POSTER PRESENTATION ABSTRACTS

PP-003 ARE GEL SEPARATOR TUBES SUITABLE FOR ANALYSIS OF TRACE ELEMENT?
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Objective: Preanalytical factors are now the most important cause of faulty trace elements results in biological fluids. In blood, there is less than 1% of total body zinc and copper levels. For this reason, analysis of trace elements requires precise measurements. One of the most important points that cause preanalytical errors is the use of appropriate materials to ensure accurate results when working in biological fluids. Two preserving samples while increasing sensitivity. Studies have shown that in tubes containing gel, a portion of zinc and copper; does not pass to the serum by attaching to the pores of the gel and it shows that some loss of element has occurred. Despite being the ideal gel-free tube for trace element analysis, different tube types are sometimes used. The aim of this study is to investigate effectively the zinc and copper levels of different tube types.

Materials and Methods: Blood samples collected from 24 volunteers were gel-free, gel separator and heparinized tubes. Centrifuged at 1500 g for 5 minutes, and serum and plasma were obtained. Serum and plasma copper and zinc levels were measured by Atomic Absorption Spectrometer (AAS).

Results: The levels of zinc [60 (54-62) µg/dL; (69 (61-81), p < 0.001] and copper [64 (54-71) µg/dL], (66 (60-76), p = 0.012] in gel separator and gel-free tubes were found to be statistically different, respectively, it was seen that the lowest zinc and copper levels were found in plasma samples. There was a significant difference (p < 0.001) between the levels of serum and plasma.

Conclusion: If serum and plasma are used replace each other for trace elements, the appropriate reference intervals for plasma or serum should be taken as different. For serum zinc and copper measurements it is suitable to take samples in gel-free tubes.

Key Words: Blood collection tubes, Trace Elements, Atomic Absorption Spectrometer

PP-005 OUR PATIENT-SPECIFIC EXPERIENCE ON HOSPITAL INFORMATION MANAGEMENT SYSTEM
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Objective: Preanalytical phase errors begin at the point of requesting lab tests by clinicians and it is quite difficult to standardize them because they arise not by clinicians but by lab services. The aim of this project is to make a patient-based analysis regarding the importance of certain conditions.

Materials and Methods: Personal definition applied on HIMS for the patients diagnosed with MM. When a test for which should be collected in SSTs requested, a warning message appears on the computer to the corresponding users thus, the sample is being collected into Li-H BCT in the direction of warning.

Results: For samples collected in SSTs, a warning message appears on the computer to the corresponding users thus, the sample is being collected into Li-H BCT in the direction of warning.

Conclusion: After the circular, it was concluded that hemolytic index should be made for certain conditions.

Key Words: Preanalytic, HIMs, serum separation, Lithium-Heparine

PP-007 EFFECT OF PNEUMATIC TRANSPORT SYSTEM ON HEMOLYSIS RATES
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Objective: The use of pneumatic transport systems in clinical laboratories has increased in decrease of turnaround time and reduction in the work force requirement. However, it may cause hemolysis, and therefore preanalytical errors due to the physical stress brought on blood specimens. In this study, we aimed to compare the hemolysis rates of blood samples before and after the establishment of pneumatic transport system in our hospital.

Materials and Methods: The study was conducted on the basis of a hospital's laboratory information management system, monthly hemolysis rates of 12 months before the establishment of pneumatic transport system, and 6 months after the use of pneumatic transport system were obtained. Mann-Whitney U test was performed to compare groups.

Results: The mean monthly hemolysis rates before and after the use of pneumatic transport system were 0.4±0.0156% and 0.38±0.042%, respectively. The difference between the groups was not statistically significant (P = 0.820).

Conclusion: It is known that, possibility of hemolysis and breakdown of the erythrocytes will increase as the level of physical stresses increases. In our study, it was concluded that the pneumatic transport system used in our hospital does not cause physical stress at high levels, therefore hemolysis rates did not increase.

Key Words: Hemolysis, pneumatic transport system, preanalytical error

PP-008 EFFECTS OF REGULATION CHANGES ON ETANOL ASSAY SAMPLE TRANSFER AND REJECTION RATES IN BLOOD
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Objective: With the Department of Laboratory Services of the Ministry of Health entering into force with the general rule no. 2017/12, corrective actions were taken in the preanalytical, analytical and postanalytical processes related to the regulation of ethanol in the hospital and laboratory. The aim of this study is to evaluate the effect of changes in the preanalytical process determined by the circular on the sample acceptance / rejection rates in addition to the safety of the forensic sample.

Materials and Methods: After the circular, a locked bag was prepared for the transport of the requested samples of ethanol test. From July, before the circular, the retroactive 7month period between 01.01.2017 - 01.08.2017, after the circular, the ethanol test rejection rate was scanned retrospectively from 01.09.2017 - 01.04.2018 over the laboratory information system Results: In the period before the circular; Hemolysis rate, number: 1.003, 16. After the circular Hemolysed sample rate: 2.76%, 41. The hemolysed sample rate and number were found to increase significantly (p < 0.001).

Conclusion: After the circular, it was concluded that hemolytic index should be evaluated for the ethanol test in plasma as well as the hemolytic index evaluation in our other biochemical tests as the result of the increase in the rate of hemolysed samples resulting from the application of the locked bag which we started with the name of safe transfer in sample transfer. By showing the application example of our hospital, it has been shown that different effective applications can be made for certain conditions.

Key Words: Ethanol, Transfer, Hemolysis

PP-009 COMPARISON OF CK MB ACTIVITY AND MASS MEASUREMENT METHODS
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Objective: CK-MB is a test with high diagnostic value in AMI. Immunoinhibition, which is still widely used in the routine laboratories for CKMB activity measurement, may result in misinterpretation of the clinician while reducing the specificity of the test by giving results above the reference intervals in healthy people without myocardial necrosis. The aim of this study is to compare CK-MB mass and activity measurement and examine the effect of hemolysis on these parameters.

Materials and Methods: In February-March 2018, a total of 187 patients who were admitted to the emergency room with complaints of chest pain and 36 of whom were diagnosed with AMI, CK-MB activity and hemolysis index measurements were performed in the Roche Cobas 6000 autoanalyzer C501 module using the Roche Diagnostic kit using the immunoinhibition method, CK-MB mass measurement was performed in the Roche Cobas 6000 autoanalytical-E601 module with the Roche Diagnostic kit by electrochemiluminescence method. Results: In patients with AMI, the mean CK-MB activity values were 42.6 U/L for the activity, 26.7 ng/mL for the mass, and 27.4 U/L and 2.4 ng/mL for the healthy subjects, respectively. There was a statistically significant difference (p <0.01, p <0.001, respectively) in the AMI patient group when compared with the Mann-Whitney U test in terms of CK-MB activity and mass values.

The CK-MB activity values of the healthy group were 46.5 U/L in the hemolysis index-positive cases and 16.8 U/L in the negative ones. There was a statistically significant difference (p <0.001), p <0.05 was considered statistically significant.

Conclusion: After the circular, it was concluded that hemolytic index should be evaluated for the ethanol test in plasma as well as the hemolytic index evaluation in our other biochemical tests as the result of the increase in the rate of hemolysed samples resulting from the application of the locked bag which we started with the name of safe transfer in sample transfer. By showing the application example of our hospital, it has been shown that different effective applications can be made for certain conditions.

Key Words: الواحد, فيلم, تفاعل
significant, while the increase in mass and CK-MB activity was significant. While CK-MB activity measurement is affected by hemolysis, mass measurement is not affected by hemolysis. In AMI, CK-MB mass seems to be a better method than activity because it is more susceptible to mass measurement and prevents unnecessary further examination and treatment due to interferences in emergency services where hemolysis (hemolysis index was found high in 36% (54 of 151 healthy cases in healthy group) is seen at a higher rate. Key words: Hemolysis, AMI, CK-MB

PP-010 COMPARISON OF SOME BIOCHEMICAL TESTS IN DIFFERENT BLOOD COLLECTION TUBES
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Objective: Blood Collection Tubes (BCT) related interferences in test results can adversely affect the results of an examination. This study was designed to compare laboratory efficiency, delay test results, and increase the cost per test due to recollection and retesting. Blood from patients who are receiving anticoagulant therapy may take longer to clot. We compared with BD (Becton Dickinson, Franklin Lakes, USA) Vacutainer Serum Separator Tubes (SST), BD Vacutainer® Barricor™ Plasma Blood Collection Tubes, BD Vacutainer® RST (Rapid Serum Tube). Materials and Methods: 32 samples were obtained after the dialysis were included in this study. 8 sera were analyzed with biochemical routine parameters (AST, ALT, ALP, γGT, urea, creatinine, uric acid, glucose, LDEH, sodium, potassium, calcium, magnesium, HDL, LDL, VLDL, HDL-C, LDL-C, CRP, albumin, protein, magnesium, calcium, phosphorus, Na, K, Ca). Blood samples from patients were divided into two groups: one group was kept in horizontal position (vertical position) while the other was kept in horizontal position (for two hours). The significance of the differences between samples was assessed by paired t-test or Wilcoxon test after checking for normality. Evaluation of clinical significance was performed based on total allowable error. Results: Results of Glucose, K, Urea, LDEH, PTH, K, calcium were statistically significantly different between the BD Vacutainer SSTs and BD Vacutainer® Barricor™ Plasma Blood Collection Tubes (p<0.017, p<0.011, p<0.019, p<0.019 respectively). Results of PTH were significantly different BD Vacutainer Separator Tubes (SST) and BD Vacutainer® RST (p<0.001). Statistical significance of test results was not clinically significant for the biochemical parameters. Conclusion: BD Vacutainer® Barricor™ Plasma Blood Collection Tubes provides a fast, clean, high-quality plasma samples, safety results and may lower times and costs. Key words: Blood collection tube; Plasma; Serum

PP-012 EFFECT OF DELAYING EDTA CONTAINING TUBES VERTICALLY OR HORIZONTALLY ON CBC RESULTS
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Objective: Prolonged delay of EDTA-containing whole blood specimens vertically or horizontally may cause preanalytical errors. The purpose of this study is to evaluate the effect of delaying EDTA-containing tubes vertically or horizontally for two hours on complete blood count (CBC) results. Materials and Methods: CBC analysis of 100 patients was performed within 10 minutes after the sample acceptance. 50 of these samples were kept in the vertical position, while remaining 50 were kept in horizontal position for two hours and analyzed afterward. Paired samples t-test or Wilcoxon signed-rank test was used for the comparison of groups. P<0.05 was considered statistically significant. Results: Results of WBC, MCV, MPV, PCT, PDW, PLT, RDW, neutrophil counts and lymphocyte counts of 2-hour vertically delayed group were significantly different from their first results (P<0.001, P<0.001, P<0.001, P<0.001, P<0.001, P<0.001, P<0.001, P<0.001, P<0.001, P<0.001, P<0.001 respectively). Conclusion: Keeping the blood samples with EDTA-containing tubes horizontally or vertically for two hours caused statistically significant differences in CBC results. Therefore, it is important to perform CBC analysis immediately to ensure correct results. If sample admission time for the EDTA-containing blood samples will be as much as two hours, transferring the blood samples vertically can minimize the incorrect results. Keywords: Complete blood count, EDTA, horizontal, preanalytical error, vertical.

PP-013 HYPOPOTASSEMIC PERIODIC PARALYSIS, DRAMATIC RESPONSE TO POTASSIUM TREATMENT: CASE REPORT

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Objective: The hypopotassemic periodic paralysis is an uncommon and autosomal dominant disease characterized by recurrent muscle weakness. It occurs due to mutations in the sodium, potassium or calcium channels. If appropriate treatment is not received, patient may be lost due to cardiac arrhythmias or insufficiency in respiratory muscles. We wanted to present a case with quadriparesia and also affecting respiratory muscles, because of the hypopotassemic periodic paralysis. Case: 18-year-old girl was brought to emergency department with complaints of weakness and respiratory distress. She had a history of similar complaints about two times in last one year. There was no trauma in the history before and no pathological finding except for neurological assessment on her physical examination. Quadriparesis near to quadriplegia was detected. In laboratory tests, serum potassium level was too low (1.8mEq/L). The other hematological and biochemical tests were in normal range. And blood gas analyses were also normal except potassium (1.5mEq/L). To exclude a central and respiratory event, radiological images were taken. Patient was taken to the emergency observation unit and potassium replacement was done quickly. The muscle strength and respiratory distress were recovered within hours. According to the clinical and laboratory investigations and the response to treatment, hypopotassemic periodic paralysis was considered. The patient was discharged by arranging treatment after 12 hours observation and genetic tests (mutation in gene CACNA15) and short exercise EMG were suggested for definite diagnosis. Conclusion: Although it’s rare, low potassium level with widespread muscle weakness let us consider hypopotassemic periodic paralysis. The patients should be warned about some conditions can trigger the attacks just as more exercise, carbohydrate-heavy meals, infection diseases, stres and trauma. Key words: hypopotassemia, paralysis, respiratory distress

PP-014 INVESTIGATION OF THE FACTORS AFFECTING TURNAROUND TIMES IN ETHANOL TESTING

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Objective: Turnaround time (TAT) is an important indicator of the laboratory quality. In the present study, it is aimed to investigate the differences between the TATs of the ethanol test ordered from different clinics in the hospital, the influence of chain of custody on the TATs, and the contribution of intra-laboratory and extra-laboratory TATs to the total TAT in ethanol testing. Materials and Methods: 15 months of TAT data of ethanol test was gathered from laboratory information system. The differences between TATs of the ethanol test ordered from the different clinics were analyzed by Kruskal-Wallis test. Mann-Whitney U test was used for comparing the TATs before and after the chain of custody procedure. The relationship between sub-processing times and the total TAT was evaluated by Spearman’s correlation coefficient. Results: The chain of custody procedure had no influence on total TAT (p=0.441). The TATs of samples from the psychiatry clinic were found higher than the emergency service and the reanimation clinic (p<0.001, p=0.018 respectively). While preanalytical and extra laboratory TAT had a very high (r=0.925) and high (r=0.722) positive correlation with total TAT respectively, low positive correlation (r=0.310) was found between analytical TAT and total TAT (p<0.001). Conclusion: The chain of custody procedure did not extend total TAT. TATs of the ethanol test ordered from distant clinics were found prolonged. Furthermore, preanalytical and extra laboratory TATS constituted the majority of total TAT. Establishing satellite laboratories close to the remote clinics or the utilization of pneumatic tube systems to transport samples can help to achieve better TATs. Keywords: turnaround time, ethanol, preanalytical phase

PP-015 A DIFFERENT VIEW ON THE PRENATAL SCREENING TEST REQUEST RATES OF KAYSERI REGION IN RECENT YEARS

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Objective: It is aimed to investigate the prevalence of clinical request of prenatal double and triple screening testing for Turkish citizens (TC) and immigrant refugees(IR). Materials and Methods: Between January-2015 and April-2018-approximately 40 months were scanned and evaluated statistically for the double and triple
Results: In our laboratory, 208 urinary organic acid test were requested in a year. The rate of unsuitable specimens in urinary organic acid test requests.

Materials and Methods: Samples sent to the biochemical metabolism laboratory were assessed by real time polymerase chain reaction. Inherited metabolic disease, Urine creatinine

Objective: Organic acids are analyzed in patients suspected of having a broad range of genetic metabolic disorders including inborn errors of amino acid metabolism, fatty acid oxidation, carbohydrate, neurotransmitter, vitamin, sterol, mitochondrial energy, and purine and pyrimidine metabolism. The aim of this study was to find out the rate of unsuitable specimens in urinary organic acid test requests.

Materials and Methods: Samples sent to the biotechnical metabolism laboratory from Selçuk University Faculty of Medicine clinics between 2017-2018 years for organic acid analysis were included in this study. The percent of urine creatinine values below 5 mg/dL in these samples was calculated as a ratio to the total number of requests.

Results: In our laboratory, 208 urinary organic acid test were requested in a year period and 40 (19.2%) urine creatinine values were found below 5 mg/dL.

Conclusion: Quantitative error may occur in the analysis of some acids (keto or pyruvate) extracted from urine specimens with low creatinine, the extent of the error resulting from the dilution effect may be such that the quantitative response is significantly altered, possibly changing the clinical interpretation when successive samples from a given patient are monitored.

Keywords: Organic acid analysis, Inherited metabolic disease, Urine creatinine.
**PP-020**

**COMPARISON OF THE LIPID PROFILE AND THE ICTERUS AND LIPEMIA INDEX**

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Objective: Haemolysis, lipemia, and other factors that interfere with test results can be identified as qualitative or semiquantitative. Serum indices of serum lipid profile and bilirubin levels were investigated in this study.

Materials and Methods: During January-February 2018, the SI values determined by Abbott Architect CI12600 autoanalyzer were retrospectively screened. 23,891 SI values were semiquantitatively grouped.

Results: Lipemia, as categorized as 0 = 0-50, 1 = 51-100, 2 = 101-150, 3 = 151-200 and 4 = 200, TG, total cholesterol, HDL-C, LDL-C, total-bilirubin, direct-bilirubin, albumin, total-protein and TG/LI were statistically significant (p <0.05). When Icterus Index categorized as 0 = 0-2, 1=2-4, 2=4-10, 3=10-20, 4=20, total-cholesterol, HDL-C, total-bilirubin, direct-bilirubin, total-protein and TG/LI, there was a statistically significant difference between variables (p <0.05).

Conclusion: Lipemia defined as turbidity that can be seen with the naked eyes in the sample. It is known that the contribution of all lipoproteins to the increase in turbidity is not equal, the increase is mostly associated with large lipoprotein molecules. However, the presence mononuclear, polynuclear gamaglobulin increase, etc. that may cause turbidity increase should be considered. Lipemia and triglyceride incompatibilities should be carefully examined. It should be taken into account the II can interact with serum total-bilirubin level and direct-bilirubin and also other tribudimentary effects may also interfere with these.

Keywords: Lipid profile, lipemia index, icterus index

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**PP-021**

**EFFECTS OF TIME AND TEMPERATURE ON STABILITY OF SOME TUMOR MARKERS AND HORMONES**

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Objectives: In this study, the stability of analytes measured by immunoassay at different temperatures and times was examined in serum gel tubes and plain tubes.

Materials and methods: Ten healthy subjects were recruited and blood was collected into four tubes, two with and two without gel separator. All samples were allowed to clot for 30 min at room temperature before centrifugation. Analyzing the baseline samples in 30 min, all were stored at 4 °C and 24 °C for 6, 24, 48, 72 and 96 h. Thirteen analytes were measured on each sample. If the change in the baseline and subsequent measurement results were greater than the practical stable change limit (ACL), it was considered clinically significant.

Results: On the fourth day, most analytes remained stable including AFP, Ca-125, Ca-15-3, Ca-19-9, FT3, FT4, TSH, FSH, LH vs PRL regardless of tube types at 4 °C and 24 °C. Insulin was stable 6 h at 24 °C in gel tubes and then decreases, but it should be taken into account the IL can interact with serum total-bilirubin level and direct-bilirubin and also other tribudimentary effects may also interfere with these.

Keywords: Lipid profile, lipemia index, icterus index

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**PP-022**

**EFFECT OF PREANALYTICAL EXTRACTION METHOD FOR URINARY CORTISOL DETERMINATION**

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Objective: Cortisol is lipophilic and is transported bound to cortisol-binding globulin (CBG) and albumin; a small fraction (10%) of total serum cortisol is unbound and biologically active. Automated immunoassays are used to measure cortisol but lack specificity and show significant inter-assay differences. The objective of this study was to compare the effect of extraction on urinary cortisol measurement in immunosassay systems.

Materials and Methods: A total of 30 urine samples were analyzed with Roche cortisol commercial immunoassay kit. 24-hour urine samples were collected and liquid extraction was performed of urine samples with dichloromethane. Urine cortisol was analysed in both extracted and unextracted samples. Statistical analysis was performed with SPSS v21. p <0.05 value was considered as statistically significant.

Results: According to paired sample t test, there was a statistically significant difference between extracted and unextracted 24-hour urine cortisol measurement in immunoassay platform. The mean values were 80±62 and 337±232 mcg/24 hours for extracted and unextracted urine samples, respectively (p<0.001).

Conclusion: Cortisol immunoassays are thus deteriorated by varying degrees of antibody cross-reactivity with other steroids, endogenous and exogenous and can be unreliable in certain clinical settings such as congenital adrenal hyperplasia (CAH) and in patients treated with synthetic glucocorticoids. According to this study’s results, it might be effective to analyze the samples with liquid-liquid extraction in immunoassay systems.

Keywords: Cortisol, Dichloromethane, Immunoassay

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**PP-023**

**RATES OF HIGH HEMATOCRIT LEVELS AS A CAUSE FOR FALSE RESULTS IN COAGULATION TESTS**

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Objective: One of the many preanalytical variables which affect the results of routine coagulation tests is the high hematocrit (Hct). In a study many years back, it was found that PZ and aPTT increase with an increase in hematocrit value. CLIA and CAP suggested to adjust the amount of citrate used for blood samples with high hematocrit value. In our study, we aimed to evaluate the coagulation results of patients with high hematocrit (> 55%) from the automation system.

Materials and Methods: Ankara University Medical Faculty Cebeci Biochemistry Laboratory automation system patient data were obtained between November 2017 and January 2018 from the automation system. Hematocrit> 55% patient outcomes were evaluated. For coagulation tests, a tube with a total volume of 1.8 mL containing 3.2% citrate was used.

Results: Twenty-one (0.22%) of the 9451 patients who required hemogram and coagulation tests at the same time, had hematocrit value> 55%. Two patients with hematocrit> 55% had a high PT with a hematocrit of 60.2% and high aPTT with a hematocrit of 70.5%. All other outcomes were among the normal reference intervals.

Conclusion: CLIA and CAP recommend adjustment of citrate concentrations in patients with high hematocrit (> 55%). Adjustment of citrate concentrations can be done using a normogram in CLIA documents or a mathematical formula C = (1.85 × 10-3) (100 - Hct) (VBlood). Both methods provide suitable citrate concentrations for elevated hematocrit values. With this application, more accurate and reliable results are obtained in the presence of coagulation test results incompatible with patient clinic. Each laboratory should develop a procedure for eliminating errors at high hematocrit levels.

Keywords: Preanalytical variables, hematocrit, prothrombin time, aPTT

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**PP-024**

**ISTANBUL PROVINCIAL HEALTH DIRECTORATE PUBLIC HOSPITAL SERVICES-2 CENTRAL LABORATORIES-2 EFFECT OF INCREASED WORK LOAD ON TRANSFER PERIODS**

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Objective: The central laboratory began serving on March 13, 2014. The service is based on the principle of transferring the samples at certain times of the day via the couriers. This study examines how additional workload impacts sample transfer periods.

Materials and Methods: In the Central Laboratory, the transfer periods are recorded with the data logger which is used together with a special bag transfer software program and also the RFID system which is in the vehicles.

Results: Haydarpaşa RTH, Beykoz State Hospital, Üsküdar State Hospital, Ümraniye RTH, Zeynep Kamil RTH, Siyami Ersek RTH, Sile State Hospital, Medeniyet University Göztepe RTH, Erenköy Psychiatric and Neurological Diseases Hospital, Erenköy Physical Therapy Hospital, Fatih Sultan Mehmet RTH and affiliated outpatient clinics started with 15 different centers and reached to 26 in 2017 and continued till 8 January 2018. The average transfer times for 2015, 2016 and 2017 are 44,46,41 minutes respectively.

The average 2-minutes increase in 2016 was optimized by a 5-minutes decrease in 2017.

Conclusion: The transfer times are reviewed every month, and due to the deviations, the courier program is constantly revised to be optimized as follows: 1. Vehicle-based records are examined and data control is provided.

2. Route changes were made to the additional centers for traffic flow.

3. A new vehicle is included in the system.

A new vehicle is included in the system.

4. As a result, despite the increase in workload, there was no significant increase in transfer times, and by the end of 2017 the average transfer time was provided with shorter recovery activities.

Key Words: Central lab, transfer, improving
PP-025
A COMPARISON BETWEEN THE VES-MATIC 200 ERYTHROCYTE SEDIMENTATION RATE INSTRUMENT AND A MODIFIED WESTERGREN METHOD

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Objective: Estimation of the erythrocyte sedimentation rate (ESR) has a long history. The ESR measurement is simple (Values can be easily calculated), precise, and easy to use in clinical laboratories of various sizes. The methodology and measuring principles vary markedly according to method although, in principle, all methods should be accurate. The most common error sources were inadequate specimens, macroscopic haematuria, and samples were caused by preanalytical error. Rejection rate was higher (89%) in weekday preanalytical times during the 8 hours period. The interassay CV% was measured by using a commercial control. A correlation coefficient, Bland-Altman plot and Passing-Bablok analysis were used in analysis. Results: The study included 32 patients. Blood drawn in the patients in the same time with EDTA and Citrate tubes and studied different methods. Intrarun precision determined with 3 patient samples, each analyzed 3 times during the 8 hours period. The interassay CV% was measured by using a commercial control and it was 7.3% in Ves-matic 200 method. The mean ESR was 22.93 mm/h in Ves-matic 200 analyzer and 23.53 mm/h in the modified Westergen method. The difference between the averages was 0.59 mm/h (2.3%). The overall correlation coefficient was 0.92 according to the Passing-Bablok method comparison (y = 1.9799 + 0.8738 x, intercept 1.9799 and slope 0.8738). There was a non-linear relationship between the two methods. Conclusion: The ESR has a marked role globally in the diagnosis and relationship between the two methods. (P value < 0.05) Keywords: Erythrocyte sedimentation rate (ESR), EDTA, citrate

PP-026
EVALUATION OF PREANALYTIC ERRORS OF URINARY ANALYSIS IN A TERTIARY HOSPITAL

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Objective: Laboratory errors are classified as preanalytical, analytical and postanalytical errors. Today, preanalytical errors account for more than 70% of laboratory errors. The aim of our study is to identify major sources of error, especially by determining the percentage distributions of error sources in our urinary analysis laboratory.

Materials and Methods: Between January 2017 and April 2018, routine urinary and emergency urine analysis and 24-hour quantitative urine analyses were retrospectively screened by the laboratory information management system (LIMS) and results were compared to the expected urinary analysis results. Pre-analytical errors were considered for rejected samples and the error rates were calculated.

Results: The total number of urinary samples studied during this period was 239 814 while the number of rejected samples was 218 (0.09%). 98.9% of the rejected samples were caused by preanalytical error. Rejection rate was higher (89%) in emergency laboratory than that of the routine laboratory. The first three most common error sources were inadequate specimens, macroscopic haematuria, and empty specimen vessels. Conclusion: Among the sources of errors in our urine laboratories, we have found that preanalytical errors are the major error source and that the most common preanalytical error sources are insufficient samples (92%). Preanalytical errors should be detected and required precautions should be taken. The staff must be trained to inform the patients. The results should be presented faster and more accurately.

Key words: Preanalytical error, urine, error analysis

PP-027
COMPARISON OF PREOPERATIVE AND POSTOPERATIVE OMENTIN AND VISFATIN LEVELS UNDERGOING UNILATERAL TOTAL KNEE ARTHROPLASTY PATIENTS WITH Tourniquet

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Objective: It is thought that adipokines secreted by white adipose tissue, as well as extreme mechanical loadings of obesity, play a critical role in the etiology of rheumatic diseases such as osteoarthritis and rheumatoid arthritis. The aim of our study was to compare preoperative and postoperative (1th and 24th hours) omentin and visfatin levels undergoing unilateral total knee arthroplasty (UTKA) patients with tourniquet.

Materials and Methods: Twenty-nine patients who underwent UTKA with tourniquet time (the time between result arrival from autoanalyzer and results) were included in the study. Patients with diabetic microangiopathy, cardiovascular disease history, peripheral arterial disease, and three months extremity surgery history were excluded from the study. Serum omentin and visfatin levels were analyzed by ELISA device (Rayto RT-2100-C Microplate Reader). Paired sample t test was used for statistical analysis by IBM SPSS 20.0. Results: There was not found a significant difference between Omt1-Omt24, Omt0-Omt24, Vft0-Vft24, Vft0-Vft724, Vft1-Vft24 periods (p=0.404; p=0.200; p=0.172; p=0.563; p=0.502; p=0.329), respectively. Conclusion: Beginning with reduction of blood flow to the tissue and oxygen deficiency ischemic tissue damage results inflammation, which is caused by increased free radicals triggers the accumulation of inflammatory cells in the region. Cytokines released through the interaction between endothelial and inflammatory cells cause expanding of damage due to reperfusion. In our results, we observed that the levels decreased postoperatively 1th hour increased in the 24th hour, visfatin levels increased in the 1th hour slightly and after decreased to preoperative levels in the 24th hour. But these changes have not been significantly.

Keywords: Total knee arthroplasty, tourniquet, omentin, visfatin

PP-028
TURNAROUND TIME (TAT) IN ROUTINE BIOCHEMISTRY PARAMETERS

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Objective: TAT is defined as “elapsed time between two specified points through pre-examination, examination, and post-examination processes” according to ISO 15189:2012, which includes time of clinician requisition, sample collection, sample transportation, sample analysis, etc. TAT is one of the most vital quality indicators of laboratory services. It is aimed to compare the TAT values of routine biochemical parameter at different days and hours and to determine the factors influencing these time periods.

Materials and Methods: In our study, we randomly selected a weekday and a weekend day. We collected the data (sample requisition, sample receipt, input to the autoanalyzer, result arrival from autoanalyzer and result reporting times) belonging to biochemistry parameters requisition from the Central Laboratory of the University of Ankara Medical Faculty, İbni Sina Hospital via laboratory information system. Using our collected data we calculated the pre-analytical time (time between sample requisition and autoanalyzer entry); analytical time (time between autoanalyzer entry and result arrival from autoanalyzer); and result reporting times and TAT (time between sample requisition and result reporting times). A statistical analysis of the calculated times (mean/standard deviation) was performed.

Results: In our study, when weekday and weekend biochemical parameters requisition data were compared; there was no significant difference between intra-laboratory TAT (time between sample reception and result reporting times) values (p=0.92). Total TAT (time between sample requisition and result reporting times) values was found to be decreased during weekend period (85.8±40.2 vs. 61.3±25.4). Weekday analysis procedure (weekdays=28.0±29.7 min and analytical (15.4±5.2 min) durations were significantly lower than weekend pre-analytical (103.4±62.8 min) and analytical durations (20.6±5.6 min) (p=0.001 for each one). It was found that the weekday post-analytical duration (29.5±35.6 min) was significantly higher than the weekend post-analytical duration (10.9±11.3 min) (p=0.001).

Conclusion: In this study, both of the weekday and weekend TAT values for routine biochemical parameters were found to be not to exceed the intra-laboratory TAT goal (180 min) predetermined for our laboratory. Keywords: TAT, pre-analytical, biochemical parameters.
Objective: Turnaround time (TAT) is commonly defined as the duration between a test’s order and result report time, which includes pre-analytical, analytical and post-analytical stages. Early diagnosis and treatment of a disease and also early discharge of patients from emergency departments depend on TAT. The aim of this study is to investigate how TAT results of troponin, one of the most frequently requested tests in emergency department, is influenced by the performance of laboratory employees on different days and at different hours of the day.

Materials and Methods: In our study, we randomly selected a weekday and a weekend day. We collected the data (sample requisition, sample reception, input to the autoanalyzer, result arrival from autoanalyzer and result reporting times) belonging to troponin requisition from the Central Laboratory of the University of Ankara Medical Faculty, İbni Sina Hospital via laboratory information system.

Using our collected data we calculated the mean pre-analytical time (time between sample requisition and autoanalyzer entry), analytical time (time between autoanalyzer entry and result arrival from autoanalyzer), post-analytical time (the time between result arrival from autoanalyzer and result reporting times) and TAT (time between sample requisition and result reporting times) values. Calculated values (mean ± standard deviation) were statistically compared. Results: In our study when weekday and weekend troponin data were compared; there was no significant difference between TAT values. When the weekday and weekend data was grouped and averaged, they were divided into three groups (1st group; 08:00-12:00, 2nd group; 12:00-17:00 and 3rd group; 17:00-08:00), only at the weekend the post-analytical period of 3rd group (13.4±13.7 min) was significantly higher than 1st (4.8±5.3 min) and 2nd group (2.5±2.1 min) (p<0.05).

Conclusion: The TAT values calculated in this study was found to be compatible with our laboratory’s predetermined TAT goal (90 min). The statistically significant difference in the weekend group wasn’t evaluated to be clinically significant. Since; the mean intra-laboratory TAT we calculated for troponin is 63 min in weekdays and 48 mins at weekend, neither of which exceeds intra-laboratory TAT goal.

Key Words: TAT, pre-analytical, troponin

PP-030
MACROPROLACTIN: SHOULD IT BE SCREENED IN ALL HYPERPROLACTINAEMIC PATIENTS
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Objective: The different forms of prolactin (PRL) are defined according to molecular size: monomorphic PRL (predominant form, 23kDa), big PRL (50–60kDa), and very big PRL (macroprolactin, 150–170kDa). Macroprolactin is described as a complex of PRL with immunoglobulin G which is related to antiprolactin autoantibodies. This formulation of PRL may cause limited blood bioactivity. Immunoassays show variability in the detection of macroprolactin. The aim of this study was to perform macroprolactin screening in patients with hyperprolactinemia and determine the problems encountered in routine practice.

Materials and Methods: Macroprolactin screening was performed by precipitation with polyethylene glycol (PEG) in 900 patient samples with hyperprolactinemia over a period of approximately 6 months. Recovery values of less than 40% were considered as macroprolactinemia and predominantly monomorphic PRL, respectively. 40–60% recovery formed borderline values. PRL measurements were performed by spectrophotometry with colorimetric kit of Cayman brand.

Results: Statistical analysis of the data was performed with the SPSS20 program. Mean±standard deviation (SD) and t-test were used for the comparison of means. Results: Statistical analysis of the data was performed with the SPSS20 program. Mean±standard deviation (SD) and t-test were used for the comparison of means.

Conclusion: The cases in which macroprolactin screening was performed were from one of the tubes, visible hemolysed (+) serum was obtained after vortexing from one of the tubes, visible hemolysed (+) serum was obtained after vortexing from one of the tubes, visible hemolysed (+) serum was obtained after vortexing from one of the tubes, visible hemolysed (+) serum was obtained after vortexing from one of the tubes, visible hemolysed (+) from one of the tubes, visible hemolysed (+) from one of the tubes, visible hemolysed (+) from one of the tubes, visible hemolysed (+) from one of the tubes, visible hemolysed (+) from one of the tubes. The mean intra-laboratory TAT we calculated for troponin is 63 min in weekdays and 48 mins at weekend.

Key Words: Macroprolactin, PEG precipitation

PP-033
THE EFFECT OF SERUM SEPARATOR TUBES ON THE STABILITY OF THYROID FUNCTION TESTS
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Objective: Gelled tubes are known to cause interference in immunoassay methods. Serum FT3, FT4 and TSH levels were aimed to be compared gelled tubes with serum tubes and were planned to evaluate the FT4, which is indicated in the literature, to be the most adsorbed and to cause false low measurement. Materials and Methods: Blood was collected into three different tubes from 21 patients who applied to our hospital. Becton Dickinson(BD) and Tårkplast(TP) were used as gelled tubes, Vacucare was used as gel-free tube. During drawing blood, the tube line was randomized. Serum TSH, FT3 and FT4 assays were measured on Beckmann-UnicelDX3000 devices without incubation. Also, after the laboratory test results. This study was carried again two times in the same week to investigate the effect there was a difference in terms of potential gel interferences between the groups. Results: When the groups were compared, there was no statistically significant difference (p values for TSH, FT3, FT4 are p<0.098, 0.850, 0.490, respectively). In addition, after the tubes were left for five hours, FT4 was run again and there was no significant difference between the three tubes. To add, no differences were found when comparing the first and last measurements of the tubes themselves (p values for BD, TP, Vacucare are p<0.753, 0.530, 1 respectively).

Conclusion: Three of the tubes can be used for thyroid function tests. In the repeated measurements within five hours, the FT4 test was not found to be statistically significant. Each laboratory should make tube selection and verification.

Keywords: Thyroid Function Tests, Preanalytic, Gel, Immunoassay

PP-035
EVALUATION OF ALCOHOL TEST WITH SIX SIGMA METHODOLOGY IN EMERGENCY LABORATORY
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Objective: Six Sigma methodology is based on statistical evaluation of internal quality control and external quality assessment data for analytical reliability of laboratories. In our study, we aimed to evaluate the alcohol test in our emergency biochemistry laboratory with six sigma methodology. Materials and Methods: Internal quality control data for the alcohol test between January 2017 and March 2018 were obtained from the laboratory information management system and external quality data were obtained from the results of the laboratory’s participation in external quality assessment. Six sigma methodology was determined using bias, coefficient of variation (CV%) and allowable total error (TEa) goal. Clinical Laboratory Improvement Amendments (CLIA 88) data was used for TEa.
Sigma values were <3 unacceptable, 3-6 were acceptable, ≥6 were considered optimistic.

Results: Process sigma value; for alcohol testing was calculated as 3.98 for the normal level of the internal quality control and 4.05 for the pathological level of the alcohol.

Conclusion: Corrective actions that should be taken to improve the problematic processes should be evaluated carefully. The Six Sigma methodology can also be useful in identifying variables in process evaluation in such tests.

Keywords: Six sigma, alcohol, quality control

**PP-037**
THE EFFECT OF PREANALYTICAL ERRORS ON THE TEST QUALITY IN CLINICAL LABORATORIES

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Objective: Preanalytic period; “Procedures that begin with the clinician’s request, chronologically, the test procedure, the identification and preparation of the patient, the retrieval of the primary samples, the transfer of the primary samples to the laboratory and the laboratory and the end with the analytic process”. Today, preanalytical errors account for more than 70% of laboratory errors. The majority of preanalytical errors; preparation of the patient, collection of samples, transportation, preparation for analysis and storage. Errors such as improper labeling, hemolysed samples, lipemic samples, clotted samples, improper containers, insufficient samples are causing time and money loss. Quality indicators have been determined based on these errors. Our aim in this study is to evaluate the distribution of faults in the preanalytical period and to use them as quality indicators.

Materials and Methods: Preanalytical process error data from January 2017 to January 2018 was obtained from the laboratory. Our findings show monthly percentages were calculated and evaluated for each type of error by the IFCC Working Group according to the Quality Indicators (QI) developed by Laboratory Errors and Patient Safety (WG-LEPS).

Results: In the samples coming to the biochemistry, and urine laboratory, the quality indicators calculated according to the error types in the preanalytical period were determined at the optimum performance level in line with the quality targets of the laboratory. Based on the error rates, “hemolysed sample” was the first “insufficient sample” was the second. Conclusion: Continuous monitoring and management of preanalytical errors is crucial for the quality of laboratory performance. Our findings have shown that quality indicators may be useful in evaluating the preanalytic process. Errors in the laboratory can cause clinicians to report incorrectly, which can significantly affect health care services. According to quality indicators, the root of the errors affecting patient safety can be determined, corrective and preventive actions can be made. The monitoring of the preanalytical process as well as the analytical process to prevent laboratory errors will increase the reliability of the patient-physician relationship.

Keywords: Preanalytical errors, preanalytical process, laboratory performance

**PP-038**
DEPENDENT PSEUOTHROMBOCYTOPENIA

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Objective: Thrombocytopenia in a complete blood count, firstly false thrombocytopenia should be considered after incorrect identification, a clotted sample, inappropriate sample size and other sources of error are excluded. Platelet clusters developed due to antibodies in the bloodstream are counted as giant platelets or small lymphocytes by the analyzer when EDTA is generally used as an anticoagulant. Therefore, the platelet count may be inaccurately low. The appropriate test is the use of proper test requests. The platelet counts at the 0, 60th, and 120th minutes (15.8±10^9/L, 15.2±10^9/L, 14.4±10^9/L respectively) remained around the reference range lower limit (150-400x10^9/L) in the sample containing citrate anticoagulant. The result of the measurement was reported by confirming the diagnosis of pseudothrombocytopenia.

Conclusion: Pseudothrombocytopenia may occurs with the use of anticoagulant-containing tubes such as citrate, oxalate, heparin for complete blood count and other tests. It can be diagnosed by looking for small lymphocytes or giant platelets on the peripheral blood smear in order to exclude pseudothrombocytopenia. Keywords: Pseudothrombocytopenia, EDTA, citrate

**PP-039**
IMPACT OF FORMALIN-FIXED PARAFFIN-EMBEDDED (FFPE) TISSUE PROCESS AS A PREANALYTICAL FACTOR

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Objective: Formalin fixation and paraffin embedding is a timeless method of preserving tissue. This reservoir of specimens is increasingly being used for DNA and other molecular analyses. For that reason to evaluate the impact of preanalytical factors associated with the formalin fixation and paraffin embedding process on molecular methods is important.

Materials and Methods: Potential sources of preanalytical variability associated with the procurement, fixation, and storage of FFPE tissue were identified based on the experience of our molecular biophysics laboratory.

Results: Investigations of the potential effects of tissue size, before fixation, found that PCR success rates were highest when DNA was extracted from specimens that were to 10 mm in diameter as opposed to smaller specimens or larger specimens. Importantly, extraction method and amplicon size have been shown to influence. Also, when unbuffered formalin and neutralbuffered formalin (NBF) were compared, our results shown that DNA extracted from NBF-fixed tissues gave greater yields and genotype determination success rates.

Conclusion: We must be careful about the archival FFPE-tissue when the handling. Fixation, processing, and storage parameters for a specimen are unknown. With a concerted effort and attention to detail, accuracy, and awareness, FFPE tissue can serve as an important resource to clinical and research activities.

Keywords: Formalin-fixed, paraffin-embedded (FFPE) tissue, preanalytical factors

**PP-040**
ARRANGEMENT OF CAUSES OF REJECTION IN THE PREANALYTICAL PROCESS AT THE UNIVERSITY HOSPITAL CENTRAL LABORATORY

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Objective: Preanalytic process is the time between the test request and arrival of the specimens. We aimed efficient pre-analytical process management targeted by optimizing sample rejection causes.

Materials and Methods: Reasons for rejection have been re-examined and categorized, taking into account the EFLM recommendation and laboratory needs, in order to use the reasons for rejection more efficiently in Manisa Celal Bayar University Hafsa Sultan Hospital.

Results: In consideration of the reasons for rejection manually entered in the previous 24 reasons for retesting and other categories and for the requirements and EFLM proposals, the top 10 headings and the total 20 reasons for rejection were determined as follows.

1. Inappropriate quantity: a) Inadequate, b) Overfilled
2. Clotted
3. Hemolysed
4. Inappropriate test request: a) Missing parameter, b) Double, c) False, d) Not-analyzed in the night shifts
5. Inappropriate tube: a) Incorrect, b) Empty, c) Over expired date
6. Lipemic
7. Icteric
8. Contaminated: a) with EDTA, b) with fluid
10. Transport fault: a) Opened cap, b) Inappropriate transport, c) Inappropriate sample size and other causes

Conclusion: In year 2017, 15,228 samples (%1.50) were rejected among 1,010,569 samples. Rejection causes for the samples starting from the most frequent were inadequate (%4.1), double (%29.6), hemolysed (%18.7), inappropriate test requests (%5.6), and inappropriate tubes (%5.9). The reasons for rejection were determined by paying attention to these ratios and a user friendly system was aimed. Conclusion: For good process management one should be open to innovations, follow the literature and take into account the needs of the laboratory. This change in the system will provide a more efficient pre-analytical process management.

Key words: rejection analysis, preanalytical process, process management

http://www.TurkJBiochem.com
PP-041
THE EFFECT OF FREEZING-DISPOSITION ON PLASMA HOMOCYSTEIN MEASUREMENTS
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Objective: Homocysteine is an independent risk factor for cardiovascular disease. The current recommendation for the collection of homocysteine samples is to centrifuge within 1 hour and place on ice. Plasma homocysteine levels are stable for at least 24 hours if kept at room temperature and may stabilize for a few months when stored frozen. Our goal in our study is to evaluate the effects of these preanalytical error sources on the stability of homocysteine samples during supernatant and storage of samples by performing freeze-thaw procedures on homocysteine samples.

Materials and Methods: The homocysteine samples were frozen at -20 °C and the subsequent analyses were carried out on a fresh sample, followed by a two-day freeze-thaw procedure and analyzed with a Thermo Scientific UltiMate 3000 UPLC instrument. The preanalytical error level that could be attributed to this procedure was statistically evaluated using the Spss IBM 21 program.

Results: We found that the plasma homocysteine measurement between the fresh sample and frozen-thawed sample showed statistically significant difference in the chromatographic platform compared to the paired t-test. The mean values for fresh and frozen plasma samples were 5.46 ± 1.66 and 4.52 ± 1.53 µmol/L, respectively (p < 0.001).

Conclusion: For homocysteine measurement, it may be more reliable to analyze plasma samples without freezing.

Keywords: Homocysteine, storage, stability

PP-042
THE EFFECT OF STORAGE ON EXTRACTED SAMPLES FOR CHROMATOGRAPHIC HOMOCYSTEINE MEASUREMENT
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Objective: One of the significant preanalytical factors that can affect the reliability of homocysteine measurements is storage. The reported stability for homocysteine measurement was two days after extraction in the commercial kit insert. The aim of this study was to demonstrate the effect of storage on extracted samples for chromatographic homocysteine measurement.

Materials and Methods: A total of 30 plasma samples were analyzed. 50 µL plasma was added to 50 µL internal standard, 20 µL reducing agent and 300 µL derivatizing agent. After vortex and incubation for 10 minutes at 60 °C, plasma samples were collected on 2-8 °C. 100 µL precipitation reagent was added, vortexed and incubated again. Samples were centrifuged at 10000 rpm for 10 minutes. 20 µL supernatant was injected to the chromatography system. A portion of extracted supernatant was stored for 5 days at 2-8 °C and reanalyzed for plasma homocysteine.

Results: According to Wilcoxon test, there was a statistically significant difference between first analysis and stored sample for homocysteine measurement in chromatography platform. The mean values were 6.60 (1.57-48.6) and 6.43 (1.55-45.8) µmol/L for fresh and stored plasma samples, respectively (p = 0.003).

Conclusion: It might be more reliable to analyze the plasma samples immediately after sample collection for homocysteine measurement. Although the extracted supernatant was stored in 2-8 °C, the stability was deteriorated after five-day storage.

Keywords: Homocysteine, storage, stability

PP-043
EFFECTS OF LIEPIEIA ON PROTROBIMIN TEST, A CASE REPORT
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Objective: In biochemistry laboratories interferences are common that affect the reliability of homocysteine measurements is storage. The reported stability for homocysteine measurements is two days after extraction in the commercial kit insert. The aim of this study was to demonstrate the effect of storage on extracted samples for chromatographic homocysteine measurement. In this study, we aimed to reanalyze the BFT-2 instrument using Siemens Thromborel S test kit with the manual hook fine needle method.

Results: To avoid misdiagnosis in lipemic samples, abnormal coagulation results were carefully evaluated in terms of measurement technique. False elevations should be considered according to the clinical condition of the patient and appropriate technical measurements should be considered. Otherwise, improper treatment might be performed for the patient.

Keywords: Lipemia, prothrombin time, INR

PP-044
THE RATE OF HEMOLYSIS IN AMMONIA SAMPLES ADMITTED TO BIOCHEMISTRY LABORATORY
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Objective: Hemolysis is defined as the breakdown of erythrocytes and the spread of hemoglobin content outside the cell. Hemolyzed samples causes latency of laboratory results on preanalytical factors. In this study, we aimed to investigate the rate of hemolysis in the samples with ammonia test requested from the pediatric clinics.

Materials and Methods: Ammonia samples of 710 patients that admitted to Selecuk University Faculty of Medicine Pediatric Services between 2012-2017 were examined retrospectively in our laboratory. Hemolysis indexes were assessed using the Abbott Architect c8000 autoanalyzer. Hemolysis indexes were evaluated with a hemoglobin values >200 g/dl as (+++,+++), >150-200 g/dl as (++), >100-150 g/dl as (+), >50-100 g/dl as (+) and >0-50 g/dl as (-).

Results: In our hospital, it was determined that the rate of hemolysis in the samples with ammonia test requested from the pediatric clinics over 5 years period was 8.4%. Conclusion: Erythrocyte ammonia content is three times higher than plasma. The stability of ammonia is 3 hours in 2-8 degrees, 24 hours in +20 degrees. It has to be transported on ice to laboratory. Because of the difficulty in obtaining blood from newborns, the exclusion of urea cycle defects may be a good laboratory practice if samples with hemolysis are analyzed and their value is in the reference range.

Keywords: Hemolysis, pediatric sample, Ammonia.

PP-045
THE EVALUATION OF INTERN KNOWLEDGE ABOUT THE FACTORS WHICH CAUSE TO PREANALYTIC ERRORS
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Objective: The clinical laboratory’s results are very important for accurate clinical diagnosis and prognosis. Preanalytical variables can account for up to 70% of laboratory errors. The most of the preanalytical errors occur during preparing patients, sampling, storage and transporting of the samples. In our hospital, usually interns are responsible for these processes. We aimed in this study is to determine awareness of interns about taking and transferring laboratory samples.

Materials and Methods: Sixty volunteer interns were included in the study. A survey containing 44 different types of questions was used by the researchers to collect data.

Results: According to the survey results, it can be said that in our hospital, blood and urine samples are collected by interns however in the previous period they have not gained sufficient experience. It was also determined that more than half of the participants did not have adequate and / or correct knowledge of most of the venous blood sampling stages and the transfer of the blood gas sample. Interestingly, about half of the whole group (% 49.2) stated that they did not want to receive training on preanalytical factors. When scored individually, it was also shown that there was no significant relationship between students’ GPAs and course demands and the scores they had received on this test.

Conclusion: It is extremely important to control the preanalytical factors that have the most impact on the quality of the results produced by the laboratory and which have the most faults and to produce accurate and concurrent quality results when these results are evaluated, it can be argued that theoretical biochemistry courses taught to medical faculty students are not clinically adequate and students should be trained practically for the clinical biochemistry course.

Key Words: Preanalytic, survey, intern.
PP-046 EFFECTS OF DIFFERENT PREANALYTIC CONDITIONS ON LYMPHOCYTE SUBGROUPS
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Objective: The analysis of whole blood samples by flow cytometry for pharmacodynamic and biomarker assessments in clinical studies has been limited by the necessity to test these samples within a short time frame after blood collection. In most clinical studies, blood specimens are shipped to a centralized testing facility; it is critical to demonstrate specimen stability over a period of time to explain the delay before the specimen reaches the testing facility. We examined the effect of time and temperature on the stability of markers for T lymphocytes (CD3, CD4, CD8), B lymphocytes (CD19), NK cells (CD16+CD56).

Materials and Methods: Blood samples from 5 volunteers were collected to two EDTA tubes form each volunteer and lymphocyte subgroup analysis were done. While one of the samples was kept at room temperature, the other was kept at 4ºC. Measurements were made at 0 - 8 - 24 - 32 - 48 hours for each sample. Lymphocyte subgroups were analyzed on the BD FACS CANTO2 device. Relative error rates based on 0. hour samples data were calculated using Microsoft Excel 2015. Relative error percentage values were compared with the total change limits recommended by the ICSH and appropriate operating conditions were assessed.

Results: Mean relative change values for CD4 and CD8 T lymphocytes were <5%, B lymphocytes <10% and NK cells <15%. T lymphocytes, B lymphocytes, stability of NK cells were not affected until 48 up to storage at 4 ºC and at 25 ºC.

Conclusion: Cooling time or samples can be delayed up to 48 hours. It is advisable to work in a larger population and patient group to achieve optimal results.

Keywords: T lymphocytes, B lymphocytes, NK cells, Stability.

PP-048 THE EFFECT OF THE DIFFERENT BRAND INSULIN INJECTORS ON BLOOD HEPARINIZATION
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Objective: The blood gas collection with liquid heparin is one of the sources of preanalytical errors. It was reported that collection of blood gas samples in the syringe with liquid heparin caused dilutional errors. But, heparinized blood collection for blood gas analysis in some hospitals is still preferred in plastic syringes with liquid heparin instead of syringes with dry heparin due to decreased risk of anticoagulant and traditional syringes. In this study, it was aimed to calculate dead space volumes of different brand syringes.

Materials and Methods: Five different BRAND insulin syringes were used for this study. Dead space was calculated with the remaining amount of pure water in syringes which were filled with pure water and then emptied. Also percent dilution ratio was calculated by using pure water density.

Results: The dilution rate of different insulin syringes during heparinization varies in syringes which were filled with pure water and then emptied. Also percent dilution ratio was calculated by using pure water density.

Conclusion: Considering these results, it was observed that the dilution ratio with heparinized insulin syringes used. This may result in more dilution than is accepted, and may result in insufficiency of the anticoagulant effect. Therefore, it is very important to standardize the injector type and heparin concentration used to reduce the preanalytical error rate in blood gas analysis.

Keywords: Blood gas, preanalytical errors, heparinization, dead Space.

PP-049 FACTORS AFFECTING PREANALYTICAL STANDARDIZATION IN PERIPHERAL SMEAR-STAINING SYSTEM
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Objective: Complete blood count is composed of the analysis of quantitative morphological and functional measurements of the plasma, erythrocytes, leukocytes and platelets and their calculated parameters. Whole blood count and evaluation of the peripheral smear-staining are used on clinical diagnosis, treatment and follow-up. Cells are assessed according to the characteristics of being mature, immature and pathologic cells of the bone marrow. The preanalytical process should be standardized for the quality of evaluation of peripheral blood smear and staining used as a clinical and reflex test. The programming of the sample and patient data for standard counting should be accordingly limited to the data parameters.

Materials and Methods: Control samples were analysed by the Sysmex XN 1000 whole blood count autoanalyzer in our standardized laboratory. The programmed spread volume-angle-rate and incubation time in solutions are defined according to the hematocrit value of the specimens and fixed hematocrit value of the control specimens.

Results: Peripheral blood smear and staining process was completed with Sysmex SP1000i system. The preparations were evaluated under the microscope. The smear and staining qualities were similar. Cell characteristics and distribution of erythrocytes, leukocytes and thrombocytes were evaluated. There was no significant difference between different smears of the same sample.

Conclusion: The preanalytical process has been standardized with the optimization of the laboratory environment, the concentration of the solutions, the stability of the solutions, hematocrit value of the sample, smear thickness, smear angle, smear rate, residence times in solutions.

Key Words: Peripheral smear, peripheral staining, preanalytical standardization, automated systems.
PP-052  
PREEANALYTICAL PROCESS IN A STATE HOSPITAL BY THE NATIONAL LABORATORY ERROR CLASSIFICATION SYSTEM

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Objective: The national Laboratory Error Classification System (LECS) was developed to improve the quality processes of laboratory and patient safety by the Turkish Ministry of Health in 2015. In this study, we aimed to evaluate the total laboratory process and quality indicators (QIs) in biochemistry laboratories according to LECS.

Materials and Methods: This retrospective study included 3700 samples according to LECS out of total 489156 samples between 1 January 2017 and 30 December 2017. The main type of rejected sample was sulfonamides and higher than 0.37%.

Results: The rates of pre-analytical phases were 81.7%. The maximum error type was lipemia with a rate of 30.5%. The main samples were hemolysis (26.8%).

Key Words: Laboratory errors, quality indicators, laboratory process, laboratory error classification

PP-053  
THE EFFECT OF HEPARIN ON HIGH SENSITIVE TROPONIN T AND CREATIN KINASE MB ASSAYS

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Objective: The aim of this study was to investigate the effect of heparin on the measurement of high-sensitivity troponin T (hs-cTnT) and creatine kinase MB (CK-MB).

Materials and Methods: Residual sera of the patients who applied to emergency service and having hs-cTnT results of 14-20 ng/L, 50-100 ng/L, 100-200 ng/L, >200 ng/L, CK-MB results of 1-10 IU/mL, 1-10 IU/mL, 1-10 IU/mL, >10 IU/mL were collected and 4 serum pools were prepared. Heparin was added to the pools at a concentration of 50, 98, 450 IU/mL, and hs-cTnT was measured in duplicates in each sample. The mean percent change (MPC) values of serum pools were calculated and displayed as interferograms. The mean percent change in each serum pool was calculated. Interference was determined according to ΔSEc (standard error of the coefficient of variation) values separately according to the normal and pathological control results.

Results: Negative interferences exceeding the 10% limit was detected when the triglyceride value was >1151 mg/dL. Other levels were not affected according to ΔSEc percentages.

Conclusion: In hs-cTnT pool at a concentration of 14-20 ng/L, a positive interference exceeding the 10% limit was detected. Using CVA values obtained from normal and lipemia index were measured in pools with and without lipemia. Using the data obtained, mean percent change in each serum pool was calculated. Interference was determined according to ΔSEc values and it was accepted that the assay was affected by changes exceeding the 10% limit. The critical systematic error (ΔSEc) of the measurements was calculated using formula [(T[EA-Bias]/CVA)-1.65] and compared with mean percentage change results.

Keywords: Heparin, Interference, Troponin, Creatin Kinase MB

PP-054  
EFFECT OF HEMOLYSIS ON HIGH SENSITIVE TROPONIN T AND CREATIN KINASE MB ASSAY

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Objective: The aim of this study was to investigate the effect of hemolysis on the measurement of high-sensitivity troponin T (hs-cTnT) and creatine kinase MB (CK-MB).

Materials and Methods: Serum pools with three different pathological analyte concentrations were prepared from the residual sera of the patients who applied to emergency department and requested hs-cTnT and CK-MB. Hemolysis was added to these pools to obtain a Hb concentration of 20 g/L and then serial dilution was performed. Analyses were studied in both pools. Using the data obtained, the mean percentage change (MPC) values of each serum pool were calculated and displayed as interferograms. Two critical systematic error (ΔSEc) values were calculated for each method using the normal and pathological coefficient of variation (CVA) with ΔSEc=[(T[EA-Bias]/CVA)-1.65] formula. The MPC values were evaluated accordingly.

Results: The concentrations of hs-cTnT in pools were 14, 122 and 360 ng/L. CK-MB concentration was found to be 2.5, 5.5, 11.6 ng/L. There was a negative interference exceeding 10% limit when the Hb value was 5 g/L for all of the pools for hs-cTnT. No effect exceeding the 10% limit for CK-MB was detected. ΔSEc is 6.7% and 20.5% for hs-cTnT, 7.02% and 9.6% for CK-MB respectively. There was a negative interference exceeding 6.7% limit when the Hb was 5 g/L in pools with concentrations of 14 and 122 ng/L hs-cTnT. Negative interference exceeded 20% limit for CK-MB was observed with concentration of 360 ng/L hs-cTnT. Hemolysis effect on CK-MB did not exceed ΔSEc limits.

Conclusion: The results indicate that hemolysis negatively interferes with the hs-cTnT test in a concentration-dependent manner. CK-MB was not affected by hemolysis up to 20 g/L Hb concentration.

Keywords: Hemolysis, interference, troponin T, creatin kinase MB

PP-055  
EFFECT OF LIPEMIA ON HIGH SENSITIVE CARDIAC TROPONIN T AND CREATINE KINASE MB MEASUREMENTS

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Objective: Aim of this study is to investigate the effect of lipemia on high-sensitive cardiac troponin T (hs-cTnT) and creatine kinase MB (CK-MB).

Materials and Methods: Serum pools containing hs-cTnT at pathological levels (14-20 ng/L, 50-100 ng/L, 100-200 ng/L and >500 ng/L) were collected from the remaining serum samples of patients who applied to emergency department and hs-cTnT and CK-MB mass assays were studied. In these pools CK-MB mass was also determined. Serum pools were divided into two. Olinclonem IN4-5500 (10%) was added to pools to create a lipid concentration of 20 g/L to mimic lipemia. Serial dilutions were carried out to obtain serum pools containing lipids at concentrations of 20, 10, 5, 2.5 and 1.25 g/L. In the other half, deionized water was added to remove lipemia. Triglyceride concentration was found to be measured in pools with and without lipemia. Using the data obtained, mean percent change in each serum pool was calculated. Interference was determined according to ΔSEc values and it was accepted that the assay was affected by changes exceeding the 10% limit. The critical systematic error (ΔSEc) of the measurements was calculated using formula [(T[EA-Bias]/CVA)-1.65] and compared with mean percentage change results.

Results: Positive interference exceeding 10% limit at 2350 mg/dL triglyceride level was observed in the pool with hs-cTnT level 14-20 ng/L according to mean percent change values. No change in other pools exceeding the 10% limit was detected. Using CVA values obtained from normal and lipemia index were measured in pools with and without lipemia. Using the data obtained, mean percent change in each serum pool was calculated. Interference was determined according to ΔSEc values.

Conclusion: In hs-cTnT pool at a concentration of 14-20 ng/L, a positive interference exceeding the 10% limit was detected when the triglyceride value was >2350 mg/dL. While evaluating according to critical systematic error, there was no effect in the same serum pool exceeding 6.7% limit at a concentration of 1511 mg/dL triglyceride.

Keywords: Lipemia, Interference, Creatine kinase, Troponin

PP-056  
UNCERTAINTY OF HEMOGLOBIN A1c MEASURED BY CATION EXCHANGE CROMATOGRAPHY

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Objective: Medical laboratories primarily contribute to clinician and consequently patient management about clinical decision. Because no test result can represent absolute truth, the measurement uncertainty is crucial for the test result to be used for patient benefit. The aim of this study is to calculate this uncertainty using the test performance data of the HbA1c test measured in the Kayseri Training and Research Hospital Medical Biochemistry Laboratory. Materials and Methods: Uncertainty management using the uncertainty described in the GUM and EURACHEM guidelines were used in this study. HbA1c measurement was performed by a BIO-RAD Variant II Turbo 2.0 HPLC cation exchange chromatography and VariantTM II Turbo HbA1c kit. Standard combined uncertainty and expanded uncertainty were calculated. Other levels were not affected according to ΔSEc percentages.

Results: The measurement uncertainty which arises from calibrator, calibration measurement was performed by on a BIO-RAD Variant II Turbo 2.0 HPLC

Conclusion: In our study, the measurement uncertainty exceeds from calibration, bias, and random error uncertainty components. Because no test result can represent absolute truth, the measurement uncertainty is crucial for the test result to be used for patient benefit.

Keywords: Hemoglobin A1c, uncertainty, cation exchange chromatography

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TBD-BD Preanalytical Phase Symposium 2018
Objective: Some laboratory tests may be affected by food intake. In this case, Antalya Education and Research Hospital, Department of Clinical Biochemistry, Merve Cesur was proposed.

Results: This case is a striking example of the fact that preanalytical errors affect Antalya Education and Research Hospital, Department of Clinical Biochemistry, Merve Cesur.

Materials and Methods: The preanalytical errors seen at Kayseri Public Health Laboratory in 2016 were analyzed with Failure Mode and Effects Analysis (FMEA) and the most frequent errors were compared to the Ministry of Health’s Preanalytical Risk Management Project report. “2016 Statistical Analysis Report of Safety Report System (SRC)”. As mentioned in CLSI EP18-A2, EP 23A, ISO/TS 22367E, FMEA based risk evaluation was calculated as risk priority number (RPN) which is multiplication of risk probability, risk severity and risk detectability grades.

Key Words: Preanalytical risk, Preanalytical errors, Risk management

PP-055 COMPARISON OF KAYSERİ PUBLIC HEALTH LABORATORY FMEA BASED RISK ANALYSIS RESULTS WITH SAFETY REPORT SYSTEM OUTPUTS
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Objective: Laboratory results are essential for at least 70% of disease diagnosis and preanalytic part has the biggest error ratio of total laboratory testing process. To control proactively the preanalytical errors with risk management strategies is an important part of improving medical error management. The Turkish Ministry of Health gives importance to risk management as a part of “Standards of Accreditation in Health Laboratory Kit”. This study is aimed to compare a primary health care laboratory’s risk analysis results with outputs of Ministry of Health’s preanalytical errors report.

Materials and Methods: The preanalytical errors seen at Kayseri Public Health Laboratory in 2016 were analyzed with Failure Mode and Effects Analysis (FMEA) and the most frequent errors were compared to the Ministry of Health’s Preanalytical Risk Management Project report. “2016 Statistical Analysis Report of Safety Report System (SRC)”. As mentioned in CLSI EP18-A2, EP 23A, ISO/TS 22367E, FMEA based risk evaluation was calculated as risk priority number (RPN) which is multiplication of risk probability, risk severity and risk detectability grades.

Results: According to FMEA preanalytical risk analysis the highest degrees of RONs (≥100) were centrifuge errors, unlabeled samples, hemolysed samples and blood clots. The risks were not compatible with the most frequent preanalytical errors of 2016 SRC report.

Conclusion: Because of serving to wide spread multiple primary health care units in health care transportation process, Public Health Laboratories have some preanalytical risks. An independent statistical analysis of errors in primary health care laboratories within SRC reports would be more effective for managing risk analysis and preventive actions for preanalytical process.

Key words: Preanalytical process, risk analysis, safety reporting system

PP-056 LIPEMIA INTERFERENCE IN IMMUNOASSAY METHODS
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Objective: Today, preanalytical errors account for more than 70% of total medical laboratory errors. The majority of preanalytical errors are preparation of the patient, collection of samples, transportation, preparation for analysis and storage. In this case report, the errors are not associated with the amount of error in the test results of a patient incompatible with the clinical findings is discussed.

Materials and Methods: The blood sample of 73-year-old male patient was stored on the different DX800 analyzer and the results obtained were 0.01 ng/ml for free-PSA and <0.01 ng/ml for Total-PSA. The patient’s outcome was assessed as incompatible with the clinical and previous results. The current internal quality control results for the relevant device were within acceptable limits. The test repetition was deemed appropriate. The sample was run on a different DX800 at the second time. Possible preanalytical errors were emphasized because the results were compatible with each other. The sample was authenticated. The main reason for examination was sample result labeled that the amount was sufficient for analysis. There was no hemolysis, and there was slight cloudiness in the serum. TG was measured to confirm lipemia, it was 600 mg/dl. It was understood that the patient did not bleed blood samples at absolute fasting. Results of the following day were Free-PSA:3.44 ng/ml, Total-PSA:17.96 ng/ml. These results were consistent with the patient's clinic and previous results.

Results: This case is a striking example of the fact that preanalytical errors affect laboratory results significantly. To minimize errors, preanalytical factors need to be determined and pre-analysis conditions should be standardized as much as possible.

Key words: Preanalytical errors, Interference, lipemia.

PP-059 A TALE OF RED BEET
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Objective: Some laboratory tests may be affected by food intake. In this case, a patient with a discordance between urine strip and microscopy results is presented. The reason for the test result difference and the way to find the cause of the phenomenon were analyzed. Materials and Methods: The urine sample of a 51-year-old male patient was analysed and automated urine strip analysis showed 50 Ery/ml (+). Microscopic fields seen on the automated device contained approximately 1-2 erythrocyte per field. Manual microscopic examination showed approximately 1 erythrocyte per field. The patient said that his only complaint was sudden color change in urine. A deeper inquiry revealed that he had consumed red beet the evening before, urine color was red on the red day. The patient had given a urine sample for analysis in the morning, when he saw that the color change sustained. Food interference due to red beet was considered as the cause of the discordance between urine strip and microscopic results. The urine analysis was repeated on the next day and the strip result was 5-10 Ery/ml (+). No erythrocyte was seen in fields on the device and upon manual microscopic examination.

Conclusion: Peroxidase enzyme found in red beet can react with the urine strip hemoglobin analysis and cause false positivity. While evaluating the urine test, items that can interfere with clinically incompatible conditions should be considered and anamnesis should be questioned in more detail.

Key words: Interference, urine analysis, urine strip

PP-060 EFFECT OF CENTRIFUGAL FORCE ON COAGULATION TESTS
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Objective: Clinical Laboratory Standards Institute (CLSI) H21 A5 guideline recommends centrifugation conditions for coagulation tests to obtain citrated plasma samples with an RCF of 1500 xg, for <15 minutes at room temperature for plasma samples and 10 minutes at room temperature for citrate solution. The aim of this study is to evaluate whether routine centrifugation conditions of our laboratory affect coagulation tests (prothrombin time, PT; activated partial thrombin time, aPTT and fibrinogen) compared with the conditions recommended in the CLSI guideline.

Materials and Methods: 37 patients (24 female, 13 male) were included in the study. Three citrated blood samples were collected from each patients. First tubes were centrifuged with double centrifugation procedure (procedure A, 2500 x g at room temperature for 10 minutes), second tubes were centrifuged with CLSI recommendations (procedure B, 1500 x g at room temperature for 10 minutes), third tubes were not centrifuged. Platelet count, PT, aPTT and fibrinogen were assessed in all plasma samples on Stago STA-R Max coagulation analyser. Significance of the difference between results were analyzed with ANOVA test.

Results: Mean platelet counts were different between A - C and B - C procedures (p <0.05). A, B and C procedures platelet counts were 9.45±15.75 10^12/L, 7.02±19.52 10^12/L and 0.48±0.55 10^12/L respectively. However no difference were found among procedures for PT, aPTT and fibrinogen levels (p >0.05).

Conclusion: There was no statistically significant difference between the coagulation tests in citrated plasma obtained with different centrifugation conditions. Our routine centrifugation procedure is suitable to obtain citrated plasma for coagulation tests.

PP-061 THE IMPORTANCE OF QUANTITATIVE HEMOGLOBIN MEASUREMENT IN PREANALYTICAL STAGE
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Objective: Hemolysis is the most common problem in the preanalytical phase in Medical Biochemistry Laboratories. When the Ministry of Health examines the error codes in the “Laboratory Error Classification System (LHSS)”, this problem is exposed. The feedback about the hemolysis is in the first place. Therefore, it is important to determine the presence of hemolysis in the samples coming to the laboratory. In general, hemolysis is detected by hemolysis index -semi-quantitative metod or subjectively -in visual method observed. In visual hemolysis determination, sensitivity is high but it is difficult to determine the presence of hemolysis (namely free hemoglobin) in invisible hemolysis. Assessments made by hemolysis index are semi-quantitative methods, and there is uncertainty. For these reasons, it is important to determine the preanalytical errors and cut-off points. The aim of our study is to determine whether there is a difference by making quantitative hemoglobin determinations in samples from two different areas (intensive care and routine outpatient clinics) and non-visible haemolysis. Materials and Methods: Hemoglobin determinations were performed in a total of 60 samples, 30 from Intensive Care Units and 30 from outpatient clinics of Haskei Training and Research Hospital that were not identified as hemolysis with the eye. Hemoglobin levels of the samples were quantitatively determined by the cyanomethemoglobin method using the commercial kit (TECO Diagnostic Hemoglobin, Anaheim, USA). Mann Whitney-U test was used for statistical analysis.

Notes: http://www.TurkJBiochem.com
evaluation. Statistical significance was accepted as p <0.05.

Results: When the hemoglobin concentrations of the samples of outpatients and Intensive Care Patients were compared, the hemoglobin levels of the ICU patients were significantly higher (medians and minimum-maximum levels respectively: 0.198 (0-0.11) g/dL; 0.217 (0-0.81) g/dL; p<0.05).

Conclusion: This preliminary study suggests that there may be a difference in hemolysis between the samples from various units. In the next stage, evaluating the hemoglobin level with a more sensitive method and reinforcement of the study by increasing the number of samples with a method that can be adapted to economic and automation in the findings light to be obtained is planned.

Key Words: Hemolysis, interference, preanalytical errors

PP-062
THE PREANALYTIC ANALYSIS OF STORAGE CONDITIONS AND WAITING-PERIOD ON SPOT URINE IODINE LEVELS

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Objective: Urine is often preferred as the biofluid for metabolomic investigations due to the ease of sample collection and its metabolite rich nature. Because the patients themselves often collect urine specimens, urinalysis is very susceptible to preanalytical issues. Thus, inadequate sample transfer, storage conditions and the waiting period of the sample can lead to significant preanalytical errors.

The aim of this study is to investigate the effect of storage conditions and waiting time on iodine measurement in spot urine.

Materials and Methods: Urinary iodine levels of 15 volunteer participants were measured by Sandell-Klothoff method. Spot urine was analysed fresh within 2 hours. The samples were also stored +4°C and -20°C. These specimens at +4°C and -20°C were analyzed after one day and after a week. Thus, spot urine collected from volunteers was studied fresh and at +4°C and -20°C after one day and one week later, and the results were compared.

Results: Fresh spot urine, samples stored at +4°C and -20°C investigated one day and one week later, iodine results were 8.62±4.34, 10.25±5.10, 8.52±3.92, 10.2±5.11, 8.45±4.37 respectively. There was a statistically significant difference (p = 0.001) between the iodine values of fresh urine and samples stored at +4°C. The iodine values of samples stored at +4°C and -20°C were significantly different between themselves ( p=0.003 after one day, p=0.002 after one week).

Conclusion: According to average iodine results that we have obtained from our study, it was found out that the results of samples kept at +4°C were high in comparison with those kept at -20°C. It was observed that there was no difference between iodine values and fresh spot urine values of samples stored at -20°C. It was interpreted the reason of the highness at +4°C belong to unsuitable storage condition at +4°C.

Keywords: Storage conditions, iodine in urine, Sandell-Klothoff Method