POSTER ABSTRACTS

PA-1

Evaluation of Analytical Performance of Hemogram Tests Using Six Sigma Methodology in a University Hospital Hematology Laboratory

***[1]Gaye Malaş Öztekin*, [1]Süleyman Demir, [1]Esin Avcı, [1]Hülya Aybek**

[1]Pamukkale University Medicine Faculty, Denizli

Purpose: The Six Sigma methodology is widely used in the assessment of total test processes in clinical laboratories. Test performance can be dynamically monitored using sigma metrics based on defined quality targets. Our study aimed to evaluate the analytical performance of certain hemogram tests using the Six Sigma method and to determine appropriate control rules according to sigma levels.

Method: Retrospective data for hemoglobin, erythrocyte, leukocyte, and thrombocyte parameters, obtained from three months of internal quality control (September-November 2023) conducted on Mindray BC-6800 systems at Pamukkale University Hospital Hematology Laboratory, were collected from the Laboratory Information System. Combined %CV values for three-level controls were calculated. The total allowable error (TEa) target was obtained from CLIA. Bias was obtained from monthly results in the DKD program. The sigma metric for each test was calculated using the formula [(%TEa-%Bias)/%CV]. Test performance was visually classified on method decision charts and appropriate quality control procedures were determined based on sigma levels.

Results: The three-month sigma levels for hemoglobin tests were calculated as 5.33, 7.93, 5.50 for the 1st instrument and 5.17, 5.76, 5.35 for the 2nd instrument. Sigma levels for erythrocyte count were 4.18, 7.21, 4.95 for the 1st instrument and 4.23, 3.89, 3.85 for the 2nd instrument; for leukocyte count, 4.94, 7.45, 4.86 for the 1st instrument and 5.71, 7.69, 7.50 for the 2nd instrument; for thrombocyte count, 7.57, 6.60, 6.79 for the 1st instrument and 6.07, 7.16, 7.50 for the 2nd instrument. Tests with sigma levels 3-4 were recommended to be monitored using 13S/22S/R4S/41S control rules, those with 4-6 sigma levels with 12.5S, and those above 6 sigma levels with the 13S control rule.

Conclusion: The Six Sigma methodology is an appropriate tool for monitoring test performance in clinical laboratories. Determining control rules according to sigma levels and monitoring tests accordingly would be suitable.

Keywords: Six Sigma, analytical process, control rule

PA-2

Correlation of High Troponin I Levels and Platelet-To-Lymphocyte Ratio

***[1]Ayşe Değirmenci*, [1]Sibel Kulaksızoğlu**

[1]Antalya Training and Research Hospital,Antalya

Introduction: Platelet and lymphocyte are significant in acute myocardial infarction pathogenesis. Platelet lymphocyte ratio is more accurate and objective than platelets, and lymphocytes alone in predicting outcomes in patients with acute myocardial infarction, because they always combine two indicators that reflect the body's inflammatory status. Platelet lymphocyte ratio is a systemic biomarker which indicates thrombosis and inflammation. The diagnosis of acute myocardial infarction can be made by detecting elevated blood troponin I levels.

Aim : The objective of this study is to determine the correlation between platelet lymphocyte ratio and troponin I levels.

Method : In this study, platelet, lymphocyte and troponin I values of patients who applied to the emergency department of Antalya Training and Research Hospital between 01.01.2024 and 31.03.2024 were investigated retrospectively. Serum Troponin I levels were measured with the Maglumi x3 device, which is a fully automatic chemiluminescence immunoassay analyzer. Sysmex XN-1000 device is used for blood count.

Result: In this study, there were 958 men and 465 women over the age of 18 who applied to the emergency department and had high troponin I levels (>10 ng/l). 1423 patients were evaluated. The research included census data and measurement data. Data were processed with SPSS 20.0 Mean platelet lymphocyte ratio and troponin I levels were 278.18 ± 806.6 and 346.64 ± 1057.32 ng/l, respectively. A statistically significant correlation was detected between troponin I level and platelet lymphocyte ratio ($p<0,001$).

Conclusion: A positive correlation between platelet lymphocyte ratio and troponin I levels were observed. There is not enough research on this subject so far. Platelet lymphocyte ratio can be a guide in the diagnosis of the cardiovascular diseases in the future.

Keywords: Platelet-to-lymphocyte ratio; troponin I

PA-3

A Study on the Hemolysis Rate of Samples from the Emergency Department: University Hospital Practice

***[1]Arif Kuyusuz*, [1]Esin Avcı, [1]Hülya Aybek**

[1]Department of Medical Biochemistry, Faculty of Medicine, Pamukkale University, Denizli, Turkey

A Study on the Hemolysis Rate of Samples from the Emergency Department: University Hospital Practice Arif Kuyusuz, Esin Avcı, Hülya Aybek Department of Medical Biochemistry, Faculty of Medicine, Pamukkale University, Denizli, Turkey

Objective: Approximately 70% of laboratory errors originate from the preanalytical phase. Detection and evaluation of errors in the relevant unit are crucial for reducing these errors. In this study, we aimed to evaluate the rejection rate of hemolyzed biological samples that were received from the emergency department and pediatric emergency department to our biochemistry laboratory and were not processed in the Laboratory Information System (LIS).

Methods: The number of biological samples rejected due to hemolysis in the Pamukkale University Hospital Biochemistry Laboratory between October 2023 and December 2023 was retrospectively obtained from the LIS. The data were evaluated using Microsoft Excel, and analyses were performed according to laboratory units. The analyzed sections were evaluated by month.

Results: During the three-month period, a total of 27,645 biological samples were received from the emergency department and pediatric emergency department to our laboratory, and the total hemolysis rejection rate was calculated as 1.1%. When evaluated as a percentage, the highest rejection rate were observed in samples collected in yellow-capped tubes. In October, the hemolysis rejection rate was 0.23% in purple tubes, 0.75% in yellow tubes, and 0.73% in blue tubes, while in November, it was 0% in purple tubes, 1.5% in yellow tubes, and 0.64% in blue tubes, and in December, it was 0% in purple tubes, 1.9% in yellow tubes, and 0.83% in blue tubes.

Conclusion: Our study demonstrates that the hemolysis rejection rates originating from the preanalytical phase are not excessively high when evaluated as a percentage. However, considering the expected hemolysis rate to be higher, it may be more beneficial to establish laboratory hemolysis rejection criteria according to specific rules. Education of research assistant doctors, medical students, phlebotomists, and technicians is also crucial in this regard.

Keywords: rejection rate, hemolysis, preanalytical, laboratory medicine

PA-4

Acquired Bisalbuminemia in Pancreatitis

***[1]Gunay AFANDIYEVA*, [1]Özlem GÜLBAHAR**

[1]Gazi University, Faculty of Medicine, Department of Medical Biochemistry, Ankara, Turkey

Aim: Bisalbuminemia or alloalbuminemia is an inherited or acquired, rarely encountered serum protein anomaly, characterized by the occurrence of bicuspid electrophoretic pattern in the albumin fraction detected on serum protein electrophoresis. These albumin mutants also called alloalbumins either have increased electrophoretic mobility (fast type variants) or decreased mobility (slow type variants). We aimed to investigate and present the bisalbuminemic pattern in the serum protein electrophoresis of the patient with chronic pancreatitis.

Methods: The case is a 52-year-old male patient with chronic pancreatitis under follow-up. The patient's serum protein electrophoresis was performed using the capillary electrophoresis method.

Results: A 52-year-old male with multiple comorbidities, who has had chronic pancreatitis attacks related to hypertriglyceridemia and alcohol for 17 years, presented to the hospital with complaints of weight loss and B symptoms. The patient also had anemia and elevated sedimentation rate. A bisalbuminemic pattern was observed in the serum protein analysis conducted for further investigation. The patient underwent a thoracoabdominal Computed Tomography scan, which revealed a 5 cm collection in the splenic area. According to the biochemical analysis of the material obtained from the collection in the splenic locus, the results were as follows: Amylase >1500 U/L, Lipase 15225 U/L. According to the Endoscopic Retrograde Cholangiopancreatography report, a pancreatic duct-associated cyst was observed. The patient underwent abscess drainage and a drain was placed in the abscess area. The patient was initiated on antibiotic treatment based on the recommendation of infectious disease specialists. A stent was placed distally to the pancreatic duct during the Endoscopic Retrograde Cholangiopancreatography procedure performed on the patient. After treatment, a bipcuspid electrophoretic pattern was not observed in the albumin band.

Conclusion : The presence of a bifid peak in the protein electrophoresis conducted during the initial admission of the patient, who presented with a pancreatitis attack, and its disappearance after treatment, suggest that bisalbuminemia is due to pancreatitis. Human pancreatic juice can produce fast and slow-type albumins by proteolytic enzymes, and they are seen in patients with pancreatic ascites.

Keywords: bisalbuminemia, bifid peak, serum protein electrophoresis, albumin band, chronic pancreatitis, amylase, lipase, pancreatic duct-associated cyst

PA-5

Estimation of LDL-C In Hypertriglyceridemic Patients Using Machine Learning Methods

***[1]Bilge Su GELBAL*, [2]Şükrü Yaren GELBAL**

[1]University of Health Sciences, Istanbul Education And Research Hospital, Department of Clinical Biochemistry, Istanbul / Turkey
[2]The Ohio State University, Columbus, OH / USA

Aim: Low-density lipoprotein cholesterol (LDL-C) plays an important role in cardiovascular diseases and can be calculated by Friedewald formula if triglyceride levels are lower than 400. However, calculation methods fall short when the value is higher than 400, a value interval which carries equal importance to be aware of.This study aims to predict LDL-C levels using machine learning(ML) methods when trigliceryde levels are higher than 400.

Materials and Methods: The lipid results performed in the clinical biochemistry laboratory of Istanbul Education and Research Hospital during 2021–2023 were included in the study, consisting of 5.459 samples. These samples were divided into a training set and a test set in a %80 to %20 ratio using random selection. 21 various ML models, including Gradient Boosting Regressor, Light Gradient Boosting Machine, Random Forest Regressor, K-Neighbors Regressor and Bayesian Ridge were used for LDL-C prediction from cholesterol, HDL and triglycerides. Accuracy of the predictions was calculated for each model in comparison to the ground truth contained in the samples, LDL-C measurements from Roche Cobas 8000 analyzer. Models with the highest prediction accuracies were further evaluated in multiple different criteria to demonstrate the model performance from different perspectives.

Results: 21.836 observations from 5.459 patients were included, with 3.471 (63.6%) males and 1.988 (36.4%) females. Coefficient of determination (R2) between estimated and measured LDL-C values were 0.80 for Gradient Boosting Regressor and 0.79 for Light Gradient Boosting Machine. These two models outperformed other models. Also feature importance showed that cholesterol levels are the most relevant factor in prediction of LDL-C levels.

Conclusions: When trigliceryde levels are higher than 400, where Friedewald formula falls short, machine learning models such as Gradient Boosting Regressor or Light Gradient Boosting Machine can be used to predict LDL-C values with around %80 prediction accuracy. Accurate prediction of LDL-C levels using machine learning based models would help with proper treatment while reducing the time, cost, required samples and would prevent late diagnosis.

Keywords: Low-Density Lipoprotein, machine learning, prediction methods, Friedewald formula

PA-6

Serum Carbohydrate Antigen 19-9 and Carcinoembryonic Antigen Levels in Different Hemoglobin A1c Levels

[1]Sibel Bilgili, [1]Nuriye Uzuncan, [1]Sümeyye Akkaya, [2]İsmail Demir

[1]Izmir Bozyaka Education And Research Hospital, Biochemistry Department, Izmir/Turkey
[2]Izmir Bozyaka Education And Research Hospital, Department of Internal Medicine, Izmir/Turkey

Aim: The level of Carbohydrate Antigen (CA) 19-9 is an important marker in the diagnosis and treatment of gastrointestinal tumors and pancreatic cancer, but it may also be affected by pancreatic tissue damage that diabetes can cause. Carcinoembryonic antigen (CEA) also is a broad-spectrum marker that is widely found in gastrointestinal tumors. Some studies suggest that elevated tumor markers also occur in non-malignant diabetes patients. This study was aimed to investigate CA19-9 and CEA levels in subjects with different glucose regulation status. Method: CA19-9, CEA and hemoglobin A1c (HbA1c) levels were determined in 154 subjects retrospectively. The subjects included in the study were selected from patients without an oncological diagnosis by screening hospital information system. According to HbA1c levels there were 3 groups: Group 1; <%5.7 - normal group (n:64), Group 2; %5.7-6.4 - prediabetes group (n:50), Group 3; ≥%6.5 – diabetes group (n:40). The data obtained were analysed with MedCalc statistical calculation software. Kolmogorov Smirnov test was used for to see the normality of the distributions. The data were expressed as mean ± SD value. The levels of serum CA19-9 and CEA among three groups were compared. Mann-Whitney U test was used to compare means of variables. Also correlations between CA19-9, CEA and HbA1c levels were determined with Spearman correlation analysis. Statistical significance level was taken as $p<0.05$.

Results: The mean levels of CA19-9 and CEA in 3 groups were; 12.31±10.98 and 2.31±1.86 (group1), 13.57±13.06 and 2.89±1.71 (group2), and 22.65±23.29 and 3.31±1.69 (group3) U/ml respectively. For CA 19-9 we found significant difference between groups 1 and 3 (normal and diabetes), but there was no significant difference between groups 1 and 2 (normal and prediabetes), the difference between groups 2 and 3 was significant. We also found a significant difference between group 1 (normal group) and other 2 groups by means of CEA. But there were no difference between group 2 and 3. Also there were significant positive weak correlation between CA19-9 and HbA1c levels ($r=0.158$, $p=0.0498$) and between CEA and HbA1c levels ($r=0.309$, $p=0.0001$). Conclusion: The positive correlation of CA 19-9 and CEA with HbA1c and their higher values compared to the normal group made us think that these markers should be interpreted more carefully in patients with impaired glucose regulation. These results imply that CA19-9 and CEA might also relate to the endocrine function and damages of the pancreas. We propose that a higher cut-off values of CA19-9 and CEA should be used in diabetics and prediabetics to differentiate benign and malignant diseases.

Keywords: Diabetes Mellitus, Carbohydrate Antigen 19-9, Carcinoembryonic Antigen, Hemoglobin A1c

PA-7

The Evaluation of Preanalytical Error Types in Clinical Chemistry Laboratory

***[1]Ismail Benice*, [1]Havva Büyükyavuz**

[1]Department of Biochemistry, Zonguldak Bülent Ecevit University Hospital, Zonguldak

Objectives: Preanalytical errors are the most common error sources in the total testing process. The aim of this study was to determine the causes of preanalytical errors to different analyzers and sample types.

Materials and Methods: In this retrospective study, rejected biological samples were analyzed in the LIS of Zonguldak Bülent Ecevit University Hospital Biochemistry Laboratory between 01.04.2023 and 31.03.2024. According to analyzer types, reasons for rejection and rejection rates were identified.

Results: At the indicated dates, 3965 (1.1%) of the total 354148 samples coming to the routine laboratory and 4504 (2.5%) of the total 181568 samples coming to the emergency laboratory were rejected. The percentage of rejected samples of the total number of samples in their group in routine lab; biochemistry and hormone 1.0%, hemogram 1.8%, coagulation 2.4% and urine 0.1% samples were found. The percentage of rejected samples of the total number of samples in their group in emergency lab; biochemistry and hormone 1.3%, hemogram 4.0%, coagulation 6.1%, blood gas 5.4% and urine 0.4% samples were found. The most common reasons for rejection in the routine laboratory; incorrect test request (% 76) in the biochemistry and hormone, level error (64%) in hemogram, level error (62%) in coagulation, inadequate (46%) in urine samples were identified. The most common reasons for rejection in emergency laboratory; hemolysis (52%) in the biochemistry and hormone, level error (53%) in hemogram, level error (67%) in coagulation, clotted (77%) in the blood gas, inadequate (91%) in urine samples were identified.

Conclusions: Clinical laboratories are required to carefully monitor the types of preanalytical errors playing roles in the laboratory results. Our results suggested that it is appropriate to plan training for healthcare professionals working in the blood collection process, beginning from test ordering.

Keywords: Preanalytical error, hemolysis, clotted samples, insufficient sample, incorrect test request

PA-8

Investigation of the Impact on Clinical Decisions Using the Clarke Error Grid: Analytical Performance of Freestyle Optium Neo H and XPER TD-4289 Glucometers

[1]İrem Ecem Güler*, [1]Elif Erva Karaismail, [1]Şiyar Kaya, [1]Fatih Yeşildal

[1]Haydarpaşa Numune Education and Research Hospital, Department of Medical Biochemistry, İstanbul/Türkiye

Aim: To assess the analytical performance of Freestyle Optium Neo H (Witney, Oxon, UK) glucometer and XPER TD-4289 (Taipei City, Taiwan) glucometer, along with their impact on clinical decisions using the Clarke Error Grid.

Methods: 100 surplus serum samples were used to conduct this study, including 5 samples below 50 mg/dL, 15 samples in the range of 50- 80 mg/dL, 20 samples in the range of 80-120 mg/dL, 30 samples in the range of 120-200 mg/dL, 20 samples in the range of 201-300 mg/dL, 10 samples in the range of 301-400 mg/dL, and 5 samples above 400 mg/dL. Glucose values of the samples were measured using the spectrophotometric hexokinase method on a Roche COBAS c702 (Mannheim, Germany) autoanalyzer. The same samples were analyzed using Freestyle Optium Neo H glucometer and XPER TD-4289 glucometer. All the results were plotted on Clarke Error Grid. On this grid, Zone A indicates values within 20% of the reference glucose concentration, Zone B contains points that are outside of 20% but would not lead to inappropriate treatment, Zone C includes points leading to unnecessary treatment, Zone D includes points indicating a potentially dangerous failure to detect hypoglycemia or hyperglycemia, and Zone E includes points that would confuse the treatment of hypoglycemia for hyperglycemia and vice versa.

Results: For the Roche COBAS c702 the glucose imprecision value (CV) was found to be 2.6%. According to external quality results, the accuracy performance of the autoanalyzer was appropriate. The glucose results for Freestyle Optium Neo H glucometer were 169.2 ± 114.5 mg/dL; and for XPER TD-4289 glucometer were 161 ± 112.2 mg/dL. The glucose results of the XPER TD-4289 glucometer were generally lower than the glucose values measured by the autoanalyzer. The Freestyle Optium Neo H glucometer measured lower results than the autoanalyzer for glucose values <100 mg/dL, and generally higher results for glucose values >100 mg/dL. In the Clark Error Grid, results for the Freestyle Optium Neo H glucometer fell 98% in Zone A and 2% in Zone B. For the XPER TD-4289 glucometer, 98% of the results were in Zone A, 1% in Zone B, and 1% in Zone C. The performance was considered as sufficient when the sum of Zone A and B is 99% or more. According to this data, both devices exhibited successful performance, for both situations hypoglycemia and hyperglycemia. For the Freestyle Optium Neo H glucometer, the results falling in Zone B were below 50 mg/dL. For the XPER TD-4289 glucometer, the result falling in Zone B was in the range of 50-80 mg/dL, and the result falling in Zone C was in the range of 301-400 mg/dL.

Conclusion: According to the Clarke Error Grid analysis, both the Freestyle Optium Neo H and the XPER TD-4289 glucometer devices performed well, ensuring that patients do not receive unnecessary or incomplete treatment. Thus, the results do not cause a negative impact on clinical decisions in terms of glucose levels.

Keywords: glucometer, Clarke error grid, clinical decision making

PA-89

Determination of the Population Based Reference Ranges for Serum Zinc Levels

[1]Ayşe AKTAŞ*, *[1]Eren VURGUN

[1]Prof. Dr. Cemil Taşcıoğlu City Hospital, Medical Biochemistry, Istanbul, Turkey

Aim Zinc deficiency remains a major public health problem worldwide. Zinc status has been shown to be strongly associated with the economic development of regions, with prevalence exceeding 20% in most low- and middle-income countries. The International Federation of Clinical Chemistry (IFCC) and the Clinical and Laboratory Standards Institute (CLSI) recommend that each laboratory establish its own reference ranges. In this study, we aimed to evaluate one year serum zinc levels and determine reference ranges based on the population in Istanbul indirectly by parametric, nonparametric and the Bhattacharya methods and to compare with the manufacturer's reference ranges.

Method Serum zinc results of the population of Istanbul, measured by the photometric method using the Improgen Zinc kit on the Roche Cobas c501 analyser in 2022, were included in the study. After the exclusion of newborns (0-1 month) due to limited numbers, 42969 results were evaluated. Zinc reference ranges were calculated and determined by parametric, nonparametric and the Bhattacharya methods. The need for partitioning reference ranges was considered based on Harris-Boyd model. The prevalence of zinc deficiency was evaluated according to the manufacturer's (63 - 110, 70 - 114, 72 - 127 µg/dL for children, adult women and adult men, respectively) and our established reference ranges.

Results After excluding outliers, reference ranges were calculated from the remaining 42489 zinc results. When the reference ranges were determined using parametric, non-parametric and Bhattcharya methods, they were as follows: 54 - 103, 57 - 107, 56 - 101 µg/dL. There was no need for partitioning reference range by age group or gender. When the zinc results were evaluated according to the highest lower reference limit, 57 µg/dL was determined; the deficiency in children decreases from 6.5% to 1.9%, the deficiency in adult women decreases from 29.3% to 2.9%, and the deficiency in adult men decreases from 20% to 2% ($p<0.001$ for all).

Conclusion These results have shown that the use of reference ranges that are not appropriate for our population leads to an overdiagnosis of zinc deficiency by 17.8% overall. It is of great importance to ascertain appropriate and accurate zinc reference ranges in order to prevent the inappropriate ordering of tests and the subsequent administration of zinc supplements to non-deficient persons that may not be necessary, as well as to avoid unnecessary healthcare costs.

Keywords: zinc, zinc deficiency, overdiagnosis, reference ranges, Bhattacharya

PA-10

Evaluation of Measurement Accuracy Performance of Freestyle Optium Neo H Glucometer by ISO15197 Standard and WEQAS Data

[1]Elif Erva Karaismail*, [1]İrem Ecem Güler, [1]Şiyar Kaya, [1]Fatih Yeşildal

[1]Haydarpaşa Numune Education and Research Hospital, Department of Medical Biochemistry, İstanbul/Türkiye

Aim: To evaluate the analytical performance of Freestyle Optium Neo H (Witney, Oxon, UK) glucometer according to ISO15197 standard and WEQAS external quality assessment scheme (supplied by Karca Medikal). Methods: A total of 100 patient serum samples were collected, comprising glucose levels of 5 samples < 50 mg/dL, 15 samples 50-80 mg/dL, 20 samples 80-120 mg/dL, 30 samples 120-200 mg/dL, 20 samples 201-300 mg/dL, 10 samples 301-400 mg/dL, and 5 samples > 400 mg/dL, according to ISO15197 standard. Glucose analysis was performed using the hexokinase method on a Roche COBAS c702 (Mannheim, Germany) platform. Simultaneously, the same samples were analyzed using the Freestyle Optium Neo H glucometer. According to ISO15197 standard, acceptable performance criteria was defined as "within ±15 mg/dL" for glucose values < 100 mg/dL and "within ±15%" for values > 100 mg/dL. According to the WEQAS external quality assessment scheme, values below 10% were considered as "excellent," values between 10-20% were considered as "good," and values above 20% were considered as "unacceptable."

Results: The glucose imprecision value (CV) of the autoanalyzer was calculated as 2.68%. According to external quality assessment data, the accuracy performance met the desirable biological variation database specification. According to ISO15197 standard, all 100 measurements met the minimum acceptable criteria for accuracy. For glucose values < 100 mg/dL, the average difference was -8.1% (-5.3 mg/dL); for glucose values > 100 mg/dL, the average difference was +1.7% (+5.6 mg/dL). Additionally, according to the WEQAS external quality assessment data, over an 8-month period, there were 286 excellent results, 15 good results, and 1 unacceptable result. WEQAS control materials included 1 sample < 100 mg/dL, 6 samples between 100-200 mg/dL, and 1 sample between 200-300 mg/dL. Considering the 8-month external quality assessment results, glucometer CV% values changed between 3.5% to 6.5%.

Conclusion: Glucometers are point-of-care testing devices under the responsibility of clinical laboratories. It is imperative for clinical laboratories to periodically assess the analytical performance of glucometers. The performance of the Freestyle Optium Neo H glucometer was found to be satisfactory according to ISO15197 standard and the WEQAS external quality assessment data. Freestyle Optium Neo H glucometer gave lower results compared to the autoanalyzer for hypoglycemic and normoglycemic samples; while the glucometer results were generally higher for hyperglycemic patients compared to the autoanalyzer.

Keywords: glucometer, ISO15197, external quality assessment

PA-11

One-Year Total Analytical Error Evaluation in Medical Biochemistry Laboratory

[1]Sibel Bilgili, [1]Nuriye Uzuncan, [1]Ertuğrul Avcı, [1]Ayfer Meral, [1]Evrim Senem

[1]Izmir Bozyaka Education and Research Hospital Biochemistry Department, Izmir/Turkey

Aim: To determine the analytical quality of a laboratory test, common practice is to determine the total analytical error (TAE), which includes both precision and accuracy. In evaluating analytical performance,TAE should not exceed the total allowable error limit. Many countries have established their own total allowable error criteria to evaluate analytical performance.With the circular published in our country on 10/2016, total allowable error limits for 15 biochemical parameters were determined. Our aim in this study was to evaluate the total % CV values for 15 biochemistry tests, calculate the one-year TAE with the % bias values obtained from external quality control data for each test over the same time period, and compare these with the allowable percents.

Method: In our study, internal quality and external quality control data obtained from Cobas 8000 (Roche) analyser for 15 tests (Albumin, ALT, ALP, AST, Total cholesterol, Creatinine, Glucose, HDL Cholesterol, LDH, Na, K, Cl, Total protein, Triglyceride, Urea) were taken from the last year. After taking the arithmetic mean of the laboratory and peer group results obtained from 12-month external quality control samples of each test, % bias was calculated with the formula [(Peer group mean-Laboratory mean)/Peer group mean]x100. The current % CV values for each month were calculated from the Level 1 and Level 2 internal quality control results of each test and total % CV values were obtained by taking the square root of the sum of the squares of the two level % CV values. The calculated total % CV values were compared with the allowable % CV values.% TAE was calculated with the formula (1.65 x % CV)+% Bias. Also% total analytical errors were compared with total allowable error limits.

Results: Among 15 clinical biochemistry parameters, only cholesterol in October 2023 was higher than the permissible total error limit of 11 (calculated cholesterol TAE value: 15.19). All other parameters were below the permissible %CV and permissible total allowable error limits.

Conclusion: TAE estimates the 95% limit of the expected error from the combined effects of random and systematic errors. Laboratories can determine analytical quality by comparing their TAE values with the total allowable error limits. If the total error of a test exceeds total allowable error, it requires more comprehensive evaluation and follow-up of the analytical process of that test. As a result of our study, we concluded that monthly calculation of the TAE and corrective and preventive actions for tests exceeding the allowable error limit will be important in detecting possible errors at an early stage.

Keywords: total analytical error; total allowable error; analytical performance

PA-12

The Role of XPG ASP1104HIS Gene Polymorphism on the Susceptibility and Clinicopathological Characteristics of Bladder Cancer

[1]Mehmed Said Çelik, [1]Şefika Nur Gümüş, [2]Selçuk Erdem, [1]Canan Kucukgergin, [1]Oner Sanli, [2]Faruk Özcan, [1]Sule Seckin

[1]Department of Biochemistry, Istanbul Faculty of Medicine, Istanbul University Istanbul/Turkiye
[2]Division of Urologic Oncology, Department of Urology, Istanbul Faculty of Medicine, Istanbul University Istanbul/Turkiye

Objectives: Bladder cancer (BC) is considered to be the fourth most common cancer among men worldwide and the incidence rate is three times less common in women than in men. It is well known that the etiology of BC is multifactorial and its development is associated with many environmental factors including cigarette smoking, alcohol consumption, occupational exposures to chemicals and obesity. On the other hand, recent studies have reported that genetic variations especially single nucleotide polymorphisms (SNPs) may also be involved in the development of various types of cancer. DNA repair mechanisms play a crucial role in protecting genomic integrity from DNA damage and defects in DNA repair mechanisms are associated with the susceptibility to cancer. The aim of this study was to explore the possible association of XPG ASP1104 HIS gene polymorphism with the risk and clinicopathological characteristics of BC in a Turkish population.

Materials and Methods: In the present study, 51 individuals diagnosed with histologically confirmed BC between 2012-2023 at the Department of Urology, Istanbul Faculty of Medicine were enrolled as a patient group. The control group (n=132) consisted of urology patients who were treated at our outpatient clinic for various urological complaints but had no evidence of any malignancy based on a detailed evaluation. XPG ASP1104 HIS gene polymorphism was assessed by polymerase chain reaction restriction fragment length polymorphism (PCR-RFLP) in all subjects. For the statistical analyses Pearsons's Chi-Squared ($\chi 2$), Mann-Whitney U and multiple logistic regression model tests were used where appropriate.

Results: No statistically significance regarding demographic data was observed between groups. However, the smoking prevalence was found significantly higher in BC patients than in controls. No relationship was found between XPG ASP1104 HIS gene polymorphism and BC risk. In the mean time, XPG ASP1104 HIS gene polymorphism was not found to be associated with clinicopathological characteristics including pathological grade and T stage among BC patients.

Conclusions: We suggest that the XPG ASP1104 HIS gene polymorphism is not a risk factor for both initiation and progression of BC in a Turkish population.

Keywords: Bladder cancer, XPG, Turkish population, PCR

PA-13

Investigation of Routine Biochemical Parameters in Maternal and Umbilical Blood in Intrauterine Growth Restriction

[1]Huriye Erbak Yılmaz, [1]Osman Ahmet Duman, [2]Halime Şen Selim, [3]Mustafa Şengül, [1]Saliha Aksun, [1]Furkan Oğuzhan Karalar, [1]Mehmet Can Kenar, [1]Figen Narin

[1]Izmir Katip Celebi University, Medical Faculty, Department of Medical Biochemistry, Izmir
[2]Izmir Atatürk Education and Research Hospital, Department of Gynecology and Obstetrics
[3]Izmir Katip Celebi University, Medical Faculty, Department of Gynecology and Obstetrics

Aim: Intrauterine growth restriction (IUGR) is a condition where the fetus does not reach its expected growth potential for its gestational age. This study aims to investigate the routine biochemical parameters in maternal and umbilical blood in cases of IUGR.

Method: This study has been conducted at İzmir Katip Çelebi University Atatürk Education and Research Hospital, with approval from the Ethics Committee. 21 pregnant women and fetus diagnosed with IUGR and 20 healthy pregnant women and fetus were included in the study. Maternal and umbilical blood samples were collected at the time of delivery. The levels of glucose, total protein, albumin, calcium, phosphorus, magnesium, triglyceride, and cholesterol were measured using a biochemical analyzer. Data were analyzed using SPSS 25.0 software, and a p-value of less than 0.05 was considered statistically significant.

Results: No significant differences were observed in the levels of glucose, total protein, albumin, calcium, phosphorus, magnesium, triglyceride, cholesterol, thyroid stimulating hormone and free thyroxine hormone between the IUGR mothers and control mothers' serum. Similarly, no significant differences were found between the serum of IUGR infants and control infants. The ratios of glucose, total protein, albumin, calcium, phosphorus, magnesium, triglyceride, and cholesterol between maternal and fetal blood were calculated, and significant differences were observed in the triglyceride and phosphorus ratios between the IUGR group and the control group.

Conclusion: The absence of significant differences in the routine biochemical parameters between mothers and infants with intrauterine growth restriction and the control group indicates that the concentration of blood transferred to the fetus is similar.The relationship between intrauterine growth retardation and the amount of blood transferred to the fetus and placental resistance rather than the concentration of analytes in the blood should be investigated.

Keywords: intrauterine growth restriction, biochemistry, infant, hormone

PA-14

Verification of the Albumin Levels in Serum Protein Electrophoresis Method by Comparison with Quantitative Measurement Methods

***[1]Meltem Çetinkaya*, [1]Pınar Akan**

[1]Dokuz Eylül University Faculty of Medicine, Department of Medical Biochemistry, Izmir

Objective: The aim was to evaluate the validity of the serum protein electrophoresis measurement method under our laboratory conditions and to compare its compatibility with quantitative protein measurement results.

Methods: Between 01/12/2023 and 01/04/2024, serum protein electrophoresis (Agarose gel, Helena Biosciences®SAS1 and SAS2) was performed concurrently with serum albumin and total protein levels (Beckman Coulter® AU5800) using colorimetric and photometric methods in the Central Laboratory of Dokuz Eylul University Hospital for a total of 40 patients. Patient serum samples for the study were selected to have low and moderate levels of serum total protein and albumin. Using quantitative total protein levels, the percentage density of the bands was expressed as "g/dL" by densitometry. Repeatability measurements between runs were performed using low and high- level quality control materials for albumin, covering a total of 7 runs. The correlation and differences between the obtained results were evaluated using the SPSS 29.0.0.0 program.

Results: The coefficient of variation (%CV) for inter-assay repeatability of the low-level albumin value obtained by our serum protein electrophoresis method was determined as 2.1%, while the coefficient of variation for the high-level albumin value was determined as 1.63%. The bias value obtained from the method comparison for albumin in the electrophoresis method was determined as 3%, and the total error (TE) was determined as 6.069%, which was found to be lower than the Total Acceptable Error (TEa) level of 10% for albumin. Regression analysis showed that the determination of albumin level by electrophoresis was highly correlated with quantitative albumin measurement (r^2=0.913 and r=0.956, y=0.49+0.83*x).

Conclusion: The method comparison experiments with quantitative albumin measurements in evaluating the suitability of the serum protein electrophoresis method, an important tool in the diagnosis and follow-up of disease patterns, under our laboratory conditions can be a valid way to assess method validity.

Keywords: Albumin, total protein, serum protein electrophoresis, method validity

PA-15

Effect of Vacuum Blood Collection Tubes on Biochemistry Tests in Serum and CSF Simulations

***[1]Zeynep BASOGLU*, [1]Elif Nur ARIKAN BAKIM, [1]Ozben Ozden ISIKLAR, [1]Evin KOCATURK, [1]Ozkan ALATAS**

[1]Eskisehir Osmangazi University Faculty of Medicine, Department of Medical Biochemistry, Eskisehir / Türkiye

Aim: The total testing process is divided into three phases: preanalytical, analytical, and postanalytical. Studies show that approximately 70% of errors occur in the preanalytical phase. One of the errors encountered during this period is collecting samples in the wrong tube. It is very difficult to reject CSF (cerebrospinal fluid) samples which are put in serum tubes because they are obtained by risky interventional procedure and sufficient literature information is insufficient. Due to the difficulty in obtaining sufficient amounts of CSF samples, this study aims to evaluate the effects of different tube types on tests typically performed in CSF analyses by using serum samples as a surrogate.

Method: Twenty serum samples were included in the study. Each sample was divided into three parts: placed in a blank container, a Becton Dickinson (BD) Vacutainer SST II Advance 8.5 mL tube, and a Greiner Bio-One Vacuette Tube 8 mL Cat Serum Clot Activator tube. The tubes were inverted to ensure contact between the serum and the tube walls. After a 30-minute waiting period, the tubes were inverted again, and albumin, total protein, glucose, alanine aminotransferase, creatinine, sodium, potassium, chlor levels were measured using the Cobas 702 (Switzerland) biochemistry analyzer in our laboratory. The results obtained from different tubes were compared. Additionally, to lower the protein and albumin levels to CSF levels, the samples in the blank container were diluted 1/60, and 0.5 mL of these diluted samples were placed in the blank container, the Becton Dickinson (BD) Vacutainer SST II Advance 8.5 mL tube, and the Greiner Bio-One Vacuette Tube 8 mL Cat Serum Clot Activator tube. Microalbumin and CSF-urine protein levels were measured from each of these samples. The results were compared to determine the effect of using different tubes on laboratory test results.

Results: No statistically significant difference was found between the blank container, Becton Dickinson (BD), and Greiner tubes in terms of serum parameters ($p>0.05$). In the samples diluted 1/60, no significant difference was found in microalbumin concentrations among the three different tubes. In terms of total protein concentrations, there was no statistically significant difference between the blank container and Becton Dickinson (BD) tubes ($p=0.567$), but the total protein concentration measured in the Greiner tube was significantly lower than in the blank container and Becton Dickinson (BD) tubes ($p<0.0001$ for both).

Conclusion: Collecting CSF in tubes containing gel separators can significantly alter CSF protein levels due to the presence of tube components (clot activator, gel, etc.). As this can affect patient diagnosis and treatment management, it is recommended that CSF samples be collected in additive-free tubes.

Keywords: Cerebrospinal fluid proteins, Blood specimen collection, Specimen Handling, Serum albumin.

PA-16

The Correlation Between Sampling Time and Levels of TSH

[1]Mehmet Başkaya, [1]Seda Nur Şentürk, [1]İkbal Özen Küçükçetin, [1]Sebahat Özdem

[1]Akdeniz University Department of Medical Biochemistry, Antalya / Türkiye

Aim: Level of TSH is the one of the most demanded hormonal tests and can be requested at any time of the day. The circadian timing system or circadian clock plays a crucial, complex and integral role in many physiological processes. Like many other hormone levels, TSH can be affected by diurnal rhythm. This study was planned retrospectively to evaluate the possible effects of blood sampling times on TSH levels.

Materials and Methods: The results of 5470 patients who applied to our laboratory within the last month and had their TSH levels examined were included in the study. Results are divided into 6 groups according to blood sampling hours: 00:00-06:59, 7:00-9:59, 10:00-11:59, 12:00-13:59, 14:00-16:59 and 17:00-23:59.

Results: While the TSH levels of 220 patients in the 12:00-13:59 group was found to be 1.81±1.93, the TSH average of 2707 patients in the 7:00-9:59 group was found to be 2.41± 3.83. The difference between the two groups was found to be statistically significant (p=0.022).

Conclusion: Our research showed that it is important to pay attention to diurnal rhythm when taking blood samples to measure TSH levels, and if the sample could not be taken at the appropriate time, it could be useful to take this change into consideration when evaluating it by a clinician.

Keywords: TSH, Diurnal Rhythm, Blood Sampling Time

PA-17

The role of serum Phospholipase A2 Receptor antibody testing in Membranous Nephropathy – Can the laboratory safe patients from minimally, yet invasive Renal Biopsies?

***[1]Sena Türkmen*, [2]Melike Çamoğlu, [2]Özant Helvacı, [1]Özlem Gülbahar**

[1]Gazi University Department of Medical Biochemistry, Ankara
[2]Gazi University Department of Nephrology, Ankara

Aim: Membranous nephropathy (MN) is a disease in which immune complexes deposit at the glomerular basement membrane, causing damage to the filtration barrier and resulting in proteinuria. It is among the most common causes of nephrotic syndrome in nondiabetic adults. Approximately 80 percent of cases of MN in adults are idiopathic (primary). Secondary MN has been attributed to a variety of causes. In patients who are suspected of having MN, a thorough history is necessary to determine any potential secondary causes. Studies have shown that in the majority of patients with primary MN, the immune complexes consist of autoantibodies against the podocyte protein M-type phospholipase A2 receptor (PLA2R). PLA2R is a type I transmembrane receptor and a member of the mannose-receptor family. This protein is expressed on normal glomerular podocytes and can be present in the glomerular immune deposits in patients with MN. In this study we examined the use of serum PLA2R antibody testing in routine clinical care.

Method: Patients that visited Gazi University Hospital around September 2023 and May 2024 were included in this study. Blood was collected in serum tubes with gel seperator and centrifuged at 3500 rpm for 10 minutes. PLA2R antibody concentrations were assessed by enzyme- linked immunosorbent assay (EUROIMMUN AG, Lübeck Germany). Cut-off value for seropositivity recommended by manufacturer is 20 RU/mL. Concentrations between 14 and 19 RU/mL are considered borderline and values below 14 RU/mL can be interpreted as negative. Patients' baseline data including renal biopsy result, clinical manifestations and serum PLA2R antibody titers were obtained and evaluated.

Results: A total of 151 patients and 153 test results were evaluated. 29 patients tested positive for serum PLA2R antibodies (19.2%), 6 patients were considered borderline (3.97%) and 116 patients were seronegative (76.82%). Approximately 9.57% tested negative for serum PLA2R antibodies but had PLA2R antibody positive renal biopsies. 22 of the 29 patients were diagnosed with membranous nephropathy for the first time.

Conclusion: Using serum PLA2R antibody testing has helped diagnose 19.2% of patients with membranous nephropathy without the need for a biopsy. Nevertheless, patients with seronegativity will still require a biopsy for confirmation. The need for a biopsy is expected to further decrease by adding more parameters (e.g. Thrombospondin Type-1 Domain containing 7A) and doing additional testing with indirect immuneflorescence assays. More testing is needed to confirm an appropriate and population specific cut-off. Biopsies are invasive procedures that even if uncommon can result in certain complications. Furthermore, it is not as cost effective as blood testing and relatively time-consuming. The development of blood tests such as PLA2R antibody testing are valuable for effective patient and hospital management, giving the laboratory a critical role.

Keywords: Membranous Nephropathy, PLA2R Antibody, Laboratory Testing

PA-18

Levothyroxine-Simethicone Drug Interaction and Presence of macro-TSH in an İnfant with Congenital Hypothyroidism

[2]Kürşat Çetin, [2]Berna Singin, [1]Sebahat Özdem, [1]İkbal Özen Küçükçetin, [2]Yasemin Funda Özdem, [2]Mesut Parlak, [2]Hale Ünver Tuhan

[1]Akdeniz University Medicine Faculty, Biochemistry, Antalya
[2]Akdeniz University Medicine Faculty, Pediatric Endocrinology, Antalya

Introduction: Congenital primary hypothyroidism (CHT), occurring in approximately 1 in 2000 to 1 in 4000 newborns, is one of the most common preventable causes of intellectual disability worldwide. Early detection through newborn screening and appropriate levothyroxine treatment leads to normal or near-normal neurocognitive outcomes. Drug interactions with levothyroxine could potentially influence this process. We report a case of CHT, highlighting a probable drug interaction between levothyroxine and simethicone, an active ingredient in infant colic drops.

Case Report: An 18-day-old baby boy was referred to our pediatric endocrine unit for assessment and management. Routine newborn screening using the Guthrie test identified a raised TSH level of 897 mIU/L (cut-off for a positive screen: TSH >20 mU/L). His clinical history and examination were unremarkable, and there was no significant family history. A thyroid function test on day 18 confirmed CHT with a low fT4 level of 0.13 ng/dL (normal range 0.89–2.2) and a TSH level of >100 mIU/L (normal range 0.72-11). Thyroid hypoplasia was detected on a thyroid ultrasound performed the same day. Oral levothyroxine treatment was commenced at 50 µg (12 µg/kg/day) once daily for 2 weeks. At a clinic review 2 weeks later, when the child was 4 weeks old, TSH remained elevated (16.3 mIU/L), although fT4 was normal at 1.35 ng/dL (normal range 0.89–2.2). No issues were identified with compliance, administration techniques, dosage, or vomiting, so the dose of levothyroxine was increased to 67.5 µg once daily. At a clinic review 3 weeks later, when the child was 7 weeks old, TSH continued to be elevated (50.9 mIU/L), although fT4 remained normal at 0.98 ng/dL (normal range 0.89–2.2). Upon further questioning, the parents revealed that the child had been started on over-the-counter infant colic drops (Sab Simplex, containing simethicone) for colic symptoms when he was 5 weeks old. They administered 10 drops (0.4 ml) four times a day, as recommended by a neonatal nurse. The parents confirmed that the child was not taking any other over-the-counter medications or herbal remedies. Comprehensive literature research indicated that simethicone might interact with levothyroxine. It was decided to stop the colic drops immediately. Additionally, in the polyethylene glycol (PEG) precipitation test performed on the serum taken from the baby, a more than 30% decrease in TSH level was detected (TSH: 50.9 mIU/L, after PEG TSH: 21.8 mIU/L). This situation was attributed to the presence of IgG-bound TSH, known as macro-TSH. It was considered that both simethicone interaction and the presence of macro-TSH could coexist in our patient. At a clinic review 1 month later, when the child was 3 months old, the TSH level normalized (0.9 mIU/L, normal: 0.73-8.3) and fT4 was normal at 1.81 ng/dL (normal: 0.92–1.99).

Conclusion: This case highlights the importance of regularly reviewing clinical history and considering potential drug interactions in unusual circumstances, especially when patients require high doses of medication despite good compliance and proper administration. Clinicians should alert parents of children being commenced on levothyroxine against the use of colic drops containing simethicone.

Keywords: congenital Hypothyroidism, drug interaction, macro-TSH, interferences, levothyroxine, simethicone

PA-19

Urinary System Stone Analysis Using Fourier Transform Infrared Spectroscopy (FTIR) Method

[1]Nazlı Canpunar, [1]Mehmet Cengiz Altınsoy, [1]Alper Kağan Aslan, [1]Sena Türkmen, [1]Elvin Malikov, [1]Aysel Aliyeva, [1]Niyazi Samet Yımaz, [2]Rıdvan Murat Öktem, [1]Özlem Gülbahar, [1]Orhan Canbolat

[1]Department of Medical Biochemistry, Faculty of Medicine, Gazi University, Ankara
[2]Department of Child Health and Diseases, Division of Child Nutrition and Metabolism, Faculty of Medicine, Gazi University, Ankara

Aim: Urinary system stones are gaining increasing importance due to their potential to cause extremely severe pain, their role in the development of chronic kidney failure, and their rising incidence in recent times. Determining the composition of the stones is essential for identifying the etiology. This allows for appropriate recommendations (diet etc.) tailored to the stone content and etiology during the treatment process, thereby contributing to the reduction of the high recurrence risk. With the advancement of technology, the analysis of urinary system stones can now be conducted using Fourier Transform Infrared Spectroscopy (FTIR), which is a more reliable method compared to the previously used manual techniques.

Methods: Urinary system stone analyses have been performed using the FTIR method at the Gazi University Life Sciences Center under the responsibility of Gazi University Faculty of Medicine Hospital since September 2023. A comprehensive library for stone analysis has been established, and detailed stone analyses have been conducted for 76 patients to date.

Results: Among a total of 76 patients, 33 (43.4%) had only one stone, while the others had multiple stones. In 30 patients (39.4%), the stone color was light brown, while the others had stones of various colors. On average, 0.477 grams of stone sample were analyzed from each patient. The stone analysis results showed that the most frequently detected stone types were calcium monohydrate and calcium dihydrate, identified in 59 samples (77.6%). The most common location was the left kidney in 22 patients (28.9%), while the least common location was both kidneys simultaneously in 2 patients (2.6%). Out of the total, 71 patients (93.4%) were referred from the Department of Urology, 2 patients (2.63%) from the Division of Adult Nephrology, 1 patient (1.31%) from the Department of Pediatric Surgery, 1 patient (1.31%) from the Division of Pediatric Hematology, and 1 patient (1.31%) from the Division of Pediatric Nephrology. The gender distribution showed that 52 patients (68.5%) were male and 24 patients (31.5%) were female, with an average age of 44 years.

Conclusion: The stone types identified in the analyses are consistent with the literature, with calcium monohydrate and calcium dihydrate stones being the most frequently detected. The detailed stone analyses reported in our laboratory allow for the evaluation of stone type and all other characteristics. This enables the management of the patients' treatment process, reducing risks such as chronic kidney disease and preventing patients from experiencing severe pain by lowering the recurrence risk. It is crucial to analyze stones, which are not extensively analyzed in healthcare institutions in our country, and to preferably use the more reliable and standardized FTIR method over manual techniques.

Keywords: urinary system stones, FTIR

PA-20

Diagnostic Power of Serum Protein Electrophoresis as the First Test in Suspected B Cell Neoplasia

[1]İzzet UYUMAZ, [1]Tülay KÖKEN

[1]Afyonkarahisar Health Sciences University, Faculty of Medicine, Department of Medical Biochemistry ,Afyonkarahisar

Introduction: Although new methods have begun to be used in the diagnosis and follow-up of B-cell neoplasias, Serum Protein Electrophoresis still maintains its clinical importance. This study aimed to reveal the diagnostic power of Serum Protein Electrophoresis when requested as the first test in detecting paraproteins in serum.

Material and Method: 162 samples accepted to our laboratory in 2023 and with simultaneous Immunofixation Electrophoresis test results were retrospectively scanned. Serum Protein Electrophoresis and Immunofixation Electrophoresis test results were evaluated as "Positive" or "Negative" depending on the presence of paraprotein. Immunofixation Electrophoresis was accepted as the gold standard test and sensitivity, specificity, positive predictive value and negative predictive value were calculated.

Results: The sensitivity of Serum Protein Electrophoresis in detecting paraprotein was found to be 94.5% and its specificity was 98.1%. The positive predictive value of this test was calculated as 96.3% and the negative predictive value was calculated as 97.2%. False negativity was detected in three of 162 patients and false positivity in two.

Conclusion: Serum Protein Electrophoresis has high sensitivity and specificity and low false negativity in the detection of paraproteins in serum. Considering these findings and cost-effectiveness, Serum Protein Electrophoresis can be used as the first test in patients with suspected B-cell neoplasia.

Keywords: Paraproteinemia, Serum Protein Electrophoresis, Immunofixation Electrophoresis

PA-21

Estimation of Internal Quality Control Data for Buprenorphine Testing

***[1]Gaye MALAŞ ÖZTEKİN*, [1]Esin AVCI, [1]Hülya AYBEK**

[1]Pamukkale University, Medicine Faculty, Medical Biochemistry Department, Denizli, Turkey

Objective: Monitoring the internal quality control of tests conducted on auto-analyzers in clinical laboratories is crucial. Although commercial kit companies provide suggested internal quality control limits, laboratories need to determine their control targets, %CV, and SD. In our study, we aimed to determine the internal quality control targets and %CV, and SD ranges for buprenorphine testing in urine, a test that we have not previously conducted in our laboratory, but plan to incorporate into our daily routine.

Method: We analyzed buprenorphine in urine, by using a semi-quantitative method on the Cobas 6000 system (Roche Cobas systems, Mannheim, Germany) with the c501 module, For both level 1 and level 2, four analyses were conducted daily over five days, a total of 20 analyses for each level separately. Level 1 represented a negative control (L1-), while level 2 represented a positive control (L2+). Buprenorphine levels were analyzed using an immunoassay method based on competition for antibodies present in the reagent with a fixed amount of drug labeled with glucose 6-phosphate dehydrogenase (G6PDH) enzyme. The drug level was determined by a change in absorbance measurable at 340 nm wavelength using spectrophotometry. From the obtained data, intra-day and inter-day %CV, SD, and mean target values were calculated.

Results: For buprenorphine, the mean value for level 1 was -14.82, while for level 2, it was found to be 14.485 ng/ml. The CV values ranged from 14% to 28% for L1 and from 6.9% to 20.9% for L2. The standard deviation values were calculated as 3.34 for level 1 and 2.45 for level 2.

Conclusion: Laboratory professionals suggest to determine the target values for newly introduced tests in clinical laboratories. In our study, we established the target value, %CV, and acceptable SD values for buprenorphine. We monitor that our test operates within acceptable deviation using graphs we created ourselves.

Keywords: Buprenorphine, SD, %CV

PA-22

Can We Use Different Formulas to Estimate LDL When Serum Triglycerides Are >400 Mg/DL?

[2]Giray Bozkaya, [1]Kaan Kuzu, [1]Kübra Ekiz

[1]Izmir City Hospital, Department of Medical Biochemistry, İzmir
[2]Izmir Sağlık Bilimleri University, Izmir Faculty of Medicine, Department of Medical Biochemistry, İzmir

Purpose: Although there are analytical methods available for directly measuring low-density lipoprotein (LDL) in serum, clinical laboratories often prefer to use an estimated formula due to the high cost of these methods. However, the Friedewald formula does not provide reliable results when serum triglyceride levels are >400 mg/dL. These formulas are known to provide more reliable results with direct LDL measurement methods when serum triglyceride levels exceed 400 mg/dL. The aim of this study is to compare the differences in LDL levels produced by the Sampson and Martin-Hopkins formulas.

Method: Between October 2023 and May 2024, data from individuals who presented to our hospital and requested cholesterol, triglyceride, high-density lipoprotein (HDL), and LDL tests were retrospectively obtained from the Laboratory Information System. Direct LDL results were compared with those calculated using the Sampson and Martin-Hopkins formulas. Subgroups were formed based on triglyceride levels at 50 mg/dl intervals between 400-767 mg/dl. Bland-Altman plots and Passing-Bablok regression analysis were utilized for comparison of LDL results calculated by different formulas.

Results: The concentrations obtained with the Martin-Hopkins formula were found to be closer to those obtained by the direct LDL measurement method. Analysis of Bland-Altman plots revealed that the measurement differences were homogeneously distributed around zero. Examination of Passing-Bablok regression analysis results indicated that the confidence intervals of the Martin-Hopkins formula were closer to the desired values across all subgroups.

Conclusion: Despite the Martin-Hopkins equation demonstrating the highest LDL accuracy overall and particularly within subgroups, notably when triglyceride levels are between 400 mg/dL and 767 mg/dL compared to the Sampson formula, the direct method is recommended for LDL results when serum triglyceride levels are >400 mg/dL.

Keywords: analysis, retrospective study, methods

PA-23

Comparison of 24-Hour Urinary Protein and Spot Urinary Protein to Creatinine Ratio in the Assessment of Proteinuria

***[1]Emre Bozkaya*, [1]Pelin Özüçetin, [1]Muhammed Emin Ceylan, [1]İkbal Özen Küçükçetin, [1]Sebahat Özdem, [1]Sadıka Halide Akbaş**

[1]Akdeniz University Faculty of Medicine, Department of Medical Biochemistry, Antalya

Introduction: Proteinuria is an independent risk factor for renal diseases and is considered a parameter indicating renal damage. The gold standard for proteinuria monitoring is protein measurement in 24-hour urine, but since this method involves difficulties in sample collection, it is preferred to determine the protein/creatinine ratio in a spot urine sample. The purpose of this study was to investigate the relationship between 24-hour urine protein level and spot urine protein/creatinine ratio in the diagnosis and follow-up of proteinuria.

Materials and Method: In this study, 24-hour urine protein levels, spot urine protein/creatinine ratios and estimated glomerular filtration rates (eGFR) were compared in 75 patients between the ages of 19-77. The subjects were classified according to their 24-hour urine protein levels into groups as described follows: Group 1 ; <1 g/day, Group 2; 1-3.5 g/day and Group 3; >3.5 g/day. Urine protein, serum and urine creatinine levels were analyzed on an autoanalyzer (Cobas 8000, Roche Diagnostics, Germany). GraphPad 8.0.2 program was used for statistical analysis. Pearson's correlation (r) and Student's T test were done. A value of $p<0.05$ was considered statistically significant.

Results: Significant correlations were detected with 24-hour urine protein level and spot urine protein/creatinine ratio in all three groups ($r=0.44$ $p<0.001$, $r=0.42$ $p<0.001$ and $r=0.64$ $p<0.001$, respectively). Though there was a weak and negative correlation ($r=-0.158$) was observed between eGFR value and spot urine protein/creatinine ratio in Group 1, a moderate correlation ($r=0.459$) was observed in Group 2. We did not observe any significant correlation between eGFR value and spot urine protein/creatinine ratio in the overtly proteinuric patients (Group 3).

Conclusion: In the literature, the relationship between 24-hour urine protein and spot urine protein/creatinine ratio has been reported to weaken in patients with high proteinuria. However, in our study, this correlation was found more stronger in patients with high proteinuria. The effects of variations in daily creatinine excretion and eGFR values on the correlation should be investigated in larger study groups.

Keywords: Proteinuria, 24-hour urine protein, spot urine protein/creatinine ratio

PA-24

A Case Report; Beta-Ketothiolase Deficiency and Lower Respiratory Tract Infection

[1]Emre Bozkaya, [2]Erdoğan Soyuçen, [1]Sadıka Halide Akbaş

[1]Akdeniz University Faculty of Medicine, Department of Medical Biochemistry
[2]Akdeniz University Faculty of Medicine, Department of Pediatric Metabolism

,

Purpose: Beta-ketothiolase deficiency, also known as 2-methyl 3-hydroxy butyric acidemia, is an inherited autosomal recessive disorder that involving the metabolism of isoleucine and ketone bodies. The disease is characterized by malnutrition, vomiting, dehydration and ketoacidosis attacks leads to coma. Since it is rare and has not any obvious symptom in the neonatal period, it can often be omitted in the differential diagnosis.

Case: A 1 year old boy was hospitalized due to lower respiratory tract infection and developed ketoacidosis. Routine biochemical tests, plasma/urine amino acids, expanded newborn (amino acids and acylcarnitines) and lysosomal storage disorders screening and urine organic acid analyses were done to elucidate the pathogenesis.

Results: The cyanosis, poor general condition and breathing difficulties were observed in the physical examination. Plasma and urine amino acid analyses and lysosomal screening tests were determined as normal. Urinary organic acid analysis was performed by gas chromatography-mass spectrometry. 2-methyl 3-hydroxy butyric acid (74.30 mmol/mol creatinine, 3.2-26.6 mmol/mol creatinine) and tiglylglycine (42.67 mmol/mol creatinine, 0.01-2.0 mmol/mol creatinine) levels were found as elevated. Dried blood spot acylcarnitine analysis showed elevation of C4DC+C50H (methyl malonylcarnitine + isovalerylcarnitine) as 2.05 µmol/l (0-0.69 µmol/L) and C5:1 (tiglylcarnitine) as 0.42 µmol/L (0-0.25 µmol/L). Based on the clinical and laboratory findings, the patient was diagnosed as Beta- ketothiolase deficiency and the diagnosis was confirmed by molecular analysis.

Conclusion: Babies presenting with malnutrition, vomiting, tachypnea and lethargy should be evaluated for Beta-ketothiolase deficiency. Since these patients look generally healthy except episodic attacks, make a timely diagnosis and early treatment of metabolic acidosis are vital for morbidity and mortality. Carnitine support has an important place in the treatment. These patients must be fed a protein-restricted diet throughout their lives.

Keywords: Beta-ketothiolase, 2-methyl 3-hydroxy butyric acid, ketoacidosis, tiglylglycine

PA-25

Calculation of Imprecision and Reference Change Values for Ferritin and Parathyroid Hormone Parameters in Our Laboratory

***[1]Zahide Adıyaman*, [1]Büşra Üresin Yazlak, [1]Bağnu Orhan**

[1]University of Health Sciences, Istanbul Education and Research Hospital, Department of Clinical Biochemistry, Istanbul, Turkey

Objective: The reference change value (RCV) offers an objective method for interpreting serial analysis results by considering both analytical and biological variations. Consequently, we calculated the analytical variation and the RCV for ferritin and parathyroid hormone analytes, using the Roche Cobas 8000 e602 autoanalyzer (Roche Diagnostics GmbH, Mannheim, Germany), which is routinely used in our laboratory.

Materials and Methods: The reference change value for ferritin and parathyroid hormone analytes was calculated using the formula 21/2 x Z x (CVA2+ CVI 2)1/2 (95% probability, two-way; Z=2.58). The analytical coefficient of variation (CVA) was determined from the results of the internal quality control (Elecsys PreciControl Varia 1 (lot: 45330099) and 2 (lot: 45330199), Roche Diagnostics, Mannheim, Germany) using the same lot numbers at two levels for 3 months, from November 2022 to January 2023. Intra-individual (CVI) and inter-individual (CVG) coefficients of variation were obtained from the Westgard biological variation database. The individuality index (II) was calculated using the formula II = CVI / CVG. Quality specifications were determined using the criteria: CVA < 0.25 × CVI for optimum performance, CVA < 0.50 × CVI for acceptable performance, and CVA < 0.75 × CVI for minimum performance.

Results: The reference change values (%) (95% probability, two-tailed) for our analytes were as follows; ferritin: 40.98, parathyroid hormone: 75.46. The individuality index (II) was 0.95 for ferritin and 1.09 for parathyroid hormone. According to the quality specification criteria, CVA < 0.50 x CVI for ferritin (4.11<7.1) and parathyroid hormone (8.38<12.95), indicating that these analytes meet acceptable performance quality specifications.

Conclusion: Since the individuality indices calculated for ferritin (0.95) and parathyroid hormone (1.09) analytes in our laboratory fall between 0.6 and 1.4, it is recommended to evaluate these analytes according to both the reference change value and population-based reference ranges. To ensure the reliability of laboratory results, sources of both analytical and biological variation should be considered.

Keywords: analytical performance, reference change value, precision

PA-26

Does M protein Level Reflect Atypical Plasma Cell Number in Multiple Myeloma Patients?

***[1]Muammer Üzüm*, [1]Tarık Aydın , [2]Çiğdem Özdemir, [1]Tülay Köken**

[1]Afyonkarahisar Health Sciences University, Department of Medical Biochemistry, Afyonkarahisar, Turkey
[2]Afyonkarahisar Health Sciences University,Department of Medical Pathology, Afyonkarahisar, Turkey

Aim: Multiple Myeloma is a malignancy of clonal plasma cells and accounts for approximately %10 of hematological malignancies. Kappa and Lambda light chain concentration in serum and Kappa/Lambda ratio and Serum Protein Electrophoresis are the first laboratory tests to be examined in suspicious cases. In addition, determining the percentages of atypical plasma cells (CD38++CD138+) using the "Flow Cytometry" method in pathological bone marrow samples in which a definitive diagnosis is made also supports the diagnosis. In this study, we compared the percentage of atypical plasma cells determined by the Flow Cytometry method with the "M protein" amounts determined by Serum Protein Electrophoresis, as well as the Kappa/Lambda ratio.

Method: Serum Kappa and Lambda light chain concentrations, M protein concentration determined by Serum Protein Electrophoresis, and atypical plasma cell percentages determined in the bone marrow by Flow Cytometry of 35 cases diagnosed with Multiple Myeloma were evaluated retrospectively.

Results: When the concentrations of M protein in Serum Protein Electrophoresis of 35 patients were compared with the percentage of atypical plasma cells in Flow Cytometry, no correlation was detected between them (p=0,954). Additionally, it was observed that there was no relationship between the percentage of atypical plasma cells in Flow Cytometry of 18 patients and the Kappa/Lambda ratio in the serum (p=0,129).

Conclusion: The lack of a correlation between the amount of atypical plasma cells and the amount of M protein suggested that the M protein secretion patterns of atypical plasma cells were not the same. In addition, it should not be forgotten that situations such as bone marrow samples not containing a homogeneous cell population may also affect the study results.

Keywords: Multiple Myeloma, M Protein, Flow Cytometry, Kappa/Lambda, Atypical Plasma Cell

PA-27

The Necessity of Performing Confirmation Analysis in Drug and Stimulant Testing

***[1]Mehmet Can Kenar*, [1]Saliha Aksun, [1]Leyla Demir, [1]Furkan Oğuzhan Karalar, [1]Huriye Erbak Yılmaz, [1]Figen Narin**

[1]Izmir Katip Celebi University, Faculty of Medicine, Department of Medical Biochemistry, Izmir

Introduction: Drug and stimulant screening analyses are conducted using immunochemical methods. These analyses have the potential for false positive or negative results. Positive samples need to be confirmed using more advanced methods such as LC-MS/MS or GC-MS. For legal purposes, it is essential to provide the results along with confirmation analysis to ensure accurate administrative and legal processes.According to the Health Implementation Communiqué the following parameters are investigated for confirmation:

For opiates: Morphine, 6-MAM, Codeine, DihydrocodeineFor amphetamines: Amphetamine, Methamphetamine, MDMA, MDEA, MDAFor cocaine: Cocaine and BenzoylecgonineFor THC: Delta-9-tetrahydrocannabinolThe aim of this report is to evaluate the screening and confirmation analyses conducted and emphasize the importance of confirmation analysis.

Method: In our laboratory, confirmation analysis of positive screening analytes from the Forensic Medicine outpatient clinic is performed using the LC-MS/MS(Sciex Q-Trap 4500). Screening threshold values for the amphetamine/ecstasy group, opiate group, cocaine, and cannabis analytes are 500, 2000, 150, and 50 ng/mL, respectively; the confirmation threshold values are 250, 300, 100, and 15 ng/mL(SAMSHA).RESULTSBy 2023, the number of urine samples requested for drug and stimulant screening from the Forensic Medicine outpatient clinic was 1153. Among these, 458 were positive for THC, 392 amphetamines, 124 cocaine, and 9 opiates. Some samples contained one or more substances and were subjected to confirmation analysis.Evaluating the confirmation results of these, only 4 THC, 6 amphetamine group, and 1 opiate were determined to be negative according to the threshold values. In samples from patients positive for the amphetamine group, 341 contained amphetamine, 353 contained methamphetamine, 46 contained ecstasy, 40 contained MDA, and 1 contained MDEA.

Discussion and Conclusion: Urine samples that have undergone drug screening analysis but not confirmation analysis lack sufficient evidentiary value administratively. Guidelines state that all positive screening analyses should be confirmed. In our country, there are only four confirmation laboratories, and the practitioners are not theoretically proficient enough in the application principles of drug and stimulant analyses, leading to insufficient confirmation analyses. Our laboratory's recommendation is that at least the parameters that tested positive in screening for forensic samples should be reported to administrative channels with confirmation.While the screening results of patients from AMATEM can be evaluated by the requesting physician and confirmation analysis can be requested if necessary, the results of screenings requested for legal reasons are taken by law enforcement and added to the court file without any evaluation or consultation. When only the screening result is present in the file, confirmation analysis is often questioned by court. However, due to the lengthy legal processes, the retention period of sample may have expired. As seen in our one-year sample data, 99,7% of the parameters tested in screening were positive in confirmation, but if confirmation analysis is not reported, presence of only positive screening result is not accepted as administrative evidence, causing legal processes to be delayed. Therefore, it is essential that laboratory experts report screening test results with confirmation and have the authority to request confirmation tests independently of the clinic.

Keywords: Drug, Screening, Confirmation, False-positive, Forensic

PA-28

Reduced Activity of HbA1c-Glycemic Marker in Hemolysis

***[1]Pelin Özüçetin*, [1]Emre Bozkaya, [1]Muhammed Emin Ceylan, [1]İkbal Özen Küçükçetin, [1]Sebahat Özdem, [1]Sadıka Halide Akbaş**

[1]Akdeniz University Faculty of Medicine, Department of Medical Biochemistry, Antalya

Introduction: Autoimmune hemolytic anemia is a rare disease affecting 0.8 to 3/100,000 individuals annually. This condition is caused by an autoimmune attack against erythrocyte antigens.Severity depends on antibody type (IgG, IgM), warm or cold type, and the ability to activate complement. Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood glucose levels. Diagnosis is based on blood glucose or HbA1c levels.

Methods: A case of diabetes mellitus and autoimmune hemolytic anemia diagnosed at our hospital was examined. Age, gender, complaint, hemoglobin, hematocrit, white blood cell count, platelet count, MCV, direct and indirect Coombs, LDH, haptoglobin, total and direct bilirubin, glucose, HbA1c levels, and clinical follow-up results were recorded.

Case Report: A 65 years old female patient with mitral valve replacement and diabetes mellitus diagnosis, a history of cholelithiasis, was referred to our laboratory due to a lower than expected HbA1c level despite impaired glucose regulation and a possible source of error has been questioned. In the examinations performed in 2020 of the patient who is being followed with the diagnosis of diabetes mellitus, her fasting blood sugar was determined as 153 mg/dL and HbA1c was 6.3%. The patient stated that she did no take any antidiabetic medication or diet. Although impaired glucose regulation, fasting blood glucose was 160 mg/dL and HbA1c was 5.1% in 2023.Since the further hemoglobin level was found as 5.2 g/dL, the patient was admitted to the hematology department for further evaluation and erythrocyte transfusion. Direct and indirect Coombs positivity, high LDH and low haptoglobin levels were found and the patient was diagnosed with iatrogenic autoimmune hemolytic anemia.

Discussion: In this case the reason of low HbA1c level of the patient can be explained by rapid erythrocyte destruction. Since HbA1c levels may be misleading in diabetes mellitus patients with hemolytic disease, this should be taken consideration when regulating the treatment.

Keywords: Diabetes Mellitus, Hemolytic anemia, HbA1c

PA-29

Application of Broken Windows TheoryToClinicalLaboratories as a Pro-Active Risk Management Strategy toReduce Human-InducedErrors

[1]Melis Elif Ahtık*, [1]Emine Uğur, [1]Nilay Elif Karacan, [1]Gülçin Dağlıoğlu, [1]Tamer Cevat İnal, [1]Özlem Görüroğlu Öztürk

[1]Çukurova Üniversitesi Tıp Fakültesi Tıbbi Biyokimya, Adana

Aim: Despite the increasing focus on quality and patient safety in clinical laboratories over the last decades, rates of unwarranted variations, errors, workflow disruptions (WFDs), and preventable harm to patients remain high. Risk management trategies promote error prevention through simplification, backup systems, and redundancy to compensate the less-than-perfect human performance. To identify the risks and prevent errors, many guidelines, procedures, and policies are written and followed. However, there also should be sufficient flexibility and room for "personal judgment," sometimes allowing staff to work independently. Personnel in clinica llaboratories, because the nature of their work is complex and under time pressure, often operate under stress to produce correct and timely test results. In addition, they are obliged to take the necessary precautions to avoid medical errors that may harm the patient. As a social-psychological theory, Broken Windows Theory (BWT)focuses on "disorders" that may perpetuate themselves and spread into individual behaviors. There are several studies on hospital settings that applied BWT as a new management model. The aim of this study was to develope a measurable, valid, and reliable survey instrument based on BWT that can be applied regularly to the staff at scheduled intervals to evaluate the dynamic physical and social environments.

Material and methods: Cross-sectional survey was done to laboratory technicians in three different period. This survey was developed for the present study to evaluate the social and physical disorders which can cause human-induced laboratory errors.

Results: Participants were 17 staff from our laboratory. In order to examine the relationship between hospital disorder and staff outcomes, two separate models were run (models were run separately for physical disorder and social disorder). The present study found that both social and physical disorder were positively related to burn out, and negatively related to job satisfaction and patient safety culture.

Conclusion: Physical and social disorders in laboratory settings could result in shifts from the norms, which can lead to possible human- induced WFDs, possible errors, and possible harms to patients. As one of the first studies to empirically test the BWT in laboratory staff, we found that a positive, productive behaviors with safety culture, is likely to lead to well being for staff an this could reduce the human-induced errors.This methodology could shed new light on the relationships between the physical and social environments of laboratories, and the psychology and behaviors of the laboratory staff and conceptualizing normalization processes.

Keywords: Broken Windows Theory, Human inducederrors, proactive risk management.

PA-30

Calculation of Biological Variation, Individuality Index, and Reference Change Valuesfor Serum Soluble CD30 Levels

[1]Nilay Elif Karacan*, [1]Kezban Dönmez, [1]Zeynep Tan, [1]Gülçin Dağlıoğlu, [1]Tamer Cevat İnal, [1]Özlem Görüroğlu Öztürk

[1]Çukurova Üniversitesi Tıp Fakültesi Tıbbi Biyokimya, Adana

Introduction: The significance of soluble CD30 (sCD30) in evaluating allograft rejection in renal transplant patients was elucidated approximately two decades ago, and subsequent studies and meta-analyses have supported this conclusion. For a potential new biomarker to be implemented into routine practice, it is essential to reveal its analytical variation (CVA), within-individual (CVI), between-individual (CVG) variation, individuality index (II) which is an indicator of the availability of reference ranges, and the reference change value (RCV) to ensure its clinical utility and proper utilization for the benefit of patients. In 2014, the European Federation of Clinical Chemistry and Laboratory Medicine Biological Variation Database (EFLM Biological Variation Database, https://biologicalvariation.eu/about) was established to provide data on biomarkers suitable for routine use, yet data on sCD30 are not currently available in this database. This study aims to calculate the analytical (CVA), within-individual (CVI), between-individual (CVG) variations, and reference change values (RCV) for sCD30 and add these data to the database.

Materials and Methods: Serum samples were collected from 13 healthy individuals over a period of 6 weeks at weekly intervals, and serum sCD30 levels were determined using the ELISA method (Biovendor cat no: RAF091R). ANOVA test was used for the calculations of variations. Analytical variation was calculated by repeated analysis of the same sample. The suitability of reference values was assessed using II. CVI, CVG, II, and RCV were calculated for soluble CD30.

Results: The concentrations and median values of sCD30 measurements over 6 weeks for the 13 individuals included in the study were determined, with calculated values of CVI = 4.4, CVG = 32.8, and II = 0.13 for sCD30. The % RCV value was calculated as 10.5 (% 95 confidence interval, Z value = 1.96).

Conclusion: According to the obtained data, CVI and CVG values are within acceptable limits. Due to the individuality index being below 1, it is considered better to evaluate sCD30 by comparing it with the individual's own results (delta check) rather than according to the reference range. In the evaluation of two consecutive results for an individual, the use of RCV is essential. If there is a deviation of more than 10.5% between two sCD30 values measured at different times, this result is considered acceptable and clinically significant as it exceeds the % RCV threshold.

Keywords: Biological Variation, soluble CD30, Individuality Index, Reference Change Values

PA-31

Proactive Risk Management with Failure Mode and Effect Analyses Method in Çukurova University Central Laboratory

***[1]Kezban Dönmez*, [1]Mehmet Emin Kutlu, [1]Zeynep Tan, [1]Melis Elif Ahtık, [1]Gülçin Dağlıoğlu, [1]Özlem Görüroğlu Öztürk, [1]Tamer Cevat İnal**

[1]Çukurova Üniversitesi Tıp Fakültesi, Tıbbi Biyokimya Anabilim Dalı, Adana

Introduction: Proactive risk management is a process that involves anticipating what could go wrong (failures) and assessing the frequency of occurrence of these failures, as well as the consequences or severity of harm they cause and finally what can be done to reduce the risk of potential harm. Risk management concepts like Failure Mode and Effect Analysis (FMEA) and Failure Reporting Analysis and Corrective Action System are new to laboratories and still in progress. FMEA (Failure Mode and Effect Analysis) is a significant tool in strategies, concerning risk identification and control carried out for preventing failures. FMEA is a systematic method, analyzing the failure and determines where and how it happens and a systematic method attracting attention to different faults depending on these failures.

Materials and Methods: A team of 10 people (2 laboratory technicians, 2 biologists, 1 nurse, 1 occupational health and safety specialist and 4 physician) from laboratory who were involved in evaluation of the risks. Their main responsibility was to analyze and score all possible clinical chemistry laboratory failures based on three aspects: the severity of the outcome (S), the likeliness of occurrence (O), and the probability of being detected (D). These parameters were multiplied to calculate risk priority numbers (RPNs), which were used to prioritize remedial measures. Failure modes with RPN≥100 were deemed as high risk, meaning that they need immediate corrective action. All preanalytical, analytical and postanalytical processes which includes high risk failure modes such as biological hazards, medical errors and delays were defined by mapping. Severity, occurrence and detectability of each failure mode were ranked in FMEA analyses. Improvements were evaluated after corrective actions.

Results: A total of 35 possible risky situations (modes) have been identified and 18 of them have an RPN value above 100 and have been taken into immediate corrective action. As a result of the corrections made, 7 of them were decreased below 40, which is the lowest risk level, and 11 of them were decreased between 40 and 100 which is defined as moderate level. 54% of modes that caused delay, 26% of modes that caused medical errors and 10% of modes that caused biological hazards were reduced in all processes.

Conclusions: Besides the studies toward laboratory errors, risk analyses is an important activity directed towards assessing, mitigating to an acceptable level and monitoring of risks before the errors occurred. FMEA is an effective method to reduce errors in clinical chemistry laboratories.

Keywords: FMEA, Proactive approaches, Risk analyses, Risk Management

PA-32

Evaluation of Post-Analytical Quality Indicators for Clinical Laboratories According to Joint Commission International LaboratoryStandarts

[1]Emine Uğur*, [1]Nilay Elif Karacan, [1]Kezban Dönmez, [1]Gülçin Dağlıoğlu, [1]Tamer Cevat İnal, [1]Özlem Görüroğlu Öztürk

[1]Çukurova Üniversitesi Tıp Fakültesi Tıbbi Biyokimya, Adana

,

Aim: Errors in the processes of clinical laboratories, which are an important component of patient safety, can lead to serious consequences for patients. Therefore, these errors must be managed and improvement plans must be implemented to reduce them. It is widely accepted that the risk of error could also minimized by the use of quality indicators. Quality indicators are frequently used as a suitable tool in monitoring and achieving improvement and had ultimate purpose to keep the error risk at a level that minimizes the likelihood of patient harm.The aim of this study was to evalaute and reduce the errors of post-analytical processes according to Joint Commision International Laboratory Standarts.

Material and methods: This study was a longitudinal, before–after analysis of process improvements in the central laboratory of a teaching university hospital along three years. Laboratory chose three key indicators for post-analytical phases which includes efficient transfer of information, timeliness of reporting test results and adequacy of documentation. A quality-improvement team collected data on turn around times from the laboratory information system. Data were extracted from the laboratory information system for both the pre- and post- intervention periods. Monitoring was used to observec ompliance with minimum requirements and performance expectations on a regular basis over time.

Results: Turn around time also improved for stat samples from 70 to 53,5 min. In addition, incorrect laboratory reports was reduced for %10 and efficient transfer of information was improved %16.

Conclusion: In conclusion, laboratory management is required to decrease costs, increase efficiency, and promote user satisfaction by emphasizing quality. After the successful implementation of quality-improvement strategies, all selected performance metrics showed significant improvements and sustainability in the subsequent 3 years.

Keywords: Broken Windows Theory, Human inducederrors, proactive risk management

PA-33

Evaluating Device Performance for Selecting Glucometers Used in Hospitals

***[1]Yunus Dursun*, [1]Leyla Ibrahimkhanli, [1]Niyazi Samet Yilmaz, [1]Ozlem Gulbahar**

[1]Gazi University Faculty of Medicine, Department of Medical Biochemistry, Ankara

Aim; Glucometers used in hospitals play a vital role in diabetes management and emergency medical interventions. These devices are indispensable for monitoring patients' health conditions, organizing treatment plans, and improving overall patient care. Therefore, it is essential to select glucometer devices accurately in terms of analytical performance. The aim of this study is to compare glucometer devices from 4 different companies by referring to the CLSI POCT12-A3 guideline and to choose the most suitable one.

Method; Using the Hospital Information Management System (HIMS) software in our laboratory, we screened 43 patient results with different glucose concentrations measured from patients' serum. Tubes containing K2EDTA which are collected simultaneously from these patients, were set aside for the study. Before starting the study, the calibrations of four different brands (G1, G2, G3, G4) of glucometer devices were performed, low and high-level control solutions were measured, and the devices were prepared for use. The whole blood samples taken from tubes containing K2EDTA were separately analyzed on these four devices, and the results were recorded. The tubes containing K2EDTA were centrifuged to separate the plasma. Glucose measurements were conducted on these plasma samples using the autoanalyzer in our laboratory, and the results were recorded.

Results; The results obtained from four different brands of glucometer devices (G1, G2, G3, G4) were compared with the plasma glucose levels measured using the autoanalyzer. According to the CLSI POCT12-A3 guideline, at least 95% of results for values less than 100 mg/dL should fall within ±12 mg/dL of the target value. In all four brands, this rate was 100%. While at least 95% of results for values ≥ 100 mg/dL should fall within ±12.5% of the target value, the rates were 96% for G1, 65% for G2, 69% for G3, and 92% for G4. The number of results exceeding the limits of ±15 mg/dL for values <75 mg/dL and ±20% for values ≥75 mg/dL should be less than 2%. For G1 and G4, this value was 0%, while for G2 and G3, it was 2%.

Conclusion; This study aimed to compare the analytical performance of four different brands of glucometer devices with an autoanalyzer in the laboratory. The G1 brand glucometer device was selected as the most suitable device for clinical use due to its ability to provide values closest to the autoanalyzer results and its consistent performance. Furthermore, additional studies with a larger sample size could be conducted for the G4 brand glucometer device. These results could guide glucometer selection in a hospital setting and contribute to the improvement of patient care.

Keywords: Glucometers, Analytical performance, Device comparison

PA-34

The Relationship Between Prostate Tissue Growth and Fatty Acid Synthetase (FASN) and Glucagon Like Peptide GLP-1(9-37) (9-36) Amid

[1]Abdullah ÜNER, [1]Tevfik NOYAN, [2]Erdal BENLİ

[1]Ordu University Faculty of Medicine, Department of Biochemistry, Ordu
[2]Ordu University Faculty of Medicine, Department of Urology, Ordu

Aim: The main aim of this study was to investigate the difference between serum fatty acid synthetase (FASN) and glucagon-like peptide-1 (GLP-1) levels in patients diagnosed with prostate cancer and benign prostatic hyperplasia (BPH) and healthy controls. We also aimed to investigate the diagnostic significance of these two parameters in prostate diseases.

Material and Method: A total of 60 male patients with lower urinary tract complaints and 28 healthy male subjects were included in our study. According to the biopsy results, patients were divided into two groups prostate cancer (n=30) and BPH (n=30). Samples were taken after at least 8 hours of fasting and FASN, GLP-1 levels were measured by ELISA (Enzyme-Linked Immunosorbent Assay) method.

Results: FASN level was 6,71±0,81 ng/mL in the prostate cancer group, 3,84±0,21 ng/mL in the group diagnosed with BPH and 3,57±0,29 ng/mL in the control group. There was no statistical difference between the control and BPH groups in terms of FASN levels ($p>0,05$). However, FASN levels were significantly higher in the cancer group than in the control and BPH groups ($p<0,001$). GLP-1 level was found to be 9,69±0,65 pmol/L in the prostate cancer group, 11,40±0,77 pmol/L in the group diagnosed with BPH and 7,03±0,62 pmol/L in the control group. When compared with the control group, GLP-1 levels showed a statistically significant increase in the groups diagnosed with BPH and cancer ($p<0,001$ and $p<0,001$, respectively), whereas no significant difference was found between the groups diagnosed with cancer and BPH ($p>0,05$). When the diagnostic performance results of FASN, GLP-1, free PSA (s-PSA), total PSA (t-PSA), free/total PSA (s/t-PSA), reticulocyte distribution width (RDW-SD), and lactate dehydrogenase (LDH) parameters were analyzed in our study, the sensitivity of the tests was found as 43, 3%, 17,86%, 100%, 100%, 100%, 86,67%, 80,77%, and 76,6%, respectively, while the specificity was found to be 98,2%, 70,21%, 51,72%, 51,72%, 62,07%, 75,61%, and 70%, respectively.

Conclusion: Our results show that FASN and GLP-1 parameters may contribute to diagnostic accuracy in the prostate disease when used together with PSA and its derivatives. In addition, our study is important as it is the first study to examine the relationship between FASN, GLP-1, and PSA and its derivatives in prostate cancer.

Keywords: Prostate cancer, benign prostatic hyperplasia, fatty acid synthetase, glucagon-like peptide-1

PA-35

Evaluation of the Effect of Sample Type and Centrifugation Time on Zinc Levels

***[1]Gizem Ercan*, [1]Gülşen Şahin**

[1]Eskişehir City Hospital, Medical Biochemistry Laboratory, Eskişehir

Purpose: Zinc is a multifunctional trace element which has found in the structure of important enzymes, the deficiency of zinc is associated with growth retardation, infectious diseases and many metabolic disorders. Serum or plasma can be used as matrix for measuring zinc levels. It is mentioned in the literature that the release of zinc from cells during coagulation may lead to an increase in serum levels. This study aimed to determine the zinc levels in serum samples obtained from yellow-capped gel tubes and plasma samples obtained from dark blue-capped gel-free tubes and to evaluate the effect of the time between sample collection and separation on serum zinc concentrations.

Method: Forty-three volunteers were included in the study. Three tubes of blood were collected simultaneously from 15 people: 2 yellow- capped and 1 dark blue-capped. The dark blue-capped tube and one of the yellow-capped tubes were centrifuged after 20 minutes, and the second yellow-capped tube was centrifuged after 45 minutes. From the other 28 people, 2 tubes of blood, one dark blue-capped and one yellow-capped, were collected simultaneously and centrifuged within 45 minutes. Zinc levels were measured by colorimetric method on the Architect ci8200 analyzer. SPSS 24.0 program was used for statistical analysis. $p<0.05$ level was considered significant.

Results: In the first phase of the study, the mean±standard deviations of plasma and serum zinc levels centrifuged at 20th and 45th minutes from 15 people were 98.6±12.2, 99.7±13.5 and 113.5±17.4 µg/dl, respectively. While there was no statistically significant difference between the plasma and serum results in the tube centrifuged at the 20th minute ($p>0.05$), a significant difference was found between the serum results in the tubes centrifuged at the 20th and 45th minutes ($p=0.045$). There was also a significant difference between the plasma and serum results in the centrifuged tube at the 45th minute ($p=0.011$). The plasma and serum zinc averages of 28 people whose blood was taken in the second stage of the study were 74.4±11.1 and 78.7±12.4 µg/dl, and no significant difference was found between them ($p>0.05$).

Conclusion: Our findings support the knowledge that higher results can be obtained in serum than plasma, due to the release of zinc from platelets during the coagulation process. If serum matrix is to be used in zinc analysis, we think that centrifugation should be performed within 45 minutes at the latest after sample collection to avoid falsely high results.

Keywords: Zinc, trace elements, blood collection tubes

PA-36

Evaluation of Coagulation Parameters by Sigmametric Method

[1]Alperen Halil İhtiyar

[1]Bafra State Hospital, Department of Medical Biochemistry, Samsun, Turkey

Objective: The Six Sigma method is a quality management system that aims at zero defects, based on statistical calculations used to monitor and improve the performance of tests studied in clinical laboratories. The sigma value indicates the degree to which a test has an error-free process. A calculated sigma value above 6 indicates world-class (excellent) quality performance, and a score between 2-3 indicates "bad, needs improvement" quality performance. In this study, the analytical performance of coagulation parameters (activated partial thromboplastin time-APTT, prothrombin time-PT and D-dimer) studied in our laboratory was investigated by sigmametric method.

Method: The performance of APTT, PT and D-dimer tests studied in Bafra State Hospital Central and Emergency Laboratory was calculated over 3-month (February-March-April 2024) data. For the sigmametric calculation, the data used in the Bias % calculation were obtained from the KBUDEK (Association of Clinical Biochemistry Specialists External Quality) external quality control system and the absolute values of the 3-month Bias % data used were averaged. In order to calculate the CV% (Coefficient of variation) values, 2 level internal quality control data obtained from SF-8300 (Beijing Succeeder Technology Inc. China) for APTT and PT test and Cobas 6000 (ROCHE Diagnostics, Mannheim, Germany) devices for D-dimer test were used. APTT and CLIA (Clinical Laboratories Improvement Act) databases were used for PT tests, and American Association of Bioanalysts (AAB) databases were used for D-dimer tests. For all 3 tests, sigmametric values were calculated for the two quality control levels.

Results: In our study, the mean sigma values of the APTT test were 3.5 and 2.73 in two levels of control, respectively; The PT test was 3.1 and 4.54; The D-dimer test was found to be 4.4 and 5.35

Conclusion: When our 3-month data were analysed, we realized that regulatory preventive actions should be taken for our APTT test with a sigma value under 3, and the analytical performance of this test should be examined again after the necessary quality control procedures were applied.

Keywords: analytical performance, D-dimer, sigmametric method

PA-37

Evaluation of Haseki Training and Research Hospital Immunofixation Electrophoresis Data

***[1]Gamze Ekin*, [1]Macit Koldaş, [1]Yasemin Erdoğan Döventaş, [1]Pelin Kulan, [1]İbrahim Yılmaz**

[1]Haseki Training and Research Hospital

Aim: Immunofixation electrophoresis is a method used in the diagnosis, treatment and follow-up of monoclonal gammopathies. In paraproteinemias, there is excessive production of immunoglobulin known as monoclonal protein (M-protein). These proteins can be seen as sharply defined bands in the immunofixation electrophoresis method. Paraprotein types can be identified by this immunofixation electrophoresis method. (heavy and light chains). In this study, we retrospectively evaluated the types of paraproteinemia detected by the serum immunofixation electrophoresis method in our central laboratory between February and June 2024.

Material and Methods: In our study, a total of 605 serum immunofixation electrophoresis analysis results performed in the laboratory were evaluated retrospectively. Patient data were accessed through the laboratory information system and divided into classes according to band types. Serum samples of the patients were obtained on an agarose gel basis using the Interlab G26ı (Interlab Srl, Rome, Italy) analyzer.

Results: In the study, paraprotein bands were detected in the serum of 169 patients (28%). IgG kappa (53%) was detected in 89 patients, IgG lambda (23%) in 39 patients, IgM kappa (8%) in 14 patients, and IgA kappa (7%) in 11 patients.

Conclusion: In our study, we detected the most common type of IgG kappa and the second type of IgG lambda paraproteinemia. Our study provided important data about the frequency of monoclonal gammopathy in our hospital. As a result of our study, 169 (29%) monoclonal bands were found in 605 patients. As a result of this rate, it is possible to say that immunofixation electrophoresis has an important place in diagnosis and treatment follow-up, together with the clinician's suspicion. The International Myeloma Working Group recommends immunofixation electrophoresis for the diagnosis of proliferative cell diseases .Our developmental studies for the detection of patients with paraproteinemia continue in our laboratory, and with the data we have, it is possible to say that immunofixation electrophoresis has an important role in the diagnosis, treatment and follow-up of paraproteinemia.

Keywords: immunofixation electrophoresis, paraproteinemia, monoclonal gammopathy

PA-38

Evaluation of the Analytical Process Performance of CEA, CA 125, and CA 19-9 Tests Using the Six Sigma Methodology

***[1]Emre ARI*, [1]Birand ÇELİK, [1]Ercan SARUHAN**

[1]Muğla Training and Research Hospital

Objective: In this study, we aimed to evaluate the analytical performances of routinely used CEA, CA 125, CA 19-9 tests using the six sigma methodology and to contribute to the knowledge and skills of medical laboratories regarding six sigma.

Materials and Methods: Our study was conducted using data from Muğla Training and Research Hospital Central Laboratory between 01.04-24.05.2024. The internal quality control data used in our study were obtained from the Roche Cobas 8001 autoanalyzer (BIO-RAD) in our central laboratory and external quality control data were obtained from EQAS. All data were entered into Microsoft Excel program, and necessary statistical data (Mean, Standard Deviation, %CV, %BIAS) were obtained for sigma measurement.

Results: Despite the acceptable performance of the CEA test, the CA 125 test shows high variability in the 1st level %CV in May, and the CA 19-9 test exhibits high %CV in the 1st level in December and the 2nd level in May, resulting in poor six sigma performance. Due to these high %CV values, it is recommended to conduct sigma level checks in the upcoming periods and tighten the control rules as suggested by Westgard.

Conclusion: Analysis of the analytical performance of our three immunoassay tests over a six-month period using the six sigma methodology reveals that a significant portion meets world-class quality standards by month. However, parameters requiring improvement have been identified. Regular performance evaluations of analytical processes using the six sigma methodology and close monitoring by medical biochemistry experts can reliably reduce laboratory errors.

Keywords: Six Sigma, Analytical Performance, Tumor Markers

PA-39

Determining Medical Students' Approaches to Teaching Methods in the Medical Biochemistry Course and Program Changes Accordingly

***[1]Aleyna Nur Zeren Biçer*, [1]Ayça Tuzcu, [1]Mustafa Yılmaz, [2]Dilek Akdoğan**

[1]Medical Biochemistry Department, Faculty of Medicine, Aydın Adnan Menderes University
[2]Medical Education Department, Faculty of Medicine, Izmir Bakırçay University

Objective: Pre-graduation education at Aydın Adnan Menderes University comprises system-based horizontal integrated boards in the first three years, followed by discipline-based clinical training and internships. The "learner-centered" education model is significant for medical education accreditation. We aim to enrich the Medical Biochemistry courses with methods such as flipped education as an alternative to traditional teaching in our medical faculty, which was accredited on 05.03.2024. To gather student opinions on the teaching style of the Medical Biochemistry course, we conducted a survey. Based on the responses collected, we intended to organize teaching methods to increase student participation and understanding of the topics.

Method: In the 2023-2024 academic year, a survey was conducted among 100 first-year students in the Medical Faculty of Aydın Adnan Menderes University after a class taught using traditional slide presentations. The question "In what way would you like Medical Biochemistry courses to be taught?" was posed through Google Forms. The five answer choices were: 1) Lecturing using slides, 2) Case- based teaching, 3) Student-led teaching, 4) Flipped classroom with discussion, 5) Flipped classroom with question-solving via the Kahoot app. The responses were evaluated as percentages in the statistical section.

Results: Out of 100 students, 42 chose option 5, 27 chose option 2, 21 chose option 1, 8 chose option 4, and 2 chose option 3. The most preferred option by the students, selected by 42%, was "Flipped classroom with question-solving via the Kahoot app." This was followed by "Case-based teaching" chosen by 27%, "Lecturing using slides" chosen by 21%, and "Flipped classroom with discussion" chosen by 8%. The least preferred method was "Student-led teaching," chosen by 2% of the students.

Conclusion: The 5th option, "Flipped classroom with question-solving via the Kahoot app," was the most selected by 42% of students. Making the classes engaging, encouraging students to study the topic beforehand, and participating interactively by answering questions via Kahoot during the class were found to be important for the students. The second most chosen method was "Case-based teaching," indicating the value of case presentations in terms of both retention and clinical integration . The 3rd most selected option was "Lecturing using slides," preferred by 21% of students, as a traditional teaching method. While this method remains valid due to its clarity and retention benefits, it was found to be less preferred compared to alternative teaching methods. The 4th option, "Flipped classroom with discussion," was selected as the 4th choice, with fewer students opting for it due to hesitance in expressing opinions in a classroom setting. The least preferred option, "Student-led teaching," chosen by only 2% of students, suggests that students may require guidance from an educator. Following the high preference for flipped education observed among students in the survey, Dr. Ayça Tuzcu, Assistant Professor, implemented the flipped education model in the 3rd term "Cardiovascular Biochemical Tests" course, and Assoc. Dr. Mustafa Yılmaz used it in the 2nd term "Copper Metabolism" course. In the "Cardiovascular Biochemical Tests" course, cardiologist Dr. Arzu Ateş and in the "Copper Metabolism" course, pediatric metabolism specialist Dr. Emine Göksoy

Keywords: Medical education, Flipped classroom, Survey

PA-40

Evaluation of Rapid Antibody Test Compatibility in COVID-19 Cases Confirmed by RT-PCR Assay

[1]Asuman Akkaya Fırat, [2]Haluk Kılıç, [3]Serkan Elarslan, [1]Ümit Bilgili, [2]Hanife Aydın Yazıcılar, [4]Ebru Tarıkçı Kılıç, [5]Uğur Ayan

[1]Health Sciences University Fatih Sultan Mehmet Training And Research Hospital, Medical Biochemistry Laboratory, Ataşehir Istanbul, Turkey
[2]Health Sciences University Fatih Sultan Mehmet Training And Research Hospital, Medical Microbiology Laborator, Ataşehir Istanbul, Turkey
[3]Health Sciences University Fatih Sultan Mehmet Training And Research Hospital, Internal Medicine Clinic, Ataşehir Istanbul, Turkey
[4]Health Sciences University Ümraniye Training And Research Hospital, Anesthesia And Reanimation Clinic, Ümraniye Istanbul, Turkey
[5]Goztepe Prof. Dr. Süleyman Yalçın City Hospital İslab-2 Laboratory Kadıköy Istanbul.Turkey

Aim: It was aimed to determine the reliability of rapid antibody detection test (RADT) results and compatibility with RT-PCR assay in the screening and control of COVID-19 infection.

Methods: The retrospective study was performed with the permission of the Ministry of Health and the local ethics committee of our hospital. Between May 2020 and November 2020, 624 health staff laboratory results were recorded. Data processing hospital (HIS) and laboratory information system (LIS) records of our hospital were used as data collection methods. The level of agreement between tests was estimated using Cohen's κ index. Statistical analyses were performed using SPSS open-source software. Results: The mean age of the participants in the study was 28,46 ± 2,35. 54% were female (337), 46% (n=287) were male, and they had no additional disease. Both rapid antibody testing and RT-PCR tests were negative in 86% (n=540) of all tests. Two nasopharyngeal specimens were collected from each case to perform the RADT and RT-PCR. 13,6% (n=102) of the included patients had positive RT-PCR results. The RADT detected 84 of the 102 RT-PCR-positive cases and there were no false positive results. Overall sensitivity and specificity were 84,7% and 100%, respectively. Sensitivity was found >95% in symptomatic cases.

Conclusion: The Weimi Bio-Tech COVID-19 Ag RADT can be useful in screening for COVID-19, especially in cases in the first or second weeks of symptomatic infection.

Keywords: COVID-19; RT_PCR assey; Rapid antibody test

PA-41

Is Vitamin K Deficiency the Most Important Piece of the Puzzle in Idiopathic Short Stature?

[1]Muhammed Emin Ceylan, [1]İkbal Özen Küçükçetin, [2]Mesut Parlak, [2]Aynur Bedel, [2]Zeynep Donbaloğlu, [3]Taner Erkaymaz, [1]Sebahat Özdem

[1]Akdeniz University Medical Faculty, Department of Biochemistry
[2]Akdeniz University Medical Faculty, Department of Pediatric Endocrinology
[3]Süleyman Demirel University, Natural Products Application And Research Center

Aim: Short stature is a socially and medically important problem. Children with heights lower than 3rd percentile or -2SD (standard deviation) of age- and sex-matched and updated growth curves determined for the belonged population are defined to have shorth stature. In 60 to 80% of the children with short stature there is no pathological cause and therefore these children are followed with the diagnosis of idiopathic short stature. Vitamin K is the coenzyme of glutamate gamma-carboxylase and contributes in addition of carboxyl group into the gamma-carbon of glutamic acid residues of vitamin K-dependent 17 proteins. Vitamin K antagonist warfarin usage in pregnancy was shown to be associated with abnormalities in bone structure and bone growth such as ectopic calcifications in epiphyseal plagues of bones, inhibition of tibial longitudinal growth with fusion of growth plague, marked reduction in blood osteocalcin levels in babies. It is known that mutation in matrix Gla protein gene in humans is related with diffuse cartilage calcifications, abnormal shortness of distal phalanxs and abnormal bone growth. Therefore, based on the relation between vitamin K and bone tissue development/growth, it was aimed in the present project to study the role of vitamin K deficiency in childhood in development of idiopathic short stature and the mechanisms taking part.

Material and method: In our study, 44 children (22 girls and 22 boys, mean±SD age: 10,70±3,40) who were diagnosed with idiopathic short stature who applied to Akdeniz University Faculty of Medicine Pediatric Endocrinology department and 44 children (22 girls and 22 males, mean±SD age: 10,80±3,40) of the same age and gender who did not have idiopathic short stature and came to the pediatric outpatient clinic for control purposes were included in our study. Levels of menaquinone-4, menaquinone-7, IGF-1, IGF-BP3, total 25(OH)D3, PTH tests were performed in blood samples. Menaquinone-4 and menaquinone-7 levels were measured using UPLC-MS/MS, IGF-1, IGF-BP3, total 25(OH)D3 and PTH tests were performed by chemiluminescence immunoassay. Statistical Analysis: The data obtained in the study were analyzed using GraphPad Prism-8 program package.

Results: In the patient group; menaquinone-4, menaquinone-7, IGF-1, IGF-BP3, total 25(OH)D3 levels were found to be significantly lower ($p<0.0001$, $p<0.0001$, $p=0.018$, $p=0.023$ and $p=0.0237$, respectively) when compared with the control group. Both menaquinone-4 and menaquinone-7 were found to be approximately 2.5 times higher in the control group than in the patient group. In addition, moderate positive correlations were found between menaquinone-7 and height standard deviation scores (SDS) ($r=0.416$, $p=0.005$). When PTH levels were compared, no significant difference was found between the groups.

Discussion: In our study, vitamin K2 levels were found to be low in patients with idiopathic short stature. To our knowledge, this finding regarding menaquinone-4 and menaquinone-7 are reported for the first time in the literature. At the same time, this finding, since the determination of the effects and the role of vitamin K on bone growth and in development of idiopathic short stature clinically may provide a new therapeutic approach in prevention and/or treatment of a socially and medically important problem, idiopathic short stature.

Keywords: Short stature, Vitamin K, menaquinone-7, menaquinone-4

PA-42

Correlation of Oxidized Low-Density Lipoprotein with Standard Lipid Profile Parameters in Cardiovascular Risk Assessment

***[1]Nairo Massakazu Sumita*, [1]Sara Josa Mena, [1]José De Sá, [1]Rafael Augusto Dos Santos Pinho, [1]Ana Carolina Massucati Martins, [1]Patrícia De Fátima Dos Santos Monteiro, [1]Gustavo Loureiro**

[1]Grupo Fleury, São Paulo, Brazil

Aim: The low-density lipoprotein cholesterol is an established marker for cardiovascular disease. The oxidized low-density lipoprotein plays an important role in atherogenesis by promoting a chronic inflammatory disease and lipid deposition in the arterial wall increasing the risk of premature atherosclerosis and adverse cardiovascular events. The oxidized low-density lipoprotein can promote endothelial injury, induce expression of adhesion molecules, promote proliferation of smooth muscle cells, recruit and activate leukocytes, and contribute to foam cells and thrombus formation. This study aimed to evaluate the correlation of oxidized low-density lipoprotein with standard lipid profile parameters in cardiovascular risk assessment.

Methods: The standard lipid profile (total cholesterol, HDL-cholesterol, LDL-cholesterol, non-HDL-cholesterol, VLDL-cholesterol and triglycerides), apolipoprotein A, apolipoprotein B and high-sensitivity C-reactive protein concentrations were retrospectively evaluated in 37 outpatients aged 20 years or older in a large clinical laboratory routine. The total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides, apolipoprotein A, apolipoprotein B and high-sensitivity C-reactive protein measurements were carried out on the Roche 8000 analyzer (Roche Diagnostics GmbH, Germany) using reagents from Roche. The LDL-cholesterol and non-HDL-cholesterol were calculated. The LDL-cholesterol was calculated using the Martin-Hopkins equation. The oxidized low-density lipoprotein was measured using the sandwich enzyme-linked immunosorbent assay Mercodia Oxidized-LDL Kit (Mercodia AB, Uppsala, Sweden).

Results: The clinical characteristics of the population were 6 (16.2%) men with mean age of 46±17 years and 31 (83.8%) women with mean age of 48±14 years. The results of evaluated parameters were: total cholesterol: 228±59 mg/dL; HDL-cholesterol: 61±16 mg/dL; LDL- cholesterol: 146±54 mg/dL; non-HDL- cholesterol: 168±57 mg/dL; VLDL- cholesterol: 21±7 mg/dL; triglycerides: 103±49 mg/dL; apolipoprotein A: 154±32 mg/dL; apolipoprotein B: 118±29 mg/dL; high-sensitivity C-reactive protein: 0.19±0.17 mg/dL and oxidized low-density lipoprotein: 56±19 U/L. The Pearson correlation analysis of oxidized low-density lipoprotein and total cholesterol, HDL-cholesterol, LDL-cholesterol, high- sensitivity C-reactive protein, apolipoprotein A, and apolipoprotein B were:
-Total cholesterol: $r^2 = 0.694$, $p = 0.000$
-HDL-cholesterol: $r^2 = -0.213$, $p = 0.207$
-LDL- cholesterol: $r^2 = 0.736$, $p = 0.000$
-High-sensitivity C-reactive protein: $r^2 = -0.051$, $p = 0.771$
-Apolipoprotein A: $r^2 = -0.230$, $p= 0.222$
Apolipoprotein B: $r^2 = 0.685$, $p = 0.000$

Conclusion: The results suggest that the measurement of circulating levels of oxidized low-density lipoprotein may contribute to the estimation of cardiovascular disease risk.

Keywords: correlation, oxidized low-density lipoprotein, standard lipid profile, cardiovascular risk

PA-43

The Role of the Equation Derived from Standard Lipid Profile Parameters to Estimate the Elevated Levels of Small Dense LDL-Cholesterol

[1]Nairo Massakazu Sumita*, [1]Sara Josa Mena, [1]José De Sá, [1]Rafael Augusto Dos Santos Pinho, [1]Ana Carolina Massucati Martins, [1]Patricia De Fátima Dos Santos Monteiro, [1]Gustavo Loureiro

[1]Grupo Fleury, São Paulo, Brazil

Aim: Elevated LDL-cholesterol and small dense LDL-cholesterol have been associated with increased cardiovascular disease risk. The laboratory methods for assessment of small dense LDL-cholesterol are expensive. Therefore, several investigators have proposed methods for estimating small dense LDL-cholesterol in the form of equations that derive from classic lipid parameters. A study by Hattori et al., in a large population had suggested a positive predictive marker for the presence of small dense LDL- cholesterol particles if the LDL-cholesterol/apolipoprotein B ratio was less than 1.2. The objective of this work was to study the standard lipid profile and the frequency of patients with elevated levels of small dense LDL-cholesterol estimated by calculation in a private laboratory routine.

Methods: The standard lipid profile (total cholesterol, HDL-cholesterol, LDL-cholesterol, non-HDL-cholesterol, VLDL-cholesterol and triglycerides) and apolipoprotein B concentrations were retrospectively evaluated in 107,196 outpatients, aged 20 years or older. The total cholesterol, HDL-cholesterol, LDL- cholesterol, triglycerides and apolipoprotein B measurements were carried out on the Roche 8000 analyzer (Roche Diagnostics GmbH, Germany) using reagents from Roche. The LDL-cholesterol, non-HDL- cholesterol and VLDL-cholesterol were calculated. The LDL-cholesterol was calculated using the Martin-Hopkins equation.

Results: In the evaluated population of 107,196 outpatients, 10,280 (9.59%) presented LDL-cholesterol equal to or greater than 130 mg/dL, which is considered as borderline high level by the National Cholesterol Education Program (NCEP) and LDL- cholesterol/apolipoprotein B ratio less than 1.2. The clinical characteristics of this elevated LDL-cholesterol population were 5,486 (53.4%) men with mean age of 46±12 years and 4,794 (46.6%) women with mean age of 50±14 years. Results of lipid parameters were: total cholesterol: 228±28 mg/dL; HDL-cholesterol: 46±14 mg/dL; LDL-cholesterol: 153±22 mg/dL; non-HDL-cholesterol: 182±28 mg/dL; VLDL-cholesterol: 30±12 mg/dL; triglycerides: 163±89 mg/dL; apolipoprotein B: 135±20 mg/dL and LDL- cholesterol/apolipoprotein B ratio: 1.13±0.06.

Conclusion: The LDL-cholesterol/apolipoprotein B ratio may represent a feasible way to predict high small dense LDL-cholesterol levels. Assessment of small dense LDL-cholesterol levels may represent a valuable tool for further risk stratification in patients with high LDL-cholesterol levels. However, more studies are needed to establish guidelines for small dense LDL-cholesterol evaluation in clinical practice.

Keywords: standard lipid profile, small dense LDL-cholesterol, equation, cardiovascular disease risk

PA-44

Quantitative Assay of Sex Steroid Hormones in Different Biological Matrices Through LC/MS

[1]Aurora Piombarolo*, [1]Roberto Verna, [1]Cristiano Ialongo, [1]Maria Sapio, [1]Antonio Angeloni, [1]Mariano Bizzarri

[1]University of Rome

Aim The possibility of identifying main sex steroids (Dehydroepiandrosterone, 17β-estradiol, Estrone, Progesterone, Testosterone, Androstenedione, and Dihydrotestosterone) released by ovarian cells in a unique sequence offers invaluable practical advantages. Steroid analysis has been a key tool in the diagnosis and monitoring of numerous endocrine, oncological and metabolic diseases. However, there are still some important problems inherent in the management of complex matrices (blood, saliva, urine) and the need to optimize the quantification of hormones present at very low concentrations (estradiol and metabolites). Moreover, suitable models are still lacking in order to investigate the temporal variation of main sex steroids in animal models (mice and rats) and in the course of some human pathologies. The introduction of chromatographic (liquid chromatography and high performance gas chromatography) and mass spectrometry systems has significantly contributed to the evolution of methods for analyzing and quantifying steroids in biological samples. In this context, liquid/gas chromatography, coupled with mass spectrometry, emerged as the technique of choice for the simultaneous determination of a large number of steroids, due to the sensitivity and robustness of the method. However, the assessment of steroid hormones presents two major criticalities: inadequate full recovery of analytes after extraction due to the matrix complexity, and structural similarities among molecules, which explains why signal recognition can overlap between two similar compounds. Moreover, some endocrine factors (especially estrogens) are represented in biological matrices in very low concentrations. Methods. We utilized a C18 column (2.1x50mm, 1,9 µm) with a flow rate of 0,3 ml/min. The Mobile phase was H2O:ACN + 0,1%NH4OH and the gradient was: T0 52%ACN, T0,3 52%ACN, T0,8 82%ACN, T2 82%ACN, T2,5 52%ACN and T3 52%ACN. The oven temperature was 25°C and the volume injection was 20 µl. Results. The analytical resolution of the two main hormones, 17β-estradiol and estrone was a challenging task. Although the first approach enabled separating a number of endocrine factors - like DHEA, DHT, testosterone, progesterone and androstenedione - estrogens not reliably separate from each other. However, the modification of the mobile phase and the choice of a column with an appropriate length allowed us in performing an almost complete resolution of all considered analytes. To improve the partitioning efficiency NH4OH was identified as a useful modifier of mobile phase, able to favor the ionization of both estrogen and progesterone, simply changing the polarity during the chromatographic run. Separation efficiency is still retained in the different matrices investigated. Conclusion Our results provide an innovative solution, given that no methods are available today in permitting the contemporary chromatographic resolution and quantitation of estrogens altogether with the identification of other steroids. Moreover, the LC/MS method makes it easier to use even more complex matrices, such as urine and saliva, a fundamental aspect if we think of a possible extension of the analytical protocol.

Keywords: Sex Steroid Hormones, Liquid Cromatography-Mass Spectrometry, Animal Models, Estradiol, estrone

PA-45

Evaluating the Performance of Three Different Blood Collection Tubes on Monitoring Tacrolimus Levels

[1]Zeynep Yildiz , [1]Müge Kutnu, [2]Serap Yadigar , [1]Özlem Çakır Madenci

[1]Istanbul Kartal Dr. Lütfi Kırdar City Hospital Medical Biochemistry, Istanbul, Turkey
[2]Istanbul Kartal Dr. Lütfi Kırdar City Hospital ,Department of Internal Medicine, Division of Nephrology, Istanbul, Turkey

Objective: Tacrolimus is monitored due to its narrow therapeutic range and risk of toxicity. This study aimed to evaluate the effect of different blood collection tubes on tacrolimus levels.

Methods: Samples from 42 volunteers undergoing tacrolimus therapy were collected using three different blood collection tubes: Tube 1, BD Vacutainer® (Becton, Dickinson and Company, Franklin Lakes, NJ, USA) with ethylenediaminetetraacetic acid di-potassium salt (K2EDTA) 3 mL, 13x75 mm; Tube 2, Greiner Bio-One GmbH Samplix® with ethylenediaminetetraacetic acid tri-potassium salt (K3EDTA), 3 mL, 13x75 mm, Thailand; and Tube 3, Greiner Bio-One GmbH Vacuette® K3EDTA, 3 mL, 13x75 mm, Austria. Tacrolimus levels were analyzed on a Roche Elecsys Cobas e 601 analyzer (Roche Diagnostics, Penzberg, Germany) simultaneously. The BD Vacutainer, our routine tube, was used as the reference. Data were presented as median and interquartile range. The significance of the differences between tubes was assessed using the Kruskal-Wallis test. Passing and Bablok regression analysis and Bland-Altman plots were performed for method comparison. The level of significance was set at $P < 0.05$.

Results: There was no statistically significant difference in tacrolimus levels between the tubes, with median values (2.5-97.5 percentile) of 8.75 (0.50-39.90) for tube 1, 8.44 (0.50-36.19) for tube 2, and 9.32 (0.50-38.61) for tube 3 ($p = 0.82$). According to the Passing– Bablok regression analysis, Tube 2 and Tube 3 showed no proportional or systematic differences, with slope values of 1.019 (95% CI: 0.997- 1.079) and 1.015 (95% CI: 0.983-1.081), and intercept values of -0.041 (95% CI: -0.485-0.105) and -0.007 (95% CI: -0.549-0.330), respectively. The Bland–Altman analysis indicated no bias for either tube compared with the reference Tube 1.

Conclusion: These results indicate that both the Greiner Samplix® and Greiner Vacuette® tubes can be used interchangeably with the BD Vacutainer® tube for monitoring tacrolimus levels.

Keywords: Therapeutic drug monitoring; tacrolimus; evaluation; specimen collection

PA-46

Hematologic Cytogenetic Profiling in Uruguay: A Detailed Examination of Cases Representing a Small but Significant Population

[1]Vania Medina*, [1]Luciana Borgarello, [1]Daniela Infante, [1]Analía Sanguinetti, [1]Mónica González, [1]Elizabeth Tafernaberry, [1]Pablo López, [1]Raquel Ballesté

[1]Asociación Española. Bulevar Artigas 1525. Montevideo. Uruguay.

Aim This study aimed to analyze and characterize cytogenetic samples processed in a laboratory in Uruguay from October 2019 to May 2024. The focus was on sample distribution, patient demographics, clinical findings, and response times. The study's setting in Uruguay is crucial, as it provides a significant and representative dataset for the country's population of approximately 3,000,000 inhabitants, offering valuable regional insights for Latin America.

Method Data were collected from cytogenetic samples received between October 2019 and May 2024. The data included the total number of samples, patient age, gender, clinical data, and sample origin. The samples analyzed encompassed bone marrow, peripheral blood, lymph nodes, biopsies, and other body fluids. Data extraction was conducted using specific software, followed by analysis in Microsoft Excel 2010®.

Results A total of 6025 cases were received, with 5999 samples successfully processed, representing a comprehensive and highly representative dataset for Uruguay, given the country's population size. The gender distribution among patients was 48% female and 52% male, with ages ranging from 0 to 104 years and a mean age of 60 years. The laboratory processed an average of 106 samples per month, with the number of samples ranging from 71 to 143 monthly. The majority of samples were from bone marrow (77.28%), followed by peripheral blood (5.54%) and lymph nodes (15.83%). A smaller proportion included spleen biopsies and other samples, such as cerebrospinal fluid, peritoneal fluid, and pleural fluid. Notably, only 17.28% of the samples originated from the laboratory's own institution, while the remaining 82.72% came from other laboratories from several regions of Uruguay. The average response time for processing these samples was 16 days, with 2024 showing the shortest average response time of 10 days. Clinically, the distribution of samples was as follows: 52.5% chronic lymphoid diseases, 34.5% chronic myeloid diseases, 4.2% acute lymphoid leukemia, and 5.6% acute myeloid leukemia. Regarding the outcomes, 20.0% of the cases presented pathological results, 64.5% had normal results, and 15.5% of the samples were non-analyzable due to the absence of metaphases. Among the non-analyzable samples from lymph nodes, 65.6% were deemed insufficient for cultivation.

Conclusion This study provides a valuable and comprehensive dataset that reflects the cytogenetic landscape of Uruguay, with a significant sample size of 6000 cases in a country with a population of around 3,000,000. This makes the findings highly representative and relevant. The study offers critical insights into the prevalence of various hematological and other diseases within the region. These data could provide valuable insights that aid in understanding regional epidemiological trends and enhancing diagnostic practices. The findings emphasize the importance of high-quality diagnostic services and underscore the need for continued research and data collection to inform healthcare policies and practices both locally and across the region. This study's outcomes serve as a crucial reference point for future epidemiological studies and healthcare planning in Latin America.

Keywords: Cytogenetics, Hematology, Uruguay, Sample Analysis, Clinical Findings

PA-47

Evaluation of the Concordance Between Erythrocyte and Leukocyte Counts in ZYBIO U2610 Fully Automated Urine Sediment Analyzer and Manual Microscopy

[1]Ayşen Caniklioğlu, [1]Besna Ünver Seyfi

[1]Yozgat Bozok Üniversitesi Tıp Fakültesi, Yozgat/Türkiye

Objective: Urinalysis is one of the most commonly used tests in medical laboratories and provides valuable information to clinicians, primarily about urinary system diseases and other pathologies. This study aims to determine the concordance of the erythrocyte and leukocyte counts in the sediment field images of the ZYBIO brand fully automatic urine analyzer newly installed in our laboratory, without any correction, with manual microscopy reports.

Method: A total of 134 urine samples were simultaneously examined for erythrocyte and leukocyte counts by both the ZYBIO U2610 and manual microscopy. The ZYBIO U2610 urine sediment analyzer, which operates with laminar flow technology, is a device that has recently become widespread in medical laboratories in our country. The degree of concordance between the manual microscopy results and the ZYBIO U2610 urine sediment analyzer results was evaluated using Cohen's kappa (κ) coefficient.

Results: The concordance between the 134 urine samples analyzed with the ZYBIO U2610 urine analyzer and manual microscopy was statistically evaluated using Cohen's kappa coefficient. The kappa coefficient for erythrocytes was found to be $\kappa=0.789$, $p<0.001$, and for leukocytes, it was $\kappa=0.732$, $p<0.001$.

Conclusion: Although many fully automated urine analyzers with different technologies have been developed, manual microscopy is still the best method for urine sediment analysis. According to the results of our study, the erythrocyte and leukocyte counts obtained without any correction from the ZYBIO U2610 urine analyzer were found to be statistically in good agreement with those obtained by manual microscopy.

Keywords: ZYBIO U2610, manuel microscopy, erythrocyte and leukocyte counts

PA-48

Neisseria gonorrhoeae and Chlamydia trachomatis: a retrospective study

[1]Joana Sevilha, [1]Carla Gonçalves Ferreira, [1]Ezequiel Moreira, [1]Helena Ferreira Da Silva

[1]Unidade Local De Saúde Médio Ave, Vila Nova De Famalicão, Portugal

Aim: Accessing the importance of a faster diagnosis of Neisseria gonorrhoae and Chlamydia trachomatis in a local hospital unity.

According European Centre for Disease Prevention and Control, in the European Union the notification rate for Chlamydia trachomatis (CT) infection is 146 cases/100 000 inhabitants and 26,4 cases/100 000 for Neisseria gonorrhoeae (NG) infection. Urethritis in males and cervicitis in females are characteristics of a symptomatic infection, but it's known that frequently it stays asymptomatic. If these infections remains untreated of undetected it can lead to severe sequels like infertility, ectopic pregnancy and neonatal conjunctivitis leading to blindness. A rapid and correct diagnosis allows an appropriate treatment and a better outcome of these patients, whom a sexual transmitted infection (STI) is suspected. To detect these agents, a test with specific targets must be chosen, avoiding cross-reactions with other genital microorganisms.

Methods: Retrospective analysis of N. gonorrhoae and C. trachomatis tests performed, between 2017 and 2022, by qualitative in vitro real- time PCR test (Xpert® CT/NG, Cepheid GeneXpert® Intrument Systems). Data treated by Microsoft Excel.

Results: Between January, 1, 2017 and February, 15, 2022, 325 samples were analyzed (248 females and 77 males). Samples were collect in patients with risk factors (unprotected sexual intercourse). Leucorrhoea was the main symptom. NG was detected in 3 samples and CT in 20 samples, 5 samples were simultaneously positive for both microorganisms. The major source was urine (80%) being the remaining samples from another source like ocular or urogenital exudates. Young females were the group with higher prevalence (82%), being the group between 15-19 years the most significant. In the case of N. gonorrhoeae detection, cultural test was done, in order to perform susceptible tests.

Conclusions: The nucleic acids amplification tests (NAAT) are the recommended to the diagnosis of NG and CT infection. To be capable to perform this test in an emergency context, it's a vantage for rapid exclusion of this kind of infection, avoiding unnecessary antimicrobial therapeutics. This study led to an implementation of a screening program for NG and CT in sexual active young females (<25 years). Ocular exudate has proven to be important in the detection of these agents. However, despite NAAT been approved and the gold standard for diagnosis of STI, it's important to refer that in cases of sexual abuse victims, the cultural test is still necessary in males and in extra-genitals sites in females. The cultural test is also recommended in case of empiric treatment failure.

Keywords: Neisseria, Chlamydia, NAAT, STI

PA-49

The Difference Between Glucose Level Measured From K2-EDTA Plasma and Serum Samples

[1]Nazila Ismayilova*, [1]Zainab A Aburas, [1]Evin Kocaturk, [1]Ozben Ozden Isiklar, [1]I.Ozkan Alatas

[1]Eskisehir Osmangazi University Faculty of Medicine, Department of Clinical Biochemistry, Eskisehir / Turkey

Introduction: Glucose is one of the most frequently analyzed parameter in biochemistry laboratories, owing to its significant role in Diabetes Mellitus diagnosis and fallow up. Studies on the difference of glucose level in serum and plasma samples revealed different results. Researches pointed out that, plasma samples are centrifuged immediately then analyzed. In contrast serum samples are waited for the blood to clot. Thus, less ex-vivo glycolysis occurs in plasma samples compared with serum samples. This study aimed to compare glucose levels between plasma and serum samples centrifuged and analyzed at the same time.

Method: Samples of 20 patient, with glucose and complete blood count or Hba1c requests with the same order number, were taken and brought to our laboratory at the same time, included in this study. The patients' tubes containing clot activator and K2-EDTA were centrifuged together at the recommended speed and time. Obtained serum and plasma samples were separated and analyzed twice. The mean of each sample results were calculated. Passing-Bablok regression and Bland-Altman plot were used to evaluate the consistency between serum and plasma glucose levels.

Results: The evaluation was carried out on serum (N= 20) and plazma (N= 20) glucose result. The linear range of glucose in both samples was between 76.7 and 250.9 mg/dL. Median glucose levels in serum and plazma sample were 90.1 (83 - 96.4) mg/dL and 93.4 (88.1 - 105.5) mg/dL, respectively. There was a high concordance between the two samples. In the Passing-Bablok analyses, the 95% confidence intervals of the slope and intercept parameters were (0.990 to 1.054) and (-2.027 to 4.959), respectively. within the acceptable ranges. The regression equation is y= 2.477 + 1.009 x, with a correlation coefficient r= 0.968 (P< 0.001). There was no statistically significant deviation from linearity (P= 0.72). The Bland-Altman diagram shows that the percent bias between the two samples is %3.8 (95%CI, 2.35 - 5.25) as the glucose levels were higher in plasma than serum sample.

Conclusion: According to the results, a good agreement between the two sample glucose measurements was seen. It is possible to say that both samples are comparable for glucose measurement because there is a positive and strong linear relationship between these two samples. However, laboratory and clinical physicians should be aware of the difference between these two samples when evaluating patients' glucose results.

Keywords: Glucose, comparison, plasma, serum, specimen handling.

PA-50

Blood Culture Diagnostic Intervention in Time of Earthquake Catastroph to Improve Diagnostics and Therapy

***[1]Osman Sezer Cirit*, [2]Sophie Schneitler**

[1]Gaziantep City Hospital, Gaziantep/Türkiye
[2]Saarland University Medical Center - Homburg/Germany

Aim: Diagnosis of bloodstream infections remains one of the most critical functions in hospitals. From a clinical point, deficits were identified, including the fact that only one aerobic bottle was taken rather than a set. The aim of the study was to evaluate and intervene in blood culture (BC) diagnostics.

Method: In my hospital, inappropriate sampling of blood cultures takes place, especially in the intensive care unit. Blood culture samples from most patients were collected and sent in a single bottle, and there was no habit of taking them as a set or sending them in an anaerobic bottle. We aimed to compare two separate intensive care units, which we designed as control and case. We trained the nurses working in the intensive care unit, which we determined as cases, on blood culture collection. We conducted a pretest survey consisting of 13 questions to the participants before the training.

Study design A case-control-intervention study was carried out on two intensive care units at Dr. Ersin Arslan Training and Research Hospital in Gaziantep, Türkiye, selected based on their bed capacity, number of staff, and previous number of blood culture request numbers. The study comprised four different phases: From May to June (period 1; measurement), in July (interim period; Diagnostic Stewardship intervention including staff survey, training, and, continued measurement), from August to October (period 2; measurement), and from November to December 2023 (follow-up period; measurement). Interactive BC-training was conducted on the case ward, accompanied by a pre- and posttest survey consisting of questions on demographics and 10 topic related multiple-choice questions. We assessed contamination rate in BCs. Data was extracted from the LIS. We also compare the pre and posttest results.

Staff questioning and training A total of 59 nurses in the intensive care unit, who were identified as cases, were given 20-25 minutes of interactive training to raise awareness about correct blood culture collection accompanied by a pre- and posttest survey, consisting of 3 questions regarding demographic information and 10 multiple choice questions. At the end of the training, a 7-8 minute video on correct blood culture collection was shown. After the second period, the staff survey was used again with the same questions as a final posttest.

Interactive BC-training was conducted on the case ward, accompanied by a pre- and posttest survey consisting of questions on demographics and 10 topic related multiple-choice questions. We assessed contamination rate in BCs. Data was extracted from the LIS. We also compare the pre and posttest results.

Results: A total of 59 (100%, females 37/ 68%) nurses received the training and completed the test. Participants was in 80% between the ages of 20-29 an 46% had 2-5 years of job experience. Only 15% of participants reported receiving formal training in BC sampling, most answered “by observing” and “with the help of senior colleagues. 19 nurses (32.2 %) completed the post-test. The intervention led to a considerable increase in the rate of obtaining

Keywords: antimicrobial stewardship, diagnostic stewardship ,blood culture

PA-51

Evaluation of the Necessity to Dilute Urine for Albumin Measurement in a Unıversity Hospital

***[1]Tugba Turkoglu*, [1]Ozben Ozden Isiklar, [1]Evin Kocaturk, [1]I. Ozkan Alatas**

[1]Eskisehir Osmangazi University Faculty of Medicine, Department of Medical Biochemistry, Eskisehir, Turkey

Introduction: Microalbuminuria is defined as the presence of 30-300 mg of albumin in a 24-hour urine sample. Under normal physiological conditions, daily urinary albumin excretion is below 30 mg. Microalbuminuria is one of the earliest signs of diabetic nephropathy diagnosis. It is also used as a marker in the risk assessment of cardiovascular disease. Microalbuminuria is evaluated by measuring the albumin-to-creatinine ratio in a spot urine sample or by analyzing a 24-hour urine collection. Since urinary albumin excretion follows a circadian rhythm, measuring the amount of albumin excreted over a 24-hour period is considered the gold standard. The goal of this study is to investigate the proportion of samples with microalbuminuria analyzed in our laboratory and determine the frequency of samples exceeding the measurement range that require dilution.

Method: In this study, we analyzed albumin results from spot and 24-hour urine samples collected between July 1, 2023, and July 1, 2024. The albumin levels in these samples were measured using the immunoturbidimetric method (Cobas 702, Roche Diagnostics, Mannheim, Germany) with a measurement range of 0.3–40 mg/dL. Samples with albumin concentrations exceeding 40 mg/dL were automatically diluted at a 1/2 ratio. For samples exceeding 80 mg/dL, manual dilution was performed at a 1/10 ratio. The results were then evaluated in this retrospective study.

Results: During a one-year period, a total of 6,686 urine samples were analyzed for microalbumin levels in our laboratory. of these samples, 5,816 (86.9%) did not exceed the upper measurement limit of 40 mg/dL and thus did not require any dilution. The remaining 870 samples (13.1%) exceeded this upper limit. Among these, a 1/2 ratio automatically diluted 344 samples (39.5%), while additional dilution procedures were required for the remaining 526 samples (60.5%).

Conclusion: As a tertiary healthcare facility, our hospital has admitted many patients with nephropathy. As a result, these patients' urinary albumin levels may exceed the measurable range. Multiple analyses are often required because of the need for high dilution ratios to obtain accurate results. This situation reduces cost-effectiveness, prolongs the analysis process, increases workload, and may lead to dilution-related errors. Kits capable of measuring high values of albumin in urine are necessary to eliminate these issues and identify patients with high albuminuria.

Keywords: Albuminuria, Dilution, Immunoturbidimetric Assays, Nephropathy

PA-52

Can Triglyceride/Glucose Index and Triglyceride/HDL Cholesterol Ratio Predict Insulin Resistance and Glycemic Control?

[1]Selda Telo, [1]Nurullah Seçilmiş, [1]Ahmet Yılmaz

[1]Firat University School of Medicine, Department of Biochemistry, Elazig

Introduction: Since insulin resistance (IR) occurs before the development of type 2 diabetes and cardiovascular disease, early diagnosis becomes important in planning prevention strategies. HOMA-IR index, which measures insulin resistance, and HBA1c levels, which also show glycemic control, are commonly used markers. However, in cases where these tests cannot be performed, more easily accessible, reliable and inexpensive methods are needed. When insulin resistance begins to occur, one of the metabolisms most affected is lipid metabolism. This study aimed to evaluate the use of Triglyceride/Glucose index (TyG) and Triglyceride/HDL cholesterol ratio (Tg/HDL-c) as indicators for insulin resistance and glycemic control.

Methods: Fasting blood sugar, triglyceride, HDL-cholesterol, HbA1c and insulin levels, which were studied simultaneously from samples taken from 1103 patients in our laboratory between January 2024 and July 2024, were retrospectively examined. 564 of the patients were men and 539 were women. HOMA-IR was calculated as Fasting blood sugar (mg/dl) x Fasting Insulin (uU/mL)/405. The formula ln[fasting triglyceride (mg/dl)x fasting glucose (mg/dl)/2] was used for the TyG index. Patients were divided into 2 groups according to their HbA1c levels: >6.5% and <6.5%. According to the HOMA-IR score, patients were divided into two groups: >2.5 (patients with insulin resistance) and <2.5 (patients without insulin resistance). Mann-Whitney U test was used to compare variables that did not show normal distribution. ROC analysis was used to evaluate the ability of TyG index and Triglyceride/HDL-c ratio to determine insulin resistance and glycemic control. Results: Both TyG index and Triglyceride/HDL-c ratio were found to be statistically high in patients with insulin resistance ($p<0.001$, $p<0.001$, respectively). When ROC analysis was performed to evaluate the ability to distinguish insulin resistance, these parameters were found to be (AUC=0.763, $p<0.001$) for the TyG index and (AUC=0.730, $p<0.001$) for the Triglyceride/HDL-c ratio. It was found that both TyG index and Triglyceride/HDL-c ratio were statistically high in patients with poor glycemic control ($p<0.001$, $p<0.01$, respectively). In terms of glycemic control, TyG index was found to be (AUC=0.822, $p<0.001$), and for Triglyceride/HDL-c ratio (AUC=0.683, $p<0.001$).

Conclusion: In institutions where HOMA-IR and HBA1c, which is a marker of glycemic control, cannot be performed, TyG index and Triglyceride/HDL-c tests, which are cheap and simple biochemical parameters, can be used to determine insulin resistance and glycemic control. However, this needs to be confirmed by prospective studies validated with the reference method.

Keywords: Insulin resistance, Triglyceride/Glucose index, HOMA-IR

PA-53

Allergic Transfusion Reactions Secondary to Food Consumed Before Blood Donation

[1]Ryu Yanagisawa*, *[1]Manjiro Yamanaka*, *[2]Yumi Koike*, *[2]Yasunori Ito

[1]Shinshu University Hospital, Matsumoto, Japan
[2]Nagano Children's Hospital, Azumino, Japan

Background: There have been reports on allergic reactions induced by transfusion of blood from a donor who consumed peanuts to patients with peanut allergy. Therefore, before blood donation, the donor consuming food to which the recipient is allergic could trigger allergic transfusion reactions. Evidence to explain this phenomenon remains insufficient, although we previously reported activation of basophils in children who were allergic to eggs, milk, and wheat after receiving blood from healthy individuals who consumed these foods.

Aim: To investigate basophil activation in patients who were sensitized to foods other than eggs, milk, and wheat and received blood from donors who consumed these foods

Methods: Healthy participants were asked to consume peanuts or buckwheat. Blood samples were collected from participants before and after the consumption, and serum was separated from the blood. Basophil activation test (BAT) was conducted using the obtained serum and basophils of participants who were positive for peanut- or buckwheat-specific IgE.

Results: of the 12 patients with peanut-specific IgE, 1 showed BAT positivity in serum collected 8 h after peanut consumption. of the 11 patients with buckwheat-specific IgE, 4 showed BAT positivity in serum samples collected 2–4 h after buckwheat consumption.

Conclusions: The blood of donors who consumed peanuts or buckwheat activated the basophils of children who were sensitized to these foods. However, the frequency of positive BAT results might be lower in cases with peanut or buckwheat allergy than in cases with allergies to eggs, milk, and wheat.

Keywords: Allergic transfusion reaction, Basophil activation test

PA-54

The Fine Line Between Contaminant and Pathogen: Corynebacterium Kroppenstedtii

[1]Raquel Ballesté*, [1]Leticia Caiata, [1]Daniela Cauteruccio, [1]Barloco Ana, [1]Ballesté Raquel

[1]ASESP, Montevideo, Uruguay

Aim: The genus Corynebacterium includes well recognized human pathogens, such as Corynebacterium diphtheriae, but most species are usually considered contaminants in clinical specimens. Corynebacterium kroppenstedtii was first isolated in 1998, and since then has been sporadically associated with human infections, mainly breast abscesses and granulomatous mastitis in young women. We aim to describe a clinical case of infection with this emerging pathogen.

Method: Clinical data: retrieved from the electronic medical record and the laboratory information system. Specimen handling (in biological safety cabinet). Inoculation of: blood and chocolate agar plates (5%CO2), Mac Conkey agar plate (ambient air) and broth culture (tryptic soy broth). Anaerobic culture (blood agar plate in anaerobic jar with sachet and indicator strip, Thermo Scientific TM). Incubation: 35°C. Smear for Gram stain. Identification: matrix-assisted laser desorption/ionization-time-of-flightmass spectrometry (MALDI TOF, BrukerDaltonik®). Susceptibility test: disk diffusion (clindamycin) and minimum inhibitory concentrations (MICs) by "E-test" (penicillin, ciprofloxacin, vancomycin). Medium: Mueller–Hinton (MH) agar +5% sheep blood (the European Committee on Antimicrobial Susceptibility Testing (EUCAST) recommended medium: MH+5% defibrinated horse blood, was not available). Incubation: 5%CO2 35°C. Interpretation according to EUCAST 2024.

Results -CLINICAL CASE: On june 2024 a syringe with pus was received at the microbiology laboratory from a breast needle aspiration performed on a 26 year-old woman. She had a personal history of 3 pregnancies (last one: 2022) and was currently breastfeeding. Over the last month she experienced pain and swelling on her left breast and was diagnosed with 2 abscess by ultrasound. She received ampicillin-sulbactam for 15 days, but persisted with pain, so she was prescribed trimethoprim-sulfamethoxazole for 10 days. Upon completion of the new prescription, the patient remained symptomatic so an evacuative needle aspiration was performed 1 ml of purulent material was obtained and sent for bacteriological study. Clindamycin was prescribed for 10 days; with good subsequent evolution. The direct specimen Gram smear showed numerous polymorphonuclear cells, not bacteria. After 72 hours of incubation, small grayish-white colonies were observed exclusively on blood and chocolate agar plates, which were identified as Corynebacterium kroppenstedtii by MALDI TOF (score: 2.07). The same microorganism was recovered from the broth medium. The isolate was susceptible to clindamycin and vancomycin and resistant to penicillin and ciprofloxacin (we chose the EUCAST more rigorous criteria for the interpretation of the results over the Clinical and Laboratory Standards Institute -CLSI- ones).

The laboratory report included a note stating the antibiotic susceptibility test was not performed according to the standardized method so it should be interpreted with caution. CONCLUSION: Corynebacterium spp might represent contamination or true opportunistic human pathogens: adequate clinical information and accurate microbiological identification are essential for such differentiation. MALDI-TOF, thanks to its simplicity, speed and precision, seems to be an adequate tool achieving precise identification within the genus. Prolonged incubation of invasive samples may help recognize pathogens that would otherwise go undetected. The susceptibility study of Corynebacterium spp has some difficulties that must be acknowledged: the test medium is not usually available in the clinical lab, and there are differences between CLSI and EUCAST breakpoints.

Keywords: emergent pathogen, breast abscess, Corynebacterium spp.

PA-55

Diversity of Pitfall Sizes of Thyroglobulin Autoantibodies on Different Thyroglobulin Immunoassays: a Comprehensive Method Comparison Study from the Analytical Perspective

***[1]Özlem Gülbahar*, [1]Tuba Saadet Deveci Bulut, [2]Muhittin A. Serdar, [3]M. Muhittin Yalçın, [3] Meriç Coşkun, [4]Aylar Poyraz, [1]Seda Gökgöz Acar, [1]Gizem Yaz Aydın**

[1]Gazi University School of Medicine, Department of Medical Biochemistry, Ankara, Turkey
[2]Acibadem Mehmet Ali Aydinlar University, Department of Medical Biochemistry, Istanbul, Turkey
[3]Gazi University School of Medicine, Department of Endocrinology And Metabolism Ankara, Turkey
[4]Gazi University School of Medicine, Department of Pathology Ankara, Turkey

Aim: Serum thyroglobulin immunometric assay (Tg-IMA) techniques, essential for evaluating treatment response in Differentiated Thyroid Cancer (DTC), are influenced by thyroglobulin autoantibodies (TgAb), affecting result accuracy. In this investigation, different Tg-IMAs were compared using quantitative approach following American Thyroid Association (ATA) and Clinical and Laboratory Standards Institute (CLSI) EP09c guidelines.

Methods: A total of 249 serum samples were tested with four Tg-IMA methods: Abbott Architect, Beckman Access, Roche Cobas Elecsys (second-generation), and Siemens Immulite (first-generation). Passing-Bablok, Folded Probability analyses were performed.

Results: Second-generation Tg-IMA methods demonstrated strong correlations ($r>0.884$) across all concentration levels (≤1, 1-10, >10 ng/mL), although biases of up to 2-fold were observed at different Tg levels (slope:1.131-2.027). Correlations between the Siemens Immulite Tg and second-generation Tg methods were observed to be strong at concentrations >10 ng/mL ($r>0.945$), but less so at lower concentrations ($r<0.642$). Negative interference from TgAb notably affects Siemens Immulite Tg.

Conclusion: Second-generation Tg-IMA methods yield highly correlated results at all levels, including low Tg concentration subgroups. However, it is noteworthy that the Tg results obtained from these methods for the same patient sample exhibit proportional biases at levels that render them unsuitable for comparison with each other. Nevertheless, Siemens Immulite Tg exhibited negligible and weak correlations with second-generation Tg assays at Tg concentrations below 10 ng/mL, indicating that the limit of quantification (LoQ) for Siemens Immulite Tg may require recalculation. Additionally, Siemens Immulite Tg is more susceptible to negative interference from TgAb compared to the other three Tg assays, a factor that should be carefully considered in the clinical management of patients with DTC.It is crucial to underscore that serum Tg measurements are a valuable tool for monitoring cancer recurrence in patients with DTC after surgical and/or radioactive iodine (RAI) treatments. They provide insight into the biochemical aspects of patient follow-up, which is pivotal for effective surveillance and management of this disease. In particular, collaboration between clinicians and clinical biochemists will be beneficial in identifying potential issues in the interpretation of Tg tests that exhibit significant differences in analytical methodology.

Keywords: method comparison; thyroglobulin; interference of thyroglobulin autoantibody; CLSI EP09c; differantiated thyroid cancer

PA-56

Evaluation of the Analytical Performance of Endocrine Tests Using the Six Sigma Method

***[1]Yasemin Erdoğan Döventaş*, [1]Hatice Erdoğan**

[1]Haseki Training And Research Hospital,Istanbul,Türkiye

Purpose: Six Sigma process analysis is used in evaluating and monitoring laboratories' preanalytical, analytical, and postanalytical stages. The Six Sigma methodology is based on the specification of process performance according to sigma levels. Sigma metrics are calculated using the coefficient of variation (CV), bias, and total allowed error (TEa). In this study, we aimed to evaluate the analytical performance of endocrine tests studied in the Central Laboratory of Haseki Training and Research Hospital using the Six Sigma method and to determine corrective actions for the necessary tests.

Method: Haseki Education and Research Hospital Central Laboratory, 13 parameters (TSH, FT3, FT4, HCG, E2, FSH, LH, PROG, PRL, Testosterone, cortisol) from endocrine tests were evaluated in the Beckman Coulter UniCel DxI 800 (Beckman Coulter, Brea, CA, USA) autoanalyzer in three months between December 1, 2019 and March 1, 2020. Three-month consecutive internal (level 1- 2) quality control data were used for the coefficient of variation (% CV) and external quality control data was studied in the same date range for % bias. For the total allowed error (% TEa), the error limits determined by CLIA (Clinical Laboratory Improvement Amendments) 2019 and Biological variation were accepted. Sigma values (σ) were calculated using σ= [% TEa (CLIA) - % bias)] /% CV. The analytical performance of the tests was evaluated according to the sigma levels obtained. Sigma values of <3 was considered unacceptable, 3-6 sigma values were considered acceptable, and ≥6 sigma values were considered good.

Findings: When the %TEa (total analytical error) values of the tests at both control levels were evaluated according to CLIA criteria, they were lower than the allowed limits. The Six Sigma levels calculated for both levels of the tests were ≥6 sigma for E2, Folate, PTH; 3 ≤ sigma < 6 for TSH, FT3, FT4, HCG (level 2), FSH, LH, PROG, PRL, Testosterone, TPSA, FPSA, vitamin B12, CA 125, CA 15-3, CA 19-9 (level 1), CEA (level 1), vitamin D, AFP (level 1) and cortisol; AFP (level 2), CA 19-9 (level 2), CEA (level 2), Ferritin, HCG (level 1) were calculated as < 3 sigma.

Conclusion: It is quite useful to apply sigma values for the evaluation of analytical process performance and quality management. Six Sigma can help achieve the desired quality in laboratory test processes and measurements. A low sigma value (<3 sigma) in clinical laboratories indicates that precautions should be taken to improve the quality of the analysis and that the laboratory should use alternative methods. It is seen to be quite useful in ensuring that internal and external quality control data are evaluated together. In our study, the analytical performances of the Beckman Coulter UniCel DxI 800 immunoassay system were evaluated with the Six Sigma methodology. According to the results, it was observed that the sigma levels of the analyzer in our laboratory were at acceptable levels for all parameters except for level 2 AFP, level 2 CA 19-9, level 2, and level 1 HCG. According to CLIA

Keywords: Six Sigma, total allowable error, analytical performance, CLIA

PA-57

STAT ('short turnaround time') tests management model in the area of USL Toscana Nord-Ovest

[1]Filippo Cellai, [1]Maria Bombara, [2]Alberto Conti, [3]Stefania Lombardi, [4]Clizia Murratzu, [5]Fabio Palla, [6]Stefano Rapi, [1]Elisabetta Stenner

[1]Azienda USL Toscana Nord-Ovest, Dipartimento Delle Diagnostiche, Laboratorio Analisi Chimico-Cliniche, Ambito Livorno
[2]Azienda USL Toscana Nord-Ovest, Dipartimento Emergenza Urgenza Area Critica Blocco Operatorio
[3]Azienda USL Toscana Nord-Ovest, Dipartimento Delle Diagnostiche, Laboratorio Analisi Chimico-Cliniche, Ambito Massa Carrara
[4]Azienda USL Toscana Nord-Ovest, Dipartimento Delle Diagnostiche, Laboratorio Analisi Chimico-Cliniche, Ambito Pontedera
[5]Azienda USL Toscana Nord-Ovest, Dipartimento Delle Diagnostiche, Laboratorio Analisi Chimico-Cliniche, Ambito Viareggio
[6]Azienda USL Toscana Nord-Ovest, Dipartimento Delle Diagnostiche, Laboratorio Analisi Chimico-Cliniche, Ambito Lucca

Aim: Standard admission order set of laboratory investigations represents an useful tool to improve clinical assistance, setting turn around times (TAT) on clinical requirements, and reducing inappropriate requests in the Emergency Department (ED). Contextually, analitycal performance control allows a tight monitoring of quality data and process efficiency. These aspects contribute to the implementation of a model of governance of STAT ("short turn around time") tests in the area of ASL Toscana Nord Ovest.

Method: A set of STAT tests has been drafted, dividing all tests into 3 branches, based upon ordering timing: emergency branch 7/7 days 24 hours; clinical suspicion branch 7/7 days 24 hours; fast microbiology branch 7/7 days 12 hours. Branches has been definied combining the recent literature and regional instructions and laws in matter of drugs and sexual assault, but also according clinical requests of EDs. TATs for each branch have been definied.

Results: The emergency branch includes clinical pathology tests (clinical chemistry, haematology, coagulation) run in total laboratory automation (TLA) with a TAT = 60-90 minutes (90% of results), and other tests (toxicology, microbiology, serology) with a TAT = 12-24 hours (90% of results), depending on internal laboratory organization and technical time of processing by laboratory instruments. Together with a short TAT, supported by algorithms of auto-verification and validation rules, the efficacy of the process is assured by the adoption of a shared quality strategy based on specific quality goals and internal quality controls, for all the clinical chemistry tests performed in TLA. The clinical suspicion branch includes tests ordered in case of specific diagnostic query (e.g. malaria, meningitis, sepsis) that have TATs generally of 60-90 minutes or more, depending on technical factors (blood culture, TAT 24 hours). Finally, the fast microbiology branch consists of molecular biology and antigenic tests, such as multiplex PCR panels or Legionella/Pneumoccocus urinary antigens, with TAT = 12 hours (90% of results).

Conclusions: The model described is approching to the laboratory area scenario of the ASL Toscana Nord Ovest, which consists in 13 laboratories (5 hubs, 5 spokes, 3 decentralized) performing STAT

test, and, clearly, it entails a key organization of workflows, as the centralization of rapid microbiology (TAT=12h) into two hub laboratories or the use of point-of-care testings in specific labs depending on the local context. Nevertheless, this great effort in homogenization of the connection between ED and laboratory represents a significant improvement in terms of economic sustainability, harmonization of standard procedures and increase of quality process, as well as a guarantee of equality in critical patient management.

Lippi G. et al. Clin Chem Lab Med. 2018; 56(10):1655-1659 Dolci A et al. Clin Biochem. 2017; 50(10-11):605-611 Beştemir A. et al. Turk J Biochem 2023; 48(5): 467–474.

Keywords: Harmonization, TAT, Emergency department

PA-58

Comparison of Complete Blood Count Results Between Mindray BC-6800 Plus and Sysmex XN-1000 Hematology Analyzers

[1]Zeynep Yildiz , ***[1]Özlem Çakır Madenci, [1]Müge Kutnu***

[1]Istanbul Kartal Dr. Lütfi Kırdar City Hospital Medical Biochemistry, Istanbul, Turkey

Objective: We aimed to compare the complete blood count (CBC) results of the Mindray BC-6800 Plus and Sysmex XN-1000 hematology analyzers.

Methods: A total of 125 patient samples, randomly selected from the routine workflow, were measured simultaneously using the Mindray BC-6800 Plus (Shenzhen, China) and Sysmex XN-1000 (Sysmex, Kobe, Japan) hematology analyzers. The compatibility between white blood cells (WBC), red blood cells (RBC), hemoglobin (Hb), platelets (PLT), hematocrit (HCT), mean corpuscular volume (MCV), red cell distribution width (RDW-CV), mean platelet volume (MPV), and platelet distribution width (PDW) was evaluated using Passing–Bablok and Bland–Altman analyses.

Results: Passing-Bablok regression analysis for WBC, Hb, HCT, PLT, and MCV showed that the 95% confidence interval of the regression equation intercept for each test included 0, and the 95% confidence interval of the slope contained 1, with r>0.98, indicating a good correlation. However, both constant and systematic errors were detected for RBC, RDW-CV, MPV, and PDW, with intercepts of 0.169 (0.102–0.233), 1.165 (0.514–1.720), -1.885 (-2.875 to -1.089), and 14.429 (13.991–14.778), and slopes of 0.948 (0.932–0.966), 0.939 (0.900–0.985), 1.154 (1.074–1.250), and 0.143 (0.109–0.182), respectively. Bland-Altman analysis revealed the following absolute differences between the analyzers: WBC 3.7%, RBC 0.80%, Hb 0.30%, PLT 2.3%, HCT 0.10%, MCV 0.7%, RDW-CV 1.8%, MPV 3.8%, and PDW 35.6%. Desirable Biological Variation Database specifications for Bias were given for all parameters except PDW. Bias exceeded acceptable limits for RDW-CV and MPV with values of 1.8% (1.7%) and 3.8% (2.29%) respectively and a notable Bias was observed for PDW at 35.6%.

Conclusion: The Mindray BC-6800 Plus and Sysmex XN-1000 analyzers showed strong correlation and consistency for WBC, RBC, Hb, HCT, PLT, and MCV. Because of the discrepancies in RDW-CV, MPV, and PDW, adopting the common reference ranges for different analyzers seems virtually impossible.

Keywords: Standardization, Complete blood count, Bia

PA-59

Analysis of Factors Affecting Post-Transfusion Hemoglobin Levels in RBC Transfused Patients

[1]In Bum Suh, [2]Hana Kim, [1]Hee-Jeong Youk, [1]Jian Kim, [1]Byonggon Min

[1]Kangwon National University, Chuncheon / South Korea
[2]Korea Clinical Medicine Center, Chuncheon / South Korea

Aim: Accurate prediction of post-transfusion hemoglobin (Hgb) levels is crucial for optimizing transfusion strategies and minimizing complications. It is generally known that Hgb levels increase by approximately 1 g/dL per unit of packed RBC transfusion. Hemoglobin (Hgb) level changes after red blood cell (RBC) transfusion can be influenced by various factors. Bleeding, medications, and underlying conditions as primary determinants. However, the influence of factors such as age, gender, pre-transfusion Hgb levels, and inflammatory markers like C-reactive protein have not been clearly established as affecting post-transfusion Hgb changes. This study aims to investigate the influence of these factors on post-transfusion Hgb changes using our dataset of patients who have undergone RBC transfusions.

Methods: A total of 73,738 units of packed RBCs were transfused at Kangwon National University Hospital between 2018 and 2023. This retrospective study analyzed a cohort of 7,119 patients who received RBC transfusions. Data sets with incomplete variables, as well as cases where clinical events such as bleeding and other complications occurred during the RBC transfusion period, were excluded based on chart review. Data including age, gender, blood type, pre- and post-transfusion hemoglobin (Hgb) levels, C-reactive protein (CRP), and other hematologic markers were collected. The primary outcome was the change in Hgb levels measured 6 to 48 hours post- transfusion. Multivariate regression analysis and time series analysis were performed to evaluate the influence of age, gender, pre-transfusion Hgb, CRP levels, and other factors on the post-transfusion Hgb increase. SHAP (SHapley Additive exPlanations) values were used to interpret the importance of each variable in influencing the outcome.

Results: Our analysis identified several significant predictors of post-transfusion hemoglobin (Hgb) changes. Age was found to be a significant factor, with older patients showing a marginally larger increase in Hgb levels post-transfusion (Coefficient: 0.0058, 95% CI: 0.0021–0.0095, P-value: 5.63×10^{-5}). Pre-transfusion Hgb levels exhibited a strong inverse relationship with post-transfusion Hgb changes, suggesting that higher pre-transfusion Hgb levels were associated with smaller increases in Hgb (Coefficient: -0.4619, 95% CI: -0.5000 to -0.4238, P-value: $<2.2\times10^{-16}$). Pre-transfusion CRP levels showed a modest positive correlation with Hgb changes, indicating that higher CRP levels were associated with slightly larger Hgb increases (Coefficient: 0.0073, 95% CI: 0.0015–0.0131, P-value: 0.0136). However, lagged pre-transfusion Hgb (Coefficient: -0.0170, P-value: 0.1205) and CRP levels (Coefficient: -0.0028, P-value: 0.3310) did not emerge as significant predictors. Gender did not significantly influence post-transfusion Hgb changes, with the coefficient for males being -0.0017 (P-value: 0.9703), indicating no notable difference in Hgb changes between genders.

Conclusions: This study identified age, pre-transfusion Hgb levels, and CRP levels as significant factors influencing post- transfusion Hgb changes. Older age and higher inflammatory states, as reflected by elevated CRP levels, were associated with a greater rise in Hgb levels following transfusion. Pre-transfusion Hgb levels, however, had a strong inverse association with post-transfusion Hgb changes. These findings suggest that transfusion strategies should be individualized based on these patient-specific factors to optimize treatment outcomes. Further research is needed to explore the mechanisms underlying these associations and to confirm whether modifying these factors can improve transfusion efficacy.

Keywords: Transfusion, RBC, Hemoglobin level, Factor

PA-60

Determining Laboratory Cut-Offs for the Rosner Index and Percent Correction formulas for Evaluating Factor Deficiencies

[1]Müge Kutnu, [1]Özlem Çakır Madenci, [1]Zeynep Yildiz

[1]Istanbul Kartal Dr. Lütfi Kırdar City Hospital Medical Biochemistry, Istanbul, Turkey

Objective: The study aims to determine the laboratory cut-offs for the Rosner index and percent correction formulas used to interpret mixing studies on patients with prolonged APTT and PT to evaluate factor deficiency.

Methods: A retrospective study was performed using the data of patients with prolonged APTT and PT results whose factors II, V, VII, VIII, IX, XI, and XII were measured on STAR Max® coagulation analyzer (Diagnostica Stago Inc., France), and mixing study was performed. Factor deficiency was confirmed by both clinical and laboratory findings. A mixing test was performed by mixing patient plasma and Normal plasma pool with a 1:1 ratio. Rosner index was calculated for the interpretation of the APTT mixing test and the percent correction formula for both. Area under curve values of receiver operator's characteristics (AUC-ROC) analysis in diagnosing factor deficiency was performed.

Results: A total of 178 APTT and 139 PT results were evaluated. 168 Patients (56%) were classified as intrinsic or extrinsic factor deficiency. The optimum cut-off for the Rosner index was 14.32 % with a sensitivity of 81.25% % and specificity of 35.96 % with an AUC- ROC % value of 55 %. The optimum cut-off for the APTT percent correction formula was 62.5 % with a sensitivity of 43.75 % and specificity of 74.56 % with an AUC-ROC % value of 60.4%. The optimum cut-off for the PT percent correction formula was 70.0% % with a sensitivity of 54.9 % and specificity of 72.9 with an AUC-ROC % value of 62.5 %.

Conclusion: Rosner index was found more sensitive than the percent correction formula in suggesting factor deficiency for cut-offs of <14.3 % and >62.5 % respectively. The correction of < 70 % for PT and <62.5 % for APTT had high specificity for excluding factor deficiencies.

Keywords: Rosner index, Percent correction formula, Mixing test

PA-61

The Role of Oral and Transurethral Pirfenidone Administration for Preventing Urethral Stricture Formation in Experimental Urethral Stricture Models in Rabbits and Its Effects on Biomarkers

[2]Mehmet Kırdar, [3]Nursinem Alkan, [2]Mesut Berkan Duran, [3]Nilay Şen Türk, [1]Hülya Aybek, [2]Zafer Aybek

[1]Pamukkale University Medical Faculty Department of Biıochemistry, Denizli/Turkey
[2]Pamukkale Uniıversity Medical Faculty Department of Urology, Denizli/Turkey
[3]Pamukkale University Medical Faculty Department of Pathology, Denizli/Turkey

Aim: Urethral stricture is characterized by the narrowing of the urethra due to the formation of scar tissue. The pathogenesis of urethral stricture involves a fibrotic process caused by excessive collagen synthesis and changes in the composition of the extracellular matrix. Various agents with antifibrotic activity have been studied in experimental models of urethral stricture prevention, including Halofuginone, Mitomycin C, Botulinum toxin A, somatostatin analogs, glucocorticoids, and Rapamycin (1-6). Pirfenidone is a drug used in the treatment of interstitial pulmonary fibrosis known for its antifibrotic, anti-inflammatory, and antioxidant properties. Pirfenidone has not been previously studied in experimental animal models of urethral stricture. In this study, we aimed to evaluate the effect of pirfenidone on fibrosis, inflammation, and biomarkers in male rabbits with induced urethral injury.

Methods: Thirteen male New Zealand rabbits, aged 120 ± 20 days and weighing 3-4 kg, were used as subjects. The rabbits were randomized into three groups. Urethral tissue injury was induced in all rabbits. The groups were Sham (urethral injury only), urethral injury + oral pirfenidone treatment, and urethral injury + intraurethral pirfenidone treatment. Urethral injury was created using an 11Fr pediatric resectoscope according to the method described by Jaidine et al., with electrocoagulation at 40W energy power, 15 mm distal to the verumontanum (7). Blood samples were collected on days 0-1-3-5-7 and 14 considering the stages of wound healing. Serum samples obtained after centrifugation at 2000 g for 10 minutes were stored at -20°C until analysis. Serum levels of TGF-β, IL- 1β, TNF-α, PDGF, and FGF were analyzed and recorded using the ELISA method. On day 15 following treatment and monitoring, rabbits were sacrificed after penectomy. Formalin-fixed, paraffin-embedded (FFPE) urethral tissue sections were stained with Hematoxylin & Eosin (H&E) and Masson's Trichrome (MT) for histopathological examination under light microscopy, focusing on urethral fibrosis and inflammation, including spongiosal fibrosis and inflammation.

Results: Histopathologically, oral pirfenidone treatment reduced inflammation following urethral injury in rabbits. When compared with rabbits receiving intraurethral pirfenidone treatment, those treated with oral pirfenidone showed more effective inflammation prevention. Fibrosis values among the rabbit groups were similar, and no statistically significant differences were found between the groups. There was no significant change in FGF and TGF-beta levels, biomarkers involved in wound healing, inflammation, and fibrosis formation, between oral pirfenidone and intraurethral pirfenidone treatments. However, IL-1, PDGF, and TNF-alpha levels were suppressed in the group treated with oral pirfenidone, supporting its anti-inflammatory and antifibrotic effects after urethral stricture.

Conclusion: Pirfenidone, known for its anti-inflammatory and antifibrotic effects, presents new hopes in the management of urethral fibrosis, where current medical treatment options are limited.

Keywords: biomarker, fibrosis, inflammation, pirfenidone, urethra

PA-62

Regional Distribution of Omega-3 Fatty Acids in the Phospholipids of Antarctic Krill (Euphausia superba)

[1]Nadia Segura*, [1]Elisa Volonterio, [2]Andrés Alallón, [1]Iván Jachmanián, [3] Bartolomé Grillo, [2]Walter Alallón

[1]Fats and Oils Department, Faculty of Chemistry, University of the Republic, Montevideo, Uruguay.
[2]Pathology Laboratory, Faculty of Medicine, University of the Republic, Montevideo, Uruguay.
[3]Uruguayan Antarctic Institute, Uruguay.

Introduction: In recent decades, there has been a shift in dietary habits leading to a reduction in omega-3 consumption. Omega-3 deficiency poses a high risk for cardiovascular and cerebrovascular diseases, as well as neurodegenerative diseases and predisposition to depression, attention deficit hyperactivity disorder (ADHD), or sudden death. Several studies have shown that the bioavailability of polyunsaturated fatty acids of the n-3 family (n-3 PUFAs) is higher when they are supplied in the form of phospholipids (PLs) rather than triacylglycerols. This is reflected in a faster increase in the omega-3 index in the red blood cell membrane. Additionally, intestinal absorption is greater for fatty acids in the sn-2 position of PLs. Krill oil has great nutritional appeal due to its high content of PL and n-3 PUFA. Although the fatty acid composition of krill has been extensively studied, the positional distribution of n-3 PUFA in PLs still needs to be clarified, which is the objective of this work.

Methods: Krill was captured in the FAO subarea 48.3 of the Atlantic Ocean, South Georgia Islands, during the spring season. Lipids were extracted using the Hara & Radin method, and the PL fraction was separated by silica gel column chromatography. The region-distribution of fatty acids in phospholipids was determined from the purified PLs by analyzing the fatty acid composition at both positions of the molecule using specific phospholipases: phospholipase A1 from Aspergillus oryzae (≥10 KLI/g; 1.2 mg/mL) for the sn-1 position and phospholipase A2 from Honey bee venom (600-2400 units/mg; 0.7 mg/mL) for the sn-2 position. Incubations were performed for 1 hour, and the hydrolysis products were separated by TLC, recovering the free fatty acid fraction. This fraction was then derivative to its methyl esters, which were analyzed by GC.

Results: In the sn-1 position, saturated fatty acids (SFA) reached 68.5%, monounsaturated fatty acids (MUFA) 26.7%, and PUFA 3.8%, with n-3 PUFA constituting 3.3%. Notable in this position are the high content of palmitic acid (59.9%) and oleic acid (16.6%). Conversely, in the sn-2 position, 0.7% SFA, 8.2% MUFA, and 90.4% PUFA were found, with 86.6% of PUFA being n-3. The prominent fatty acids in the sn-2 position are EPA and DHA, with 62.8% and 17.2%, respectively.

Conclusion: The results conclude that PUFAs, particularly those from the n-3 family, are located at the sn-2 position of the krill PLs, while the sn-1 position is occupied by SFAs and MUFAs. This regional distribution of omega-3 fatty acids in PL provides better bioavailability. Therefore, Antarctic krill (Euphausia superba) is oil source of oil that should be considered a valuable supplement of n-3 PUFAs due to the unique regional distribution in its PL.

Keywords: omega-3 fatty acids, krill oil, phospholipids

PA-63

Levels of Vitamin K1 and K2 by Age in Healthy Individuals Using the Liquid Chromatography-Tandem Mass Spectrometric Method

[1]İkbal Özen Küçükçetin*, *[2]Taner Erkaymaz*, *[1]Sebahat Özdem

[1]Akdeniz University Medical Faculty Department of Medical Biochemistry, Antalya/Türkiye
[2]Suleyman Demirel University, Natural Products Application and Research Center, Isparta/Turkey

Objective: Vitamin K has been shown to play a key role in several important areas. These include metabolic events such as the activation of certain clotting proteins, the integrity of bone tissue, inhibition of arterial calcification, and regulation of cell growth. Therefore, determining vitamin K levels is important. Liquid chromatography tandem mass spectrometry methods have been introduced for accurate and reproducible vitamin K measurements. In order for liquid chromatography tandem mass spectrometry methods to be used in clinical laboratories, it is very important to validate the measurement method. In this study, plasma levels of vitamin K1 and two forms of vitamin K2 (menaquinone-4 and menaquinone-7) were measured using the liquid chromatography-tandem mass spectrometry method. The validation studies of the method were conducted, and differences in the levels of these parameters among different age groups and genders in healthy individuals were investigated.

Materials and Methods: Vitamin K forms were performed using the Thermo Scientific Ultimate 3000 UPLC and Thermo Scientific-TSQ Fortis (Thermo Fisher Scientific Inc., Waltham, Massachusetts, USA) system. A total of 122 participants (64 women and 58 men) aged between 19 and 77 were included in the study after applying the exclusion criteria. The three parameters were analyzed following the extraction process. The results were compared across six age groups: 20-29, 30-39, 40-49, 50-59, 60-69, and 70-77 years. Additionally, when comparing male and female groups statistically, they were divided into those under and over 50 years old. Results: The average age of the 122 volunteer participants was calculated as 48.3±16.9 (mean ± SD). The levels of vitamin K1, menaquinone-4, and menaquinone-7 (mean ± SD) across the entire group were measured at 0.131±0.083 ng/mL, 0.715±0.179 ng/mL, and 0.963±0.237 ng/mL, respectively. While menaquinone-7 values showed no differences across age groups, menaquinone-4 levels in the 30- 39 age group were found to be significantly higher than in the 20-29, 50-59, 60-69, and 70-79 age groups. Vitamin K1 levels in the 30-39 age group were found to be significantly lower compared to the 20-29 and 40-49 age groups. The average menaquinone-4 level was found to be 0.608±0.129 ng/mL for all female groups over 50 years old, and 0.704±0.184 ng/mL for males in the same age groups. Menaquinone- 4 levels in those over 50 were significantly different between male and female groups. It was observed that menaquinone-4 levels in women over 50 years old were significantly lower than the average for women under 50 years old. No difference was observed in menaquinone-4 levels between men over and under 50 years old. Vitamin K1 and menaquinone-7 values showed no differences between female and male groups either over or under 50 years old.

Conclusion: Due to the many important functions of Vitamin K, measuring its levels in routine clinical laboratories has become essential. In our study, different types of Vitamin K were measured across gender and various age groups. Upon evaluating our data, it was observed that menaquinone-4 levels were low in women over 50, a finding that may be particularly related to osteoporosis.

Keywords: Vitamin K, LC-MS/MS

PA-64

Correlation of Triglyceride-Glucose Index and HOMA-IR in Predicting Insulin Resistance

***[1]Gülce Kiren*, [1]Gülce KİREN**

[1]Sincan Research and Training Hospital, Ankara/Turkey

Aim: Insulin resistance is a risk factor for Type 2 Diabetes Mellitus and its potential complications. Insulin resistance can be diagnosed using the Homeostasis Model Assessment of Insulin Resistance (HOMA-IR) index, which is calculated from insulin and fasting plasma glucose measurements. Numerous studies across different geographical regions have been carried out to determine reference values for HOMA-IR, with varying results due to ethnic diversity and different methodological approaches. In recent years, the Triglyceride-Glucose (TyG) index has been introduced as a more practical method for indicating insulin resistance, utilizing fasting plasma glucose and triglyceride measurements. This study aims to evaluate the correlation between the TyG and HOMA-IR values to determine whether the TyG index, which can be easily implemented even in primary healthcare settings, can be used as a marker for diagnosing insulin resistance.

Methods: The results from 1029 patients from the Endocrinology Clinic of Sincan Training and Research Hospital, collected between August 2023 and May 2024, were included in this study. Triglyceride, fasting plasma glucose, and HOMA-IR values of the patients were incorporated into the analysis. The TyG index was calculated using the following formula: TyG index = Ln [Triglyceride (fasting) (mg/dL) x glucose (fasting) (mg/dL) / 2]. HOMA-IR was calculated using the following formula: HOMA-IR = [Insulin (fasting) (μU/mL) x plasma glucose (fasting) (mg/dl)] / 405. Data entry and analysis were performed using the SPSS Statistics 26 software. The normality of the data distribution was assessed using the Kolmogorov-Smirnov test. A p-value of less than 0.05 was considered statistically significant. Spearman's rho correlation test was appropriately employed for the correlation analysis.

Results: In the Spearman correlation analysis conducted, a statistically significant, moderate correlation was observed between HOMA-IR and the TyG index, with a p-value < 0.05 and a correlation coefficient (rho, ρ) of 0.443.

Conclusion: The TyG index is well-suited for daily clinical use due to its simplicity in measurement and calculation from routine laboratory tests. Our research demonstrated a significant moderate correlation between the TyG index and HOMA-IR values. Therefore, additional studies are required to further evaluate the TyG index's utility in predicting insulin resistance.

Keywords: Triglyceride, Glucose, Diabetes mellitus, HOMA-IR

PA-65

Early Diagnosis of Non-Communicable Diseases in Remote Areas of Southern Chile with Diagnostic Access gaps. Utility of POCT

[2]Carolina Prieto, [1]Miguel Berr, [3]Guillermo Ariztia, [4]Francisco Aguilera, [4]Juan Pablo Torres, [4]Jesus Rodríguez, [4]Daniela Rozas, [4]Verónica Barrientos, [5]Sebastián Miranda, [4]Boris Valenzuela, [4]Sergio Agüero

[1]University of Chile Hospital -Active Aging Program Santiago Chile
[2]Hospital Dipreca-Laboratorio Santiago Chile
[3]University of Chile -Active Aging Program Santiago Chile
[4]DESAM Quinchao Chile
[5]Active Aging Program Quinchao Chile

Objective: to carry out a screening study of chronic non-communicable diseases using POCT systems in the population living in remote areas on the Quinchao islands of the Chiloé Archipelago with poor diagnostic access. This study is part of a preventive control strategy for diseases such as diabetes and hypercholesterolemia, to achieve early diagnosis and treatment aiming to an active and healthy aging.

Methods: it is a descriptive work of the results of the first 167 cases in which screening was carried out using POCT equipment in remote areas, for detection and control of non-communicable diseases. The HbA1C and lipid profile examinations were performed with the cobas s101 equipment installed on the islands of Apiao, Meulín and Chaulinec. They were carried out by personnel previously trained, under the manufacturer's recommendations for quality control. The % of cases outside the recommended cut-off points and the measurement of the time to perform the examination per patient were obtained.

Results: of the first 167 cases evaluated, 121 were women (72%) and 47 were men. The average of HbA1c was 5.95% (4.9-12%). Total cholesterol averaged 211 mg/dl (114-322) in 140 cases measured and with results over 200 mg/dl in 53 cases (37.9%). The LDL cholesterol estimated in 117 cases by Friedewald formula on average was 115.6 mg/dl. The average triglyceride level was 220.3 mg/dl and hypertriglyceridemia above 150 mg/dl was detected in 76 cases out of 140 (54%) and above 300 mg/dl in 23 cases (16%). The average testing time for each patient was 20 min.

Conclusions: The use of POCT in remote areas with little access to basic diagnoses is a strategy that allows achieving equity in health care. Diagnosis is the first step to improve people's health, to know their health status and then apply treatment. This study suggests a high prevalence of hypertriglyceridemia, hypercholesterolemia and cases that may have resistance or diabetes in the population of these locations not previoulsy detected. Achieving easy and reliable access through the use of POCT systems can resolve these diagnostic gaps and allows early detection and treatment, for population leaving in remote areas with lack of healthcare access.

Keywords: POCT, screening, diabetes, cholesterol, triglycerides, remote areas

PA-66

Impact of Behavioral Assessment on Occupational Health and Safety in a Public Tertiary Hospital Laboratory

[1]Maria Elizabete Mendes*, [2]Valeria Aparecida Faria, [2]Adalgisa Andrade, [2]Maria Leide Sena Badaró, [3]Luana Turibio, [3]Livia Lemos, [3]Lucimar Cavalcanti, [4]Nairo Massakazu Sumita

[1]São Paulo Brazil
[2]DLC HC FMUSP, São Paulo, Brazil
[3]CEAC HC FMUSP, São Paulo, Brazil
[4]DLC HCFMUSP,São Paulo/Brazil

Aim: Safe behavior (SB) is a proactive and responsible conduct that prevents accidents, protects the health and well-being of workers, and reduces material damage. It is part of the occupational health and safety (OHS) culture. It depends on everyone's engagement to avoid exposure to hazard. It requires training and awareness for risk perception. Inspection by the occupational safety technician (OST) is carried out in the workplace to identify hazards, assess behavior (AB), prevent risks, and implement actions to prevent accidents and work health problems. The objective this study is to evaluate the impact of AB on OHS performance in the public tertiary laboratory with 460 employees.

Material and Method: The study was carried out between 2021-2023, carrying out a hazard inspection and risk assessment. The need to carry out OST in the technical areas of the laboratory was defined. In these areas, there is a standardized AB of employees during operational practice, checking adherence to safe practices and compliance with regulatory standards of the Brazilian Ministry of Labor NR32(chemical and biology risks)/NR17(ergonomic risks), issuing a report. The observations made trigger immediate training, to raise awareness of the risks, involving the employee and their immediate superior. The OST returns to verify the changes. The records are categorized and monitored. The training hours/year (THY) and accidents at work /year (AW) were computed. Results: There are 24 different areas inspected by occupational safety technicians.

year 2021 2022 2023 total number of inspection 84 72 96 252 behavioral assessment 40(47.62%) 48(66.66%) 52(54.17%) 140(55.55%) year 2021 2022 2023 total number of inspection 84 72 96 252 Number of conformities/ (%) 70(83.3%) 60(83.3%) 82(84.13%)

year 2021 2022 2023 total number of inspections 84 72 96 252 Number of non conformity NR32(chemical, biological risks) 7/40 5/48 6/52 18/140 % of non conformity NR32(chemical, biological risks) 8.33% 6.94% 6.25% 12,86%

year 2021 2022 2023 total number of inspections 84 72 96 252 Number of non conformity NR17(ergonomic risks) 7/40 7/48 8/52 22/140 % of non conformity NR172(ergonomic risks) 8.33% 6.94% 6.25% 15,71%

Accidents at work/year 2021-2023: 11 AW/y - 7AW/y- 6 AW/y. THYe 2021-2023: 972 hs/y- 325 hs/y- 325 h/y. The number of OST ranged from 72-96/year in the period studied. The percentage of AB corresponded to 55.55% of the total inspections carried out. The annual percentages ranged from 47.62% to 66.66%. Among the AB, the notes were classified according to risks expressed in the Brazilian standards NR32 (chemical and biological) and NR17 (ergonomic). The occurrences due to NR32 (n=18) represented 12.86% of the total.The percentages of non-conformities recorded by NR32 ranged between from 6.25% to 8.33%. The occurrences due to NR17 (n=18) represented 15.71% of the total.The percentages of non-conformities recorded by NR32 ranged between from 6.25% to 8.33%.

Conclusion: Accidents at work decreased in the three years studied, after AB were implemented. The THY in the same period were high.

Keywords: accidents at work, occupational health and safety, occupational risks, behavior assessment

PA-67

Impact of ecological footprint on natural gas consumption in a Brazilian public laboratory

***[1]Maria Elizabete Mendes*, [2]Maria Leide Sena Badaró, [2]Valeria Aparecida Faria , [2]Nairo Massakazu Sumita**

[1]São Paulo Brazil
[2]DLC HC FMUSP, São Paulo, Brazil

Aim: The ecological Footprint measures a person´s demand on ecosystems services: the amount of land and sea area needed to produce the goods they use and absorb in their carbon dioxide emissions. The global hectare (gha) is a measurement unit for the ecological footprint of people or activities and biocapacity of Earth or its regions. This tool is used in this laboratory as a way of raising awareness among employees about the impact of their daily habits on the environment, how the consumption of natural resources (natural gas) should be reduced and used rationally. The objective this study was to assess the impact of the Ecological Footprint on the consumption of natural gas in the clinical laboratory.

Materials and Methods: Application of the annual ecological footprint questionnaire (measurement of the gha) grouped into categories of personal habits in: home, work environment, transportation and food. The result indicate the types of behavior: active conscious, partially active conscious, not active, not conscious. The study was carried out between 2012- 2023. The assessment of environmental aspects and impacts (LAIA) in the laboratory revealed that the consumption of natural gas had a high impact. It was evaluated before and after the start of these actions. The number of employees was monitored because this number is part of the calculation of the gha. Action plan to reduce this consumption including: monitoring of monthly natural gas consumption (m³), maintenance of pipelines, leak test on natural gas pipelines, exclusion of unnecessary access points to the natural gas, exclusion/replacement of equipment that was fueled by natural gas, implementation of contingency plan and training of employees.

Results: This public laboratory in a tertiary hospital produces about 9 million tests per year. Year 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 Number of employees 399 410 489 535 505 498 501 498 535 504 473 482 Year 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 gha 2,88 2,46 2,63 2,04 2,17 2,17 2,5 2,5 2,4 2,4 2,6 1,17 Year 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 gás/m³ 1282 1228 1121 933,1 938,11 921,73 1083,77 1392,01 1313,65 834 900 800 Between 2012-2023 the gas consumption fell 37.59% and the ecological footprint fell 59.37%. The falls were proportional and related(r=0,58703900). gas gha 2012 1282 m³ 2.88 2023 800 m³ 1.17 % Reduction 37,59% 59,37% The LAIA previous LAIA=749 post LAIA =243.

Conclusion: The ecological footprint was monitored for 12 years. Campaigns were carried out with leaders to find new technologies to reduce or eliminate gas use, raise awareness among employees about saving on consumption, comply with the preventive maintenance schedule on the gas network, reduce points on the gas network (n=16), and review procedures. The staff was prepared to activate contingencies. The use of the ecological footprint provided elements to rethink natural gas consumption and try to adapt it to the planet's ecological capacity.

Keywords: environmental aspects and impacts, ecological footprint, gha, environmental risks,natural gas

PA-68

The Relationship Between NT-proBNP Levels and Hemogram Parameters

***[1]Fikret Akyurek*, [2]Fatma Sengul Bag**

[1]Selçuk University, Faculty of Medicine, Department of Medical Biochemistry, Konya/Turkiye
[2]Adıyaman University, Faculty of Pharmacy, Department of Biochemistry, Adiyaman/Turkiye

Aim: N-terminal natriuretic peptide type B (NT-proBNP) is an inactive N-terminal fragment produced by the cleavage of the hormone proBNP and is characterized by a longer half-life and higher stability. This hormone produced by heart muscle cells is one of the strongest prognostic factors for assessing the severity and prognosis of heart failure (HF). The relationship between this marker and hematologic parameters may provide additional information for clinical assessment and thus contribute to a precise management of the disease. The aim of this study is to evaluate the relationship between NT-proBNP and hemogram parameters and to investigate whether commonly used and easily measurable hemogram parameters can provide new insights into the diagnosis and prognosis of HF in situations where NT-proBNP analysis is not available.

Methods: This retrospective study included the data of 694 patients who presented to Selçuk University Faculty of Medicine Hospital and whose records were available in the hospital information system. NT-proBNP levels were measured using a Roche Cobas e801 (USA) device, while hemogram parameters were measured using a Mindray BC-6000 (China) device. The relationships between NT-proBNP and the hemogram parameters were analysed using the SPSS 21 statistical software package.

Results: The study revealed significant positive correlations between NT-proBNP level and red blood cell distribution width (RDW) (Spearman's correlation coefficient (r) = 0.518, $p < 0.001$), mean platelet volume (MPV) ($r = 0.233$, $p < 0.001$), mean corpuscular volume (MCV) ($r = 0.133$, $p < 0.001$) and platelet/lymphocyte ratio (PLR) ($r = 0.425$, $p < 0.001$). A negative correlation was observed between NT- proBNP and platelet (PLT) ($r = -0.078$, $p = 0.041$). These results suggest that increased NT-proBNP levels indicative of heart failure may be associated with increased RDW, MPV, MCV, and PLR, as well as decreased PLT, reflecting underlying hematologic changes.

Conclusion: The results of this retrospective study show that routine hematologic parameters, especially RDW and MPV, are significantly correlated with NT-proBNP levels in patients diagnosed with heart failure. The negative correlation with PLT suggests that hemodynamic stress in HF may influence vascular damage and platelet turnover. The wide availability, low cost and clinical applicability of hemogram tests suggest that parameters such as RDW, MCV and MPV could be used as diagnostic markers for HF, with cut-off values to be determined by further research. These simple and rapid tests are crucial, especially in resource-limited settings where advanced diagnostic tools are not accessible. Therefore, careful evaluation of routine hemogram analysis could play a crucial role in the early diagnosis and treatment of many diseases.

Keywords: NT-proBNP, Heart failure, Platelet/Lymphocyte ratio, RDW, MPV.

PA-69

Analytical Performance of High-Sensitivity Cardiac Troponin T (hs-TnT) Test Using the Six Sigma Method

[1]Şeniz Korkmaz*, *[1]Dilek Yeğin

[1]Bursa City Hospital, Bursa

Aim: The main analytical criteria for measuring clinical laboratory tests are accuracy and reproducibility, which are measured by bias and standard deviation (SD), respectively. Total allowable error (TEa) establishes the acceptable limits for imprecision and bias. Various additional quality indicators have been developed for laboratories to incorporate into their quality management principles. The Six Sigma methodology is widely used in laboratory quality management as a performance metric and is considered a critical component for quality assurance and continuous improvement in laboratories. This study aims to apply Six Sigma metrics to evaluate the analytical performance of high-sensitivity cardiac troponin T (hs-cTnT) tests, which are crucial for diagnostics in emergency services.

Methods: In this retrospective study, internal and external quality control data for the hs-cTnT (Elecsys Troponin T hs) parameter were collected from May to July 2024 at the central laboratory. Four Roche Cobas analyzers (Roche Diagnostics) were assessed. The process sigma levels were calculated using the formula: Sigma (σ) = (TEa% - Bias%) / CV%. The Bias represents accuracy and is derived from external quality control reports (RIQAS). The CV% (coefficient of variation) represents repeatability and is obtained from two levels of internal quality control samples (PreciControl Troponin L1-L2, Roche Diagnostics). The total allowable error value (TEa) referenced from CLIA-24 (Clinical Laboratory Improvement Amendments) sources. Six Sigma (σ) is a world-class quality target, while three sigma is the minimum acceptable level in the Sigma metric quality assessment.

Results: Sigma values for hs-cTnT tests were 8,4-6,7 on analyzer 1, 6,7-5,8 on analyzer 2, 10,6-11,2 on analyzer 3, and 5,5-5,8 on analyzer 4 for L1 and L2 respectively according to CLIA'24. All sigma values exceeded 5.5, indicating excellent, world-class performance.

Conclusion: The application of the Six Sigma methodology provides valuable insights into laboratory quality control processes. It helps determine the quality of hs-cTnT tests by quantifying both accuracy and reproducibility against allowable error limits. This methodology supports the development of targeted quality control strategies and facilitates the identification of tests requiring closer monitoring, thus contributing to overall improvements in laboratory performance and safety. The results indicate that hs-cTnT tests consistently achieve high-quality standards, contributing to improved laboratory performance and diagnostic safety.

Keywords: CLIA, Six Sigma, total allowable error, quality control

PA-72

Does Reporting LDL-Cholesterol by Measuring or Calculating It When Triglyceride Levels are Below 400 mg/dl Change the Dyslipıdemia Treatment Protocol ?

[1]Mehmet Orbay Soğucak*, [1]Saliha Uysal, [1] özgür Baykan

[1]Department of Medical Biochemistry, Balikesir University, Faculty of Medicine, Balikesir, Türkiye

Email : *drorbaysogucak@gmail.com, drsaliha87@gmail.com, ozgurbaykan@gmail.com*

Aim:This study investigated the magnitude of the difference between the LDL-cholesterol value calculated with the Friedewald formula and measured with the photometric method in individuals with triglyceride levels below 400 mg/dL and whether this difference changes the approach to dyslipidemia treatment.

Materials and Methods:LDL-cholesterol and triglyceride tests were measured on the Beckman Coulter AU680 Chemistry Analyzer. LDL- cholesterol calculation was made using the Friedwald formula. Between November 1, 2023 and April 30, 2024, the LDL-cholesterol values in the lipid profile obtained by measuring 57 patients with triglyceride values lower than 400 mg/dL and using the formula were compared. The LDL-cholesterol levels of the patients were staged using the LDL-cholesterol staging established by the European Heart Association according to the risk of atherosclerotic cardiovascular disease. The chi-square test and Bland-Altman plot were used while performing the statistics of this study. . The chi-square test and Bland-Altman plot created using SPSS and MedCalc programs were used in this study.

Results:In the staging system created according to the patients' LDL-cholesterol levels, the calculated results were found to be at a lower stage compared to those measured by the photometric method. It was observed that of the calculated LDL-cholesterols, 66% of those with stage 1 increased to stage 3 when measured by the photometric method, all of those with stage 2 increased to stage 4, 78.9% of those with stage 3 increased to stage 5, and all of those with stage 4 increased to stage 5. The mean difference between measured and calculated LDL-cholesterol in the Bland-Altman plot was 35.5%. Lower and upper Limit of Agreement (LoA) (95% Confidence Interval) were 9.9% (5.4-14.5) and 49.2% (44.6-53.8), respectively.

Conclusion:The European Heart Association recommends lifestyle changes or drug therapy for patients in the same risk group according to LDL-cholesterol levels. As seen in this study, calculated and photometrically measured LDL-cholesterol levels can change the dyslipidemia treatment protocol. Although limitations of the formula are mentioned in the literature when the triglyceride level is above 200 mg/dl, it is generally preferred to calculate LDL cholesterol with the formula up to 400 mg/dl triglyceride levels. Laboratories can report LDL cholesterol with photometric measurements at different triglyceride levels. It is thought that harmonization in LDL cholesterol reporting is important to ensure standardization in the dyslipidemia treatment protocol. The limitations of this study can be shown as the small number of samples and the use of a single brand of reagent.

Keywords: LDL-cholesterol, Friedewald formula

PA-73

Immunoblotting of Anti-ganglioside Antibodies in Guillian Barre Syndrome

***[1]Sudhahar Tamizhan*, [2]Rupali Bains, [3]Manisha Naithani, [4]Sarama Saha**

[1]Senior Resident, Biochemistry, All India Institute of Medical Sciences (AIIMS), Rishikesh, India
[2]Junior Resident, Biochemistry, All India Institute of Medical Sciences (AIIMS), Rishikesh, India
[3]Professor, Biochemistry, All India Institute of Medical Sciences (AIIMS), Rishikesh, India
[4]Additional Professor, Biochemistry, All India Institute of Medical Sciences (AIIMS), Rishikesh, India

Background: Guillain-Barre Syndrome (GBS) is a rare heterogeneous neurological disorder with various clinical subtypes. The objective is to show how a specific ganglioside autoantibody test may accurately diagnose GBS variant and how cerebrospinal fluid (CSF) analyses and lipid profiles correlate with disease severity, progression, and consequences.

Material and Methodology: In a 24-month retrospective analysis of 52 clinically suspected GBS patients, we collected patients recorded data for clinical symptoms, baseline investigations (cerebrospinal fluid, lipid profile) and antiganglioside antibody. Results: In our study there were 60% males (n=31) and 40% females (n=21) included. The mean age was 29.63 years. We found 60% (n=31) patients positive and 40% patients negative to ganglioside antibodies. We profiled those patients according to the type of antibody tested positive. Profiling showed 29% (n=9) had Acute Inflammatory Demyelinating Polyneuropathy (AIDP) with IgG GM1 and GQ1b as commonest, 19% (n=6) had Acute Motor-Sensory Axonal Neuropathy (AMSAN) with IgG GM1 and GD1b as commonest, 36% (n=11) had Acute Motor Axonal Neuropathy (AMAN) with IgM GM1 and GD1a as commonest, and 16% (n=5) had Miller Fisher Syndrome (MFS) with IgG GM1 and GM2 as commonest antibodies. We discovered a statistically significant correlation between ganglioside profile and CSF analysis ($p < 0.0001$), S.TG ($p < 0.0001$), and LDL ($p < 0.0001$).

Conclusion: Profiling the positive ganglioside antibody in distinct GBS variants indicates the type of GBS, treatment choice, and illness progression. The association between CSF analysis, serum triglycerides, and LDL levels reveals links between immune response, lipid metabolism, and disease manifestations.

Key messages: In GBS-positive patients, most frequent antibody found was IgG GM1 using immunoblot technique. Based on the findings of this study, early examination and exact identification of the type of GBS will be possible. Therefore, patients suffering with GBS will benefit from this in terms of early care and treatment.

Keywords: Guillain-Barre Syndrome

PA-74

Novel Colorimetric Methods for Determination of Colistin Susceptibility

[1]Kübra Hacıeminoğlu Ülker, [1]Yeliz Tanrıverdi Çaycı, [1]Asuman Birinci

[1]Ondokuz Mayıs University, Medical Faculty, Samsun, Türkiye

Aim: Due to the increasing use of colistin for the treatment of multidrug-resistant microorganisms worldwide, its widespread use in food-producing animals, and the discovery of mcr genes responsible for the rapidly spreading plasmid-mediated colistin resistance, the World Health Organization has classified colistin as a "Highest Priority Critically Important Antimicrobial". Given the growing concern over colistin resistance, the accurate and rapid detection of colistin resistance, especially in multidrug-resistant bacteria, is critical. The aim of this study was to determine the susceptibility of colistin, which is used as a last resort in resistant Enterobacterales isolates, with the newly developed rapid polymyxin bromcresol, resazurin-based colistin broth disk elution and nitrate reductase- based colistin broth disk elution tests.

Method: Among the multidrug-resistant and extensively drug-resistant Enterobacterales isolates isolated from various clinical specimens sent to our laboratory, 140 colistin-resistant and 75 colistin-susceptible Enterobacterales isolates whose colistin susceptibility was determined by broth microdilution were included in the study. The Rapid Polymyxin Bromocresol Test has been developed as a novel modification and an alternative to the Rapid Polymyxin NP Test. This test is a colorimetric assay performed in 96-well microplates, where bromocresol purple is used as a pH indicator to detect the growth of Enterobacterales through glucose metabolism. The Rapid Polymyxin Bromocresol Test allows for the rapid and cost-effective detection of colistin resistance within approximately 4 hours. Resazurin-based and nitrate reductase-based colistin broth disk elution tests have been developed from the Colistin Broth Disk Elution method, which has been recognized as 'acceptable' by the Clinical & Laboratory Standards Institute. The resazurin-based colistin broth disk elution test is a colorimetric assay that relies on the reduction of blue resazurin to purple/pink resorufin by metabolically active bacterial cells. The nitrate reductase-based test is a colorimetric assay based on the reduction of nitrate to nitrite by bacteria. In these tests, each isolate is assessed using a control tube containing 5 ml of cation-adjusted Mueller-Hinton broth and a test tube containing 5 ml of cation-adjusted Mueller-Hinton broth with one colistin disk (10 µg). Colistin resistance can be determined in approximately 6 hours using these tests.

Results: Colistin susceptibility results were obtained in an average of 4-6 hours using the three newly developed tests. For rapid polymyxin bromcresol, resazurin-based colistin broth disk elution, and nitrate reductase-based colistin broth disk elution tests, sensitivity rates were 99.3%, 86.4%, 82.1%, specificity rates were 97%, 100%, 100%; positive predictive value rates were 98.5%, 100%, 100%, and negative predictive value rates were 98.6%, 80%, 75%; categorical agreement rates were 98.6%, 91.2%, 88.37%; very major error rates were 0.46%, 8.8%, 11.6%; and major error rates 0.93%, 0%, 0%, respectively.

Conclusion: In resistant Enterobacterales isolates, the new rapid colistin susceptibility tests, which provide results approximately 12- 14 hours earlier than the reference method, had high sensitivity, specificity, positive predictive value, and negative predictive value rates. The rapid polymyxin bromcresol test, with the high categorical agreement and low major error rates, could be a rapid alternative to the reference method.

Keywords: Colistin, Rapid Anrimicrobial Susceptibility, Colorimetric.

PA-75

What Can We Do for a Better Medical Biochemistry Specialty Education?

***[1]Saliha Aksun*, [1]Figen Narin , [1]Mehmet Can Kenar, [1]Huriye Erbak Yılmaz , [1]Leyla Demir**

[1]Izmir Katip Celebi University, Faculty of Medicine, Department of Medical Biochemistry , Izmir

Aim: Regulations are frequently made in order to make specialist training more effective in medical specialties. We would like to briefly introduce to the situation in the field of laboratory medicine in Turkey, with a focus on training in the field of medical biochemistry. It was aimed to conduct a survey study to evaluate the opinions of experts in the field of Medical Biochemistry and to determine the needs of the current specialty training program.

Method: For this purpose, a survey containing 17 questions was prepared and 138 biochemistry experts were reached. The questions in the survey covered the external rotations during medical biochemistry specialization training. There were also questions aimed at examining the biochemical methods we saw and wanted to see in the clinic where we received training during our specialization training.

Findings: 54% of participants received their medical biochemistry residency training less than 10 years ago 71% of the participants found the 4- month internal medicine rotation to be long or very long. 13% participants stated that they did their rotation on paper. 26.5% participants stated that they were not there every day. One quarter emphasized that they only attended visits. 95% of the specialists who went on internal medicine rotation stated that they did not witness dynamic tests. 72% did not work in the hematology service. Only 8.5% of the specialists who responded to the survey did a 2-month pediatric rotation. 90% of the participant were either not present at the pediatric clinic or had very little participation. 63% of the participants stated that they had never done the microbiology rotation, did it on paper, or were not actively involved. 88.6% stated that they had not received any training regarding blood bank analyses. During medical biochemistry specialization training, only 67% of the participants received training on blood count analyses. They declared that they not received any training about 65% with drug and stimulant analysis, 50% with prenatal screening, 52% with ethanol analysis, 91% with molecular tests, 84% with microeliza methods, 77% with flow cytometry, 93% with genetic tests, 70% with atomic absorption.

Conclusion: Rotations in which genetic tests, blood banking, drug and substance analysis, hematological and endocrine tests can be learned are requested. Training should be planned by going to other medical biochemistry training clinics for tests that are not available in the training clinic. Medical biochemistry specialty training should be standardized in order to meet the demands related to learning cell culture, drug and drug analysis, LC MSMS methods, mostly in metabolic diseases analysis. Mutual agreements should be reached between different educational institutions. Internal medicine rotation period should be shortened or structured. The rotation training received in the microbiology clinic should be extended and include blood bank analysis. In our country, it can be recommended that studies be continued on the reorganization of specialization training programs by considering the areas of need and that continuous training after specialization, which is already being carried out be continued and increased.

Keywords: Medical Biochemistry Specialist, education

PA-76

The Role of PSA Levels in Determining the Prognosis of Prostate Cancer

[1]Huriye Erbak Yılmaz*, *[2]Şerif Şentürk

[1]İzmir Katip Çelebi University, School of Medicie, Clinical Biochemistry
[2]İzmir Biomedicine and Genome Institute

Aim: Prostate cancer is one of the most common types of cancer among men. Prostate-Specific Antigen (PSA) is a biomarker widely used in the diagnosis of prostate cancer and is known as a protein produced by the prostate gland. This study aims to examine PSA levels in metastatic prostate cancer, benign prostatic hyperplasia, localized prostate cancer, and locally advanced prostate cancer. The objective is to determine whether PSA levels differ among these groups and to evaluate how effective PSA is as a distinguishing factor in the diagnosis of prostate diseases.

Method: In this study, PSA (Prostate-Specific Antigen) levels were analyzed in patients from four different prostate disease groups. The study groups consist of metastatic prostate cancer, benign prostatic hyperplasia, localized prostate cancer, and locally advanced prostate cancer. The study was designed retrospectively, and statistical analyses were conducted to determine the differences in PSA levels among these groups. Metastatic Prostate Cancer Group: This group included 78 patients diagnosed with advanced-stage prostate cancer. Benign Prostatic Hyperplasia Group: This group consisted of 9 patients diagnosed with benign prostatic hyperplasia. Localized Prostate Cancer Group: This group included 15 patients diagnosed with localized prostate cancer. Locally Advanced Prostate Cancer Group: This group consisted of 19 patients diagnosed with locally advanced prostate cancer.

Results:It was found that PSA values in the metastatic prostate cancer group were significantly higher compared to the other three groups. The locally advanced prostate cancer group did not show any significant differences in PSA levels compared to the benign prostatic hyperplasia and localized prostate cancer groups. No significant difference in PSA levels was observed between the benign prostatic hyperplasia and localized prostate cancer groups.

Conclusion: This study indicates that PSA levels may be an important biomarker, particularly in distinguishing metastatic prostate cancer from other prostate diseases. However, the ability of PSA values alone to differentiate within the non-metastatic group of prostate cancer is limited, highlighting the need for additional diagnostic biomarkers.

Keywords: prostate cancer, Biomarker, Grade, Stage, Benign Prostatic Hyperplasia,Prostate-Specific Antigen

PA-77

Pregabalin and Opioids Effects on Breast Cancer Cell Line

[1]Saliha Aksun, [2]Rozita Tamjidifer, [3]Murat Aksun , [4]Cigir Biray Avci, [5]Gülinnaz Ercan

[1]Izmir Katip Celebi University, Faculty of Medicine, Department of Medical Biochemistry;Ege University, Institute of Health Sciences, Department of Stem Cell
[2]Ege University, Institute of Health Sciences, Department of Stem Cell
[3]Izmir Katip Celebi University, Faculty of Medicine, Department of Anesthesiology And Reanimation
[4]Ege University, Faculty of Medicine, Department of Medical Biology
[5]Ege University, Faculty of Medicine, Department of Medical Biochemistry; Ege University, Institute of Health Sciences, Department of Stem Cell

Aim: The most common cancer-related pain is neuropathic pain. Despite surgical intervention, patients may continue to experience various pains in the surgical area. Opioid-derived drugs such as morphine, codeine, norcodeine, heroin, fentanyl, tramadol, and gabapentinoid-derived drugs pregabalin and gabapentin are widely used in cancer-related neuropathic pain. This study aimed to investigate whether these drugs have a proliferative effect at the cellular level.

Method: Our study was conducted on MDA-MB-231 breast cancer cell line. Cells were incubated with 30, 10, 3, 1, 0.3 micromolar concentrations of pregabalin, tramadol and morphine. The results obtained by cell viability measurement conducted with MTT (Thiazolyl blue tetrazolium bromide).

Findings: The study revealed that pregabalin and morfin derivatives demonstrated a proliferatif effect on breast cancer cell line. Remarkably, pregabalin increased cell viability at drug levels of 30.0 and 10.0 micromolar. MTT absorbance values which are a directly proportional indicator of cell metabolism and therefore cell viability, were consistently higher in cells treated with pregabalin, tramadol and morphine, compared to the control cell group which no drug was applied.

Conclusion: The agents given to reduce the patient's pain should not affect the cancer cell proliferation. Some side effects of pregabalin, such as weight gain, peripheral edema, nonperipheral edema, visual impairment, somnolence, vertigo have been described, the clinical effects of these substances are widely debated. However, its proliferative or apoptotic effects on cell metabolism, effect of triggering neovascularization, or suppressing the microenvironment have not yet been defined. While there are some studies evaluating the effects of morphine and tramadol on cancer cells, the number of studies on the effect of pregabalin is very limited. Waganer investigated the cytotoxic effects of pregabalin on osteoblasts, and osteosarcoma cells. In another study, the neuroprotective effect of pregabalin and the nerve damage caused by oxaliplatin on human glioblastoma cells were investigated. Following drug applications and at the end of the 24-hour incubation, the absorbances in MTT test results are higher compared to the control cell group that did not receive any drug. Results indicates that these drugs don't have a cytotoxic effect or apoptotic effect on the cells, at least at these concentrations. Since the absorbance values of the drug-applied group were not statistically significant compared to the control group, it cannot be said that these concentrations had a proliferative effect during the 24-hour application period. However, after 48 hours of incubation, some doses of morphine, tramadol and pregabalin were found to have a statistically significant increasing effect on cell viability. After 72 hours of incubation, the increase in cell viability, especially in cells which high doses of pregabalin and tramadol were applied, can be considered a preliminary finding as an indicator

of proliferation. According to our study, effect of pregabalin, morphine and tramadol on cell population at different concentrations is to increase the viability, these are preliminary findings. Studies are carried out working with different doses on breast cancer cells and cancer stem cells. It will be presented to clinicians to be useful for clinical follow-up.

Keywords: Stem Cell, Pregabalin, Proliferation

PA-78

Pseudo-hyperphosphatemia in Multiple Myeloma

[1]Selen Sezen*, [1]*Özlem Doğan

[1]Ankara University School of Medicine Medical Biochemistry

Objective: In patients with multiple myeloma, hyperphosphatemia is usually a result of renal failure related to light-chain tubulopathy. A rarer condition is pseudo-hyperphosphatemia, which can occur due to the interaction of monoclonal components with phosphomolybdate used in the colorimetric test for phosphate. In our study, we aimed to describe a case of pseudo- hyperphosphatemia in a 76-year-old woman with IgG kappa-type multiple myeloma and normal kidney function.

Methods: A 76-year-old female patient who had been followed up for 3 years with a diagnosis of multiple myeloma at our hospital had a significantly elevated total protein level of 107 g/L in her latest laboratory evaluation, with a serum albumin level of 26.2 g/l. Serum phosphorus was alarmingly elevated at 6.88 mg/dl, which was inconsistent with the patient's clinical condition. The results of additional blood tests were as follows: creatinine, 0.79 mg/dL; uric acid, 8.6 mg/dl; calcium, 9.8 mg/dl; and normal parathyroid hormone levels.

Results: Based on laboratory, radiological investigations, and clinical findings, causes of true hyperphosphatemia such as renal failure, hyperparathyroidism, and tumor lysis syndrome were ruled out. No hemolysis, icterus, or lipemia was observed in the sample. While there was no apparent cause of hyperphosphatemia in the patient, serum calcium levels were normal, and renal function was preserved. These findings suggested that the elevated serum phosphate levels were pseudo-hyperphosphatemia due to paraprotein interference. In the literature, it was reported that protein interference was eliminated, and phosphate levels could be accurately measured after dilution and treatment with 20% sulfosalicylic acid. Following dilution with normal saline, the phosphate level was found to be 3.2 mg/dL, and after treating the sample with 20% sulfosalicylic acid for 60 minutes, the phosphate level was 4.7 mg/dL.

Conclusion: Hyperphosphatemia in patients with multiple myeloma is usually secondary to renal failure related to light-chain tubulopathy. However, spuriously elevated inorganic phosphate levels, which are inconsistent with the patient's clinical condition, may result from increased turbidity due to the elevated globulin fraction of serum proteins or from the enhanced phosphate-binding capacity of the paraprotein. These findings can interfere with colorimetric assays or increase total phosphate levels without an increase in biologically active phosphate. Deproteinization of paraproteins can help correct this spurious result.

Keywords: Pseudo-hyperphosphatemia , interference, multiple myeloma