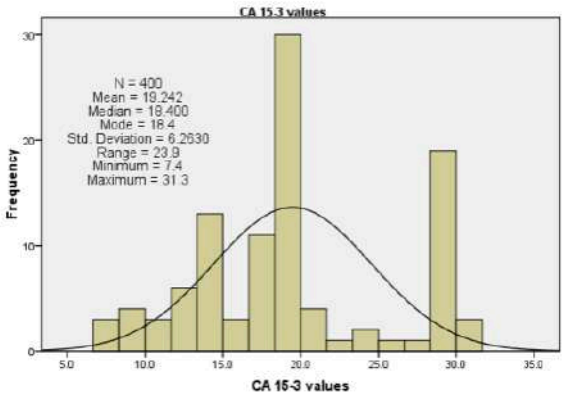

Figure 1. CA 15-3 values

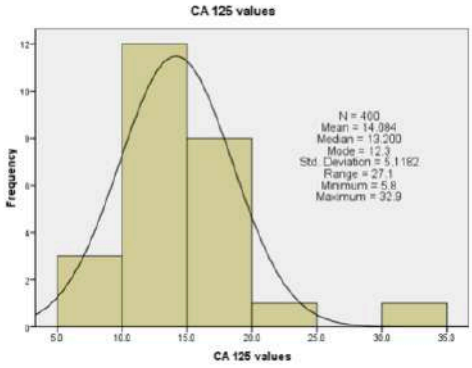

Figure 2. CA 125 values

This marked difference underscores the potential of CA 15-3 as a diagnostic biomarker for breast cancer. Statistical analysis revealed that the sensitivity of CA 15-3 for detecting breast cancer was 78%, indicating that 78% of patients with breast cancer were accurately identified as positive by this marker. The specificity of CA 15-3 was 85%, meaning that 85% of healthy controls were correctly classified as negative. These results suggest that CA 15-3 serves as a relatively reliable marker for identifying breast cancer in symptomatic women, particularly in distinguishing cancer patients from healthy individuals.

Similarly, CA 125 levels were also significantly higher in the breast cancer group (mean: 18 U/mL) compared to the controls (mean: 9 U/mL) (Figure 2).

Although the difference was statistically significant, the sensitivity of CA 125 was slightly lower than that of CA 15-3, at 62%. This indicates that 62% of breast cancer patients were correctly identified as positive for the disease using CA 125. The specificity of CA 125 was 80%, meaning that 80% of the healthy control group was accurately classified as not having breast cancer. These metrics suggest that while CA 125 can serve as a supplementary marker for breast cancer detection, it is less sensitive than CA 15-3, which may limit its usefulness as a standalone diagnostic tool in clinical practice.

Further analysis revealed that both CA 15-3 and CA 125 showed a significant correlation with advanced stages of breast cancer. Elevated levels of these markers were more commonly observed in patients with late-stage (III and IV) breast cancer, supporting the idea that these markers may be more indicative of metastatic or advanced disease. In particular, the increase in serum levels of these tumor markers was associated with more aggressive disease characteristics, such as larger tumor sizes and distant metastases. This finding underscores the potential of CA 15-3 and CA 125 as prognostic indicators for monitoring disease progression, especially in patients with advanced breast cancer.

Moreover, both tumor markers were found to correlate with obesity in the breast cancer cohort. Obesity, a well-established risk factor for breast cancer—especially in postmenopausal women—was associated with significantly higher serum levels of both CA 15-3 and CA 125. The elevated levels of these markers in obese patients may reflect the complex interplay between adiposity, hormone regulation (particularly estrogen), and tumor biology. Obesity is known to increase systemic inflammation and insulin resistance, which are factors that may contribute to cancer progression and the production of tumor markers (Figure 3).

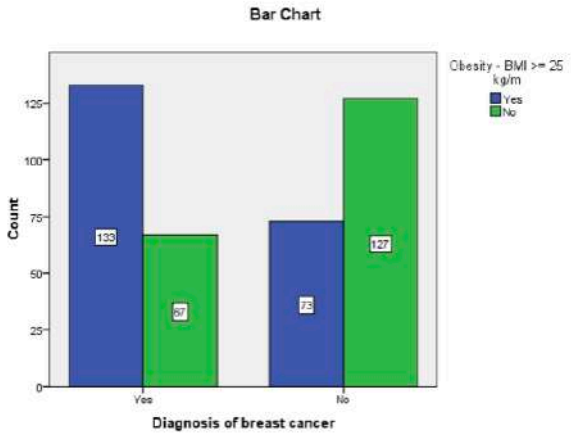

Figure 3. Correlation between obesity and breast cancer diagnosis

Furthermore, adipose tissue can function as an endocrine organ, producing hormones and cytokines that influence tumor growth. This may help explain the observed correlation between obesity and elevated levels of these tumor markers.

Table 1. Statistical significance for correlation between obesity and breast cancer diagnosis

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	36.032[a]	1	.000		
Continuity Correction[b]	34.841	1	.000		
Likelihood Ratio	36.596	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	35.942	1	.000		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 97.00.

b. Computed only for a 2x2 table

The study findings suggest that CA 15-3 may be a more reliable marker for early breast cancer detection and monitoring due to its higher sensitivity and specificity than CA 125. However, since both markers are correlated with advanced cancer stages and obesity, they could serve as complementary tools for breast cancer diagnosis and prognosis, particularly when used alongside imaging studies and clinical evaluations. Further research with larger sample sizes and longitudinal follow-up will be necessary to fully validate the role of these biomarkers in the clinical management of breast cancer.

Discussion

The present study evaluated the diagnostic and prognostic value of CA 15-3 and CA 125 in a cohort of breast cancer patients, highlighting their potential as biomarkers for early detection, disease progression, and monitoring. The results revealed significant differences in the serum levels of these markers between breast cancer patients and healthy controls, with CA 15-3 demonstrating better diagnostic performance compared to CA 125. These findings are consistent with previous studies, which have shown that CA 15-3 is a valuable biomarker for detecting breast cancer, particularly in more advanced stages. In contrast, CA 125 shows potential for complementing other diag-

nostic methods. The diagnostic sensitivity and specificity of CA 15-3 (78% and 85%, respectively) found in this study align with other research demonstrating its role as a reliable marker for breast cancer detection, particularly in metastatic or advanced disease. Several studies have indicated that CA 15-3 is a sensitive marker for breast cancer, especially in patients with advanced disease or distant metastasis. For example, a study by Duffy et al. showed that CA 15-3 is an effective marker for monitoring disease progression and recurrence in breast cancer patients [21]. Similarly, Sturgeon et al. reported that CA 15-3 is commonly elevated in the blood of patients with metastatic breast cancer, making it a useful tool for assessing treatment efficacy and predicting recurrence [22]. The high specificity of CA 15-3 in our study suggests that it is an excellent marker for distinguishing breast cancer patients from healthy individuals. However, it may not be sensitive enough for early-stage detection in asymptomatic women.

In contrast, CA 125 showed a lower sensitivity (62%) and specificity (80%) in the current study. While CA 125 is more commonly associated with ovarian cancer, several studies have investigated its utility in breast cancer, particularly in advanced stages. A study by Ma et al. found that CA 125 is elevated in patients with metastatic breast cancer, although it is less sensitive than other markers such as CA 15-3 [23]. Our results align with these findings, suggesting that CA 125 may have value as an adjunct to other diagnostic methods, particularly in patients with more advanced diseases. However, due to its relatively low sensitivity, CA 125 may not be suitable for early detection or screening asymptomatic women.

Both CA 15-3 and CA 125 showed a significant correlation with advanced breast cancer stages, which supports the use of these markers as prognostic tools. Elevated levels of CA 15-3 have been associated with tumor burden, and it is often used to assess the progression of breast cancer and predict patient outcomes. For example, Sturgeon et al. demonstrated that CA 15-3 levels are significantly higher in patients with stage III and IV breast cancer and that these levels correlate with worse prognosis [24]. Similarly, our study found that CA 15-3 levels were elevated in advanced stages of breast cancer, suggesting that it may be a useful marker for monitoring disease progression and guiding treatment decisions. This is particularly important as breast cancer can have variable clinical courses, and monitoring tumor markers helps in tailoring individual treatment plans.

CA 125 has been less commonly used in breast cancer but has shown promise in identifying patients with metastatic disease, especially in the context of peritoneal and pleural metastasis. A study by Kim et al. found that CA 125 was significantly elevated in breast cancer patients with stage IV disease, supporting its potential role as a complementary biomarker in advanced cases [25]. While our study also found that CA 125 levels were elevated in the later stages of the disease, the lower sensitivity and specificity make it less reliable as a first-line diagnostic tool for breast cancer, especially in the absence of other clinical indicators.

An important finding in this study was the correlation between CA 15-3 and CA 125 levels and obesity, which is a well-established risk factor for breast cancer. Obesity is associated with chronic inflammation, insulin resistance, and elevated estrogen levels, all of which are believed to promote breast cancer development. Our results support the hypothesis that adiposity may influence tumor marker levels, as we observed higher CA 15-3 and CA 125 levels in obese breast cancer patients. Previous studies have also highlighted the impact of obesity on cancer prognosis. Vona-Davis and Rose noted that obese women with breast cancer often experience worse outcomes, including higher recurrence rates and lower survival [26]. Similarly, Caan et al. reported that obesity in breast cancer patients is associated with increased tumor marker levels, potentially reflecting the complex interplay between obesity-related metabolic changes and tumor biology [27].

The relationship between obesity and elevated tumor markers is likely multifactorial. Adipose tissue produces inflammatory cytokines, adipokines, and estrogen, all of which may contribute to the higher levels of CA 15-3 and CA 125 observed in obese women. Studies have shown that inflammatory markers, such as C-reactive protein (CRP), are elevated in obese individuals and may influence the secretion of tumor markers [28]. Moreover, obesity is associated with altered metabolic pathways, including increased insulin-like growth factor (IGF) signaling, which can

drive tumor growth and marker production [29].

While the results of this study are promising, several limitations must be acknowledged. The cross-sectional nature of this study limits the ability to assess the markers' ability to detect early-stage breast cancer or predict the long-term clinical outcomes of patients. Future longitudinal studies are needed to evaluate the potential of CA 15-3 and CA 125 in monitoring treatment response and survival. Additionally, this study included a relatively small cohort of participants, which may limit the generalizability of the results. More extensive prospective studies with diverse patient populations, including those with different breast cancer subtypes and stages, would help validate the diagnostic and prognostic value of these markers.

Moreover, while CA 15-3 and CA 125 may have utility in advanced breast cancer, further research is needed to determine the combined use of these markers with other biomarkers (e.g., HER2, ER, PR) and imaging techniques to improve diagnostic accuracy and predict patient outcomes more effectively. For example, using multimarker panels incorporating CA 15-3, CA 125, and other emerging biomarkers could improve early detection, treatment monitoring, and patient stratification in clinical practice.

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CORRELATION BETWEEN BENIGN BREAST DISEASE, AGEING, AND BREAST CANCER RISK

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Introduction

Breast cancer remains one of the most public health challenges for women worldwide, with its incidence rising steadily as women age. It is a multifaceted disease influenced by various risk factors, including genetics, lifestyle, and hormonal factors. A significant body of research has increasingly focused on understanding the relationship between benign breast diseases (BBD), the ageing process, and the subsequent risk of developing breast cancer.

As women age, changes in breast tissue are common, and many experience non-cancerous conditions such as fibrocystic changes, fibroadenomas, and other benign abnormalities. These conditions are often detected during routine screenings or imaging, but their potential to increase breast cancer risk remains a subject of considerable debate and ongoing research [1-3]. While most benign breast diseases do not progress to cancer, specific types have been associated with a higher risk, especially in older women. For example, conditions like atypical hyperplasia or specific types of mastitis can elevate the likelihood of malignancy, although they remain far less common than typical benign changes [4, 5].

The question of how ageing influences the transformation of benign conditions into malignant ones remains a com-

plex puzzle, as the mechanisms underlying these processes are not yet fully understood. However, it is clear that with ageing, breast tissue undergoes a range of structural and functional changes, including shifts in hormone levels, tissue density, and immune responses—all of which can contribute to the development of both benign and malignant lesions [6, 7].

Moreover, the increasing life expectancy globally has resulted in a growing population of older women, many of whom may face cumulative breast cancer over time. This highlights the need for targeted screening approaches that consider both the natural ageing process and benign breast conditions. Such an understanding could lead to more personalized and effective prevention strategies, allowing for earlier detection and potentially reducing the incidence and mortality rates of breast cancer. Additionally, recognizing that benign conditions may act as precursors to breast cancer could lead to more refined risk stratification methods, helping doctors identify those women who may benefit most from more frequent or advanced screening methods [8, 9].

Furthermore, while ageing is a known risk factor for breast cancer, it is crucial to consider how other factors—such as family history, genetics, reproductive history, and lifestyle choices—intersect with benign breast diseases in influencing cancer risk. For instance, research has demonstrated that women with a family history of breast cancer may face a higher risk even if they have benign breast changes. Similarly, lifestyle factors like diet, exercise, alcohol consumption, and hormone replacement therapy can further modulate this risk [10, 11].

In addition to improving screening techniques, advancing our understanding of the biological mechanisms that link benign breast diseases with breast cancer could lead to novel interventions. For example, targeting the molecular pathways that govern the progression from benign conditions to malignancy could provide opportunities for chemoprevention—using drugs or other treatments to reduce the risk of cancer in high-risk populations. Research into these mechanisms could also inform the development of new therapies for early-stage breast cancer, potentially improving survival rates and quality of life for women affected by the disease [12, 13].

Ultimately, a comprehensive understanding of the relationship between aging, benign breast diseases, and breast cancer risk is essential for creating more effective public health strategies. These strategies should focus not only on improving early detection and prevention but also on addressing the broader social, environmental, and genetic factors that contribute to breast cancer risk. By adopting a more holistic approach to breast cancer prevention and care, we can work toward reducing the global burden of the disease, particularly among older women who may face a higher risk as they age [14, 15].

Material and Methods

A retrospective case-control study was conducted to examine the relationship between benign breast diseases (BBD) and subsequent breast cancer development in a cohort of 400 women who underwent routine breast cancer screening. The study aimed to understand better how the presence of BBD might influence the risk of developing breast cancer later in life. Participants were divided into two groups: those with a prior diagnosis of benign breast diseases (including conditions such as fibrocystic changes, fibroadenomas, and atypical hyperplasia) and those without any history of BBD. This categorization allowed for a direct comparison between women with benign breast conditions and those without in terms of the incidence of breast cancer over time.

The data collected during the study included various demographic and clinical variables, such as age, specific type of benign breast disease, family history of breast cancer, and other relevant factors. Information was also gathered regarding any subsequent breast cancer diagnoses made during follow-up periods. These data were carefully analyzed to assess whether there was a statistically significant association between BBD and the development of breast cancer.

Statistical methods, including Chi-square tests and logistic regression models, were employed to analyse the data. The Chi-square test was used to assess the relationships between categorical variables, such as the presence or absence of BBD and breast cancer diagnosis, allowing for a comparison of proportions between the two groups. Logistic regression models, on the other hand, were used to account for multiple variables and to assess the independent effect of benign breast diseases on the odds of developing breast cancer while controlling for potential confounding factors such as age, family history, and other lifestyle-related risk factors.

Results

Among the 400 participants in the study, 300 were diagnosed with benign breast diseases (BBD), representing a significant portion of the cohort. The incidence of BBD was notably higher in women aged 60 to 80 years, with this group showing the most pronounced prevalence of benign breast conditions ($p < 0.01$). This finding is consistent with existing research suggesting that ageing is a key factor in the development of BBD, as the hormonal and physiological changes that occur with ageing can contribute to alterations in breast tissue classified as benign. The increased incidence of BBD in this age group highlights the growing importance of monitoring older women for breast health, as these conditions may have implications for long-term cancer risk.

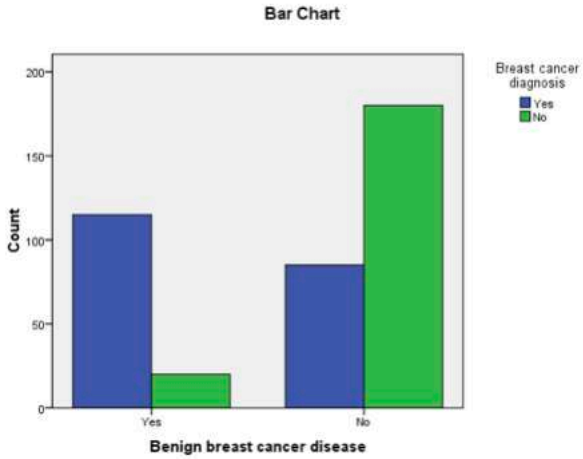

Figure 1. Correlation between BBD and diagnosis of breast cancer

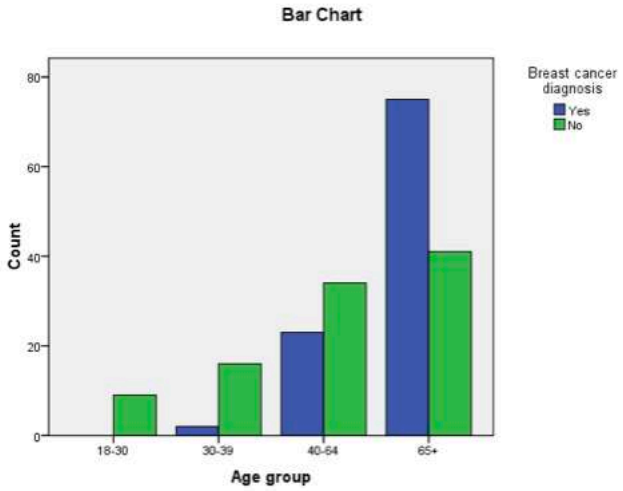

Figure 2. Correlation between aging and breast cancer diagnosis

The study further revealed that women with a history of benign breast diseases (BBD) had a nearly threefold higher risk of developing breast cancer compared to those without a history of benign breast conditions ($p < 0.001$). This finding underscores the potential link between benign breast lesions and an elevated risk of malignancy. While the majority of benign conditions do not lead to cancer, certain types of BBD—particularly those involving atypical hyperplasia or other pre-cancerous changes—have been shown to increase the likelihood of developing breast cancer. This highlights the need for closer surveillance and more personalized screening strategies for women with BBD, especially as they age.

Table 1. Statistical significance of the correlation between BBD and breast cancer diagnosis

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	100.908[a]	1	.000		
Continuity Correction[b]	98.795	1	.000		
Likelihood Ratio	108.716	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	100.656	1	.000		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 67.50.

b. Computed only for a 2x2 table

Additionally, the study found that older age was strongly correlated with an increased number of breast cancer diagnoses ($p < 0.001$). This relationship is well documented in breast cancer epidemiology, where age is a well-established risk factor for both the development and progression of breast cancer. As women age, the cumulative effects of hormonal exposure, genetic predispositions, and environmental factors may contribute to the higher incidence of breast cancer in older populations. The significant correlation observed in this study further supports the need for age-appropriate screening and prevention strategies to address better the unique risk factors associated with breast cancer in older women.

Taken together, these findings suggest that benign breast disease and ageing significantly elevate the risk of breast cancer. The results emphasize the importance of early detection, tailored screening, and risk assessment for women with benign breast disease (BBD), particularly those in the higher age brackets, who may face compounded risks due to both ageing and the presence of benign lesions. These insights could be crucial for refining local breast cancer prevention and early detection strategies in populations like those in Sarajevo Canton, where age-related health issues are becoming increasingly prevalent.

Table 2. Statistical significance of the correlation between ageing and breast cancer diagnosis

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	133.529[a]	72	.000
Likelihood Ratio	164.881	72	.000
Linear-by-Linear Association	83.705	1	.000
N of Valid Cases	400		

a. 122 cells (83.6%) have expected count less than 5. The minimum expected count is .50.

Discussion

The results of our study demonstrate a significant relationship between BBD, ageing, and the risk of breast cancer, particularly in women aged 60 to 80 years. We found that women with a history of BBD had a nearly threefold higher risk of developing breast cancer compared to women without ($p < 0.001$), which supports previous findings in the literature that have established an association between benign lesions and increased breast cancer risk [16, 17]. Additionally, our study observed that the incidence of BBD was highest among women aged 60 to 80 years ($p < 0.01$), and older age was strongly correlated with increased breast cancer diagnoses ($p < 0.001$), aligning with findings from other studies indicating that both ageing and benign breast conditions are significant risk factors for the development of breast cancer [18, 19].

Our study corroborates numerous studies showing an increased risk of breast cancer in women with benign breast diseases. A large cohort study by Li et al. [20] found that women with benign breast lesions, particularly those with atypical hyperplasia, have a 4 to 5 times higher risk of developing breast cancer. Similarly, a meta-analysis by McCormick et al. [21] concluded that benign breast conditions such as atypical ductal hyperplasia (ADH) and atypical lobular hyperplasia (ALH) were associated with a significantly elevated risk of breast cancer, mainly when these lesions were detected at an early age. Our study's finding that women with BBD face a nearly threefold increased risk of breast cancer aligns with this body of evidence and emphasizes the importance of identifying high-risk benign lesions in clinical practice.

Several studies have shown that the risk conferred by benign lesions is not uniform across all types of BBD. For example, benign conditions like fibrocystic changes or fibroadenomas do not appear to increase cancer risk significantly. In contrast, conditions such as atypical hyperplasia have been consistently linked with higher risks of progression to malignancy [22, 23]. Our findings also suggest that the risk of breast cancer in women with BBD may vary depending on the specific type of benign condition, supporting the need for more personalized screening protocols that differentiate between various categories of benign lesions.

Additionally, our results demonstrate a strong correlation between ageing and an increased risk of breast cancer ($p < 0.001$), which is consistent with a wealth of studies highlighting age as one of the most significant risk factors for breast cancer [24,25]. The incidence of breast cancer rises sharply in women after the age of 50, with the highest rates observed in women aged 60 and above [26]. This increase is related to a combination of hormonal changes, such as decreased estrogen and progesterone levels, and the accumulation of genetic mutations over time [27,28].

The age-related changes in breast tissue and hormonal regulation have been well documented in the literature. As women approach menopause and enter postmenopause, their breast tissue becomes more adipose (fatty), and the protective effects of estrogen are reduced, which may facilitate the development of estrogen receptor-positive breast cancers [29]. Our study's findings, which show a significant increase in breast cancer diagnoses with age, are consistent with these mechanisms, further emphasizing the need for enhanced screening and preventive measures for older women. Studies have also suggested that women in their 60s and 70s may have a higher likelihood of being diagnosed with breast cancer that is more aggressive or at a later stage due to less frequent screening or misdiagnosis [30].

One of the most significant findings of our study is the combined effect of ageing and BBD on breast cancer risk. Older women with BBD exhibited the highest risk for breast cancer, supporting the hypothesis that ageing and benign lesions may have a synergistic effect on cancer risk. Previous research has shown that while BBD itself is a risk factor for breast cancer, its association with cancer risk becomes more pronounced as women age. For example, Eliassen et al. [30] found that women with a history of benign breast conditions, particularly in their 40s and 50s, had an elevated risk of developing breast cancer in their 60s and beyond. Our findings suggest that ageing exacerbates the risk associated with BBD, making it a crucial factor to consider when designing screening and prevention strategies.

In a similar vein, a study by Tice et al. [31] found that older women with benign breast disease were at significantly higher risk of breast cancer compared to their counterparts, underscoring the need for age-adjusted surveillance. Moreover, the interaction between ageing and BBD is likely influenced by hormonal changes that occur with menopause and genetic and environmental factors that accumulate over time. This interaction is critical when developing risk models, as women with both advancing age and benign lesions may require more intensive screening and preventive care.

The findings of this study have important implications for breast cancer screening and prevention strategies, particularly in older women with BBD. Current screening guidelines often recommend mammography every 1 to 2 years for women aged 50 and older. Still, our study's findings suggest that women with BBD, especially those in the 60 to 80 age range, may require more frequent or specialized screening to detect potential malignancies at an earlier stage. This recommendation is supported by several studies indicating that mammography may miss up to 20 to 30% of breast cancers in women with dense breast tissue or benign conditions such as fibrocystic changes [32, 33]. Supplementary imaging techniques, such as breast ultrasound or MRI, could be particularly beneficial for women with BBD, as these methods are more sensitive in detecting cancers that might be obscured by dense tissue [34, 35].

Additionally, genetic counselling and risk assessment should be considered for women with both benign breast disease (BBD) and a family history of breast cancer. Research has shown that women with a first-degree relative diagnosed with breast cancer are at significantly higher risk of developing the disease, regardless of whether they have benign lesions [36, 37]. In light of these findings, personalized screening protocols that take into account both benign breast conditions and family history may offer a more effective strategy for reducing breast cancer morbidity and mortality, particularly in older women.

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ERYTHROMYCIN INTERFERENCES WITH LABORATORY TEST RESULTS

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Introduction

Erythromycin is known as a macrolide antibiotic and an inhibitor of CYP3A, originally discovered in the 1950s. Its antimicrobial action mainly inhibits bacterial protein synthesis [1]. The interferences of erythromycin with laboratory test results include increasing activity of enzymes and rising concentration of bilirubin and cyclosporine [2-4]. Laboratory test results are a crucial part of medicine because 60-70% of all medical decisions are based on them. According to the work of Katanic J et al., about 43% of patients had drug-laboratory test interactions (DLTI. If interactions are not recognized, it can lead to incorrect or delayed diagnosis, additional costs for unnecessary additional tests or inadequate therapy because all of this can cause false clinical decisions [5]. The treatment with medicines can produce false-negative or false-positive results, and it is important to have this information in laboratory routine, as well as in clinical practice and pharmaceutical care. The information could lead to changes in the clinical laboratory diagnosis and monitoring and evaluation of patient prognosis [6]. Laboratory analyzes should be viewed according to the possible interaction with medications (therapy in the last 10 days) that could impact the final results [2,5].

Case presentation

A 6-year-old male was ill in July 2019 (age 18 months) when he was diagnosed with nephrotic syndrome, and it was treated with systemic steroids. The first relapse occurred in December 2019 (age 23 months) when re-treated with systemic steroids. The second relapse of nephrotic syndrome followed in May 2020, when a kidney biopsy was performed ("minimal change disease"), and steroid therapy was reintroduced. In May/June 2019, a complete rheumatological treatment was performed, and systemic lupus erythematosus was excluded. It was considered that his disease has an unusual association between nephrotic syndrome and juvenile idiopathic arthritis. The kidney transplant was performed in 2021. After 3 years since the kidney transplant, he got chicken pox, the flu and infections of the respiratory system. Our patient was referred to the Infection Clinic of our Clinic Centre, and laboratory investigation was done: serum C-reactive protein (CRP); procalcitonin (PCT); aspartate aminotransaminase (AST); alanine aminotransaminase (ALT), bilirubin and cyclosporine (CsA). In the therapy, he received a 120 mg infusion of cyclosporine, a 600 mg infusion of acyclovir, and a 100 mg infusion of amphotericin B over 24 hours. Erythromycin suspension syrup was given at 60 mg twice a day.

The laboratory tests were done using Alinity (ABBOTT). The laboratory test results on the first day were: CRP 57.1 mg/L (reference range 0.0-5.0 mg/L), PCT 1.69 ng/mL (reference range 0.05-0.5 ng/mL). The liver test and cyclosporine were: 31 U/L AST (reference range 21-44 U/L); 27 U/L ALT (reference range 16-32 U/L); 10.4 umol/L bilirubin (reference range 1.7-20.5 umol/L) and 102.30 ug/L cyclosporine (CsA) (reference range 75-150 ug/L). After 7 days of therapy, laboratory tests were repeated: decrease 4.9 mg/L CRP and 0.4 ng/mL PCT; increase 61 U/L AST; 50 U/L ALT; 62.2 umol/L (bilirubin); and 372.60 ng/mL (CsA). The erythromycin suspension syrup was given for 7 days, and after 3 days, when erythromycin suspension syrup was temporarily stopped, AST, ALT, bilirubin and CsA

were in the reference range. The results of the biochemistry test are shown in **Table 1.**

Table 1.: Laboratory test results

Laboratory tests	1st day	2nd days	7th days	10th days
CRP (mg/L)	57.1	45	4.9	4.2
PCT (ng/mL)	1.69	1.40	0.4	0.3
AST (U/L)	31	39	61	41
ALT (U/L)	27	35	50	31
Bilirubin (umol/L)	10.4	17	62.2	20
Cyclosporine (ng/mL)	102.30	97.20	372.60	145.60

Our investigation had shown the enzyme activity was increased for AST, ALT, bilirubin concentration and CsA concentration after 7 days of erythromycin therapy. Using erythromycin therapy, CRP and PCT concentrations decreased after 7 days of treatment.

Discussion

The results of Silva RS et al. [2] show that medicines such as erythromycin can cause biological interference in the hepatic function because it may be hepatotoxic, and important to measure the hepatic enzymes ALT, AST, GGT, and alkaline phosphatase (ALP), as well as bilirubin of the patients who use them. Drug-induced liver injury (DILI) is an induced liver injury that generally occurs between one and 90 days after drug administration in usual doses. Many drugs that cause transient increases in serum ALT or AST do not cause progressive or severe DILI [7]. Freeman AJ et al. have found that erythromycin significantly increased the concentration of CsA. The results on normal subjects confirm that patients administered CsA and erythromycin have a risk of CsA toxicity [4]. The cytochrome P-450IIIA in the liver metabolize CsA and erythromycin. In the coadministration of erythromycin and CsA, prolonged elimination of cyclosporine could be expected [8]. According to the therapeutic values for CsA in renal kidney transplant, patients is 200-300 ng/mL in the first 3–12 months, then after the reference range is 75-150 ng/mL, the toxic dose for cyclosporine is a concentration over 350 ng/mL [9]. It is very important to know the interferences in order to remove the analytical errors of the laboratory results in time, which can be positive and negative. Reducing errors prevents complications for patients, laboratories and doctors [10].

The main learning points obtained through our study are as follows: Erythromycin can cause biological interference with laboratory test results; it raises enzyme activity ALT, AST, GGT and bilirubin concentration; erythromycin and cyclosporine have the same liver metabolize enzyme system; erythromycin induced increase of CsA blood concentration and decrease in clearance of CsA. Medication interference can cause wrong laboratory tests. Laboratory professionals should warn physicians and other health professionals how to identify possible interference and reduce wronged diagnoses and unsuccessful monitoring of patients. Lastly, special care should be taken with transplanted patients and use antibiotic therapy.

Conclusions

In cases where erythromycin and CsA are coadministered, CsA metabolism is reduced, hepatic metabolism decreases, and plasma concentrations of CsA increase. Erythromycin causes biological interference in hepatic function, increasing serum levels of bilirubin and hepatic enzymes. The therapy of organ transplant patients is vital, especially **in** monitoring immunosuppressive blood concentrations and renal function. It is important to be awarded with these interactions to reduce toxicity and enhance therapeutic effect.

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PP105

CHALLENGES OF BLOOD COUNT DETERMINATION IN PREMATURE BABIES AND NEWBORNS

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Introduction

Red blood cells with nuclei (NRBCs) are precursors of premature erythrocyte (RBC – red blood cells) and rarely present in the circulatory system of healthy adults. They are usually found in the bone marrow of people of all ages, where the common myeloid progenitor cell differentiates into more developed cells to become an erythroblast. The nucleus is ejected, and the cell becomes a reticulocyte, which later develops into a mature erythrocyte. NRBCs can circulate in fetuses and appear to disappear in healthy newborns in the first month of life [1].

The number of neonatal NRBCs varies depending on gestational and chronological age. In newborns, NRBCs emerge from bone marrow approximately 28 hours after stressors such as hypoxia [2].

Various NRBC patterns appear to be related to fetal injury time, suggesting that the number of NRBCs may help determine the timing of fetal neurological damage. A large number of NRBCs reflect the severity and duration of hypoxia, and the number of NRBCs can rise rapidly after short but severe hypoxia due to the release of stored NRBCs [3]. NRBCs are also a sensitive indicator of mortality among premature infants and prognoses of retinopathy of prematurity (ROP), bronchopulmonary dysplasia, necrotizing enterocolitis, or sickle cell disease [1]. Increased number of NRBCs in the first 2-5 days of life are associated with higher mortality. The earlier the premature baby is born, the higher the number of NRBCs at birth [2]. The presence of NRBCs may indicate an increased production of erythrocytes outside the bone marrow or a disorder of the blood-bone marrow barrier.

The number of NRBC/100 leukocytes is quite variable but rarely higher than 10. There are cases where the number of NRBCs exceeds 10, and the most common causes are premature birth, Rhesus sensitization and Diabetes mellitus of the mother [4].

The morphology of erythroblasts, which contain the nucleus but also their average size, is a common reason why analyzers count erythroblasts into leukocytes (WBC - white blood cells), thus obtaining falsely higher numbers of WBC and unrecognized or inadequately counted erythroblasts. Therefore, the use of analyzers that can differentiate erythroblasts as a separate cell line is important.

Case report:

A male newborn sample was received in the Pediatric Clinic of Clinical Center University of Sarajevo laboratory. Ethics committee approval is not required for that case, and informed consent was not applicable (Document number 51-45-1-40286/24 issued by Discipline for Science and Teaching, Clinical Center University of Sarajevo). This is the first child from a twin pregnancy, low birth weight, in the group of neuro risk children, with associated diagnoses: Asphixia perinatal, Hydrocephalus and Intrauterine Growth Restriction. A blood sample was analyzed in routine work. Considering that this is a premature child of low birth weight and suspicion of the presence of erythroblasts, the analysis was performed on three hematological analyzers: Quintus 5-part analyzer (Boule Medical AB, Spanga, Sweden), Beckman Coulter DxH 900 (Beckman Coulter, Brea, CA, U.S.A) and Sysmex XN 3100 analyzer (SYSMEX CORPORATION, Kobe, Japan).

The Quintus 5-part analyzer uses the volumetric impedance method to count and measure the size of cells by detecting changes in electrical resistance when a particle in a fluid passes through a small opening where there is a change in impedance. The number of pulses is proportional to the number of particles, and its intensity is proportional to the particle's volume. Optical scattering and refraction measurements are used for the differential analysis of leukocytes. The resulting optical phenomena, refractions and scattering depend on the volumes and granulation of the cells, and based on the detected differences, leukocyte differentiation is performed [5].

Beckman Coulter DxH 900 Analyzer is a quantitative, multiparameter automatic hematology analyzer (29 parameters) for in vitro diagnostic use and screening of the patient population [6]. The basic principle of this analyzer is based on the Coulter principle, i.e., measuring the change in electrical resistance registered when a particle-cell passes in a conductive liquid. In this way, WBC, RBC and platelets (PLT) are counted.

Nucleated red blood cell (NRBC) measurement, reticulocyte percentage and differential WBC analysis take place in the VCS module (volume, conductivity and light scatter) [6]. The VCS provides information on cell complexity, cytoplasmic granulation, nucleus structure, and size [7]. Using impedance, information on volume is obtained; radiofrequency conductivity provides information on the internal composition of the cell as well as the nucleus/cytoplasm ratio and light scattering measurements about cell granularity [8]. Using complex and innovative algorithms, the analyzer accurately classifies cell populations and marks samples with abnormal cells [7,8].

Sysmex XN-3100 is a modern multifunctional, fully automated analyzer in which the analysis of leukocytes is based on a combination of two methods: fluorescent flow cytometry and light scattering method [9]. This analyzer is characterized by three different channels in which different cell types are analyzed.

The WNR channel (white cell nucleated) is a specific channel that serves to analyze red blood cells with a nucleus (NRBC) and distinguishes them from leukocytes, especially basophils.

WDF channel (white cell differential) is used to differentiate and count lymphocytes, monocytes, eosinophils, immature granulocytes, and atypical lymphocytes.

The WPC channel (white cell precursor) can detect immature leukocytes as well as abnormal lymphocytes. This channel is used to analyze those samples that show abnormalities by analysis in the WDF.

In cases where an abnormality is detected in the Sysmex XN-3100 analysis, a microscopic examination of the blood smear is recommended to confirm or eliminate the observed deviations. In this case, automatic blood smear production is possible by the analyzer, which is done in the parts of the analyzer that are marked as SP-50 (Slide preparation) and DI-60 (Digital Imaging).

SP-50 is a part in which the blood smear is made and stained. DI-60 is a device that provides digital morphological analysis of blood smear cells, which is done using a light microscope and a digital color camera. The processed slides can be viewed on a computer using a CellVision digital system that uses algorithms to recognize and classify cells based on their morphology. The obtained results (preclassification) are examined by educated laboratory staff, who make possible corrections (reclassification) and verify them.[9]

The above haematological analysers obtained the following results (Table 1).

Table 1. Display of the results of the analyzed blood sample on 3 analyzers

	Quintus 5-diff	Beckman Coulter DxH 900	Sysmex XN-3100
WBC ($x\ 10^9/L$)	9.73	4.90	5.35
RBC ($x\ 10^{12}/L$)	3.44	3.71	3.68
PLT ($x\ 10^9/L$)	44	10	8
NRBC (%)	/	24.8	50.7
Flag	/	Abn NRBC Pattern	NRBC Present

Table 2. Results of digital microscopic examination on the Sysmex XN-3100 analyzer (Preclassification and Reclassification)

Sysmex XN-3100 Digital Microscopy (Preclassification)	
NRBC	70%
Unclassified cells	17%
Sysmex XN-3100 Digital Microscopy (Reclassification)	
Acidophilic erythroblast (%)	79
Polychromatic erythroblast (%)	45.7
Basophilic erythroblast (%)	3.7

Discussion

Significant differences in the number of WBCs on the three hematological analyzers used can be observed.

The Quintus 5-diff analyzer showed a significantly higher number of WBCs compared to the other two analyzers. The reason for such discrepancy can be explained by the fact that this analyzer cannot differentiate NRBC, and due to similarities in morphological structure, they are counted in the WBC. This can result in a falsely high number of WBCs.

Beckman Coulter DxH 900 and Sysmex XN-3100 analyzers clearly differentiate NRBC from WBC and warn about their presence in the sample, which is a significant advantage in analysing pathological samples.

Warnings about the presence of NRBC give a clear signal to laboratory personnel that a sample should be examined with an optical Microscopy (reference method).

Since the Sysmex XN-3100 analyzer has automatic digital microscopy in its configuration, after specific warnings of abnormalities in the samples, it automatically makes a smear of peripheral blood and microscopes it. The microscopic analysis results are presented as color photographs of each individual cell.

Automatic microscopy was also performed on this sample, where, among other cells, the total number of NRBCs was presented. Considering that Sysmex XN-3100 classifies all erythroblasts in NRBC, a reclassification was made on the analyzer by observing photos obtained using DI-60 by an educated biochemistry specialist. The specialist differentiated erythroblasts into 3 groups: acidophilic, polychromatophilic and basophilic erythroblasts, then validated and verified the results.

Conclusion

The possibility of detecting NRBC is a significant performance of hematological analyzers in daily practice. NRBC plays an important role in diagnosing, prognosis and monitoring the applied therapy in children and adults with various pathological conditions.

An analyzer with this capability is imperative in today's diagnostics, especially in laboratories where samples from patients with more severe pathological conditions are present.

Analyzers with digital microscopy have a significant advantage because they reduce sample processing time, increase accuracy, eliminate subjectivity and ensure traceability. If the laboratory doesn't have such an analyzer, it is necessary to process the samples with certain optical microscopy warnings to accept or reject the analyzer's warnings.

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PP111

ACUTE PANCREATITIS AS A RARE DIAGNOSTIC CLUE FOR MULTIPLE MYELOMA: A CASE REPORT

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Introduction

Acute pancreatitis (AP) is a serious inflammatory condition of the pancreas most commonly triggered by factors such as gallstones or excessive alcohol consumption [1-3]. Clinically, it is characterized by acute abdominal pain, elevated serum lipase levels, and distinct imaging findings [4]. While these are the hallmark signs, rare and often overlooked conditions may also precipitate AP. One such rare etiology is multiple myeloma, a hematological malignancy marked by the clonal proliferation of abnormal plasma cells [5,6]. We report the case of a patient in whom AP served as an unexpected diagnostic clue, ultimately revealing the underlying presence of multiple myeloma. This case underscores the importance of considering atypical and rare diagnoses in the workup of AP, notably when the clinical presentation deviates from the common causes.

Case presentation

We present the case of Mrs H.K., a 49-year-old untreated hypertensive patient admitted to the emergency department with a range of symptoms, including asthenia, general malaise, exertional dyspnea, oppressive chest pain, vomiting, and epigastric pain that had been present for several days prior to her consultation. Upon initial examination, the patient's SpO2 was 96% on room air, and her respiratory rate was 19 breaths per minute, with no signs of respiratory distress or orthopnea. Hemodynamically, she was stable with a blood pressure of 160/80 mmHg, a heart rate of 92 bpm, and normal peripheral pulses, with no signs of heart failure. Neurologically, she exhibited lethargy with brief episodes of agitation, but no sensory or motor deficits were noted. The abdomen was soft, with tenderness localized to the epigastric region.

Initial lab results showed normal capillary blood glucose, no fever, skin abnormalities, or rectal examination issues. Electrocardiogram findings included a regular sinus rhythm at 77 bpm, incomplete right bundle branch block, left ventricular hypertrophy (Sokolow index of 38 mm), ST-segment depression in inferolateral leads, narrow QRS complexes, PR interval of 200 ms, and a QT interval of 280 ms. Chest X-ray revealed cardiomegaly with bilateral peri-hilar interstitial opacities.

Biological results indicated acute functional renal failure (urea 16 mmol/L, creatinine 237 µmol/L), hyponatremia, hypokalemia, and hypercalcemia at 4.17 mmol/L (ionized calcium 1.8 mmol/L). Inflammatory markers were elevated (CRP 53 mg/L) without leukocytosis. Troponin levels were positive, and the patient exhibited hypochromic microcytic anemia (6.23 g/dL), with a positive direct Coombs test suggesting hemolysis. Lipase levels were markedly elevated, 50 times the normal range.

While acute pancreatitis was initially suspected, a Blamey score of 1 made a biliary origin unlikely. Further investigation revealed an acute hypercalcemic crisis, evidenced by agitation, vomiting, abdominal pain, hypercalcemia, acute renal failure, hypokalemia, pancreatitis, and myocardial involvement with type 2 infarction.

The patient was treated with hyperhydration, furosemide, bisphosphonates, and urgent hemodialysis. After hemodialysis, her respiratory, hemodynamic, and neurological conditions stabilized, though mild persistent epigastric tenderness remained. Biologically, hypercalcemia decreased to 3.2 mmol/L, but her anemia worsened (Hb 4.8 g/dL).

As her condition deteriorated with hemolytic anemia and renal failure, further investigations, including a renal ultrasound, revealed normal kidneys with poor corticomedullary differentiation. Multiple myeloma was suspected and confirmed through protein electrophoresis, which showed hyperproteinemia (141 g/L) and hypergammaglobulinemia (80.5 g/L). The diagnosis of multiple myeloma was subsequently confirmed, and the patient was transferred to the nephrology department.

Discussion

This case highlights the atypical presentation of acute pancreatitis as an initial manifestation of multiple myeloma (MM), a rare but notable association in clinical practice. Acute pancreatitis is commonly associated with gallstones, alcohol, hyperlipidemia, and drug-induced etiologies; however, its occurrence due to hypercalcemia secondary to multiple myeloma is rare [7]. This case provides valuable insight into the complexity of MM and its potential for unusual presentations, underlining the importance of broadening differential diagnoses in patients with unexplained pancreatitis.

Hypercalcemia is a recognized, though uncommon, precipitating factor in AP. In this case, the patient's hypercalcemic crisis—evident through her markedly elevated serum calcium—likely contributed to the onset of pancreatitis. Mechanistically, elevated calcium levels can stimulate pancreatic enzyme activation within the acinar cells, initiating local inflammation and injury that can progress to acute pancreatitis scores. It is important to assess serum calcium levels in pancreatitis cases without clear etiologies, as hypercalcemia might point to underlying conditions like malignancies [8,9].

Multiple myeloma (MM), though primarily associated with hypercalcemia, anemia, renal impairment, and bone lesions, rarely presents through AP. In such cases, MM-driven hypercalcemia often results from osteoclastic activity induced by cytokines secreted by malignant plasma cells, stimulating extensive bone resorption. Hypercalcemia of this nature, albeit infrequent, should be considered a differential diagnosis in patients with AP, especially when common causes like biliary or alcoholic etiologies are excluded [8].

In this case, the initial diagnostic workup suggested a multifactorial origin, with AP likely resulting from a biliary cause and further complicated by renal impairment. However, persistent hypercalcemia alongside renal failure and hemolytic anemia prompted a more comprehensive evaluation, revealing MM as the underlying pathology [10-12]. The protein electrophoresis showing hyperproteinemia and hypergammaglobulinemia became a pivotal finding, supporting the diagnosis of MM and illustrating the necessity of extended hematologic evaluation when initial investigations do not reveal an obvious etiology. This reinforces the value of considering hematologic malignancies in AP cases where hypercalcemia remains unexplained [9].

The therapeutic approach prioritized rapid correction of hypercalcemia through intravenous hydration, bisphosphonates, and diuretics, achieving partial stabilization. However, further progression in anemia and renal dysfunction necessitated specific treatment for MM. Targeted therapy, particularly bisphosphonates, proved beneficial in managing hypercalcemia and reducing bone resorption caused by the myeloma cells, addressing both the metabolic and skeletal complications of MM. The improvement in the patient's status post-treatment underscores the dual role of bisphosphonates in controlling hypercalcemia and mitigating the underlying disease activity [13,14].

Clinically, this case underscores the importance of vigilance for atypical manifestations of hematologic malignancies, as such conditions may present through seemingly unrelated symptoms like AP. The need for a thorough and systemic diagnostic approach is particularly highlighted when faced with unexplained, persistent hypercalcemia and multiorgan involvement. Early identification of MM in atypical contexts such as these can prove crucial in improving outcomes, as delayed diagnosis may lead to worsening renal failure, anemia, and a cascade of complications that compromise patient prognosis [15].

Conclusion

This case underscores the importance of considering multiple myeloma in atypical presentations of acute pancreatitis,

particularly when common causes such as gallstones or alcohol are absent. Persistent hypercalcemia in the setting of pancreatitis should raise suspicion of an underlying malignancy, prompting further hematologic investigations, including protein electrophoresis, to establish a diagnosis. The management of hypercalcemia with bisphosphonates is crucial, as it not only addresses metabolic complications but also mitigates bone resorption linked to myeloma. This case illustrates the need for an interdisciplinary approach, integrating oncology, nephrology, and gastroenterology expertise to manage multi-organ involvement and enhance patient outcomes.

Reporting Guidelines: This case report adheres to the Consensus-based Clinical Case Reporting Guideline Development (CARE)

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