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P001
FAKTORSKA ANALIZA POVEZANOSTI INFLAMATORNIH, LIPIDNIH, SRČANIH I BUBREŽNIH BIOMARKERA SA KLASIFIKACIJOM DUGOROČNOG 30-GODIŠNJEG KARDIOVASKULARNOG RIZIKA

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U kliničkoj praksi koristi se nekoliko skorova za procenu kratkoročnog (10-godišnjeg) rizika od pojave različitih oblika kardiovaskularnih bolesti (KVB) koji se zasnivaju na multivarijabilnim regresionim jednačinama izvedenim iz rezultata praćenja različitih kohortnih grupa. Međutim, pošto je starost promenljiva kojoj se dodeljuje najveći broj poena u modelima 10-godišnjeg rizika, mnoge osobe sa značajnim opterećenjem faktorima rizika imaju kratkoročni rizik daleko ispod granice koja uslovljava intenzivan tretman, iako njihov dugoročni (30-godišnji) rizik može biti značajan. Takođe, drugi biomarkeri mogu da identifikuju osobe sa većim kardiovaskularnim rizikom od onog izračunatog primenom skorova kratkoročnog rizika. Cilj rada bio je da se analizira priroda uticaja ispitivanih biomarkera na kardiovaskularni rizik i njihovo grupisanje, kao i povezanost dobijenih faktora sa kategorizacijom 30-godišnjeg rizika faktorskom analizom. Pomoću interaktivnog kalkulatora »30-year risk of cardiovascular disease« izračunavan je dugoročni 30-godišnji rizik za pojavu »kompletne« KVB (sve manifestacije KVB) i »teške« KVB (potencijalno fatalne komplikacije KVB). Analiza glavnih komponenti je korišćena za ispitivanje grupisanja markera inflamacije [visoko-osetljivi C-reaktivni protein (hsCRP), serumski amiloid A (SAA), fibrinogen, α_1-kiseli glikoprotein (A1AGP), haptoglobin, C3 i C4 komponente komplementa], metabo-

P001
FACTOR ANALYSIS OF ASSOCIATION OF LIPID, INFLAMMATORY, CARDIAC AND RENAL BIOMARKERS WITH LONG-TERM 30-YEAR CARDIOVASCULAR RISK CLASSIFICATION

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Several risk score algorithms for short-term (10-year) cardiovascular risk assessment based on multivariable regression equations derived from different cohorts are being used in clinical practice. However, since the age is variable with the strongest influence on short-term risk, many individuals with moderate increase of other traditional risk factors would have a 10-year risk below cutoff for intensive treatment, but a significant long-term (30-year) risk. Also, other biomarkers might identify persons with higher actual cardiovascular risk compared with calculated using short-term risk scores. The aim of this study was to analyze the nature of influence of examined biomarkers on cardiovascular risk and their clustering, as well as relations of identified factors with long-term 30-year risk categorization, using factor analysis. Interactive calculator »30-year risk of cardiovascular disease« was used for long-term 30-year risk calculation, for both »full CVD« (all manifestations of cardiovascular disease) and »hard CVD« (serious manifestations of CVD). Principal component analysis was used to investigate clustering of markers of inflammation [high sensitivity C-reactive protein (hsCRP), serum amyloid A (SAA), fibrinogen, α_1-acid glycoprotein (A1AGP), haptoglobin, C3 and C4 complement components], lipid metabolism [non-HDL and LDL cholesterol, triglycerides, apolipoprotein A-I (apo A-I), apolipoprotein B (apo B), lipoprotein (a) (Lp(a))],

lizma lipida [non-HDL i LDL holesterol, trigliceridi, apolipoprotein A-I (apo A-I), apolipoprotein B (apo B), lipoprotein (a) (Lp(a))], bubrežne [kreatinin, mokraćna kiselina, cistatin C (Cys-C)] i srčane funkcije [N-terminalni pro-natriuretički peptid tip B (NT-proBNP), visoko-osetljivi srčani troponin T (hs-cTnT)], dobijenih analizom uzoraka seruma 242 zdrave osobe. Faktorskom analizom identifikovano je 5 klastera, kojima je objašnjeno je 67,4% ukupne varijacije, raspoređene na sledeći način 1) 29,7% »sistemska inflamacija« (hsCRP, fibrinogen, SAA, A1AGP, haptoglobin, C3 i C4 komponenta komplementa); 2) 12,5% »aterogena dislipidemija« (LDL i non-HDL holesterol, apo B i trigliceridi); 3) 11,0% »kardiorenalni faktor« (kreatinin, mokraćna kiselina, Cys-C i hs-cTnT); 4) 7,6% »hemodinamski faktor« (NT-proBNP) i 5) 6,7% »lipoproteinski faktor« [apo A-I, Lp(a)]. Prediktivne vrednosti u proceni 30-godišnjeg rizika za »kompletnu KVB« i »tešku KVB« su bile značajne za četiri faktora (OR 1,892–5,590; P<0,0001 i OR 2,183–5,931; P<0,0001, redom), a »hemodinamski faktor« nije imao statistički značajan prediktivni potencijal za vrednosti iznad optimalnih/normalnih za odgovarajući pol i starost (P>0,05). Površine ispod ROC krivih (AUC) modela sa pet faktora u predikciji povećanog 30-godišnjeg rizika za »kompletnu KVB« i »tešku KVB« iznosile su 0,881 i 0,888, redom, i nisu bile statistički značajno različite od multivarijabilnog logističkog modela od 18 polaznih parametara (0,892 i 0,901; P>0,05; redom). Sistemska inflamacija, aterogena dislipidemija, kardiorenalna funkcija i lipoproteinski status nezavisno doprinose dugoročnom, 30-godišnjem riziku iznad normalnog/optimalnog kako za ozbiljne komplikacije KVB, tako i za sve vrste kardiovaskularnih komplikacija.

P002
LONGITUDINALNE PROMENE PARAMETARA LIPIDNOG PROFILA TOKOM NEKOMPLIKOVANE TRUDNOĆE I NAKON PORODAJA

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Specifične metaboličke promene u trudnoći su neophodne kako bi se obezbedile potrebe u hranrenal [creatinine, uric acid, cystatin C (Cys-C)] and cardiac function [N-terminal pro-natriuretic peptide type B (NT-proBNP), high sensitivity cardiac troponin T (hs-cTnT)], obtained from 242 apparently healthy individuals. Factor analysis identified five clusters, which explained 67.4% of the total variance distributed as follows: 1) 29.7% »systemic inflammation« (hsCRP, fibrinogen, SAA, A1AGP, haptoglobin, C3, C4); 2) 12.5% »atherogenic dyslipidemia«, (LDL and non-HDL cholesterol, apo B, triglycerides); 3) 11.0% »cardiorenal factor« (creatinine, uric acid, Cys-C, hs-cTnT); 4) 7.6% »hemodynamic factor« (NT-proBNP); and 5) 6.7% »lipoprotein factor« [apo A-I, Lp(a)]. When estimating 30-year risk from both »full CVD« and »hard CVD«, predictive values were significant for four factors (OR 1.892–5.590, P<0.0001 and OR 2.183–5.931, P<0.0001, respectively), and »hemodynamic factor« had no statistical significance in predicting potential for values above optimal/normal for corresponding gender and age (P>0.05). The areas under the receiver operating characteristic curves (AUCs) of the five factor model in predicting increased 30-year risk for »full CVD« and »hard CVD« were 0.881 and 0.888, respectively, which were not statistically significantly different from AUCs of the multivariable logistic model of 18 original parameters (0.892 and 0.901, P>0.05, respectively). Long-term, 30-year risk above normal/optimal for hard CVD complications and for all kinds of cardiovascular complications was independently contributed by systemic inflammation, atherogenic dyslipidemia, cardiorenal function and lipoprotein status.

P002
LONGITUDINAL CHANGES IN LIPID PROFILE PARAMETERS DURING UNCOMPLICATED PREGNANCY AND AFTER DELIVERY

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Specific metabolic changes in pregnancy are necessary to provide the needed in nutrients for fetal

njivim materijama za rast i razvoj fetusa, te pripremi trudnica za porođaj i laktaciju. Metabolizam lipida je esencijalan za razvoj nekomplikovane, zdrave trudnoće tokom koje se dešavaju odgovarajuće metaboličke promene koje dovode do izmenjenog lipidnog profila, tako da većina trudnica do kraja trudnoće razvije specifičan lipidni profil koji se kod zdravih negravidnih žena može smatrati proaterogenim. Ispitali smo kretanje triglicerida, ukupnog holesterola, HDL i LDL holesterola, ApoAI, ApoB i odredili aterogeni indeks plazme – AIP kod 43 zdrave trudnice u cilju procene potencijalne proaterogenosti izmenjenog lipidnog profila. Uzorci krvi su sakupljani prema utvrđenom kalendaru poseta u I, II i III trimestru, neposredno pred porođaj u 38. nedelji trudnoće i 2 meseca nakon porođaja. Rezultati analize pokazuju kontinuirani porast ukupnog holesterola i triglicerida tokom trudnoće, sa značajno višim vrednostima u odnosu na prvi trimestar ($p<0,05$). Vrednosti HDL-holesterola značajno rastu u drugom trimestru ($p<0,05$), nakon čega lagano opadaju do termina porođaja, a LDL-holesterol značajno raste u drugom trimestru i dalje tokom trećeg trimestra do porođaja. Promene vrednosti ApoAI i ApoB tokom ispitivanog perioda uglavnom prate kretanje vrednosti HDL i LDL-holesterola. AIP značajno raste tokom trudnoće u odnosu na prvi trimestar ($p<0,05$). Nakon porođaja vrednosti ispitivanih parametara su niže u poređenu sa prvim trimestrom. Fiziološka trudnoća pokazuje proaterogeni potencijal, tako da bi veći broj trudnoća mogao imati uticaj na kardiovaskularni status žene u kasnijem životnom dobu.

P003
POVEZANOST VITAMINA D I PARATIROIDNOG HORMONA SA VERTEBRALNIM FRAKTURAMA KOD POSTMENOPAUZALNIH ŽENA

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Aktivan oblik vitamina D suprimira oslobađanje paratiroidnog hormona (PTH) iz paratiroidnih žlezda. Povišen nivo PTH, usled insuficijencije vitamina D može da ubrza metabolizam kosti, gubitak koštane mase i poveća rizik od fraktura. S toga, cilj ovog ispitivanja je bio da se ustanovi povezanost između vertebralnih fraktura (VF), serumkog nivoa 25-hidroksivitamina D (25OHD) i PTH kod postmenopauzalnih žena. Ispitane su 94 postmenopauzalne žene prosečne starosti 65,09 godina (±9,1). Vertebralne frakture su dijagnostikovane pomoću X-zraka na

growth and development, and prepare pregnant women for delivery and lactation. Lipid metabolism is essential during pregnancy, with the respective metabolic changes that lead to altered lipid profile. Most pregnant women develop the specific lipid profile which in healthy non pregnant women can be regarded as proatherogenic. We evaluated changes in triglycerides, total cholesterol, HDL and LDL cholesterol, ApoAI, ApoB and atherogenic index of plasma – AIP in 43 healthy pregnant women in order to assess the potential proaterogenic altered lipid profile. Blood samples were collected according to the calendar visit in the I, II and III trimester, before delivery in the 38. week of pregnancy and 2 months after delivery. The results show a continuous increase in total cholesterol and triglyceride levels during pregnancy, with significantly higher values in the first trimester ($p<0.05$). HDL-cholesterol increased significantly in the second trimester ($p<0.05$), followed by slowly decreasing until the birth date and the LDL-cholesterol increased significantly in the second trimester, and continued during the third trimester until delivery. Changes in ApoAI and ApoB during the examined period generally follow the values of HDL and LDL cholesterol. AIP increases significantly during pregnancy compared with the first trimester ($p<0.05$). After delivery the studied parameters were lower in comparison with first trimester. Physiological pregnancy shows proatherogenic potential, so that a greater number of pregnancies may affect the cardio-vascular status of women in later life.

P003
VITAMIN D AND PARATHYROID HORMONE IN RELATION TO VERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMEN

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Active vitamin D suppresses the secretion of parathyroid hormone (PTH) from the parathyroid gland in a negative manner. Increased PTH due to vitamin D insufficiency may increase bone turnover, bone loss and fracture risk. Therefore, the aim of this study was to establish the relationship between vertebral fractures (VF), serum levels of 25-hydroxyvitamin D (25OHD) and PTH in postmenopausal women. A total of 94 postmenopausal women, average age 65.09 years (±9.1), were examined. Vertebral fractures were diagnosed by X-rays of the thoracic and

torakalnom i lumbalnom delu kičme. 25OHD i PTH su određivani pomoću imuno testova metodom elektrohemiluminiscencije (Roche Diagnostics, Elecsys 2010). Srednja vrednost za 25OHD je bila 51,15± 21,5 nmol/L, a za PTH 58,14±28,76 pg/mL. Nađena je značajna negativa korelacija između 25OHD i PTH (r= –0,502, p<0,001). Snižen nivo 25OHD (<75 nmol/L) nađen je kod 88.3% postmenopauzalnih žena (45,78±14,4). Povišen nivo PTH (>65 pg/mL) nađen je kod 31.08% slučajeva (91,2±28,9 pg/mL). U grupi sa povišenim PTH, srednja vrednost 25OHD je bila 37,77±11,81 nmol/L. Kod 30 pacijenata (31,9%) su dijagnostikovane VF. U ovoj grupi srednja vrednost 25OHD bila je 48,24±17,73 nmol/L i PTH 49,75±16,86 pg/mL. VF su dijagnostikovane kod 34,9% postmenopauzalnih žena sa insuficijencijom 25OHD, i kod 26,1% sa povišenim PTH. Rezultati pokazuju visoku prevalencu insuficijencije 25OHD kod postmenopauzalnih žena (88,3%) ispitanih u ovom istraživanju. Kod pacijenata sa 25OHD insuficijencijom, povišenje PTH varira individualno, ali je najčešće povišen kada je 25OHD oko 37 nmol/L. Visok PTH i snižen 25OH D mogu biti povezani sa nekim ali ne svim vertebralnim frakturama.

lumbar spine. 25OHD and PTH were measured using electrochemiluminiscence immunoassays (Roche Diagnostics, Elecsys 2010). The average of 25OHD was 51.15±21.5 nmol/L, while PTH was 58.14±28.76 pg/mL. Negative significant correlation between 25OHD and PTH (r= -0.502, p<0.001) was found. A decreased value of 25OHD (<75nmol/L) was found in 88.3% postmenopausal women (45.78±14.4). An elevated level of PTH (>65 pg/mL) was found in 31.08% of cases (91.2±28.9 pg/mL). In the group with increased PTH, the mean of 25OHD was 37.77±11.81 nmol/L. Thirty patients (31.9%) were diagnosed as having VF. In this group the average of 25OHD was 48.24±17.73 and PTH 49.75±16.86. VF was diagnosed in 34.9% of postmenopausal women with 25OHD insufficiency, and in 26.1% with elevated PTH. Results showed a high prevalence of 25OHD insufficiency among postmenopausal women (88.3%) investigated in this study. In patients with 25OHD insufficiencies, elevated PTH varied individually, but was most often increased if 25OHD was about 37nmol/L. High PTH and low 25OH D may be related to some, but not all vertebral fractures.

P004
FAKTORI RIZIKA ZA KARDIOVASKULARNE BOLESTI U PACIJENATA SA SENILNOM DEGENERACIJOM MAKULE

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Senilna degeneracija makule predstavlja vodeći uzrok slepila kod osoba starijih od 55 godina života. Veliki broj faktora rizika je do sada opisano, dok su brojni patofiziološki mehanizmi odgovorni za nastanak i razvoj ove bolesti. Cilj ovog rada je bio da se utvrdi povezanost markera inflamacije i kardiovaskularnog rizika u pacijenata sa senilnom degeneracijom makule, kao i njihov uticaj na razvoj ove bolesti. U ovo istraživanje uključeno je 110 pacijenata sa senilnom degeneracijom makule, starosti 71,5±7,1 godina, kao i 87 zdravih ispitanika iste starosti. Svim ispitanicima je određivan lipidni profil: ukupni holesterol, HDL-, LDL-,

P004
RISK FACTORS FOR CARDIOVASCULAR DISEASE IN PATIENTS WITH AGE-RELATED MACULAR DEGENERATION

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Age-related macular degeneration (AMD) is the leading cause of blindness among persons older than 55 years of age. Many risk factors and pathological mechanisms involved in the pathogenesis of this disease have been described. The aim of this study was to evaluate the association of inflammatory markers and markers of cardiovascular risk in patients with AMD, and their impact to the development of this disease as well. A total of 110 AMD patients aged of 71.5±7.1 years of age, and 87 aged-matched healthy control subjects were included in this study. The following parameters were determined: lipid pro-

non-HDL-holesterol i trigliceridi, kao i markeri inflamacije CRP, fibrinogen i IL-6. Dobijeni rezultati su statistički obrađeni korišćenjem Man-Whitney-U testa, Pearsonove korelacije i logističke regresione analize. Rezultati istraživanja su pokazali da pacijenti sa senilnom degeneracijom makule imaju znatno veće vrednosti ukupnog holesterola (p=0,001), LDL-holesterola (p=0,007) i non-HDL-holesterola (p=0,002), kao i veće vrednosti parametara inflamacije: CRP (p=0,05) i fibrinogena (p=0,007) u odnosu na zdrave ispitanike kontrolne grupe. Dobijena je pozitivna korelacija između koncentracije CRP-a i ukupnog holesterola u AMD grupi (p=0,001), LDL-holesterola (p=0,02), non-HDL-holesterola (p=0,001) i triglicerida (p=0,001), dok sa fibrinogenom pozitivno su korelisali samo non-HDL-holesterol (p=0,003) i trigliceridi (p=0,045). Logistička regresiona analiza je pokazala da je ukupni holesterol (OR:1,89; 95% IP 1,32–2,72; p<0,0001), LDL-holesterol (OR: 1,59; 95% IP 1,13–2,24; p=0,006) non-HDL-holesterol (OR: 1,76; 95% IP 1,26–2,46; p=0,000) i trigliceridi (OR:1,68; 95% IP 1,06–2,80; p=0,039) značajno povezani sa nastankom senilne degeneracije makule, kao i parametri inflamacije: CRP (OR: 1,16; 95% IP 1,04–1,30; p=0,008) i fibrinogen (OR:1,69; 95% IP 1,07–2,65; p=0,021). Na osnovu dobijenih rezultata može se zaključiti da su ispitivani parametri značajno međusobno povezani i da su procesi inflamacije i dislipidemije u znatnoj meri uključeni u patogenezu ove bolesti.

file (total cholesterol, HDL-, LDL-, non-HDL-cholesterol and triglycerides level, and inflammatory markers CRP, fibrinogen and IL-6. For statistical evaluation of the results, Mann-Whitney U-test, Pearson correlation test and logistic regression test were used. The obtained results showed a significant difference between AMD patients and control group in baseline values of total cholesterol (p=0.001), LDL-cholesterol (p=0.007), non-HDL-cholesterol (p=0.002), CRP (p=0.05) and fibrinogen values (p=0.007). Positive correlation was found between CRP and total cholesterol values (p=0.001), LDL-cholesterol (p=0.02), non-HDL-cholesterol (p=0.001) and triglycerides (p=0.001) in AMD patients. Fibrinogen correlated positively only with non-HDL-cholesterol (p=0.003) and triglycerides (p=0.045). Logistic regression analysis showed a significant association of total cholesterol (OR:1.89; 95% CI 1.32–2.72; p<0.0001), LDL-cholesterol (OR: 1.59; 95% CI 1.13–2.24; p=0.006), non-HDL-cholesterol (OR: 1.76; 95% CI 1.26–2.46; p=0.000), triglycerides (OR:1.68; 95% CI 1.06–2.80; p=0.039), CRP (OR: 1.16; 95% CI 1.04–1.30; p=0.008) and fibrinogen (OR:1.69; 95% CI 1.07–2.65; p=0.021) with AMD development. Based on the obtained results it may be concluded that the tested parameters are significantly associated, and inflammation and dyslipidemia are significantly involved in the pathogenesis of this disease.

P005
PROCJENA TESTA ZA ODREĐIVANJE TROPONINA T HS NA ANALIZATORU COBAS E 601

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Srčani troponin T(cTnT) je kardiospecifični, visoko osjetljivi marker oštećenja miokarda. Analiza troponina T hs može se koristiti kao pomoć pri diferencijalnoj dijagnozi akutnog koronarnog sindroma te indetifikaciju akutnog infarkta miokarda. TnT je komponenta kontraktilnog aparata poprečno-prugaste muskulature porijeklom isključivo iz miokarda (srčani TnT, molekularne mase 39,7 kDa). Određivanje troponina T hs smo izvršili pomoću elektrohemiluminicentne metode (ECLIA) na analizatoru Roche-Cobas e 601. Analitička procjena određivanja troponina T hs obuhvatila je nepreciznost iz dana u dan i u seriji. Koeficijent varijacije (KV) za humane uzorke je iznosio 4,9% za nepreciznost u seriji (N=20). Kod

P005
EVALUATION OF TROPONIN T HS ASSAY ON THE COBAS E 601 ANALYSER

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Cardic troponin T(cTnT) is a cardiospecific, highly sensitive marker for myocardial damage. Troponin T assay can be used as an aid in the differential diagnosis of acute coronary syndrome to identify acute myocardial infarction. TnT is a component of the contractile apparatus of the striated musculature and originating exclusively from the myocardium (cardiac TnT, molecular weight 39.7 kDa). Measurements of Troponin T hs were performed by electrochemiluminiscence immunoassay (ECLIA) on Roche-Cobas e 601 analyser. Analytical assessment of Troponin T hs determination comprised within-run and between-run imprecision. Analytes coefficient of variation (CV) on human samples were 4.9% for with-

određivanje nepreciznosti iz dana u dan (N=30) koeficijent varijacije je iznosio 5,3% za kontrolni serum Elescys PreciControl Troponin T 1 i 6,7% zaElescys PreciControl Troponin T 2. Paralerno je određivana vrijednost koncentracije hsTnT (Roche) i Abbott STAT cTnI kod 41 uzorka pacijenata. Linearnom regresijskom analizom poređenja određivanja toponina T hs i STAT cTnI dobivena je sljedeća jednačina: y= 1.39x + 6.24 i koeficijent korelacije r=0,88. ECLIA metoda za određivanja troponina T hs na Roche Cobas 601 analizatoru je osjetljiv i precizan test. Rezultati pokazuju da postoji značajno neslaganje između imunoesejskog određivanja TnT hs i Abbott STAT cTnI.

in-run imprecision (N=20). The between–run imprecision (N=30) coefficient of variation were 5.3 % for commercially controls Elescys PreciControl Troponin T 1 and 6.7% for Elescys PreciControl Troponin T 2. Total of 41 patient samples from routine laboratory workload was simultaneously analyzed for hs TnT (Roche) and Abbott STAT cTnI levels. Linear regression analysis comparing the hs TnT and STAT cTnI method yielded the following equation: y= 1.39 x + 6.24 and correlation coefficient r=0.88. ECLIA method for Troponin hs T determination on the Roche Cobas 601 system is sensitive and accurate test. The results attest that substantial discrepancies exist among TnT hs and Abbott STAT cTnI immunoassay.

P006
GESTACIJSKI DIJABETES KOD TRUDNICA STARIJIH OD 35 GODINA

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Zdravstveni centar Užice, Srbija

Gestacijski dijabetes (GD) se definiše kao bilo koji stepen poremećaja tolerancije glukoze koji je prvi put otkriven u trudnoći. Trudnice starije od 35 godina pripadaju rizičnoj grupi za pojavu GD. Kontrola glikemije, naročito u vreme organogeneze, smanjuje učestalost makrozomije, otežanog i prevremenog porođaja, abortusa, urođenih anomalija, perinatalne smrtnosti, dijabetične nefropatije majke, preeklamsije i eklampsije. Cilj rada je da se utvrdi učestalost GD kod trudnica starijih od 35 godina. Istraživanje je obuhvatilo 40 trudnica starijih od 35 godina i 61 trudnicu mlađu od 25 godina (kontrolna grupa), u 28 nedelji gestacije. Određivana je jutarnja glikemija u venskom uzorku krvi, reagensima firme Siemens, na biohemijskom analizatoru Dimension RxLMax. Statističkom obradom podataka, upotrebom Studentovog T-testa utvrdili smo da je prosečna vrednost jutarnje glikemije viša kod starijih od 35 godina (4,85±1,02 mmol/L) nego kod mlađih od 25 godina (4,54±0,49), što je statistički značajno (t=1,795; p<0,05). Na osnovu kriterijuma za skrining GD (glikemija ≥ 5,1 mmol/L), utvrdili smo da 12 (30%) trudnica starijih od 35 godina i 7 (11,5%) mlađih od 25 godina ima GD. Zaključili smo da je učestalost GD veća kod trudnica starijih od 35 godina, nego kod mlađih od 25 godina što je statistički značajna razlika (t=2,164; p<0,05). Određivanje jutarnje glikemije u 28 nedelji gestacije neophodno je radi blagovremenog postavljanja dijagnoze GD, posebno kod trudnica starijih od 35 godina, radi blagovremenog preveniranja mogućih posledica kod majke i ploda.

P006
GESTATIONAL DIABETES AT PREGNANT WOMEN OLDER THAN 35 YEARS

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Gestational diabetes (GD) is defined as any degree of disorder of tolerance of glucose which is first discovered in pregnancy. Pregnant women older than 35 years belong to risk group for appearance of GD. Glicemic control, especially during the organogenesis decrease frequency of macrosomia, difficult premature deliveries, abortions, congenital malformations, perinatal lethality, diabetic nephropathy of mother, preeclampsia and eclampsia. The aim of the work is to determine the frequency of GD at pregnant women older than 35 years. The research has gathered 40 pregnant women older than 35 years and 61 pregnant women younger than 25 years (control group), in 28 week of gestation. Fasting blood glucose was measured in venous blood sample, by reagents of the company Siemens, on biochemical analyzer Dimension RxL Max. Statistical analysis using Student s t-test, we found that the average value of fasting plasma glucose is higher at older than 35 years (4.85±1.02 mmol/L) than those younger than 25 years (4.54±0.49), which was statistically significant (t=1.795; p<0.05). According to criteria for screening GD (glicemia ≥ 5.1 mmol/L), we found that 12 (30%) pregnant women older than 35 years and 7 (11.5%) younger than 25 has GD. We concluded that the frequency of GD is higher at pregnant women older than 35 years than at younger than 25 which is statistically significant difference (t=2.164; p<0.05). Determination of fasting plasma glucose in 28 week of gestation is necessary for early discovery of diagnosis of GD, especially at pregnant women over the age of 35 years, for the timely prevention of the possible consequences to the mother and fetus.

P007
UČESTALOST ANEMIJE KOD STUDENTKINJA

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Smanjenje koncentracije hemoglobina predstavlja osnovni funkcionalni poremećaj u sindromu anemije i predstavlja najznačajniji parametar dijagnostike anemija. Cilj rada je određivanje parametara krvne slike i procena učestalosti anemije, na osnovu koncentacije hemoglobina, kod studentkinja. U naše istraživanje je uključeno ukupno 200 ispitanica koje su podeljene u 2 grupe. I grupu je činilo 95 studentkinja, starosti 20 godina, a II 105 učenica starosti 13 godina. Kao uzorak je korišćena venska krv sa K_3EDTA antikoagulansom, a kompletna krvna slika je određivana na hematološkom analizatoru HmX (Beckman Coulter). Na osnovu dobijenih podataka smo utvrdili da su studentkinje imale niže prosečne vrednosti eritrocita ($4,44\pm0,27\times10^{12}$/L), hemoglobina (131,6±9,8 g/L), hematokrita (0,37±0,027 L/L) od 13-o godišnjakinja ($4,57\pm0,3\times10^{12}$/L, 134,07±7,62 g/L, 0,399±0,026 L/L). Studentovim T-testom smo utvrdili da je razlika statistički značajna (SZR) za hemoglobin i hematokrit ($p<0,05$), a visoko statistički značajna za eritrocite ($p<0,01$). Kod eritrocitnih parametara (MCV, MCH, MCHC, RDW) i trombocita nismo dobili SZR. Na osnovu koncentracije hemoglobina od 120 g/L kao praga za postavljanje dijagnoze anemije za obe starosne grupe, utvrdili smo da kod 10 (10,5%) studentkinja i 3 (2,85%) učenice postoji anemija što je SZR ($t=2,16$; $p<0,05$). Na osnovu svega iznetog smo utvrdili da se anemija 3,7 puta češće javlja kod studentkinja i da je izvođenje preventivnih pregleda sa određivanjem krvne slike neophodno u toj populaciji.

P007
FREQUENCY OF ANEMIA AT STUDENTS GIRLS

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Decrease of concentration of hemoglobin is the primary functional disorder in syndrome of anemia and is the most important parameters of diagnostics of anemia. The aim of the work is determination of parameters of Complete Blood count (CBC) and the determination of frequency of anemia, according to concentration of hemoglobin at student girls. Our research includes 200 subjects divided into 2 groups. I group consists of 95 students, aged 20, and II group of 105 pupil girl aged 13. As sample is used venous blood with K_3EDTA anticoagulant, and the CBC was determined on Hematology analyzer HmX (Beckman Coulter). According to found data we concluded that students had lower average values of erythrocytes ($4.44\pm0.27\times10^{12}$/L), of hemoglobin (131.6±9.8 g/L), of hematocrit (0.37±0.027 L/L), than girls aged 13 ($4.57\pm0.3\times10^{12}$/L, 134.07±7.62 g/L, 0.399± 0.026 L/L). By Student t-test we concluded that the difference is statistically significant (SSD) for hemoglobin and hematocrit ($p<0.05$), and height statistically significant for erythrocytes ($p<0.01$). For erythrocyte parameters (MCV, MCH, MCHC, RDW) and platelets we didn't found SSD. According to concentration of hemoglobin of 120 g /L as borderline for getting the diagnosis of anemia for both groups, we concluded that at 10 (10.5%) students and 3 (2.85%) pupil there is anemia which is SSD ($t=2.16$; $p<0.05$). According to all this we concluded that anemia is 3.7 times more often found at students, and doing preventive examinations with determination of CBC necessary in that population.

P008
PREVENCIJA DANAS ZA ZDRAVIJE SUTRA

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U razvijenim zemljama tokom života od raka debelog creva (CRC) oboli 1,2 miliona ljudi, što čini 9,8 % svih obolelih od malignih tumora. U Srbiji ovaj karcinom je drugi najčešći maligni tumor. Pošto se rizik od CRC se povećava sa godinama starosti, skoro 90% svih pacijenata imaju više od 50 godina. Naša

P008
PREVENTION NOW FOR HEALTHIER TOMORROW

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In developed countries during the life 1.2 million people are diagnosed colorectal cancer (CRC), accounting for 9.8% of all patients with malignant tumors. In Serbia, this cancer is the second most common malignant tumor. Since the risk of CRC increases with age, nearly 90% of all patients have more than

ustanova učestvuje u nacionalnom programu skrininga ranog otkrivanja kolorektalnog karcinoma. Ciljna populacija su muškarci i žene između 50 i 74 godina starosti. Pacijente upućuju izabrani lekari u laboratoriju za rad testa na okultno krvarenje (FOBT). U periodu od 2010. do 2013. godine koordinisanom saradnjom laboratorije i kliničara opšte medicine broj osoba koji su upućene na FOBT test povećan je 3 puta. Broj pacijenata po izabranom lekaru, koji su prihvatili preporuke lekara i uradili FOBT test povećan je za oko 14%. Preporuka lekara je najuticajniji faktor koji određuje da li će osoba prihvatiti skrining na CRC. Strategije medicine zasnovane na dokazima mogu pomoći lekaru kako bi svaki pacijent dobio odgovarajuću preporuku. Neki lekari više vole da daju preporuke za skrining na redovnom godišnjem pregledu, ali ovaj pristup neće stići do svih pacijenata. Alternativni način je preporuka na svim vidovima poseta lekaru. Adekvatna komunikacija kliničara i laboratorije, poseban protokol i izdvajanje osoba koje predaju uzorke u laboratoriji bez zakazivanja i čekanja povećava poverenje pacijenata. Pravim pristupom svakom pacijentu povećavamo znanje i smanjujemo strah od preventivnih pregleda. Za sada su preventivni pregledi najefektivniji način u pokušaju smanjenja smrtnosti od CRC.

50 years. Our institution is participating in the national program of screening for early detection of colorectal cancer. The target populations are men and women between 50 and 74 years of age. Patients were referred to the laboratory for test for occult blood (FOBT). In the period from 2010 to 2013 with good cooperation laboratories and clinicians general medicine patients who were referred for FOBT increased by 3 times. Number of patients by general practitioners, who have accepted the recommendations of doctors and did FOBT increased by about 14%. A recommendation from a physician is the most influential factor in determining whether a patient is screened for colorectal cancer. Evidence-based strategies can help the physician ensure that every appropriate patient leaves the office with the needed recommendation. While some physicians prefer to give recommendations for screening at an annual check up, this approach will not reach all patients. An alternate style of practice is to recommend screening at all types of visits. Adequate communication of clinicians and laboratories, a special protocol and separation of the people submitting the samples to the laboratory without an appointment and waiting increases the confidence of patients. The right approach to each patient is increasing the knowledge and reducing the fear of checkups. Primary care-based screening remains the single most effective tool in a national effort to reduce death from CRC.

P009
PRISUSTVO AUTOIMUNIH TIROIDNIH BOLESTI KOD PACIJENATA SA ACHR-AB I MUSK-AB POZITIVNOM MIJASTENIJOM GRAVIS

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Stečena autoimuna *myasthenia gravis* (MG) je organ-specifična autoimuna bolest uzrokovana poremećajem neuro-mišićne transmisije na postsinaptičkom nivou, sa simptomima abnormalne mišićne zamorljivosti i slabosti. Kod 80–90% pacijenata sa generalizovanom i kod 50–70% pacijenata sa očnom formom MG prisutna su autoantitela na receptor za acetil holin (ACHR-AB). U grupi pacijenata sa MG bez prisustva ACHR-AB, kod oko 30–70% nalaze se autoantitela na mišić-specifičnu tirozin kinazu (MUSK-AB) i ovaj tip MG karakteriše različito kliničko ispoljavanje, različit tok bolesti i odgovor na terapiju. Stoga je od izuzetnog kliničkog značaja da se kod

P009
PRESENCE OF AUTOIMMUNE THYROID DISEASES IN PATIENTS WITH ACHR-AB AND MUSK-AB POSITIVE MYASTHENIA GRAVIS

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Acquired autoimmune *myasthenia gravis* (MG) is organ-specific autoimmune disease caused by disorder of neuromuscular transmission at the postsynaptic level, with the symptoms of abnormal weakness and fatigability of the skeletal muscle. Acetylcholine receptor autoantibodies (ACHR-AB) are present in 80–90% patients with generalized and in 50–70% patients with the ocular form of MG. In the group of MG patients without ACHR-AB about 30–70% patients have autoantibodies to muscle-specific tyrosine kinase (MUSK-AB) and this type of MG is characterized by different clinical expression and therapeutic response. Therefore, it is of exceptional-

svih pacijenata sa MG što brže odredi prisustvo ACHR-AB i MUSK-AB u cilju usmeravanja dijagnostičkog postupka i započinjanja adekvatnog lečenja koje je u značajnoj meri različito kod ova dva tipa MG. Određivanje ovih antitela vrši se radioimunom metodom (RIA) u INEP-u. S obzirom da je poznato da se MG javlja učestalo sa drugim autoimunim bolestima, među kojima su i oboljenja štitne žlezde, u ovom radu je kod pacijenata sa MG ispitivano prisustvo autoantitela na tiroidnu peroksidazu (TPO-AB), koja su karakteristična za pojavu autoimunog tireoiditisa (kao što je Hashimoto tireoiditis), kao i antitela na TSH receptor (TR-AB), koja su indikatori Gravesove bolesti. Ispitivanjem je obuhvaćena grupa od 76 pacijenata sa ACHR-AB pozitivnom MG i 24 pacijenta sa MUSK-AB pozitivnom mijastenijom. Prisustvo TPO-AB biloje ustanovljeno kod 7 od 76 (9,2%) pacijenata sa ACHR-AB pozitivnom MG i kod samo jednog od 24 pacijenta sa MUSK-AB pozitivnom mijastenijom (4,2%). Antitela na TSH receptor (TR-AB) nismo utvrdili ni kod jednog od ispitivanih pacijenta sa MG. Naši rezultati su u skladu sa nekim podacima iz literature, koji se odnose na MG sa ACHR antitelima, gde se prisustvo TPO-AB kod obolelih od MG uglavnom kreće od 5–10%, a pojava TR-AB kod mijastenije je znatno ređa ili nije nađena. Za MUSK-AB pozitivnu mijasteniju do sada nisu objavljeni slični rezultati. Ovakav nalaz bi se mogao objasniti poznatom činjenicom da kod ACHR-AB pozitivne MG postoji slična imunogenetska predispozicija kao i za oboljenja štitne žlezde, a pre svega u vidu prisustva HLA B8 antigena, što se značajno razlikuje od imunogenetske predispozicije za nastanak MUSK-AB MG. Naši rezultati, koji pokazuju daje manji procenat autoimunih tiroidnih oboljenja kod MUSK-AB pozitivne mijastenije, idu u prilog ovim nalazima, i ukazuju na značaj ispitivanja karakteristika ova dva oblika mijastenije gravis.

ly importance to determinate, as quickly as possible, level of both antibodies, in order to apply adequate diagnostic procedure and introduce suitable therapy which is different for those two types of MG. Determination of these antibodies was achieved using radioimmunoassay (RIA) in INEP. Concerning the fact that MG can be associated with other autoimmune disorders, including the thyroid diseases, the aim of this study was to determine thyroid peroxidase autoantibodies (TPO-AB), which are characteristically present in various autoimmune thyroiditis (such as Hashimoto's thyroiditis), as well as TSH receptor autoantibodies (TR-AB), which are valuable indicators in Grave's disease, in MG patients. In this study group of 76 patients with ACHR-AB positive MG and 24 patients with MUSK-AB positive MG were included. The presence of TPO-AB was established in 7 out of 76 (9.2%) patients with ACHR-AB positive MG, and in only one out of 24 patients with MUSK-AB positive myasthenia (4.2%). TSH receptor antibodies (TR-AB) were not found in the examined patients with MG. Our results were in accordance with some literature data in the group of ACHR-AB positive MG, where other authors found that TPO-AB was present in about 5–10% of MG patients, while presence of TR-AB was in considerably less percent, or was not present at all. For MUSK-AB positive MG there were not announced similar results until now. Our results can be explained with the fact that in ACHR-AB positive MG there is similar genetic predisposition as in thyroid diseases, above all in presence of HLA B8 antigen, which is different from immunogenetic predisposition for MUSK-AB MG. Our results, which indicated less percent of autoimmune thyroid diseases in MUSK-AB positive MG, are in accordance with that, and indicate the significance of examination of features of these two specific forms of myasthenia gravis.

P010
ODREĐIVANJE TUMORSKOG MARKERA CA 15-3 U GRUPI ŽENA

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Prema podacima Instituta za javno zdravlje Srbije »Dr Milan Jovanović Batut«, karcinom dojke je najčešći maligni tumor i jedan od vodećih uzroka smrti žena u Srbiji. Svake godine se u Srbiji registruje više od 4 000 novih slučajeva, preko četvrtine svih maligniteta žena. 1 600 žena umire godišnje od karcinoma dojke što čini 18% smrti od karcinoma. U

P010
DETERMINATION OF CA 15-3 IN THE GROUP OF WOMEN

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According to the National Institute of Public Health »Dr. Milan Jovanović Batut« breast canser is the most common malignat tumor and one of the leading cause of death among women in Serbia. Every year in Serbia is registered more than 4000 new cases, more than a quarter of all malignancies in women. 1600 women die annually from breast can-

žena doba 45–65 godina karcinom dojke je 3. uzrok smrti, posle cerebrovaskularnih bolesti i ishemijske bolesti srca. Nažalost, više od polovine žena otkriveno je u poodmakloj fazi bolesti. U periodu od 01. 01.–10. 06. 2014. u našoj laboratoriji određivali smo vrednosti tumorskog markera CA 15-3 u serumu u u grupi 428 žena uzrasta 29–85 godina; na analizatoru IMMULITE 1000, koristeći BR – MA hemiluminiscentni imunometrijski test (CA 15-3). Nivoi CA 15-3 mogu se koristiti za detekciju recidiva i odgovora na terapiju kod metastaza karcinoma dojke. 84 žene je imalo vrednosti iznad gornjih referentnih, što je 19,62%. Obuhvaćene su vrednosti od 31–3142 U/mL; većina žena je u starosnoj grupi preporučenoj za skrining za karcinom dojke (45–69 godina), dve su mlađe od 45 godina i preko 69 godina bilo je 19 žena. Država bi trebalo da nađe način da uključi što više zdravih žena preporučenog doba od 45–69 godina u skrining program za rak dojke, a zdravstveni radnici da promovišu zdrav našin života.

cer accounting for 18% of deaths from cancer. In women aged 45–64 years, breast cancer is the third highest cause of death, after cerebrovascular disease and ischemic heart disease. Unfortunately, over half women is revealed in an advanced stage. During the 01. 01–10. 06 2014. in our laboratory, we determined the levels of the tumor marker CA 15-3 in serum, in a group of 428 women, age 29–85 years; on the analyzer IMMULITE 1000, by BR – MA chemiluminescent immunometric assay (CA 15-3). Serum CA 15-3 values should be used for detecting early recurrence and for monitoring response to treatment in patients with metastatic breast cancer. 84 women had values above the upper reference value,which is 19,62%. Obtained values range from 31–3142 U/mL; majority of women, 63, is in the age group advantageous for screening for breast cancer (45–69 years), two are younger than 45 years and over 69 years were 19 women. The state should find a way to include as many healthy women of recommended age, 45–69 years, in the screening program for breast cancer and health workers to promote healthy lifestyle.

P011
DA LI JE POVIŠENA SERUMSKA VRIJEDNOST MOKRAĆNE KISELINE JEDNOSTAVAN POKAZATELJ INTENZITETA OKSIDATIVNOG STRESA U AKUTNOM KORONARNOM SINDROMU?

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Oksidativni stres i inflamacija imaju značajnu patofiziološku ulogu u akutnom koronarnom sindromu (AKS). Cilj sudije je bio ispitati odnos mokraćne kiseline (MK) i C-reaktivnog proteina (CRP) u ispitanika sa AKS. Retrospektivna studija je uključila 80 ispitanika sa AKS (40 sa akutnim infarktom miokarda (AIM) i 40 sa nestabilnom anginom pektoris (NAP), dobi od 50 do 83 godine, hospitaliziranih na Klinici za bolesti srca i reumatizam, Univerzitetsko-Kliničkog Centra u Sarajevu. Ispitanici sa AKS su distribuirani u grupu hiperurikemičnih (n=34) i normourikemičnih (n=46) prema serumskim vrijednostima MK 48 sati poslije hospitalizacije. Parametri su analizirani rutin-

P011
IS ELEVATED SERUM URIC ACID LEVEL A SIMPLE INDICATOR OF OXIDATIVE STRESS INTENSITYIN ACUTE CORONARY SYNDROME?

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Oxidative stress and inflammation play an important pathophysiological role in acute coronary syndrome (ACS).The study aim was to investigate the association of uric acid (UA) andC-reactive protein (CRP) in ACS subjects.This retrospective study included 80 ACS subjects (40 acute myocardial infarction (AMI), and 40 unstable angina pectoris (UAP) subjects), aged 50 to 83 years, hospitalized at the Clinic for Heart Diseases and Rheumatism at the University Clinical Centre of Sarajevo. ACS subjects were distributed into hyperuricemic (n=34) and normouricemic (n=46) groups according to serum UA level 48 hours after hospitalization. Biochemical

skim metodama. Slabo pozitivna, signifikatna korelacija je utvrđena između serumskih vrijednosti MK i CRP u AKS (rho=0,246; p=0,028). Utvrđena je nesignifikatna negativna korelacija između MK i CRP u normourikemičnih (rho=–0,235, p=0,116), a signifikantna pozitivna korelacija u hipeurikemičnih ispitanika sa AKS (rho=0,406; p=0,017). U hiperurikemičnom stanju, između AIM i NAP ispitanika, signifikantne razlike su utvrđene za serumske vrijednosti srčanog troponina I (cTnI) i CRP, a u normourikemičnom stanju jedino su vrijednosti cTnI bile statistički značajno različite (p<0,0005). Serumske vrijednosti MK su značajno pozitivno korelirale u hiperurikemičnih (rho=0,358; p=0,038) i negativno u normourikemičnih AKS ispitanika (r=–0,309; p=0,037), dok je CRP pozitivno korelirao sacTnIu obje grupe (rho=0,647, p<0,0005; r=0,407; p=0,005). Odnos MK i CRP u AKS se mijenja ovisno o nivou MK i neovisno o tipu AKS što ukazuje na mogući manje intenzivan oksidativni stres kod normourikemičnih ispitanika sa AKS.

parameters were determined by routine laboratory methods. A weak, positive, significant correlation was observed between serum levels of UA and CRP in ACS (rho=0.246; p=0.028). An insignificant negative correlation between UA and CRP in normouricemic(rho=-0.235, p=0.116), but significant positive correlation in hyperuricemic ACS subjects (rho=0.406; p=0.017) was observed. In hyperuricemic state, between AMI and UAP subjects, significant differences were observed in sera cardiac troponin I (cTnI) and CRP values, but in normouricemic state only cTnI values were statistically different (p<0.0005). Serum UA values correlated significantly, positively in hyperuricemic (rho=0.358; p=0.038) and negatively in normouricemic ACS subjects (r=–0.309; p=0.037) although CRP correlated positively in both groups with cTnI (rho=0.647, p<0.0005; r=0.407; p=0.005, respectively).The UA and CRP association in ACS was changed dependently on UA serum level, and independently of ACS type, which indicates on possible, less intensive oxidative stress in normouricemic subjects, independently of ACS type.

P012
ZNAČAJ ALANIN AMINOTRANSFERAZE U PROCJENI KARDIOVASKULARNOG RIZIKA

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Visoke vrijednosti aktivnosti alanin aminotransferaze (ALT) unutar referentnog raspona su povezane sa nealkoholnom masnom bolesti jetre i posljedično inzulinskom rezistencijom, metaboličkim sindromom i diabetes mellitusom tip II. Cilj je bio istražiti moguću povezanost ALT aktivnosti unutar referentnog raspona sa pokazateljima kardiovaskularnog rizika. Kod 100 nasumičnoodabranih, asimptomatičnih ispitanika oba spola su urađene biohemijske analize krvi: ALT, ukupni holesterol, trigliceridi i ukupni bilirubin. Odnos ukupni holesterol/(ukupni bilirubin × 100) je izračunat kao pokazatelj kardiovaskularnog rizika. Ispitanici su podijeljeni u 4 grupe prema kvartilama ALT aktivnosti (grupa 1: 0–14,9 IU/L, grupa 2: 15–19,9 IU/L, grupa 3: 20–26,4 IU/L, grupa 4: ≥26,5 IU/L). Biohemijske analize su rađene na Odjelu za kliničku hemiju i biohemiju Univerzitetskog Kliničkog Centra Sarajevo. Statistički značajna razlika je pronađena između četiri grupe ispitanika u nivou

P012
SIGNIFICANCE OF ALANINE AMINOTRANSFERASE IN CARDIOVASCULAR RISK ASSESSMENT

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High alanine aminotransferase (ALT) activity level within the reference range is associated with Non Alcoholic Fatty Liver Disease, and consequently insulin resistance, metabolic syndrome and diabetes mellitus type II. The aim was to investigate possible association of ALT reference range activity with indicators of cardiovascular risk. In 100 randomly selected, asymptomatic subjects of both sexes analysis of biochemical parameters ALT, total cholesterol, triglycerides, total bilirubin were performed. Total cholesterol/(total bilirubin × 100) ratio was calculated as indicator of cardiovascular risk. Subjects were divided into 4 groups by ALT activity quartiles (group 1: 0–14.9 IU/L, group 2: 15–19.9 IU/L, group 3: 20–26.4 IU/L, group 4: ≥26.5 IU/L). Biochemical analyzes were performed at Clinical Chemistry and Biochemistry Laboratory, University Clinical Center Sarajevo. A statistically significant difference was found between the four groups of subjects for total

holesterola i triglicerida (p=0,026 i p=0,009, respektivno), pri čemu su nivoi mjerenih parametara bili viši u višim kvartilama aktivnosti ALT. Posthocanaliza je pokazala signifikantno više vrijednosti odnosa ukupnog holesterola i ukupnog bilirubina u grupi 4 u odnosu na grupu 2 (p=0,044). Visoka aktivnost ALT unutar referentnog raspona je potencijalni pokazatelj kardiovaskularnog rizika kod asimptomatičnih odraslih osoba. Poredeći sa vrijednostima tradicionalnih i netradicionalnih pokazatelja kardiovaskularnog rizika, mjerenje aktivnosti ALT može biti važno u ranoj prevenciji kardiovaskularnih bolesti.

cholesterol and triglycerides (p=0.026 and p=0.009, respectively). The levels of the measured parameters are higher in the higher quartiles of ALT activity. Posthoc analysis showed significantly higher total cholesterol/total bilirubin ratio in group 4 compared to group 2 (p=0.044). High ALT activity within the reference range is a potential indicator of cardiovascular risk in asymptomatic adults. Compared to the values of traditional and non-traditional indicators of cardiovascular risk, measurement of ALT activity may be important in the early prevention of cardiovascular disease.

P013
POVEZANOST HIPERURIKEMIJE I DISLIPIDEMIJE KOD PACIJENATA SA DIABETES MELLITUSOM TIP 2

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Hiperurikemija se smatra markerom rizika za kardiovaskularne komplikacije i može biti povezana sa dislipidemijom, pogoršavajući rizik za pojavu komplikacija. Cilj studije je bio da se istraži veza između mokraćne kiseline i nivoa lipida kod pacijenata sa potvrđenim diabetes mellitusom tip 2 (DMT2). U presječnoj, observacionoj studiji je bilo uključeno 100 pacijenata (62 žena i 38 muškaraca), starosti između 35 i 90 godina, hospitaliziranih na Klinici za endokrinologiju, Univerzitetskog Kliničkog Centra Sarajevo. Pacijenti su podijeljeni u grupu hiperurikemičnih (HU) i normourikemičnih (NU) (n=50 u svakoj grupi), prema nivou mokraćne kiseline u serumu (MK) (>416 μmol/L za muškarce; >356 μmol/L za žene). Biohemijski parametri su mjereni rutinskim laboratorijskim metodama. Vrijednosti triglicerida (TG) i aterogeni indeks plazme (AIP) su bili značajno viši u HU grupi DMT2 pacijenata (p=0,040 i p=0,023). Utvrđena je slaba, negativna, značajna korelacija MK i ukupnog holesterola (TC), MK i lipoproteina visoke gustoće (HDL-C) (rho=–0,316; p=0,025 irho=–0,399; p=0,004;) i pozitivna, značajna korelacija MK i lipoproteina niske gustoće (LDL-C) (rho=0,343; p=0,030), u HU grupi DMT2 pacijenata. Izostanak veze MK sa lipidnim parametrima u NU grupi ukazuje na povezanost hiperurikemije i dislipidemije u diabetes melitusu tip 2.

P013
ASSOCIATION OF HYPERURICEMIA AND DYSLIPIDEMIA IN DIABETES MELLITUS TYPE 2 SUBJECTS

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Hyperuricemia is considered as risk marker of cardiovascular complication and it may be associated with dyslipidemia, aggravating the risk for events. The objective of this study was to evaluate the relationships between uric acid and lipid levels in subject with established. Diabetes mellitus type 2 (DMT2). Cross-sectional, observational study includes 100 patients (62 women and 38 men), aged 35 to 90 years, hospitalized at the Clinic of Endocrinology, Clinical Center of University of Sarajevo. Subjects were divided into Hyperuricemia (HU) and normal uricemia groups (NU) (n=50; each) according to the uric acid serum level (UA) (>416 μmol/L for male; >356 μmol/L for female). Biochemical parameters were measured by routine laboratory methods. Values of triglycerides (TG) and atherogenic index of plasma (AIP) were significantly higher in HU DMT2 group (p=0.040 and p=0.023 respectively). A weak, negative, significant correlation of UA with total cholesterol (TC) and high density lipoprotein cholesterol (HDL-C) (rho=–0.316; p=0.025 and rho=–0.399; p=0.004; respectively) and positive significant correlation with low density lipoprotein cholesterol (LDL-C) (rho=0.343; p=0.030) was observed in HU group of DMT2 subject. No association of UA and lipid parameters in NU subject implicates association of hyperuricemia and dyslipidemia in Diabetes Mellitus type 2.

P014
POVEZANOST MOKRAĆNE KISELINE I BILIRUBINA SERUMA SA MARKERIMA RIZIKA RAZVOJA KARDIOVASKULARNIH BOLESTI U ZDRAVIH ISPITANIKA

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Promjene koncentracije mokraćne kiseline (MK) i ukupnog bilirubina (UBIL) u serumu sve više se posmatraju u kontekstu kardiovaskularnih bolesti. Cilj istraživanja je bio ispitati povezanost koncentracije MK i UBIL seruma i markera rizika razvoja kardiovaskularnih bolesti, predstavljenih kroz odnose lipida i lipoproteina. Studija je obuhvatila 60 naizgled zdravih ispitanika, oba pola. Biohemijske analize MK, UBIL, ukupnog holesterola (UHOL), triglicerida (TGL) i lipoproteina visoke gustoće (HDL-C) su provedene u laboratoriji »Poliklinika Sunce – Agram«, a izračunate su vrijednosti lipoproteina niske gustoće (LDL-C) pomoću Friedewald-ove jednačine, te vrijednosti odnosa lipida i lipoproteina, sa i bez vrijednosti UBIL dodate u imenitelj odnosa. Ispitanici su podijeljeni u grupe, na osnovu vrijednosti MK i UBIL (donja, srednja i gornja trećina referentnog raspona). Značajno niži nivoi odnosa UHOL/HDL-C, LDL-C/HDL-C i TGL/HDL-C bili su prisutni u grupi sa vrijednostima MK ≤ 240 μmol/L ($p<0,05$), u odnosu na druge grupe. Značajno niži nivoi odnosa lipida i lipoproteina su bili prisutni u grupi sa koncentracijom UBIL >14,5 μmol/L, ali samo odnosa sa dodatim vrijednostima UBIL (UHOL/HDL-C+UBIL), (LDL-C/HDL-C+UBIL), ili UBIL u imeniocu odnosa (UHOL/UBIL) ($p<0,05$). Značajno niže vrijednosti markera rizika razvoja kardiovaskularnih bolesti u grupi sa MK ≤ 240 μmol/L je vjerovatno rezultat sinergije antioksidativne aktivnosti MK i UBIL (~10 μmol/L). U grupi sa koncentracijom UBIL>14,5 μmol/ L prisutni su značajno niži nivoi markera rizika razvoja kardiovaskularnih bolesti sa dodatim vrijednostima UBIL, zbog smanjenog antioksidativnog efekta MK čije su koncentracije u gornjoj trećini referentnog raspona.

P014
ASSOCIATION OF SERUM URIC ACID AND BILIRUBIN WITH RISK MARKERS FOR CARDIOVASCULAR DISEASE IN HEALTHY SUBJECTS

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Altered serum uric acid (UA) and total bilirubin (TBIL) concentrations are increasingly related to cardiovascular disease. The aim of study was to investigate association of serum UA and TBIL concentrations with cardiovascular disease risk markers, represented by lipid and lipoprotein ratios. The study included 60 apparently healthy subjects, both gender. Biochemical analyzes of UA, TBIL, total cholesterol (TCHOL), triglyceride (TGL) and high density lipoprotein cholesterol (HDL-C) were performed in the laboratory of the »Poliklinika Sunce – Agram«, with low density lipoprotein-cholesterol (LDL-C) calculated using Friedewald equation, as well as calculated lipid and lipoprotein ratios, with and without TBIL values counted in denominator of ratio. Subjects were divided in groups, based on UA and TBIL values (lower, middle and upper third of reference range). Significant lower levels of TCHOL/HDL-C, LDL-C/HDL-C and TGL/HDL-C ratios were present in serum uric acid ≤ 240 μmol/L group ($p<0.05$), compared to other groups. Significant lower levels of lipids and lipoproteins ratios were present in bilirubin >14.5 μmol/L, but only with the counted values of bilirubin (TCHOL/HDL-C+TBIL), (LDL-C/HDL-C+TBIL), or bilirubin in the denominator of the ratio (TCHOL/TBIL) ($p<0.05$). Significantly lower values of the cardiovascular diseases risk markers in uric acid ≤ 240 μmol/L group is likely the result of synergistic antioxidant activity of uric acid and total bilirubin (~10 μmol/L). In bilirubin >14.5 μmol/L group, significant lower levels were observed for cardiovascular disease risk markers with counted total bilirubin value, because of possible reduced antioxidant effects of uric acid in upper third of reference range.

P015
OSTEOPONTIN I UGLJENOHIDRATNI ANTIGEN CA125 U DIJAGNOSTICI RAKA JAJNIKA

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Kod bolesnica sa pelvičnim masama, tumor marker CA125 nema dovoljnu osetljivost i specifičnost u detekciji raka jajnika. Cilj ovog rada je da ispitamo značaj osteopontina (OPN) i udruženih markera Ca125 i OPN, u diferencijalnoj dijagnostici malignih i benignih tumora jajnika. Ova studija preseka je urađena na Klinici za ginekologiju i akušerstvo i Centru za medicinsku biohemiju, Kliničkog centra Srbije. Uzorci krvi su uzeti preoperativno od 107 pacijentkinja koje su imale dijagnozu tumora jajnika, od kojih je 57 bolesnica bilo sa histopatološkom dijagnozom epitelnog ovarijalnog kancera a 50 sa benignim cistama jajnika. U uzorcima krvi je određen nivo OPN i CA125 (ELISA i CMIA metodom) i upoređeni su sa patohistološkim rezultatima. Dijagnostički značaj OPN i CA125 je određen statističkom metodom ROC krive i površinom ispod ovih krivi (AUC). Mediana koncentracije plazmatskog osteopontina u grupi benignih bolesnica iznosila je 356,33 ng/mL, a 865,15 ng/mL kod malignih bolesnica ($p<001$). ROC analiza za osteopontin pokazala je površinu ispod krive 0,838. Za speciičnost 90% osteopontin je imao senzitivnost 62,5%, a kada su udruženi OPN i CA125 ona je dostizala 74,9% za istu specifičnost.Osteopontin ima zadovoljavajuću sposobnost u diferencijaciji benignih od malignih cisti jajnika, koja je još bolja u kombinaciji sa osteopontinom.

P015
OSTEOPONTIN AND CARBOHYDRATE ANTIGEN 125 IN PREDICTING OVARIAN CANCER

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In women with pelvic mass, cancer antigen 125 (CA125) had not achieved satisfactory sensitivity and specificity in the detection of ovarian cancer. The objective of this study was to determine the potential of the osteopontin (OPN) and OPN+CA125 combination in differential diagnosis of the ovarian cancers and nonmalignant ovarian disease. A prospective cross-sectional study was conducted at the Clinic for Gynecology and Obstetrics, and at the Center of Medical Biochemistry, Clinical Center of Serbia. Serum samples were obtained preoperatively from 107 women undergoing surgery for pelvic mass; 57 of them had ovarian carcinoma, and 50 had benign cyst. The samples were analyzed for the levels of OPN and CA125 (using ELISA and CMIA methods) and then compared with the final pathologic results. The diagnostic performance of OPN and CA125 was estimated using receiver operating characteristic curve and area under the receiver operating characteristic curve. The mediana plasma level of OPN in patients with benign and malignant cysts were 356. 33 ng/mL and 865.15 ng/mL, respectively ($p<0.001$). Receiver operating characteristic (ROC) analysis for plasma OPN revealed the area under the curve of 0. 838. At the predefined specificity of 90%, OPN showed sensitivity of 62.5%, whereas the combination of OPN+CA125 reached 74.9% at the same specificity. OPN showed satisfactory capability of distinguishing benign from malignant ovarian cyst, particularly in combination with CA125.

P016
AKREDITACIJA PREMA STANDARDU ISO 15189 – NAŠE ISKUSTVO

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Kvalitetne medicinske laboratorije su sastavni deo zdravstvene zaštite, medicinskih istraživanja i ključni partneri za bezbednost pacijenata i javni zdravstveni sistem. Osnovna komponenta ovih aktivnosti je izvršenje usluga osiguranjem kvaliteta kroz akreditaciju prema standardima ISO serije. ISO 15189, baziran na ISO 9001 i ISO 17025 zahteva da se medicinske laboratorije pridržavaju zahteva za menadžment kvalitetom i tehničkih zahteva uključujući pre- i post- analitičke faze kao i sam analitički proces. Laboratorijska etika i bezbednost su takođe uključeni. Novo izdanje standarda ISO 15189:2012 Laboratory medicine – Requirements for referent measurement laboratories je objavljeno 5. novembra 2012. godine. Utvrđen je prelazni period za novi standard ISO 15189:2012 i to do 1. marta 2016. godine. Naša laboratorija ce imati nadzor prema zahtevima novog izdanja standarda ISO 15189:2012 do leta 2015. godine. U Srbiji, akreditacija prema zahtevima standarda ISO 15189 je počela 2009. godine. Od 2009. godine laboratorije Centra za medicinsku biohemiju, Kliničkog Centra Srbije pored zahteva ISO 9001 i ISO 17025 svoj rad obavljaju i prema zahtevima standarda ISO 15189. Laboratorije Centra za medicinsku biohemiju Kliničkog Centra Srbije su vodece u našoj zemlji i one imaju dugogodišnje iskustvo sa sertifikacijom prema zahtevima ISO 9001 kao i akreditacijom prema ISO 17025. Naša laboratorija je akreditovana za 344 testa i obim akreditacije sadrži metode za ispitivanje parametara kliničke hemije, hematologije, hemostaze i imunologije. Sistem menadžmenta kvalitetom je dokumentovan i obrađuje se elektronskim putem. Od 2008 naša laboratorija ima LIS sistem. Takođe, učestvujemo u 5 različitih PT programa, organizujemo i sprovodimo nacionalnu spoljašnju kontrolu kvaliteta. Akreditacija, upravljanje dokumentacijom, edukacija osoblja, programi za spoljašnju kontrolu kvaliteta i dokazivanje kompetentnosti ocenjivanjem od treće strane poboljšava laboratorijske usluge i poslovne procese, povecava kvalitet rezultata, motiviše osoblje i korisno je za sve zainteresovane strane.

P016
ACCREDITATION ACCORDING TO ISO 15189 – OUR EXPERIENCE

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Quality medical laboratories are an integral part of health care, medical research and the key partners in patient safety and public health system. Key component of these actions is the enforcement of quality assurance services through accreditation by ISO standards. ISO 15189, based upon ISO 9001 and ISO 17025, requires that medical laboratories comply with requirements for quality management and technical requirements, including pre- and post-analytical phases, as well as the analytical process itself. Laboratory ethics and safety are also included. New edition of ISO 15189:2012 Laboratory medicine-Requirements for referent measurement laboratories was issued on November 5th, 2012. Transitional period for the new standard is up to March 1st, 2016. Our laboratory will have surveillance according to new standard by summer 2015. In Serbia, an ISO 15189 accreditation system was started in 2009. Since 2009 Laboratories of Center for medical biochemistry Clinical Center of Serbia in addition to the requirements of ISO 9001 and ISO 17025 follow the requirements of ISO 15189 Laboratories of Center for medical biochemistry Clinical Center of Serbia are the leading in our country and they have previous of long standing experience with ISO 9001 certification and 17025 accreditation. Our laboratory was accredited for 344 tests and accreditation scope contains methods for testing parameters of clinical chemistry, hematology, hemostasis and immunology. Quality management system is documented and processed electronically. Since 2008 our laboratory has LIS system. Also, we participate in 5 different PT programs and we organize and perform national external quality control. Accreditation, data management, personnel education, external quality control programs and demonstration of competence to a third party assessor improve laboratory services and business processes, increases the quality of the results, motivates personnel and is beneficial for all interested

P017
EVALUACIJA KOMBINACIJE SERUMSKIH RENALNIH BIOMARKERA U OTKRIVANJU PACIJENATA SA HRONIČNOM BOLEŠĆU BUBREGA

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Hronična bolest bubrega (HBB) je ireverzibilna, progresivna redukcija renalne funkcije. Rani stadijum medicinske intervencije može odložiti ili sprečiti progresiju HBB do terminalnog stadijuma bubrežne bolesti. Procena jačine glomerulske filtracije (GFR) ima centralnu ulogu za dijagnozu i praćenje pacijenata sa HBB. Trenutna preporuka je upotreba kreatinina, zajedno sa na kreatininu zasnovanih jednačina, kao biomarkera GFR. U proteklih nekoliko godina, nekoliko plazma protein male molekulske težine, kao što su cistatin C (CISC), beta2-mikroglobulin (B2M) i beta-trace protein (BTP) su proučavani u cilju identifikovanja boljeg endogenog GFR markera. Cilj ovog rada je bio da se uporedi dijagnostička vrednost pojedinačnih serumskih renalnih biomarkera (kreatinin, urea, CISC, B2M i BTP) za detekciju renalnog poremećaja u ranim fazama HBB sa njihovim kombinovanim određivanjem. U studiju je bilo uključeno 125 zdravih osoba i 71 pacijent sa procenjenom GFR > 60 mL/min/1,73 m^2. ROC analiza je pokazala da pojedinačni renalni biomarkeri imaju nisku dijagnostičku tačnost za detekciju renalnog poremećaja; površine ispod ROC krivih (AUC) za kreatinin, ureu, CISC, B2M i BTP, su bile od 0,559 do 0,700. Kombinovano određivanje kreatinina i uree (AUC, 0,639) ili kreatinina i CISC (AUC, 0,585) nije poboljšalo otkrivanje renalne bolesti. S obzirom da B2M i BTP imaju značajno više AUC u odnosu na druge renalne biomarkere, kombinovano određivanje ovih biomarkera sa kreatininom bolje detektuje prisustvo renalne bolesti (AUC > 0,682) u odnosu na određivanje samo kreatinina. Rezultati iz ovog rada su pokazali da kombinovana upotreba serumskih renalnih biomarkera ima ograničenu vrednost za detekciju ranih stadijuma HBB.

P017
EVALUATION OF THE COMBINATION OF SERUM RENAL BIOMARKERS IN IDENTIFYING PATIENTS WITH CHRONIC KIDNEY DISEASE

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Chronic kidney disease (CKD) is an irreversible, progressive reduction in renal function. Early stage medical intervention may delay or prevent progression of CKD to end-stage renal disease. Estimation of the glomerular filtration rate (GFR) has central role for the diagnosis and follow-up of patients with CKD. Current recommendation is the use of creatinine together with creatinine-based estimation equations as biomarker for GFR. In the past few years, several low molecular weight plasma proteins, such as cystatin C (CYSC), beta2-microglobulin (B2M) and beta-trace protein (BTP) have been studied aiming at identifying a better endogenous GFR marker. The aim of this study was to compare diagnostic value of individual serum biomarkers (creatinine, urea, CYSC, B2M and BTP) to detect renal disorder in early CKD stages with their combined determination. The study included 125 healthy individuals and 71 patients with estimated GFR > 60 mL/min/1.73 m2. ROC analyses showed that individual serum biomarkers had low diagnostic accuracy for detection of renal disorder; the areas under the ROC curves (AUC) for creatinine, urea, CYSC, B2M and BTP, were from 0.559 to 0.700. The combined determination of creatinine and urea (AUC, 0.639) or creatinine and CYSC (AUC, 0.585) did not improve the detection of renal disease. Considering that B2M and BTP had significantly higher AUCs then other renal biomarkers, combined use of these biomarkers with creatinine better detect the presence of renal disease (AUCs > 0.682) in relation to only determination of creatinine. The results from this study showed that combined use of serum renal biomarkers had limited value for detecting early CKD stages.

P018
KONCENTRACIJE LIPIDNIH PARAMETARA KOD DOBROVOLJNIH DAVALACA KRVI I DAVALACA NA PROGRAMU PLAZMAFEREZE

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Dobrovoljni davaoci krvi i davaoci plazme na programu plazmafereze podležu redovnim lekarskim kontrolama. Plazmaferezom je omogućeno odvajanje plazme od ostalih elemenata krvi u cilju dobijanja plazme koja se koristi za proizvodnju stabilnih lekova iz krvi- albumina i imunoglobulina. Ovim ispitivanjem obuhvaćeno je ukupno 228 uzoraka dobrovoljnih davalaca krvi i davalaca plazme na programu plazmafereze oba pola. Određene su koncentracije ukupnog holesterola (UH), triglicerida (TG), HDL i LDL holesterola, indeks ateroskleroze (IA) i utvrđeni su faktori rizika (FR). Određivanja ukupnog holesterola i triglicerida su vršena standardnim enzimskim spektrofotometrijskim metodama, HDL-holesterol je određen spektrofotometrijski dekstran sulfat- magnezijumovom metodom, dok su vrednosti LDL-holesterola dobijene izračunavanjem preko Friedewaldove formule. Indeks ateroskleroze je dobijen kao količnik koncentracija LDL i HDL holesterola, a faktor rizika kao odnos koncentracija ukupnog i HDL holesterola. Ispitivanjem smo dobili sledeće srednje vrednosti: ukupni holesterol 5,38±1,17 mmol/L, trigliceridi 1,64±0,97 mmol/L, HDL-holesterol 1,27±0,33 mmol/L, LDL-holesterol 3,37±1,06 mmol/L, IA 2,85±1,25 i FR 4,20±1,93. Dobijene vrednosti ukazuju na prisustvo aterogenog rizika lipidnog porekla kod dobrovoljnih davalaca krvi i davalaca plazme na programu plazmafereze, iako oni pripadaju najzdravijem delu populacije. To ukazuje na neophodnost primene higijensko-dijetetskog režima ishrane i odgovarajuće fizičke aktivnosti.

P018
LIPID PARAMETERS CONCENTRATION IN VOLUNTARY BLOOD DONORS AND PLASMA-PHERESIS PROGRAM DONORS

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Voluntary blood donors and donors included in the plasmepheresis program are submitted to medical controls on the regular basis. Plasmapheresis procedure enables separation of plasma from other blood cell elements and it is used for the preparation of stable blood products – albumin and immunoglobulins. The study included total of 228 blood samples collected from blood and plasmapheresis donors of both genders. Total cholesterol (TCC), triglycerides (TG), HDL and LDL cholesterol concentrations were determined, as well as atherosclerosis index (AI) and risk factors (RF). Total cholesterol and triglycerides determinations were performed by standard enzyme spectrophotometric method, HDL cholesterol was measured by spectrophotometric dextran sulphate – magnesium method, while LDL cholesterol values were obtained by calculation using Friedewaldžs formula. Atherosclerosis index was calculated as the quotient of LDL and HDL cholesterol concentration, and the risk factor as the ratio between total and HDL cholesterol. Investigation resulted in the following mean values: total cholesterol 5.38±1.17 mmol/L, triglycerides 1.64±0.97 mmol/L, HDL-cholesterol 1.27±0.33 mmol/L, LDL-cholesterol 3.37±1.06 mmol/L, IA 2.85±1.25 and FR 4.20±1.93. Obtained results point to the presence of the lipid origin atherosclerosis risk in voluntary blood donors and donors included in the plasmapheresis program, despite the fact that they belong to the healthiest part of the population. It shows the necessity to apply adequate hygiene and dietary nutrition and appropriate physical activities.

P019
NERACIONALNA UPOTREBA LABORATORIJSKIH TESTOVA ZA EVALUACIJU TIROIDNE FUNKCIJE

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U laboratorijskoj evaluaciji funkcije štitaste žlezde, vodiči kliničke prakse preporučuju višestepeni pristup u čijem je prvom koraku određivanje tireostimulirajućeg hormona (TSH). Tek ako je vrednost TSH izvan referentnog opsega potrebni su dalji testovi, kao što je slobodni tiroksin (FT4). Međutim, bez obzira na jasne preporuke, u svakodnevnoj laboratorijskoj praksi srećemo se sa neracionalnim zahtevima za ispitivanje tiroidne funkcije. U ovom radu analizirani su rezultati tiroidnih testova 1113 pacijenata Biohemijske laboratorije ZZZR »Železnice Srbije« u Beogradu sa ciljem da se utvrdi procenat nepotrebno traženih testova. U analizu su uključeni samo pacijenti koji se prvi put upućuju u našu laboratoriju radi testiranja tiroidne funkcije u okviru sistematskog pregleda, a traženi su im istovremeno i TSH i FT4. Svim pacijentima su TSH i FT4 određivani hemiluminiscentnim mikročestičnim imunodređivanjem, reagensima proizvođača Abbott na analizatoru Architect i 2000. Nađeno je da su i TSH i FT4 bili u referentnom opsegu kod 92% pacijenata. Oba testa su bila izvan referentnog opsega kod 2% pacijenata. TSH je bio izvan referentnog opsega, a FT4 u okviru njega kod 6% pacijenata. Ni kod jednog od ovih pacijenata nije se desilo da je TSH u okviru referentnog intervala, a FT4 izvan njega. Dobijeni rezultati ukazuju na vrlo visok procenat nepotrebnog ordiniranja testova za procenu tiroidne funkcije. Određivanje samo TSH u opštoj populaciji na svakih 5 godina ima svoje uporište u važećim vodičima. Tek ako je on izvan referentnog opsega treba tražiti i FT4, što potvrđuju i rezultati ovog rada. Neracionalni zahtevi za izvođenje laboratorijskih testova troše vreme i materijalna sredstva, a bez koristi po pacijenta i donošenje kliničkih odluka.

P019
UNNECESSARY TESTS IN LABORATORY EVALUATION OF THYRIOD FUNCTION

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In laboratory evaluation of thyroid function, guidelines recommend step-by-step approach. First step is thyroid stimulating hormone (TSH) determination. If its level is outside the reference range, other tests, like free thyroxin (FT4), are necessary. In spite of these clear recommendations, in routine laboratory practice we often have requests for unnecessary thyroid function tests. In this paper, thyroid function tests results of 1113 patients of our laboratory were evaluated with aim to determine the rate of unnecessary test utilization. Only patients who are sent to our laboratory for the first time thyroid function evaluation during their routine health check and have simultaneously ordered TSH and FT4 were included in analysis. TSH and FT4 were determined by chemiluminescent microparticle immunoassay on Abbott analyzer Architect i2000. Analyzed data showed that both TSH and FT4 were within reference range in 92% of the patients. Both tests were outside of reference range in 2% of the patients. TSH was outside and FT4 within reference range in 6% of the patients. No patients in this study had TSH within and FT4 outside the reference range. These results reveal high percentage of unnecessary ordering of thyroid function tests. It can be concluded that these results support recommendations that at the first evaluation of thyroid function only TSH determination is sufficient and a kind of screening using TSH can be made every five years in healthy population. Only if TSH is outside the reference range additional tests like FT4 should be ordered. Unnecessary testing makes time loss and financial costs to the laboratory and provides no benefit for the patients or clinical decision making.

P020
UTICAJ SMANJENE KONCENTRACIJE ALBUMINA NA RAZVOJ SENILNE DEGENERACIJE MAKULE

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Naša prethodna istraživanja su pokazala da je senilna degeneracija makule propraćena značajnim smanjenjem koncentracija pojedinih antioksidantnih jedinjenja u serumu. Serumski albumin je dobro poznat »scavenger« slobodnih radikala. Cilj ovog rada je bio da se odrede koncentracije serumskog albumina kod pacijenata sa senilnom degeneracijom makule (AMD) i da se ispita postojanje moguće asocijacije između ovog parametra i ravoja AMD-a. Ispitano je ukupno 110 pacijenata sa senilnom degeneracijom makule, starosti 71.5±7,1 god. i 87 zdarvih ispitanika iste starosti, koji su činili kontrolnu grupu. Statistička evaluacija rezultata je vršena korišćenjem Studentovog t-testa, ANOVE i Pearsonove korelacije. ROC analiza je korišćena za određivanje cut-off vrednosti, a logistička regresiona analiza za određivanje moguće asocijacije između koncentracije albumina i razvoja AMD-a. Reyultati ispitivanja ukazuju da AMD pacijenti imaju značajno niže koncentracije albumina (43,4±2,57 g/L) u odnosu na kontrolnu grupu (44,8±2,78 g/L) ($p<0,000$). Cut-off tj. granične vrednosti albumina za razvoj AMD-a su bile 43 g/L (AUC=0,68; SE=0,041, 95%CI 0,603–0,745, Osetljivost testa 55%, a Specifičnost od 77%). Značajna asocijacija je dobijena između koncentracije albumina i razvoja AMD-a (OR: 1,25; 95%CI 1,11–1,41; $\chi^2=15,45$, $P=0,000$), a naročito između snižene vrednosti albumina (<43 g/L) i razvoja AMD-a (OR: 3,95; 95%CI 2,12–7,39; $\chi^2=20,13$; $P<0.000$). Na osnovu sprovedenih istraživanja može se zaključiti da je smanjena koncentracija albumina u serumu (ispod 43 g/L), značajno asocirana sa nastankom senilne degeneracije makule.

P020
THE IMPACT OF DECREASED ALBUMIN LEVELS TO THE DEVELOPMENT OF AGE-RELATED MACULAR DEGENERATION IN HUMANS

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Our previous studies showed significantly decreased levels of some antioxidant substances in patients with age-related macular degeneration (AMD). Albumin is well known as significant »scavenger« of free radicals in humans. The aim of this study was to analyze the concentration of serum albumin in patients with AMD, and to investigate the possible association of this parameter with the development of AMD. A total of 110 AMD patients aged of 71.5±7.1 yrs. and 87 healthy age-matched control subjects were enrolled in the study. For statistical evaluation of the results, Student's t-test, ANOVA and Pearson correlation test were used. ROC analysis was used to determine the cut-of values relevant for AMD development and logistic regression analysis was used for modelling the association of albumin with AMD development. Results indicated that AMD patients had significantly lower serum albumin concentration (43.4±2.57 g/L) compared to the controls (44.8±2.78 g/L) ($p<0.000$). The cut-of albumin values for development of AMD were 43 g/L (AUC=0.68; SE=0.041, 95%CI 0.603–0.745, Sensitivity 55%, Specificity 77%). A significant association was obtained between albumin values and development of AMD (OR: 1.25, 95%CI 1.11–1.41, $\chi^2=15.45$, $P=0.000$), especially between decreased albumin values (<43 g/L) and AMD (OR: 3.95, 95%CI 2.12–7.39; $\chi^2=20.13$; $P<0.000$). Based on the obtained results it may be concluded that decreased albumin values, beyond the cut-of values are highly associated with development of age-related macular degeneration in humans.

P021
KVALITET ODREĐIVANJA BIOHEMIJSKIH PRAMETARA SCREENING-A U DRUGOM TRIMESTRU TRUDNOĆE

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U prenatalnoj dijagnostici se koristi relativno veliki broj testova, pomoću kojih može da se proceni rizik od patoloških trudnoća. Obaveza svake laboratorije koja se bavi određivanjem biohemijskih parametara prenatalnog screening-a je da sprovodi unutrašnju i spoljašnju kontrolu kvaliteta po preporukama Organizacije koja se bavi prenatalnom dijagnostikom (Fetal Medicine Foundation, FMF) i drugih profesionalnih organizacija. Cilj ove studije je bio da se ispitaju parametri koji utiču na kontrolu kvaliteta biohemijskih testova u drugom trimestru trudnoće, kao i da se ustanovi da li se poštuju neke od preporuka iz FMF. Određivane su koncentracije biohemijskih parametara kod 60 trudnica u drugom trimestru trudnoće (quad test): α-fetoprotein (AFP) i humani horionski gonadotropin (hCG) ECLIA metodom, nekonjugovani estriol (uE3) i dimerni inhibin A (DIA) CLIA metodom. Analizom odgovarajućih komercijalnih kontrola za svaki biohemijski parametar prenatalnog screening-a utvrđeno je da su metode određivanja tačne i precizne. Dobijene su zadovoljavajuće vrednosti z-scora za AFP, hCG i uE3 aktivnim učešćem u spoljašnjoj kontroli kvaliteta UKNEQUAS, čime je obezbeđeno kontinuirano kontrolisanje određivanja. Praćenjem MoM vrednosti u quad testu u odnosu na težinu trudnice, gestacijsku nedelju i kretanje vrednosti na mesečnom nivou zadovoljene su preporuke FMF-a. Utvrđeno je da su medijane MoM vrednosti bile u preporučenim granicama (1 MoM ± 10%). Takođe su analizirane vrednosti log MoM, pomoću ANOVA statističke metode i dobijeno je statistički značajno slaganje u vrednostima log MoM AFP, hCG, uE3 i DIA (0,656; 0,477; 0,636 i 0,365, $p<0,001$). Neophodno je da se omogući laboratorijama da kontrolišu vrednosti medijana kao i da se postigne veća usaglašenost u izračunavanju specifičnog rizika za Down-ov sindrom.

P021
QUALITY OF DETERMINATION OF BIOCHEMICAL PARAMETERS OF SCREENING IN THE SECOND TRIMESTER OF PREGNANCY

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Prenatal diagnosis implies relatively large number of tests, by which it can be possible to estimate the risk of a pathological pregnancy. The obligation of each laboratory for biochemical parameters of prenatal screening is to conduct internal and external quality control, according to the recommendations of the Fetal Medicine Foundation (FMF) and other professional organizations. The aim of this study was to investigate the parameters that influence the quality control of biochemical tests in prenatal screening, and to establish whether they comply with some of the recommendations of FMF. The following biochemical parameters were determined in 60 pregnant women in the second trimester (quad test): α-fetoprotein (AFP) and human chorionic gonadotropin (hCG) (ECLIA), unconjugated estriol (uE3) and dimeric inhibin A (DIA) (CLIA). The analysis of the commercial controls for each biochemical parameter of prenatal screening revealed that the determining methods were accurate and precise. We obtained corresponding values of z-score for AFP, hCG and uE3 with active participation in external quality control UKNEQUAS, which provided continuous monitoring of AFP, hCG and uE3. Monitoring of the MoM values in quad test in relation to maternal weight, gestational week and the fluctuation of monthly values fulfilled the recommendations FMF. It was found that the median MoM values were within recommended limits (MoM 1 ± 10%). We also analyzed the values of log MoM, using ANOVA statistical methods and there were statistically significant agreement in the values of log MoM AFP, hCG, uE3 and DIA (0.656, 0.477, 0.636 and 0.365, $p<0.001$). It is necessary to enable the laboratory to control the median value and to obtain a higher compliance of the calculation of the specific risk of Down's syndrome.

P022
EVALUACIJA ODREĐIVANJA HBA1C NA BIOHEMIJSKOM ANALIZATORU ADVIA 2400

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Određivanje HbA1c predstavlja osnov praćenja dugoročne kontrole šećerne bolesti. Zbog toga njegovo određivanje zahteva visoku analitičku preciznost. Cilj rada je bio da se procene analitičke performanse imunoturbidimetrijske metode za određivanje HbA1c na biohemijskom analizatoru ADVIA 2400 i da se uporede rezultati merenja sa biohemijskim analizatorom Architect ci 8200. Nepreciznost iz dana u dan i u seriji određivana je sa dva nivoa komercijalne kontrole (Diabetes 1 i 2, Biorad). HbA1c je određivan u 50 uzoraka pune krvi uzetih od pacijenata sa šećernom bolesti, metodom imunoturbidimetrije sa predtretmanom (Architect ci 8200) i bez predtretmana (Advia 2400). Analizirane su tri grupe vrednosti HbA1c: grupa I (4,0−6,5%), grupa II (6,5−9,0 %) i grupa III (>9,0%). Dobijena je statistički značajna korelacija ($p < 0,05$) između dva analizatora u grupi I (r=0,98), grupi II (r=0,97) i grupi III (r=0,95). Za nepreciznost iz dana u dan dobijeni koeficijenti varijacije bili su CV=3,3% i CV=3,0%, za kontrole 1 i 2, a za nepreciznost u seriji koeficijenti varijacije su bili CV=3,1% i CV=2,9%. Srednje vrednosti apsolutnih razlika sa Bland-Altmanovog dijagrama su bili: – 0,0125% (grupa I), – 0,141 (grupa II), i – 0,825 (grupa III). Dobijeni rezultati ukazuju da postoji dobro slaganje vrednosti HbA1c na dva različita analizatora, kao i da metoda bez predretmana daje odgovarajuće rezultate.

P022
EVALUATION OF HBA1C MEASURMENT ON BIOCHEMICAL ANALYZER ADVIA 2400

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Measurement of HbA1c is the basis for monitoring long-term control of diabetes. Therefore, high analytical precision is required. The aim of this study was to evaluate the analytical performance of immunoturbidimetric assay for the measurement of HbA1c by biochemical analyzer ADVIA 2400 and to compare them with the results obtained on biochemical analyzer Architect ci 8200. Within and between day imprecision was determined with two levels of commercial control (Diabetes 1 and 2, Bio-rad). HbA1c was measured in 50 whole blood samples taken from the patients with diabetes mellitus, by immunoturbidimetric method with pretreatment (Architect ci 8200) and without pretreatment (Advia 2400). Three groups of HbA1c values were analyzed: group I (4.0–6.5%), group II (6.5–9.0%) and group III (>9.0%). Statistically significant correlation was found ($p<0.05$) between the two analyzers in group I (r=0.98), group II (r=0.97) and group III (r=0.96). For day to day imprecision coefficients of variation were CV=3.3% and CV=3.0%, and for within run imprecision were CV=3.1% and CV=2.9%, for control 1 and 2, respectively. The mean values of the absolute differences with Bland-Altman diagrams were: – 0.0125% (group I), – 0141% (group II), and – 0825% (group III). The results indicate that there is good agreement between the values of HbA1c by two different analyzers, and the method without pretreatment gives adequate results.

P023
ANALIZA UTICAJA FAKTORA RIZIKA NA LIPIDNI STATUS STUDENATA NOVOSADSKOG UNIVERZITETA

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Cilj naših istraživanja je bio da se, jednom sveobuhvatnom analizom studenata, kroz anketu, određena merenja i laboratorijske analize, stekne uvid u njihovo zdravstveno stanje, kao i navike u ishrani i načinu života. Ispitivanja su obuhvatila 510 studenata novosadskog Univerziteta, koji su popunili Anketu sa opštim i ličnim podacima, podacima lične i porodične anamneze, i dali odgovore na mnoga pitanja koja se odnose na životne navike. Na osnovu analize odgovora u Anketi i prema indexu telesne mase (BMI) nižim ili višim od 25 kg/m^2 i obimu struka (OS) nižim ili višim od 94 cm za muškarce (80 cm za žene) formirane su dve grupe studenata, kontrolna (74 studenta) i rizična (164 studenta) sa kojima su sprovedena dalja laboratorijska istraživanja lipidnog statusa. Vrednosti UH , non HDL-hol., LDL-hol., VLDL-hol. i TG su bile statistički značajno više u rizičnoj u poređenju sa kontrolnom grupom. IA, non HDL-hol./ HDL-hol. i FR-UH/HDL-hol. su bili značajno viši, dok je HDL-hol.značajno niži u rizičnoj u poređenju sa kontrolnom grupom (Fisher test, p<0,01). Na ispitivane parametre nije uticao pol ispitanika. Niže vrednosti lipoproteina E (Apo E) i lipoproteina A (Lp a) ne ukazuju na moguću genetsku osnovu dislipidemija u rizičnoj grupi studenata. Indikatori gojaznosti BMI i OS i pozitivna porodična anamneza pokazali su značajnu pozitivnu korelaciju sa biomarkerima lipidnog statusa u rizičnoj grupi (p<0,01). Značajna pozitivna korelacija utvrđena je i za pušenje i konzumiranje alkohola sa vrednostima koji definišu dislipidemije (p<0.01), dok je značajna negativna korelacija utvrđena između fizičke aktivnosti i UH (p<0,05). Parametri lipidnog statusa i pojedini aspekti nutritivnog statusa pokazali su značajnu pozitivnu korelaciju samo za konzumiranje crnog vina sa vrednostima HDL-hol. (p<0,05), i značajnu negativnu korelaciju sa UH, LDL-hol., IA, FR, non HDL, nonHDL/HDL- hol. (p<0,01). Dobijeni rezultati ukazuju i da su povećani antropometrijski parametri praćeni povećanim lipoproteinskim statusom u rizičnoj grupi studentske populacije i da je skrining lipidnog statusa neophodan pogotovo kod onih studenata koji imaju povećani rizik za kardiovaskularne bolesti. Podaci mogu da pruže dobru osnovu za preduzimanje primordijalnih i primarnih mera prevencije.

P023
ANALYSIS OF THE IMPACT OF RISK FACTORS ON LIPID STATUS AMONG STUDENTS OF THE UNIVERSITY OF NOVI SAD

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The aim of this study was to gain the insight into student's health, nutrition habits and general lifestyle with a comprehensive analysis of the student health conducting the survey, specific measurements, and laboratory analyses of lipid status in aim to established novel targets for the cardiovascular prevention. The study included 510 students of the University of Novi Sad. Based on the analysis of the conducted survey, according to the body-mass index (BMI) lower and higher than 25 kg/m^2 and waist circumference (WC) lower and higher than 94 cm (80 cm for females) the selected group of 238 students was divided into 2 subgroups: the control group of 74 students and the risk group of 164 students and the laboratory examinations of lipid status were performed. The values of TCH, LDL-c, non-HDL-c, VLDL-c and TG were significantly higher in the risk group participants than in the control group. The IA, non HDL-c/HDL-c and RF-TCH/HDL-c ratio were also significantly higher, while HDL-c was significantly lower in the risk group than in the control group (Fisher test, p<0.01).Lower values of lipoprotein E (Apo E) an lipoprotein A (Lp a) don't indicate possible genetic base of dyslipidemia in the risk group of students. Indicators of obesity BMI and WC and positive family anamnesis showed significantly positive correlation with biomarkers of lipid status in risk group (p<0.01). Significantly positive correlation was established for smoking and alcohol consumption with values which defined dyslipidemias (p<0.01), while significantly negative correlation was established between physical activity and TCH (p<0.05). Parameters of lipid status and some aspects of nutritive status showed significantly positive correlation only for drinking red wine with HDL-c (p<0.05), and significantly negative correlation with TCH, LDL-c, IA, RF, non HDL, nonHDL/HDL-c. (p<0.01). The obtained results indicate that increased anthropometric parameters were followed by the increased lipoprotein status in the risk group and that the screening of the lipid status is necessary, especially for those students who have an increased risk for cardiovascular disease (CVD). These data can provide a good basis for taking the primordial and primary prevention.

P024
POVEZANOST HIPERHOMOCISTEINEMIJE I DEFICIJENCIJE ALFA-1-ANTITRIPSINA KOD BOLESNIKA SA HRONIČNOM OPSTRUKTIVNOM BOLEŠĆU PLUĆA

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Hipehomocistenemija (HHcy) učestvuje u nastanku komorbiditeta hronične obstruktivne bolesti pluća (HOBP): kardiovaskularnih oboljenja, mišićne disfunkcije, osteoporoze, depresije itd. Procenjen je značaj povezanosti HHcy i deficijencije alfa-1-antitripsina (AATD), genetskog faktora rizika za HOBP. Istraživanje je uključilo 50 bolesnika (28 muškaraca i 22 žene, starosti 49,0±14,5 godina) kojima je HOBP dijagnostikovana pre 45. godine života. Homocistein (Hcy) je određivan u serumu, CMIA metodom, i HHcy definisana kao koncentracija iznad 12 μmol/L. Za detekciju AATD je korišćen algoritam koji uključuje imunonefelometriju, PCR i reverznu hibridizaciju sa alel-specifičnim oligonukleotidima, izoelektrično fokusiranje i sekvenciranje DNK. U statističkoj analizi korišćeni su Spearman-ova korelacija, Kruskal-Wallis, χ^2 i Fisher exact testovi, kao i logistička regresija. Koncentracija Hcy (medijana (interkvartilni raspon)) je iznosila 13,22 (11,48–16,08) μmol/L, a HHcy je uočena kod 36 ispitanika. AATD je bila prisutna kod 7 (pet sa ZZ i dva sa ZRetki alel genotipom), dok su 10 ispitanika bili heterozigotni nosioci (osam sa MZ i dva sa MS genotipom). Korelacija između koncentracije alfa-1-antitripsina i Hcy (ρs=–0,046) nije bila statistički značajna (P=0,750). Koncentracija Hcy se nije značajno razlikovala između ispitanika sa različitim genotipovima (P=0,115). Poređenjem bolesnika sa AATD, heterozigotnih nosilaca i onih bez AATD nisu uočene značajne razlike u koncentraciji Hcy

P024
RELATIONSHIP BETWEEN HYPERHOMOCYSTEINEMIA AND ALPHA-1-ANTITRIPSIN DEFICIENCY IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Hyperhomocysteinemia (HHcy) participates in development of chronic obstructive pulmonary disease (COPD) comorbidities: cardiovascular diseases, muscle dysfunction, osteoporosis, depression etc. Significance of the relationship between HHcy and alpha-1-antitrypsin deficiency (AATD), genetic risk factor for COPD, was evaluated. Study enrolled 50 patients (28 males and 22 females, age 49.0±14.5 years) diagnosed with COPD before the the age of 45. Homocysteine (Hcy) was measured in serum, using CMIA method and HHcy was defined as concentration above 12 μmol/L considered. AATD was detected with an algorithm including immunonephelometry, PCR and reverse hybridization with allele specific oligonucleotides, isoelectric focussing and DNA sequencing. Sstatistical analysis included Spearman's correlation, Kruskal-Wallis, 2 and Fisher exact tests, and logistic regression. Median Hcy concentration (interquartile range) was 13.22 (11.48–16.08) μmol/L and HHcy was observed in 36 participants. AATD was present in seven patients (five with ZZ and two with ZRare allele genotype), while ten were heterozygous carriers (eight wit MZ and two with MS genotype). Correlation between alpha-1-antitrypsin and Hcy concnetrations (ρs=–0.046) was not statistically significant (P=0.750). Hcy concentration did not significantly differ between patients with the abovementioned genotypes (P=0.115). Comparison of patients with AATD, heterozygous carriers and those without AATD did not revealed sig-

(P=0,785) i učestalosti HHCy (0,249). Odds ratio (95% interval pouzdanosti) od 0,258 (0,050–1,337) nije ukazao da je AATD značajan faktor rizika za pojavu HHcy (P=0,107). U ispitivanoj grupi bolesnika sa HOBP nije pokazana značajna povezanost HHcy i AATD.

nificant differences in Hcy concentration (P=0.785) and HHcy incidence (0.249). Odds ratio (95% confidence interval) of 0.258 (0.050-1.337) did not indicate that AATD was significant risk factor for HHcy occurence (P=0.107). In the investigated group of patients with COPD the significant relationship between HHcy and AATD was not shown.

P025
KORELACIJE ANTROPOMETRIJSKIH I ANTIOKSIDANTNIH PARAMETARA U STUDENTSKOJ POPULACIJI SA POVEĆANIM KARDIOVASKULARNIM RIZIKOM

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Poznato je da je gojaznost povezana sa metaboličkim sindromom, insulinskom rezistencijom i kardiovaskularnim rizikom. Cilj ovog rada bio je da se odrede i analiziraju vrednosti antioksidantnih enzima: superoksid dizmutaza (SOD), glutation peroksidaza (GPx) i glutation redukataza (GR) kao i totalnog antioksidantnog kapaciteta (TAC) u jednoj grupi gojaznih studenata i da se utvrdi njihova korelacija sa antropometrijskim parametrima: indeksom telesne mase (ITM), obimom struka (OS), obimom kuka (OK) kao i odnosom struk–kuk (OSK). Dve stotine trideset osam studenata Novosadskog univerziteta je uključeno u ovu studiju; od toga 126 muškaraca i 112 žena, prosečne starosti 22,32 ± 1,85 godina. Na osnovu vrednosti ITM manjeg ili većeg od 25 kg/m^2 i OS manjeg ili većeg od 94 cm (za muškarce) tj. 80 cm (za žene), cela grupa studenata podeljena je u dve podgrupe: Grupu 1 (gojazni) – sa povećanim rizikom za nastanak kardiovaskularnih bolesti i Grupu 2 – sa smanjenim rizikom za nastanak istih. Vrednost antioksidantnih enzima je određivana u uzorcima krvi uzetih natašte. Dobijeni rezultati su statistički obrađeni korišćenjem Studentovog t-testa, Mann-Whitney U-testa i Spearmanovom korelacijom. Statističkom obradom podataka dobijeno je da su vrednosti antioksidatnih enzima GPx i GR značajno niže u Grupi 1 u odnosu na Grupu 2 (p=0,05 i p=0,0001) kao i vrednosti TAC-a (p<0,0001). Spearmanovom korelacijom je dobijeno da ITM značajno korelira sa GPx (ρ=–0,192; p=0,042), kao

P025
THE CORRELATIONS OF ANTHROPOMETRIC AND ANTIOXIDANT PARAMETERS IN A STUDENT POPULATION WITH INCREASED CARDIOVASCULAR RISK

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It has been reported that obesity is associated with metabolic syndrome, insulin resistance, and increased risk for cardiovascular diseases. The aim of this study was to analyze the values of antioxidant enzymes: superoxide dismutase (SOD), glutathione peroxidase (GPx), glutathione reductase (GR), as well as the total antioxidant capacity (TAC) in a group of obese students in order to establish their correlation to anthropometric parameters such as: BMI (body mass index), WC (waist circumference), HC (hip circumference), and WHR (waist-to-hip ratio) compared to non-obese students who comprised the control group (CG). In this study, 238 students from the University of Novi Sad of both sexes (126 men and 112 women) with a mean age of 22.32 ± 1.85 years were included. According to the body mass index (BMI) lower and higher than 25 kg/m^2 and waist circumference (WC) lower and higher than 94 cm (80 cm for females) the whole group of 238 students was divided into 2 subgroups: the obese group at increased risk for CVD (Group 1) and the group at lower risk for CVD (Group 2). The activities of antioxidant enyzmes were determined in fasting blood samples. Statistical evaluation was made using the Studentžs t-test, Mann Whitney U-test and Spearman correlation coeficient. Statistical processing data revealed significantly lower activities of antioxidant enzymes: GPx (p<0.05) and GR (p=0.0001) as well as TAC (p<0.000) in Group 1 compared to Group 2. Spearmann correlation coeficient showed that BMI

i GR (ρ=–0,252; p=0,008) dok SOD značajno korelira sa OS (ρ=0,314; p=0,001) u Grupi 1. Na osnovu dobijenih rezultata može se zaključiti da gojazni studenti sa većim vrednostima ITM, OS, OK i OSK imaju nižu antioksidantnu zaštitu, što rezultuje povećanim oksidativnim stresom koji može predstaviti značajan mehanizam razvoja metaboličkog sindroma kod istih.

Ključne reči: antropometrijski parametri, antioksidantni enzimi, oksidativni stres, gojaznost

correlated significntly with GPx (ρ=–0.192; p=0.042), and GR (ρ=–0.252; p=0.008), while SOD significantly correlated with WC (ρ=0,314; p=0,001) in the group of obese students. Based on the obtained results, it can be concluded that obese students with higher values of BMI, WC, HC and WHR had lower antioxidant defense system, resulting in increased oxidative stress which can be an important pathogenic mechanism of obesity-associated metabolic syndrome.

Key words: anthropometric parameters, antioxidant enzymes, oxidative stress, obesity

P026
TELEFONSKA KOMUNIKACIJA U SLUŽBI LABORATORIJSKE DIJAGNOSTIKE

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Telefonska komunikacija kao efikasan način prenosa informacija je od velikog značaja u oblasti laboratorijske dijagnostike, kao i u ostalim domenima zdravstvene nege. Evidencija telefonske komunikacije je posebno važna prilikom usmenog izdavanja hitnih i kritičnih vrednosti laboratorijskih rezultata. U Centru za medicnsku biohemiju Klinickog centra Srbije (CMB KCS) vodi se evidencija o telefonskoj komunikaciji sa svim korisnicima laboratorijskih usluga, u skladu sa zahtevom standarda ISO 15189 tj. dokumentima sistema menadžmenta kvalitetom CMB KCS. Dokumentovanje telefonskog izveštavanja obavlja se kroz obrazac »Telefonsko izveštavanje CMB KCS OBR-065«. U periodu od 01. 01. 2013. godine do 01. 07. 2014. godine u Službi za poliklиničku laboratorijsku dijagnostiku CMB KCS evidentirano je 1819 telefonskih izveštavanja. Praćen je procentualni odnos izveštavanja o kritičnim vrednostima, neispravnoj identifikaciji pacijenata, neispravanim uzorcima i zahtevima za dodatna ispitivanja, u odnosu na ukupan broj telefonskih izveštavanja. Istovremeno su telefonskom komunikacijom odeljenja obaveštavana o uzorcima, koji prema zahtevima lekara nisu doneti, kao i o poslatoj nedovoljnoj količini biološkog materijala. Pored ovih podataka, u obrazac telefonskog izveštavanja, potpisom je evidentirana odgovorna osoba koja je informaciju prosledila, uz istovremeno unošenje podataka o odgovornoj osobi sa odeljenja, koja je informaciju primila. Analizom podataka do-

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TELEPHONE COMMUNICATION IN SERVICE OF LABORATORY DIAGNOSTICS

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Telephone communication as an efficient form of information transfer is of significant importance in the area of laboratory diagnostics. As in other domains of health service documentation of telephone communication is especially important when stat and critical values of laboratory results are being reported by telephone. The Center of Medical Biochemistry of Clinical Center of Serbia (CMB KCS) has been documenting telephone communication on all users of laboratory services in accordance to standard ISO 15189 as well as quality system management procedures of CMB KCS. Documenting telephone reports is conduced through the form »Telephone reporting CMB KCS OBR-065«. During the period from January 1st 2013. To July 1st 2014. in the Service for polyclinic laboratory diagnostics of CMB KCS, 1819 telephone reports have been documented. The percentage in relation to summary of telephone reports for critical values, misidentified patients, wrong samples and requests for additional investigation has been observed. Following that, departments were being informed by telephone communication about samples which hadn't been received by laboratory as well as insufficient sample volume of biological material that had been sent. Beside this data it is required that in the telephone report form the person responsible for sending the information is noted by its signature and also the notation of identity of a person responsible for receiving that information. The analy-

bijeno je da se najveći procenat telefonskog izveštavanja odnosio na neispravnost donetih uzoraka (71,03%). Od toga je 91,64% bilo koagulisanih i uzoraka sa neispravnim odnosom krv-antikoagulans, a 8.36% uzoraka neodgovarajućeg biološkog materijala prema zahtevu lekara. Izveštavanje o kritičnim vrednostima je iznosilo 4,62%, a izveštavanje o neispravnoj identifikaciji pacijenata 12,48%. Pravovremeno telefonsko izveštavanje i evidentiranje komunikacije koje se obavlja po definisanom postupku procedure sistema menadžmenta kvalitetom predstavlja osnov za postizanje bezbednosti pacijenata i pružanje kvalitetne zdravstvene usluge. Poštovanje veština dobre komunikacije koje uključuju: ljubaznost, posvećenost, koncentraciju i jasno prenošenje informacija su od velikog značaja za preveniranje grešaka i sticanje poverenja korisnika laboratorijskih usluga.

sis of data has shown that the greatest percentage of telephone reporting was about wrong samples (71.03%) of which 91.64% was clotted samples and samples with inappropriate blood-anticoagulant volume ratio and the other 8.36% of samples were of inappropriate sample type of biological material in regard to doctor request. The amount of reports on critical values was 4.62% and the amount of patient misidentification was 12.48%. Realization of appropriate timing of telephone reporting and communication documentation which is conducted according to defined procedure of quality system management represents basis for achieving safety of patients and giving quality health service. Using skills of good communication which are kindness, commitment, concentration and sending the precise information is of great significance for prevention of errors and gaining confidence of users of laboratory services.

P027
UČESTALOST MUTACIJA FAKTOR V LEIDEN I PROTROMBIN G20210A KOD BOLESNIKA SA HRONIČNOM OPSTRUKTIVNOM BOLEŠĆU PLUĆA – PILOT ISTRAŽIVANJE

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Pojava venskog tromboembolizma (VTE) može predstavljati komorbiditet hronične obstruktivne bolesti pluća (HOBP). Za populaciju obolelih od HOBP za sada nema dovoljno podataka o učestalosti dva najčešća genetska faktora rizika za VTE – mutacija FV Leiden i protrombin G20210A. Cilj istraživanja je da utvrdi da li se učestalost navedenih mutacija u grupi obolelih od HOBP razlikuje u odnosu na zdrave osobe. Istraživanje je sprovedeno na grupi od 50 bolesnika (28 muškaraca i 22 žene, starosti 49,0±14,5

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FREQUENCY OF FACTOR V LEIDEN AND PROTHROMBIN G20210A MUTATIONS IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE – A PILOT STUDY

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Venous thromboembolism (VTE) may occur as a comorbidity of chronic obstructive pulmonary disease (COPD). In the population of patients with COPD there are no enough data on the frequency of the two most common genetic risk factors for VTE – factor V Leiden and prothrombin G20210A. Aim of the study was to test whether the frequency of these mutations in a group of COPD patients differs from healthy people. The study was conducted on a group of 50 patients (28 males and 22 females, age

godina) kod kojih je HOBP dijagnostikovana pre 45 godine života. Uzorci DNK izolovane iz krvi uzorkovane sa natrijum citratom su korišćeni za analizu primenom PCR i reverzne hibridizacije sa alel-specifičnim oligonukleotidima. Učestalost mutacija je upoređena sa literaturnim podacima o njihovoj frekvenciji u grupi od 120 zdravih osoba sa teritorije Republike Srbije, primenom Fisher exact testa. Kod bolesnika uključenih u istraživanje nije detektovano homozigotno prisustvo mutacije faktor V Leiden, dok je jedan bolesnik bio heterozigotni nosilac. Mutacija protrombin G20210A nije bila prisutna u ispitivanoj grupi bolesnika ni u homo- ni u heterozigotnom obliku. U pomenutoj grupi zdravih osoba identifikovano je sedam heterozigotnih nosilaca mutacije faktor V Leiden i pet heterozigotnih nosilaca mutacije protrombin G20210A. Rezultati statističke analize nisu pokazali na postojanje statistički značajne razlike u učestalosti ispitivanih mutacija (P=0,439 za faktor V Leiden odnosno P=0,171 za protrombin G20210A). Učestalost mutacija faktor V Leiden i protrombin G20210A u ispitivanoj grupi bolesnika sa HOBP se ne razlikuje značajno od frekvencija sa kojom se navedene mutacije javljaju u populaciji zdravih osoba sa teritorije Republike Srbije.

49.0±14.5 years) diagnosed with COPD before the age of 45. DNA samples isolated from the blood collected with sodium citrate were used for the mutations' analyses performed by PCR amplification and reverse hybridization with allele specific oligonucleotides. Mutations' frequencies were compared with previously published data obtained in a group of 120 healthy persons originating from the Republic of Serbia. Fisher exact test was used for comparison. Homozygous presence of mutation factor V Leiden was not detected among patients included in the study, while one of them was heterozygous carrier. Prothrombin G20210A mutation was not present among patients either in homo- or heterozygous form. In the group of healthy persons seven heterozygous carriers of factor V Leiden and five heterozygous carriers of prothrombin G20210A mutation were detected. Results of statistical analysis did not indicate significant differences in the frequency of investigated mutations between these two groups (P=0.439 for factor V Leiden and P=0.171 for prothrombin G20210A). The frequency of mutation Factor V Leiden and prothrombin G20210A in the investigated group of patients with COPD is not significantly different from the frequency with which these mutations occur in a population of healthy individuals from the Republic of Serbia.

P028
PRAĆENJE VREDNOSTI NESPECIFIČNIH PARAMETARA ZAPALJENJA KOD BOLESNIKA SA DIJAGNOZOM INFEKCIJE VIRUSOM INFLUENCE A H1N1 U SRBIJI U PERIODU OD 2009. GODINE DO 2010. GODINE

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Za dijagnostiku infekcija, praćenje njihovog toka i odgovora na primenjenu terapiju veoma je važno određivanje vrednosti nespecifičnih parametara zapaljenja kao što su brzina sedimentacije eritrocita (SE), koncentracija fibrinogena, C reaktivnog proteina (CRP) i prokalcitonina (PCT). U toku pandemije izazvane virusom gripa Influenza A H1N1 tokom 2009/10. godine, opisane su različite forme bolesti: od blagih inflamacija gornjih respiratornih puteva, preko inflamacije donjih respiratornih puteva (različite forme bronhitisa i pneumonija), pa sve do

P028
THE MONITORING OF NON-SPECIFIC PARAMETERS OF INFLAMMATION IN PATIENTS DIAGNOSED WITH A H1N1 INFLUENZA VIRUS IN SERBIA SINCE 2009 UNTIL 2010

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For the diagnosis of infection, monitoring their course and response to therapy is very important to determine the value of non-specific parameters of inflammation, such as erythrocyte sedimentation rate (SE), the concentration of fibrinogen, C-reactive protein (CRP) and procalcitonin (PCT). During the pandemia caused by influenza virus A H1N1 in 2009 / 10th yr. different forms of the disease were described: from mild inflammation of the upper respiratory tract, through inflammation of the lower respiratory tract (different forms of bronchitis and pneu-

teških kliničkih slika praćenih pojavom adultnog respiratornog distres sindroma (ARDS). Istraživanje je imalo za cilj da analizira značaj nespecifičnih parametara zapaljenja kod bolesnika prilikom prijema i otpusta iz bolnice, kako kod onih sa, tako i bolesnika bez pneumonije, a potom i da se te vrednosti uporede kod slučajeva sa intersticijumskom (najverovatnije gripoznom) i segmentnom/lobarnom (bakterijskom) pneumonijom. U Klinici za infektivne i tropske bolesti tokom perioda jun 2009. – februar 2010. lečeno je ukupno 340 bolesnika sa kliničkom slikom gripa, od kojih je kod 63 bolesnika dokazana infekcija virusom Influenze H1N1. Za virusološku dijagnozu ove infekcije korišćen je test lančane reakcije polimerizacije (Polymerase Chain Reaction, PCR) za detekciju virusne RNK, iz brisa nazofarinksa. Prilikom prijema u bolnicu i pred otpust bolesnicima određivane su vrednosti SE, fibrinogena, CRP i PCT. Od ukupno 63 bolesnika, 46 (73%) je imalo pneumoniju i to: 41 bolesnik (89,13%) imao je intersticijumsku pneumoniju, a 5 (10,87%) bolesnika imalo je lobarnu tj. segmentnu pneumoniju. Analiza vrednosti nespecifičnih parametara zapaljenja prilikom prijema u bolnicu ispitanika sa i bez pneumonije je pokazala da brzina SE i vrednosti fibrinogena nisu bile značajno različite (p=0,209, p=0,622 pojedinačno), ali su kod bolesnika sa pneumonijom bile značajno veće koncentracije CRP i PCT (p=0,001, p=0,001 pojedinačno). Praćenje nespecifičnih parametara zapaljenja kod bolesnika sa H1N1 infekcijom omogućava »prepoznavanje« bolesnika sa komplikacijama, njihovu pravovremenu hospitalizaciju i ranije započinjanje antivirusne i antibiotske terapije.

monia), to severe clinical features accompanied by the emergence of adult respiratory distress syndrome (ARDS). The study was aimed to analyze the significance of non-specific inflammatory parameters in patients on admission and discharge from the hospital, as those with, and those without pneumonia, and then to compare these values with the cases with interstitial and segmental / lobar (bacterial) infections. A total of 340 patients with clinical signs of influenza, out of whom 63 patients with proven infection by influenza virus H1N1 were treated at the Clinic for Infectious and Tropical Diseases during the period of June 2009. – April 2010. The polymerase chain reaction, (PCR) test was used for the detection of viral RNA in nasopharyngeal swabs, in order to diagnose the viral infection. On hospital admission and before discharge of patients the following parameters were determined: erythrocyte sedimentation rate (SE), fibrinogen, CRP and PCT concentration. Out of 63 patients, 46 (73%) had pneumonia, 41 patients (89.13%) had interstitial pneumonia, and 5 (10.87%) patients had lobar ie. segmental pneumonia.The analysis of the non-specific inflammatory parameter values on patients admission with and without pneumonia, showed that the SE and fibrinogen were not significantly different (p=0.209, p=0.622 respectively), but the patients with pneumonia had significantly higher concentrations of CRP and PCT (p=0.001, p=0.001 respectively). Monitoring of non-specific inflammatory parameters in patients with H1N1 infection allows »identification« of patients with complications, their timely hospitalization and early initiation of antiviral and antibiotic therapy.

P029
BIOMARKERI KOD PACIJENATA SA KRVARENJEM PRI PRIMARNOJ PERKUTANOJ KORONARNOJ INTERVENCIJI

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Kao najznačajniji faktor mortaliteta kod pacijenata sa akutnim koronarnim sindromom (ACS) su hemoragijske komplikacije. Cilj rada je bio određivanje biomarkera kod pacijenata koji su bili podvrgnuti primarnoj perkutanoj koronarnoj intervenciji (PCI). Analizirani su STEMI pacijenti (643) kod kojih je rađena primarna PCI između 11/2006 i 7/2009.

P029
BIOMARKERS IN BLEEDING PATIENTS UNDERGOING PRIMARY PERICUTANEUS CORONARY INTERVENTION

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Hemorrhagic complications have emerged as an independent risk factor for subsequent mortality in patients with acute coronary syndromes (ACS). The aim of this study was to determinate biomarkers in STEMI patients undergoing contemporary primary PCI. All consecutive STEMI patients (643) who underwent primary PCI between 11/2006 and

Masivna krvarenja definisana su prema GUSTO kriterijumu (Global Use of Strategies to Open Occluded Coronary Arteries). Biomarkeri su određivani standarnim laoratorijskim metodama. Masivno krvarenje uočeno je kod 30 od 643 STEMI pacijenata sa primarnom PCI (4,7%). Pacijenti sa masivnim krvarenjem su bili stariji i uglavnom žene. Upotrebom multivalentne regresione analize dobili smo statistički značajne prediktore masovnog krvarenja, i to: godine starosti (≥65 godina) (OR=3,01; 95% CI za OR 1,19–7,62; p=0,020), hemoglobin (Hb) na prijemu (<120 g/L za žene i <130 g/L za muškarce) (OR=2,68; 95% CI za OR 1,07–6,73; p=0,035) i leukociti (WBC) na prijemu (>15×10^9/L) (OR= 2,52; 95% CI za OR 1,03–6,12; p=0,042). Godine starosti, niska koncentracija hemoglobina i visok broj leukocita na prijemu značajni su faktori rizika za nastanak masivnog krvarenja pri izvođenju primarne PCI.

P030
ISPITIVANJE UTICAJA LIPEMIJE NA TAČNOST ODREĐIVANJA HEMOGLOBINA

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Čak 58% grešaka u laboratorijskoj hematologiji predstavljaju greške u preanalitičkoj fazi. Moderni hematološki analizatori omogućavaju određivanje kako osnovnih, tako i novih hematoloških parametara, koji, pre svega, zavise od preanaitičkih varijabli. Da bi se na pravilan način interpretirao laboratorijski rezultat, moraju se uzeti u obzir različite fiziološke varijable, postupak venepunkcije i kapilarne punkcije, kao i transport uzoraka. Na određivanje hematoloških parametara utiču brojne interferencije, kao sto su hemoliza, poviseni trigliceridi (TG), krioglobulini, povišena koncentracija glukoze, prisustvo hladnih aglutinina. Ispitivanje uticaja povišenih triglicerida na hematološke parametre obavljeno je na uzorcima venske krvi kod 140 pacijenata, podeljenih u tri grupe: A (TG: 3–7 mmol/L), B (TG: 7–12 mmol/L) i C (TG>12 mmol/L). Hemoglobin je određivan pre i posle tretmana EDTA uzorka krvi, koji obuhvata centrifugiranje uzorka, zamenu plazme identičnom zapreminom izotona, mešanje uzorka i analizu. Hemoglobin je određivan spektrofotometrijskom metodom na HMX-AI analizatoru (Beckman Coulter, Germany). Uzimajući u obzir celu ispitivanu populaciju, značajna razlika u korelaciji nivoa hemoglobina, pre i posle tretmana uzorka, nije pronađena. Srednje vrednosti hemoglobina u grupama A, B i C,

7/2009 were studied. Major bleeding was defined according to the Global Use of Strategies to Open Occluded Coronary Arteries (GUSTO) study criteria. Biomarkers were determined by standard laboratory methods. Major bleeding occurred in 30 of 643 STEMI patients with primary PCI (4.7%). Patients with major bleeding were older, more frequently female. Multivariate logistic regression analysis showed that significant predictors of major bleeding were: advanced age (]65 years) (OR=3.01; 95% CI for OR 1.19–7.62; p=0.020), hemoglobin (Hb) at admission (<120 g/L for female and <130 g/L for male) (OR=2.68; 95% CI for OR 1.07–6.73; p=0.035) and white blood cell (WBC) at admission (>15×10^9/L) (OR=2.52; 95% CI for OR 1.03–6.12; p=0.042). Advanced age, low hemoglobin and high WBC at admission are main factors of major peri-procedural bleeding.

P030
INVESTIGATION OF EFFECTS OF LIPEMIA ON THE ACCURACY OF THE HEMOGLOBIN DETERMINATION

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Even 58% of errors in hematological determination correspond to errors in pre-analytical phase. Modern hematological analyzers enable determination of standard, as well as new hematological parameters, which depend mostly of pre-analytical variables. In order to interpret the result in a right way, it is necessary to take into account different physiological variables, venipuncture and capillary procedure, as well as the transport of the sample. It is well known that different interferences, as hemolysis, increased triglycerides (TG), cryoglobulins, increased glucose, presence of cold agglutinins, and influence on determination of hematological parameters. Examination of the impact of increased TG on hematology parameters was done using the samples of vein blood, on 140 patients, separated in three groups- A (TG: 3–7 mmol/L), B (TG: 7–12 mmol/L), C (TG>12 mmol/L). Hemoglobin was determined before and after the treatment of EDTA-sample. The treatment of the EDTA-sample implied »saline replacement« which included whole blood centrifugation, replacement of the plasma with the same volume of saline, mixing the sample and its analyzing. Hemoglobin was determined using spectrophotometric method on the HMX-AI analyzer (Beckman Coulter, Germany). Considering the whole examined

pre tretmana uzorka iznose 117.8, 121.2 i 150 g/L, dok nakon tretmana iznose 116.9, 118.6 I 142.2 g/L. Za razliku od grupa A i B ($p>0.05$), u grupi C je pronađena značajna razlika u koreleaciji nivoa hemoglobina pre i posle tretmana uzorka ($p=0.0019$). Lipemija, kao jedna od najuticajnijih interferencija, utiče na tačnost određivanja hematoloških parametara, pre svega hemoglobina. Rezultati ove studije su pokazali da povišene vrednosti TG (>12 mmol/L) utiču na spektrofotometrijsko određivanje hemoglobina, zbog povišenog turbiditeta uzorka. U takvim slučajevima neophodno je celokupno sagledavanja rezultata.

P031
NIVOI ADIPONEKTINA I EKSPRESIJA ADIPONEKTINSKIH RECEPTORA KOD PACIJENATA NA HEMODIJALIZI

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Adiponektin je protein koji sekretuje ćelije adipoznog tkiva. Njegova anit-inflamatorna, anti-aterogena i anti-apoptotska dejstva ostvaruju se preko receptora označenih kao AdipoR1 i AdipoR2. Prisustvo nekoliko tradicionalnih i netradicionalnih faktora rizika kod pacijenta sa bolešću bubrega u završnom stadijumu ukazuje na veliki rizik od smrti usled kardiovaskularnih komplikacija. Iako je adiponektin poznat kao protektitvan molekul, prethodne studije nedvosmislen opokazuju da su njegov inivoi u plazmi pacijenata sahroničnom bolešću bubrega kao i kod pacijenata na hemodijalizi izuzetno povećani. S druge strane, malo se zna o ekspresiji adiponektinskih receptora kod pacijenata sa oboljenjem bubrega. Cilj naše studije je bio da se utvrdi da li su nivo cirkulišućeg adiponektina i ekspresija adiponektinskih receptora u mononuklearnim ćelijama periferne krvi

population, significant difference in correlation of the level of hemoglobin before and after the treatment of the sample has not been found. Mean values of hemoglobin in groups A, B and C, before the treatment, are 117.8, 121.2 and 150 g/L and after the treatment, are 116.9, 118.6 and 142.2 g/L, respectively. In the groups A and B significant difference in correlation of the level of hemoglobin before and after the treatment has not been found ($p>0.05$), while in group C has been found ($p= 0.0019$). Lipemia, as one of the most significant interference, influence the precise determination of laboratory parameters, especially of hemoglobin. Results of this study have shown that the levels of triglycerides higher than 12 mmol/L do impact on determining the level of hemoglobin using spectrophotometric method because of the significant turbidity of the sample. In this situation it is necessary to have a broad overview of the result in order to make the right conclusion.

P031
LEVELS OF ADIPONECTIN AND EXPRESSION OF ADIPONECTIN RECEPTORS IN PATIENTS ON HEMODIALYSIS

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Adiponectin is a protein secreted by adipose tissue, which exerts its anti-inflammatory, anti-atherogenic and anti-apoptotic effects via two receptors, AdipoR1 and AdipoR2. Patients with end-stage kidney disease (ESKD) are greatly exposed to high risk of cardiovascular (CV) mortality due to presence of several traditional and nontraditional risk factors. In contrast to adiponectin protective functions, it has been consistently reported that its levels are increased in patients with chronic kidney disease (CKD), but not much is known about expression of its receptors in patients on hemodialysis. We sought to investigate if circulating adiponectin levels and the expression of AdipoR1 and AdipoR2 in PBMCs are changed in patients with ESKD compared to healthy subjects. This study included 33 patients (19 males and 14 females) with ESKD and 33 healthy subjects

(PBMC) promenjeni kod pacijenata na hemodijalizi u odnosu na zdrave ispitanike. U ovoj studiji su učestvovala 33 pacijenta na hemodijalizi (19 muškaraca i 14 žena) i 33 zdrava ispitanika (15 muškaraca i 18 žena). Koncentracija adiponektina je merena u plazmi ELISA metodom, dok su nivoi AdipoR1 i AdipoR2 mRNA u PBMCodređeni real-time PCR metodom. Nivoi adiponektina su bili značajno viši u plazmi pacijenta u poređenju sa kontrolonom grupom (p=0,036). Nakon korekcije za godine, BMI i koncen-traciju serumskog kreatinina ova razlika je postala još značajnija (p=0,027). Ekspresija AdipoR1 mRNA je bila značajno niža kod pacijenata (p=0,034), dok je ekspresija AdipoR2 mRNA bila gotovo identična u obe grupe ispitanika. U grupi pacijenata pronađena je značajna korelacija adiponektina sa holesterolom lipoproteina velike gustine (HDL-C) (r=0.584, p=0.001), trigiliceridima (TG) (r=–0.488, p=0.001) i serumskim kreatininom (SC) (r=–0.375, p=0.038). Višestrukom regresionom analizom (forward metod) utvrđeno je da je u modelu koga su činili: HDL-C, TG i SC, jedini nezavisni prediktor koncentracije adiponektina u plazmi pacijenata HDL-C (R^2=0.363, adjR^2=0.341, p<0.001). Nedostatak efekata adiponektina usled smanjene ekspresije AdipoR1 kod pacijenata na hemodijalizi može dovesti do kompenzatornog povećanja adiponektina. Veza između HDL-C i adiponektina sugeriše da je ovaj kompenzatorni mehanizam dovoljno snažan da protektivne funkcije adiponektina kod pacijenata na hemodijalizi ne budu kompromitovane.

(15 males and 18 females). Circulating adiponectin levels were measured by ELISA method, whereas PBMCs' AdipoR1 and AdipoR2 mRNA levels were determined by real-time PCR method. Adiponectin levels were significantly higher in plasma of patients compared to control group (p=0.036). After adjustment for age, BMI and serum creatinine levels this difference have become more significant (p=0.027). Significantly lower expression of AdipoR1 mRNA was found in patients PBMCs (p=0.034), whereas AdipoR2 mRNA levels were similarly expressed in PBMCs of both groups. Adiponectin significantly correlated with high-density lipoprotein cholesterol (HDL-C) (r=0.584, p=0.001), triglycerides (TG) (r=-0.488, p=0.001) and serum creatinine (SC) (r=-0.375, p=0.038), in patients with ESKD. Multiple linear regression analysis using forward method was performed to identify the determinants of plasma adiponectin concentration in patients. Model included HDL-C, SC and TG. HDL-C was revealed as only independent predictor of adiponectin in patients with ESKD (R^2=0.363, adjR^2=0.341, p<0.001). The lack of adiponectin effect due to downregulation of AdipoR1 in patients with ESKD could induce its counter-regulatory increase. Positive association of HDL-C and adiponectin implies that this compensatory mechanism is strong enough to keep adiponectin atheroprotective functions active in patients with ESKD.

P032
DA LI SU AKTIVNOSTI LCAT-E I CETP-A POVEZANE SA RAZVOJEM HIPERTENZIJE KOD GOJAZNE DECE?

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Smatra se da je hipertenzija jedna od glavnih komplikacija dečije gojaznosti. Ateroprotektivna LCAT (lecitin holesterol aciltransferaza) i proaterogeni CETP (holesterol estar transferni protein) imaju bitnu ulogu u metabolizmu HDL-a i mogu uticati na

P032
ARE CETP AND LCAT ACTIVITIES RELATED TO HYPERTENSION IN OVERWEIGHT CHILDREN?

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Hypertension is considered to be one of the major repercussions of childhood obesity. Atheroprotective LCAT (lecithin cholesterol acyltransferase) and proatherogenic CETP (cholesterol ester transfer protein), as important constituents of HDL metabo-

razvoj dislipidemije i posledične hipertenzije kod gojazne dece. Cilj ovog rada bio je da se utvrdi da li su aktivnosti LCAT-e i CETP-a povezane sa razvojem hipertenzije kod gojazne dece. U ovoj studiji učestvovalo je 65 gojazne dece (godine=14,2±2,1; BMI=30,0±3,4 kg/m^2): 38 sa hipertenzijom (H grupa) i 27 sa normalnim krvnim pritiskom (NKP grupa). Aktivnosti LCAT-a i CETP-a su merene prema Fildingovoj metodi: aktivnost LCAT-e je definisana kao smanjenje slobodnog holesterola (SH) u plazmi nakon dva sata inkubacije na 37 °C; aktivnost CETP-a je definisana kao razlika između smanjenja SH u plazmi, i povećanja esterifikovanog holesterola u HDL-frakciji plazme, nakon dva sata inkubacije na 37 °C. Dobijeni rezultati su pokazali da je H grupa imala veću aktivnost CETP-a u odnosu na NKP grupu (76,9(54,6–114,3) μmol/L/h vs. 58,4(41,3–84,6) μmol/L/h; p=0,011). Aktivnost LCAT-enije bila značajno različita između ove dve grupe (111,3(94,5 –135,2) μmol/L/h vs. 98,9 (70,8–128,9). Kod svih ispitanika, CETP aktivnost je pozitivno korelirala sa LCAT aktivnosti (ρ=0,638; p<0,001). Možemo zaključiti da aktivnost LCAT-a nije značajno promenjena kod gojazne dece sa hipertenzijom, dok je povećana aktivnost CETP-a povezana sa prisustvom hipertenzije kod gojazne dece: CETP može uticati na promenu sastava lipoproteinskih čestica ka proaterogenom fenotipu, i na taj način indukovati dislipidemiju i posledično hipertenziju.

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P033
RASPODELA SUBFRAKCIJA LIPOPROTEINA I OKSIDATIVNO-STRESNI STATUS U PLUĆNOJ I VANPLUĆNOJ SARKOIDOZI

Jasmina Ivanišević[1], Jelena Vekić[1], Aleksandra Zeljković[1], Aleksandra Stefanović[1], Jelena Kotur-Stevuljević[1], Zorana Jelić-Ivanović[1], Vesna Spasojević-Kalimanovska[1], Slavica Spasić[1], Jelica Videnović-Ivanov[2], Violeta Vučinić-Mihailović[2]

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Sarkoidoza je inflamatornabolest plućne ili vanplućne lokalizacije koja se karakteriše dislipidemijom i povišenim oksidativnim stresom. U takvim uslovima, lipoproteini niske gustine (engl. LDL) i visoke gustine (engl. HDL) bivaju izloženi funkcionalnim promenama, što može da ubrza razvoj ateroskleroze. Ispitivali smo raspodelu LDL i HDLsubfrakcija, markere inflalism, could impact on development of dyslipidemia in obesity and subsequent hypertension. The aim of this study was to determine whether CETP and LCAT activity are related to hypertension in obese children. 65 obese children (age=14.2±2.1; BMI=30.0±3.4 kg/m^2) were included in this study: 38 with hypertension (H group) and 27 with normal blood pressure (NBP group). LCAT and CETP activities were measured as described by Fielding: LCAT activity was defined as a decrease in whole plasma free cholesterol (FC) after 2 hour incubation at 37 °C; CETP activity represented the difference between the rate of decrease of whole plasma FC, and the rate of increase of CE in HDL fraction, after 2 hour incubation at 37 °C. Our results have shown that H group had increased CETP activity compared to the NBP group (76.9 (54.6–114.3) μmol/L/h vs. 58.4 (41.3–84.6) μmol/L/h; p=0.011). LCAT activity didn't differ between the two groups (111.3 (94.5–135.2) μmol/L/h vs. 98.9 (70.8–128.9). In all subjects, CETP activity showed positive correlation with LCAT activity (ρ=0.638; p<0.001). We can conclude that LCAT activity is not significantly altered in H group compared to NBP group, while increased CETP activity is related to hypertension in obese children: CETP could influence shifting of the composition of lipoprotein particles to proatherogenic phenotype, thus inducing dyslipidemia, and consequently hypertension.

P033
LIPOPROTEIN SUBCLASSES DISTRIBUTION AND OXIDATIVE STRESS STATUS IN PULMONARY AND EXTRAPULMONARY SARCOIDOSIS

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Sarcoidosis is an inflammatory disease characterized by dyslipidemia and elevated oxidative stress showing pulmonary orextrapulmonary manifestations. In such conditions, low density (LDL) and high density (HDL) lipoproteinscan suffer functional changes which could accelerate atherosclerosis development. We decided to explore LDL and HDL

macije i oksidativnog stresa u plućnoj (PS) i vanplućnoj (VPS) sarkoidozi. Lipidni, inflamatorni i parametri oksidativnog stresa su određeni u serumu 77 pacijenata (53 PS i 24 VPS) i 139 kontrolnih ispitanika. Ispitanici u PS i VPS grupama su imali značajno više koncentracije triglicerida (P<0,05), serumskog amiloida A, udeleLDL IVA (P<0,01) i LDLIII i totalnog oksidantnog statusa (TOS) (P<0,001) u odnosu na kontrolnu grupu i značajno niže udeoLDL I, veličinu HDL čestica, koncentraciju sulfhidrilnih (SH) grupa (P<0,001) i aktivnosti paraoksonaze 1 (PON1) (P<0,05). U samoj PS, koncentracija HDL-a (P<0,01), udeliHDL 3a (P<0,05) i LDL IVB (P<0,001) su bili značajno niži dok je pro-oksidantno-antioksidativni balans (PAB) bio značajno viši (P<0,05) u poređenju sa kontrolnom grupom. Značajne pozitivne korelacije između HDL 3c i malih HDL čestica (ssHDL) sa malondialdehidom (P<0,001) i značajne negativne korelacije sa HDL-om, SH grupama i PON1 (P<0,05) su dobijene kod pacijenata sa PS. SH grupe, TOS i PON1 su nezavisno povezani sa ssHDL česticama u plućnoj sarkoidozi. Obe grupe pacijenata se odlikuju inflamacijom, poremećajima u lipidnom profilu i povećanim oksidativnim stresom, ali je stepen ovih patoloških promena bio izraženiji u plućnoj bolesti.

subclasses profile, inflammatory and oxidative stress markers in pulmonary (PD) and extrapulmonary (EPD) disease. Lipid, inflammatory and oxidative stress status parameters were determined in serum of 77 patients (53 PD and 24 EPD) and 139 controls. Both PD and EPD patients had significantly higher concentrations of triglycerides (P<0.05),serum amyloid A, proportions ofLDL IVA (P<0.01) and LDLIII andtotal oxidant status (TOS) (P<0.001) than controls and significantly lower proportion of LDL I, HDL particle size, sulfhydryl (SH) groups (P<0.001) and paraoxonase 1 (PON1) activity (P<0.05). In PD, HDL-c (P<0.01), proportions ofHDL 3a (P<0.05) and LDL IVB (P<0.001) were significantly lower whereas pro-oxidant antioxidant balance (PAB) was significantly higher (P<0.05) comparing to control group. PD was also characterized by significant positive correlations between relative proportions of HDL 3c and small sized HDL (ssHDL) with malondialdehyde (P<0.001) and by significant negative correlations with HDL-c, SH groups and PON1 (P<0.05). In PD, SH groups, TOS and PON1 were also independently associated with ssHDL particles. Both patients groups were characterized by inflammation, adverse lipoprotein profile and elevated oxidative stress, while the extent of these pathological conditions was more evident in pulmonary group.

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VREDNOSTI GLUKOZE IZ KAPILARNE KRVI KOD PACIJENATA KOJI PRIMAJU GLUKOZU ILI INSULIN

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Kod kritično bolesnih pacijenata koji dobijaju intravenozno glukozu ili insulin, glukoza se prati često, i zdravstveni radnici koriste za praćenje između ostalog, glukometre za merenje glukoze iz kapilarne krvi, koji su pristupačni pacijentu. Mi smo ispitivali da li korišćenje glukometra može da bude pogodno kao analizirajuća metoda za ovu vrstu pacijenata kada je krv uzeta iz kapilara. Analize iz kapilarne krvi su izvedene po Accu-Chek Perform od Novartisa. Arterijska i venozna krv uzeta je istovremeno za analizu laboratorijski referentnim metodama (Novartis), kao i aparatom za biohemijske analize «Architeckt-c8000». Dodatno, merena je zapremina eritrocita (MCV). Ukupno je uradjeno 26 uzoraka krvi. Glukoza merena sa Accu-Chek Perform od Novartisa pokazuje vrednosti 7,9 (4,8–15,8) i 8,1 (4,6–16,7) mmol/L. Referentna metoda i biohemijski analizator je izmerio

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GLUCOSE VALUES FROM CAPILLARY BLOOD FOR PATIENTS RECEIVING GLUCOSE OR INSULIN

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Critically ill patients who receive glucose/insulin treatment need close glucose control. Point-of-care testing (POCT) devices are commonly used to monitor blood glucose levels. The purpose of our study was to see if capillary glucose measured with a POCT device was acceptable for this group of patients. Glucose values obtained with POCT devices Accu-Chek Performa and Novartis from fingerstick. The values were compared with arterial/venous glucose values obtained by laboratory analysis (Modular) and a biochemistry instrument (Architeck-c8000). In addition hematocrit (hct) was measured. A total of 26 samplings were included. Mean glucose obtained by Accu-Chek Performa and Novartis 7.9 (4.8–15.8) and 8.1 (4.6–16.7) mmol/L. Mean glucose was 8.6 (4.3–17.4) and 8.6 (4.6–17.1) mmol/L from the laboratory (Modular) and from the biochemistry

prosečnu vrednost glukoze 8,6 (4,3–17,4) i 8,6 (4,6–17,1) mmol/L. Izmerene glukoze su pokazale signifikantnu razliku između laboratorijskih referentnih metoda i glukometra (p 0,05). Glukometri ne zadovoljavaju zahtev koji se postavlja u ISO 15197. Niske vrednosti MCV (<0,40) potcenjuju vrednosti glukoze za 10%. Pomoću standardizovanih metoda dokazane su signifikantne razlike između glukometra i laboratorijskih referentnih metoda. Uslov glukometra za tačnost merenja nije održiva, istovremeno izmerene vrednosti glukoze se potcenjuju kada pacijent ima niske vrednsti MCV-a. Zbog toga nije sigurno da je merenje glukometrom dovoljno tačno za korišćenje kod kritično obolelih pacijenata.

instrument (ABL 725). Significant differences were found between glucose values obtained by the POCT devices and by the reference laboratory methods ($p<0.05$). POCT devices do not satisfy the requirements from ISO 15197. Low hematocrit values (HCT < 0.40) underestimated the glucose values by 10%. Under standardized conditions there was a significant difference between the glucose results obtained by use of POCT devices and those obtained by reference laboratory methods. POCT devices do not satisfy accuracy requirements and the glucose values are underestimated for patients with low hematocrit. Therefore it is uncertain as to whether POCT devices are precise enough to be used on critically ill patients.

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SERUMSKI IGG ODGOVOR NA UOBIČAJENE ANTIGENE HRANE KOD DECE KAO MOGUĆI ETIOLOŠKI FAKTOR U POREMEĆAJIMA AUTISTIČNOG SPEKTRA

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Poslednjih godina brojni podaci su pokazali da imuni odgovor posredovan IgG, koji sledi nakon izlaganja određenom antigenu iz hrane, ima veliki značaj u nastanku netolerancije prema namirnici iz koje antigen potiče. Ispitivanje dece sa poremećajima autističnog spektra (ASD-autism spectrum disorder) je ukazalo da su mogući etiološki faktori ovih bolesti reakcije preosetljivosti i netolerancije prema hrani. Ova studija je obuhvatila ispitivanje i poređenje nivoa IgG antitela prema specifičnim antigenima hrane i identifikovanje namirnica koje izazivaju najveći specifični IgG odgovor u uzorcima seruma dece stare od 2 do 18 godina. Specifična serumska IgG antitela su analizirana metodom ELISA (Allerquant Food Allergy Screening ELISA Kit, Biomerica) na 90 uobičajenih namirnica. Rezultati su pokazali da je 1 od 65 dece imalo negativne vrednosti za svih 90 namirnica, što je 1,53% od ukupnog broja. Povišen nivo specifičnih IgG različitog stepena utvrđen je kod 64 dece, što je 98,46% od ukupnog broja. Najveći nivo specifičnih IgG utvrđen je kod 28 pacijenata, što je 43,07% od ukupnog broja. 11 namirnica je izazvalo najveći IgG odgovor, među njima posebno mleko, mlečni proizvodi i jaja. Primenom ELISA metode u određivanju specifičnih IgG antitela na antigene koiji potiču iz namirnica pokazali smo da određene vrste hrane, kao što su mleko, mlečni proizvodi i jaja izazivaju najveći imunogeni odgovor. Određivanje nivoa antitela na

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SERUM IGG RESPONSES TO COMMON FOOD ANTIGEN IN CHILDREN AS A POSSIBLE ETOLOGICAL FACTOR IN AUTISM SPECTRUM DISORDER

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Accumulated data in recent years have shown that IgG mediated immune response following exposure to a certain food antigen is of great importance in food intolerance reaction. Investigations of children with autism spectrum disorder (ASD) implicated food sensitivity and food intolerance reactions as possible etiological factors. This study involved investigation and comparison of food antigen-specific IgG antibody levels and identification of food items that elected the greatest IgG response in serum obtained from children age 2 to 18. Serum food antigen-specific IgG antibodies were analyzed with enzyme linked immunosobent assay (AllerquantFoodAllergy Screening ELISA Kit) to 90 common food items. Results showed that food antigen-specific IgG antibody levels were negative in each food item in 1 out of 65 patients, which is 1.53 % of total number. Elevated levels of various foods in different degrees were determined in 64 patients, which is 98.46 % of total number. Highest positive food-specific IgG levels were determined in 28 patients, which is 43.07% of total number. 11 foods elected highest food-specific IgG response, particularly milk, dairy products and eggs. Applying ELISA method in serum food-specific IgG determination we demonstrated that certain foods, like milk, dairy products and eggs elect the greatest food antigen-specific IgG response. Determination of antibody titers to food antigens

specifične antigene hrane može da bude svrsishodno za identifikaciju dece sa ASD, kod kojih primena restrikcione dijete može da predstavlja medicinsku nutritivnu terapiju. Neophodna su dodatna ispitivanja radi identifikacije fenotipova određenih na osnovu odgovora na dijetetske modifikacije.

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POVEZANOST CITOMETRIJSKIH KARAKTERISTIKA LEUKOCITA I PARAMETARA ANEMIJE

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Savremeni hematološki analizatori, pored konvencionalnih parametara krvne slike, imaju mogućnost određivanja i citometrijskih parametara subpopulacija leukocita. Citometrijske karakteristike (CPD) leukocita na Beckman Coulter hematološkom brojaču LH750 podrazumevaju srednji volumen neutrofila i monocita istovremeno dajući i informaciju o njihovoj heterogenosti. Cilj ove studije je da se ispita povezanost morfometrijskih karakteristika leukocita izraženih kroz CPD i parametara anemije s obzirom da u anemiji dolazi i do morfoloških promena pojedinih populacija leukocita. U studiju je uključeno 120 poliklinčkih pacijenata Kliničkog centra Srbije (71 žena, 49 muškaraca) sa MCV 80–100 fL i C-reaktivnim proteinom manjim od 5 mg/L. Rezulati krvne slike i CPD dobijeni su na Beckman Coulter LH750 hematološkom brojaču. Podaci za CPD predstavljeni su kroz srednju vrednost i standardnu devijaciju volumena, provodljivosti i rasipanja svetlosti neutrofila, limfocita i monocita. Parametri statusa gvožđa kao i vitamina B12 i folne kiseline: serumsko gvožđe, feritin, transferin, vitamin B12, serumski folat, folat u eritrocitima, solubilni transferinski receptori i CRP određeni su na Olympus AU480® i Access®2 (Beckman Coulter Miami, Fl, USA). Pacijenti su prema WHO kriterijumima(Hb 120 g/L kod žena i Hb 130 g/L kod muškaraca) podeljeni na anemične (66)i one bez anemije (54). Statistička analiza je urađena u programu IBM® SPSS® 20. Poređenjem ove dve grupe dobijena je statistički značajna razlika uHb (118.2 g/L vs 141.6 g/L, p=0.000), MCV (90.6 fL vs 92.6 fL, p=0.012), %SAT (19.9% vs

could be useful to identify the ASD subjects in whom the implementation of a restriction diet might be considered as medical nutrition therapy. Additional investigations are required in order to identify phenotypes based on best and no responders to dietary modifications.

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THE RELATIONSHIP OF MORPHOMETRIC LEUCOCYTE PARAMETERS WITH MARKERS OF ANEMIA

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Recently, modern hematology analysers have the ability to determine the morphometric characteristics of leukocyte subpopulations in blood in addition to the conventional CBC. Cell Population Data (CPD) measured on Beckman Coulter LH750 haematology analyzer include mean neutrophil and monocyte volumes and give more information's about heterogeneity of different cell populations. The aim of this study was to determine relationship of morphometric characteristics of leucocytes with markers of anemia, with respect that certain morphological characteristics of leucocyte subpopulations follow changes of erythrocyte morphology. 120 patients, attending the Policlinic laboratory in Clinical Centre of Serbia (71 female, 49 male) with MCV 80–100 fL and hs CRP < 5mg/L, were selected. Blood samples were analyzed for CBC and CPD on the Beckman Coulter LH 750 haematology analyzer. Numerical data for CPD were reported for the mean and standard deviation of the volume, conductivity and scatter for the neutrophils, lymphocytes and monocytes. Biochemical markers of iron deficiency, as well as B12 and folate deficiency, were determined: serum iron, ferritin, transferrin, vitamin B12, serum and RBC folate, soluble transferrin receptor (sTfR) and CRP. These markers were measured using assay kits on Olympus AU480® and Access®2 (Beckman Coulter Miami, Fl, USA). Patients were divided according to WHO anemia criteria (Hb<120 g/L in women and Hb<130 g/L in men) in anemic (66) and non-anemic (54). Statistical analysis was performed by IBM® SPSS® 20. Statistical differences between anemic with non-

26.1%, p=0.007), sTfR (1.64 mg/L vs 1.44 mg/L, p=0.005), index sTfR (1.07 vs 0.81, p=0.012), NeMC (146.5 vs 144.6p=0.019), NeMS (151.4 vs 149.3 p=0.000), MoMS (127.3 vs 125.3 p= 0.000), MoVSD (18.0 vs 17.1 p=0.003), MoSSD (4.6 vs 4.4 p=0.002). Primena ANOVA analize pokazala je značajnu razliku u NeMS između grupa sa 145–180 pg/mL i više od 180 pg/mL vitamina B12 (F=3.384, p=0.034). Rezultati ove studije pokazuju da srednja vrednost i standardna devijacija volumena, provodljivosti i rasipanja svetlosti neutrofila i monocita kao citometrijske karakteristike leukocita jesu povezane sa parametrima anemije.

anemic group were found in following parameters: Hb (118.2 g/L vs. 141.6 g/L, p=0.000), MCV (90.6 fL vs. 92.6 fL, p=0.012), %SAT (19.9% vs. 26.1%, p=0.007), sTfR (1.64 mg/L vs. 1.44 mg/L, p=0.005), index sTfR (1.07 vs. 0.81, p=0.012), NeMC (146.5 vs. 144.6 p=0.019), NeMS (151.4 vs. 149.3 p=0.000), MoMS (127.3 vs. 125.3 p=0.000), MoVSD (18.0 vs. 17.1 p=0.003), MoSSD (4.6 vs. 4.4 p=0.002). ANOVA showed statically significant differences in NeMS between groups with B12 145–180 pg/mL and >180 pg/mL (F=3.384, p=0.034). Our results suggest that mean and standard deviation of the volume, conductivity and scatter for neutrophiles and monocytes as morphometric characteristics are related to the markers of anemia.

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PRODUKTI ODMAKLE OKSIDACIJE PROTEINA I ANTIOKSIDATIVNA ZAŠTITA U NORMALNOJ TRUDNOĆI

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Trudnoća je povezana sa promenama u oksidativno-antioksidativnom sistemu, sa tendencijom povećanja produkcije slobodnih radikala koje prati i povećanje antioksidativne zaštite. Produkti odmakle oksidacije proteina (AOPP), su jedan od markera oksidativnog stresa, koji predstavljaju proteinske agregate nastale stvaranjem disulfidnih mostova unakrsnim povezivanjem ditirozina. Tokom ove studije smo pratili promene AOPP i markera antioksidativne zaštite, kao i korelaciju između njih, tokom normalne trudnoće. Određivane su vrednosti AOPP kao markera oksidativnog stresa, slobodnih sulfhidrilnih grupa (SH) i aktivnost superoksid dismutaze (SOD) kao markera antioksidativne zaštite i prooksidativno-antioksidativni balans (PAB), u serumu 43 trudne žene u 1-om, 2-om i 3-em trimestru, pre (38-a nedelja trudnoće) i posle (7 nedelja) porođaja i u serumu 45 žena koje nisu bile trudne. AOPP je određivan metodom koju su postavili Witko-Sarsat, SOD je određivan metodom koju su postavili Mirsa i Fridovic, za određivanje SH grupa korišćena je ditiobis-nitrobenzoeva kiselina a PAB je određivan modifikovanov

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ADVANCED OXIDATION PROTEIN PRODUCTS AND ANTIOXIDATIVE DEFENCE IN NORMAL PREGNANCY

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Pregnancy is associated with changes in the oxidative-antioxidative systems with the tendency towards the increase of free radical production with an accompanying increase in the antioxidative defense. The values of advanced oxidation protein products (AOPP) are one group of markers of oxidative stress which represent protein agregates created by the formation of disulphide bridges made by cross-bonding of dityrosine. During this study we observed the changes in AOPP and the markers of antioxidative defense, as well as the corelation among them, during a normal pregnancy. We determined the values of AOPP as markers of oxidative stress, free sulfhydryl groups (SH) and activities of the enzym superoxide dismutase (SOD), as markers of antioxidative defense and pro-oxidative/oxidative balance (PAB) in sera of 43 pregnant women in 1st, 2nd and 3rd trimester, before (38th week of gestation) and after (7th week) delivery, as well as in 45 samples of sera of non-pregnant women. AOPP was determined by the method established by Witko-Sarsat, SOD by the method established by Mirsa and Fridovic, SH

metodom pomoću 3, 3',5, 5'-tetramethylbenzidina. Za poređenje parametara koristili smo Analizu varijanse a odnose između njih smo testirali neparametarskom Spearmanovom korelacijom. Rezultati pokazuju da vrednosti AOPP progresivno rastu tokom trudnoće a neposredno pred porođaj su značajno više u odnosu na vrednosti kod žena koje nisu bile trudne ($p<0,001$). Vrednosti ukupnih SH grupa tokom prvog i drugog trimestra, kao i neposredno pred porođaj su značajno niže u odnosu na vrednosti u ostalim trimestrima trudnoće i u kontrolnoj grupi ($p<0,037$, $p<0,001$, $p<0,037$). Aktivnost SOD se postepeno povečava tokom trećeg trimestra, neposredno pred porođaj i posle porođaja u odnosu na aktivnost kod žena koje nisu bile trudne (sva tri $p<0,001$). Vrednosti PAB se značajno povećavaju od drugog, tokom trećeg trimestra i neposredno pred porođaj (sva tri $p<0,001$) u odnosu na vrednosti kod žena koje nisu bile trudne. Dobijeni rezultati ukazuju da tokom svih perioda trudnoće, vrednosti AOPP pozitivno koreliraju sa vrednostima ukupnih SH grupa. Neposredno pred sam porođaj vrednosti AOPP pokazuju značajnu pozitivnu korelaciju sa vrednostima PAB ($\rho=0,422$, $p<0,05$). Tokom normalne trudnoće dolazi do povećanja oksidativnog stresa ali se takođe povećavaju i mehanizmi antioksidativne zaštite.

groups were determined by dithiobis-nitrobenzoic acid, while PAB was determined by the modified method using 3, 3', 5, 5'- tetramethylbenzidine. The results were compared by using the analysis of variance method, while their mutual influences were tested by nonparametric Spearman's correlation. The results show that the values of AOPP increase progressively during pregnancy, immediately before delivery they are significantly higher in comparison to the values obtained from the women who were not pregnant ($p<0.001$). The values of total free SH groups during the first and second trimester, as well as immediately before the delivery, were significantly lower in comparison to the values in other trimesters of pregnancy and in the control group ($p<0.037$, $p<0.001$, $p<0.037$ respectively). The activity of SOD increases gradually during the third trimester, immediately before the delivery and after the delivery in comparison to the activity of women who were not pregnant (all three values $p<0.001$). PAB increases significantly starting from the second trimester, during the third trimester and immediately before the delivery (all three values $p<0.001$), in comparison to the values obtained from the women who were not pregnant. The obtained results indicate that during all periods of pregnancy the values of AOPP correlate positively with the values of the free SH groups. Immediately before the delivery the values of AOPP show a significant positive correlation with the values of PAB ($\rho=0.422$, $p<0.05$). During a normal pregnancy oxidative stress increases, but the mechanisims of antioxidative defense increase as well.