POSTERSKE SEKCIJE

POSTER SESSIONS

SEKCIJA/SESSION A

UDK 577.1 : 61 **ISSN 1452-8258**

J Med Biochem 29: 411–433, 2010

Posterske sekcije
Poster sessions

A1
UČESTALOST SEKUNDARNOG HIPERPARATIREOIDIZMA KOD ŽENA SA POSTMENOPAUZALNOM OSTEOPOROZOM

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Paratiroidni hormon (PTH) uključen je u metabolizam kalcijuma. Kod starijih žena povećava se koncentracija PTH i resorpcija kostiju što doprinosi staračkom gubitku koštane mase. Smatra se da manjak vitamina D izaziva sekundarni hiperparatireoidizam, ubrzan metabolizam kostiju, smanjenu mineralizaciju, prelome kuka i druge frakture. Cilj ove studije je bio da se ispita učestalost sekundarnog hiperparatireoidizma kod žena sa postmenopauzalnom osteoporozom. Takođe, određivan je nivo vitamina D (25OHD) u serumu i povezanost između 25OHD i PTH. Ispitano je 105 žena u postmenopauzi prosečne starosti 65,5 ±9,1 god. (46–84 god.). Iz studije su isključene bolesnice sa primarnim hiperparatireoidizmom, diabetes mellitusom i poremećajima štitaste žlezde. Vitamin D i PTH su mereni pomoću imunotestova zasnovanih na metodi elektrohemiluminiscencije (Roche Diagnostics, Elecsys 2010). Mineralna gustina kostiju (BMD) određivana je DXA metodom u predelu kičme i kuka. Srednje vrednosti 25OHD i PTH su bile 51,04± 21,84 nmol/L i 58,04±28,62 pg/mL (n=105). Dobijene su snižene vrednosti 25OHD (<75 nmol/L) kod n=90 (85,7%), i povišene vrednosti PTH (>65 pg/mL) kod n=25 (23,7%) ispitanica. Takođe, dobijene su vrednosti BMD u predelu kičme (L1-L4) 0,820±0,117, T-skor –2,61±0,97 i u predelu kuka BMD 0.757±0.106, T-skor –1,85±0,106. Zabeležena je i značajna negativna korelacija između 25OHD i PTH (r= –0,495, p<0,001). Dobijeni rezultati pokazuju da je sekundarni hiperparatireoidizam prisutan kod jedne četvrtine žena sa postmenopauzalnom osteoporozom, dok je manjak vitamina D mnogo češći. Osim toga, rezultati ukazuju da je resorpcija kostiju samo delimično zavisna od PTH.

A1
PREVALENCE OF SECONDARY HYPERPARATHYROIDISM IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Parathyroid hormone (PTH) is related with calcium metabolism. PTH and bone resorption increase in elderly women and contribute to age-related bone loss. It is believed that vitamin D deficiency causes secondary hyperparathyroidism, high bone turnover, mineralization defects, and hip and other fractures. The aim of this study was to assess the prevalence of secondary hyperparathyroidism in postmenopausal women with osteoporosis. Also, we evaluated the serum levels of vitamin D (25OHD) and the relationship between 25OHD and PTH. A total of 105 postmenopausal women with a mean age of 65.5±9.1 yrs (46–84 yrs) were examined. The patients with primary hyperparathyroidism, diabetes mellitus and thyroid disorders were excluded. Measurements of 25OHD and PTH were performed using electrochemiluminescence immunoassays (Roche Diagnostics, Elecsys 2010). Bone mineral density (BMD) was measured by the DXA method in the spine and hip area. The means of 25OHD and PTH were 51.04±21.84 nmol/L and 58.04±28.62 pg/mL (n=105). Decreased values of 25OHD (<75 nmol/L) in n=90 (85.7%), and increased values of PTH (>65 pg/mL) in n=25 cases (23.7%) were obtained. The BMD values for the lumbar spine (L1-L4) 0.820± 0.117, T-score –2.61± 0.97 and for the total hip BMD 0.757±0.106, T-score –1.85±0.106 were found. A strong inverse correlation between 25OHD and PTH (r= –0.495, p<0.001) was detected. The obtained results show that secondary hyperparathyroidism appeared in one fourth of the postmenopausal women with osteoporosis, while vitamin D deficiency was more frequent. Moreover, results suggest that only a part of bone resorption is PTH-dependent.

A2
AKTIVNOSTI ENZIMA PROKSIMALNIH TUBULA U URINU PACIJENATA TRETIRANIH CEFALEKSINOM

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Radi utvrđivanja nefrotoksičnosti cefaleksina, polisintetskog cefalosporina prve generacije, određivana je aktivnost enzima dominantno lokalizovanih u proksimalnim tubulama, alaninaminopeptidaze (AAP), γ-glutamiltransferaze (GGT) i N-acetil-β-D-glukozaminidaze (NAG). Aktivnosti enzima su određivane u uzorku 12-časovnog urina kod 30 pacijenata koji su primali cefaleksin i kod 30 ispitanika kontrolne grupe. Među ispitanicima su bila zastupljena oba pola i bili su starosti od 3 do 10 godina. Terapija cefaleksinom, u dozama od 50 mg/kg telesne mase dnevno, sprovođena je do 15 dana. Značajne razlike u aktivnostima AAP i GGT, u U/mmol kreatinina, između eksperimentalne i kontrolne grupe, registrovane su devetog dana ($p<0,01$) i NAG dvanaestog dana ($p<0,05$) sprovođenja terapije. Može se zaključiti da čak i petnaestodnevna terapija normalnim dozama cefaleksina uslovljava nefrotoksične efekte. Povišene aktivnosti AAP i GGT su rani, ekstremno senzitivni indikatori nefrotoksičnosti, dok je NAG dijagnostički enzim većih oštećenja proksimalnih tubula izazvanih cefaleksinom i njegova aktivnost je mera kumulativne nefrotoksičnosti cefaleksina.

A2
URINARY ACTIVITIES OF PROXIMAL TUBULE ENZYMES IN PATIENTS TREATED WITH CEPHALEXIN

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In order to determine the nephrotoxicity of cephalexin, a semisynthetic first-generation cephalosporin, activity of the enzymes dominantly localized in proximal tubules, i.e. alanine aminopeptidase (AAP), γ-glutamyl transferase (GGT) and N-acetyl-β-D-glucosaminidase (NAG) was examined. We studied the enzyme activities in 12-hour urine samples in 30 patients who received cephalexin and in 30 similar control patients. The patients were of both sexes, with an age range of 3–10 years. The treatment was conducted for a period of up to 15 days using cephalexin in doses of 50 mg/kg body weight daily. A significant difference in AAP and GGT activities, in units/mmol creatinine, between the experimental and control group was noted on the 9th day ($p<0.01$) and in NAG activities on the 12th day ($p<0.05$) of therapy. It can be concluded that even a 15-day cephalexin treatment with normal doses induces nephrotoxic effects. High urinary AAP and GGT levels are one of the earliest and extremely sensitive indicators of nephrotoxicity, but the enzyme for the diagnosis of cephalexin-induced renal tubular damage is NAG and it is a measure of the cumulative nephrotoxicity of cephalexin.

A3
LIPIDNI STATUS ŽENA U GESTACIJSKOM DIABETES MELLITUSU

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Gestacijski diabetes mellitus (GDM) predstavlja povećani rizik za ishod same trudnoće kao i za zdravlje majke i novorođenčeta. Komplikacije po majku su hipertenzija, preeklampsija, spontani abortus, prevremeni porođaj i infekcije, a po plod makrosomija (beba teža od 4000 g), urođene anomalije, intrauterina smrt, porođajne traume, hipoglikemija, žutica i oštećenje plućne funkcije. Cilj ovog rada je da se odredi lipidni profil žena sa GDM. Ispitano je 30 žena sa GDM u drugom i trećem trimestru trudnoće, starosne dobi

A3
LIPID STATUS OF WOMEN WITH GESTATIONAL DIABETES MELLITUS

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Gestational diabetes mellitus (GDM) represents an increased risk of poor pregnancy outcome as well as to the mother and newborn child's health. Complications to the mother are: hypertension, preeclampsia, miscarriage, premature birth and infection and to the new bornchild macrosomia (birthweight above 4000 g), inborn anomalies, intrauterine death, birth trauma, hypoglycemia, jaundice and pulmonary function failure. The purpose of this paper work is to determine the lipid profile of women with GDM.

22–42 godine. Kontrolnu grupu činilo je 20 žena, starosti 19–40 godina između 24. i 32. nedelje gestacije. Kod svih trudnica urađen je oralni test tolerans glukoze (oGTT) sa 100 g glukoze, gde su merene koncentracije glukoze u krvi (GOD-PAP metod, »Siemens«) u toku tri sata – O'Sullivan test, glikohemoglobin-HbA1c (imunoturbidimetrija, »Siemens«) i parametri lipidnog statusa: ukupni holesterol (Allainova metoda), triglyceridi (PAP metoda), HDL-holesterol (direktni enzimski test), LDL-holesterol (izračunat po Friedewaldovoj formuli) i aterogeni indeksi (ukupni holesterol/HDL-holesterol i LDL-holesterol/HDL-holesterol). Rezultati pokazuju da žene sa GDM u toku oGTT imaju statistički značajno više koncentracije glukoze natašte, posle 1 h, 2 h i 3 h u odnosu na kontrolnu grupu ($p<0,05$). Nivo HbA1c je značajno viši u ispitivanoj grupi. Ukupni holesterol i trigliceridi su statistički značajno povišeni u odnosu na kontrolnu grupu ($p<0,05$), dok su HDL-holesterol i aterogeni faktori rizika neznačajno niži u poređenju sa kontrolom ($p>0,05$). Nalazi pokazuju da je GDM povezan sa hiperlipidemijom. Kod ovih žena postoji rizik od razvoja preeklampsije, pa je značajno odrediti lipidni status u okviru prenatalne zaštite jer to pomaže ranom otkrivanju i lečenju preeklampsije.

Thirty women with GDM in the second and third trimester of pregnancy, between 22 and 42 years were tested. The control group consisted of 20 women, between 19 and 40 years of age and between 24 and 32 weeks of gestation. All pregnant women were subjected to the oral glucose tolerance test (oGTT) with 100 g of glucose, where glucose concentrations in blood (GOD-PAP method »Siemens«) within 3h – O'Sullivan's test, glycohemoglobin–HbA1c (immunoturbidimetric method »Siemens«) and parameters of lipid status: total cholesterol (Allain's method), triglycerides (PAP method), HDL-cholesterol (direct enzyme test), LDL-cholesterol (calculated by Friedewald formula) and atherogenic indices (total cholesterol/HDL-cholesterol and LDL-cholesterol/HDL-cholesterol) were measured. Results show that women with GDM during oGTT have statistically significantly higher glucose concentration on empty stomac, after 1 h, 2 h and 3 h compared to control group ($p<0.05$). The level of HbA1c is remarkably higher in the tested group. Total cholesterol and triglycerides are statistically significantly increased compared to control group ($p<0.05$), while HDL-cholesterol and atherogenic factors of risk are insignificantly lower compared to the control group ($p>0.05$). Results show that GDM is linked to the hyperlipidemia. These women are under risk to develop preeclampsia and it is important to determine the lipid status within prenatal care because this is helping to detect and cure preeclampsia early.

A4
NIVO GLUTATIONA I AKTIVNOST GSH-ZAVISNIH ENZIMA U SOČIVIMA PACIJENATA SA SENILNOM KATARAKTOM

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Redukovani glutation (GSH), kao neproteinsko tiol jedinjenje, u sočivu ima ulogu u zaštiti tiol grupa sočivnih proteina i kao supstrat enzima glutation-peroksidaze (GPx) i glutation-S-transferaze (GST). Proteini koji sadrže tiol grupe su značajni za normalnu funkciju epitela sočiva tj. enzima Na-K-ATPaze, čime utiču na ćelijsku propustljivost. Odnos GSH/GSSG je normalno visok u sočivu i drugim okularnim tkivima, zahvaljujući glutation-redoks ciklusu, koji je lokalizovan u epitelu sočiva i površinskom korteksu. Biohemijska ispitivanja izvršena su na sočivima 101 operisa-

A4
LENTICULAR GLUTATHIONE LEVEL AND ACTIVITIES OF GSH-COUPLED ENZYMES IN AGE-RELATED CATARACT PATIENTS

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The reducing compound glutathione (GSH) exists in high concentration in the lens where it functions as an essential antioxidant vital for the maintenance of the tissue transparency. An active glutathione redox cycleis located in the lens epithelium and superficial cortex. Depletion of GSH or inhibition of the redox cycle allows low levels of oxidant to damage lens epithelial targets such as Na/K-ATPase, certain cytoskeletal proteins and proteins associated with normal membrane permeability. Clinical and biochemical research was carried out in 101 patients with

nog pacijenta sa dijagnozom senilne katarakte i to 46 osoba ženskog i 55 osoba muškog pola. Prema stepenu maturiteta katarakte, bolesnici su grupisani u dve grupe: cataracta senilis incipiens (N=41) i cataracta senilis matura (N=60). Koncentracija GSH je određivana pomoću Ellmanovog reagensa. Aktivnost GPx je određivana pomoću kumolhidroperoksida, kao supstrata, a GST praćenjem brzine formiranja konjugata glutationa i 1-hlor-2,4-dinitrobenzena, na 340 nm. Rezultati pokazuju da je koncentracija GSH značajno veća u sočivima sa početnom u odnosu na sočiva sa maturnom kataraktom (p<0,001). Aktivnosti enzima GPx i GST značajno su veće u sočivima sa početnom u odnosu na sočiva sa maturnom kataraktom (p<0,001). S napredovanjem kataraktogeneze iscrpljuju se antioksidansi sočiva od, kojih je GSH najvažniji. Time se smanjuje i količina raspoloživog GSH, neophodnog za funkciju GPx i GST, pa je i aktivnost ovih enzima značajno smanjena kod maturne katarakte. Ovakve promene su odraz izraženijih oksidacionih procesa, pojačanih stvaranjem toksičnih produkata lipidne peroksidacije u odnosu na oslabljeni antioksidacioni kapacitet sočiva tokom kataraktogeneze.

age-related cataract, 46 women and 55 men. The average age of the group was 72.47 (SD ± 7.98). According to the cataract maturity degree, the patients were classified into two groups as follows: cataracta senilis incipiens (N=41) and cataracta senilis matura (N=60). Total lens GSH was determined using Ellman's reagent. The GPx activity was assayed with cumene hydroperoxide as substrate, monitored at 412 nm. The conjugation of GSH with 1-chloro-2-4-dinitro-benzene, a hydrophilic substrate, was examined spectrophotometrically at 340 nm to measure GST activity. Significantly higher GSH concentration in lenses was measured in the patients with cataracta senilis incipiens (p<0.001), as well as a higher activity of GPx and GST (p<0.001). Results indicate that the loss of the lens GSH is related to the progression of cataract. Also, the results show that GPx and GST activities are significantly lower in lenses with cataracta senilis matura. Decreased activity of the GPx and GST in cataractous lenses may be the consequence of a deficiency in reduced glutathione. Increased production of free radicals, consumption of antioxidant, and oxidation of unsaturated lipids may play an important role in age-related cataract development.

A5
NIVO LIPOPROTEINA (a) U KRVI U NESTABILNOJ ANGINI PEKTORIS I AKUTNOM INFARKTU MIOKARDA

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Lipoprotein (a) (Lp(a)) ima važnu ulogu u aterotrombogenezi i u vezi je sa povećanim rizikom za razvoj vaskularne bolesti. Visoki nivoi lipoproteina (a) povezani su sa akutnim koronarnim sindromom, te smo stoga istraživali ovu vezu kod pacijenata sa akutnim infarktom miokarda (AIM) i nestabilnom anginom pektoris (NAP). Serumski nivo totalnog holesterola, triglicerida, LDL-holesterola i HDL-holesterola meren je uz pomoć komercijalnih testova. Nivo Lp(a) je određen iz uzoraka krvi pomoću metode ELISA. Apolipoprotein A_1 (apo A_1) i apolipoprotein B (apo B) su određivani imunoturbidimetrijski. U naše istraživanje su uključena 43 pacijenta s AMI i 40 pacijenata s NAP, i njihovi rezultati su poređeni s 28 zdravih osoba. Srednja vrednost ± SD nivoa Lp(a) iznosila je 22,38 ± 8,35 g/L kod pacijenata s AMI i 32,20 ± 22,42 g/L kod pacijenata s NAP, a srednja vrednost ± SD nivoa Lp(a) u kontrolnoj grupi je bila 8,13 ± 5,0 mg/dl. Nivoi Lp(a) u plazmi su bili značajno viši, kako kod pacijenata s AMI (p<0,001), tako i kod

A5
LIPOPROTEIN (a) BLOOD LEVELS IN UNSTABLE ANGINA PECTORIS AND ACUTE MYOCARDIAL INFARCTION

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Lipoprotein (a) (Lp(a)) plays an important part in atherothrombogenesis and has been associated with an increased risk of vascular disease. High lipoprotein (a) levels have been linked to acute coronary syndrome, so we investigated this relation in patients with acute myocardial infarction (AMI) and unstable angina pectoris (UAP). Total serum cholesterol, triglycerides, LDL-cholesterol (LDL-c), HDL-cholesterol (HDL-c) were measured using commercially available tests. Lipoprotein (a) level was measured in blood samples by an ELISA method. Apolipoprotein A_1 (apo A_1) and apolipoprotein B (apo B) were determined by an immunoturbidimetric method. Our study included 43 AMI patients and 40 UAP patients and their results were compared with 28 healthy individuals. The mean ± SD Lp(a) levels were 22.38 ± 8.35 g/L in AMI patients and 32.20 ± 22.42 g/L in UAP patients, but the mean ± SD Lp(a) in the control group were 8.13 ± 5.0 g/L. Plasma Lp(a) levels were significantly higher both in AMI patients (p<0.001)

onih s NAP ($p<0,001$), u poređenju s kontrolnom grupom. Sem triglicerida, nije nađeno statistički značajno povećanje nivoa holesterola, LDL-holesterola i apo B. Statistički signifikantno sniženje HDL-holesterola ($p<0,05$) i apo A_1 ($p<0,001$) nađeno je u oba oboljenja. Ovi rezultati pružaju dokaze koji potvrđuju uzročnu ulogu Lp(a) u razvoju ateroskleroze. Merenje lipoproteina (a) može se koristiti za određivanje osoba sa visokim rizikom za razvoj nestabilne angine pektoris i akutnog infarkta miokarda kod kojih se može primeniti agresivnija terapija u redukciji LDL-holesterola.

and UAP patients ($p<0.001$) as compared with controls. No statistically significant increase in cholesterol, LDL-c and apo B levels was found, except in triglycerides. Statistically significant decrease in HDL-c ($p<0.05$) and apo A_1 ($p<0.001$) was obtained in both diseases. These findings provide evidence in support of a causal role for Lp(a) in the development of atherosclerosis. Lipoprotein (a) testing can be used to identify individuals at high risk for developing unstable angina pectoris and acute myocardial infarction who might benefit from more aggressive LDL-c reduction therapy.

A6
FAKTOR TUMORSKE NEKROZE-α I INTERLEUKIN-10 KOD BOLESNIKA SA SISTEMSKIM LUPUSOM ERITEMATODESOM

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Prototip sistemskih autoimunskih bolesti je sistemski lupus eritematozus (SLE). Mnogobrojni faktori mogu bitno uticati na nastanak SLE ali i na dalji razvoj bolesti sa zahvatanjem različitih organa i pojavu karakterističnih simptoma i znakova bolesti. U ovom radu su određivane vrednosti faktora tumorske nekroze-α (TNF-α) i interleukina-10 (IL-10) u serumu bolesnika sa SLE. Kompletna laboratorijska obrada biološkog materijala omogućila je klasifikaciju bolesnika sa SLE (n=55) na sledeće grupe: pacijenti sa predominantnom kožnom manifestacijom bolesti, D-SLE; pacijenti sa neurolupusom, N-SLE; pacijenti sa promenama na zglobovima, A-SLE; pacijenti sa manifestnim promenama na krvnim sudovima – vaskulitisom,V-SLE, dok je kontrolnu grupu sačinjavalo 20 dobrovoljnih davalaca krvi. Koncentracija TNFα i IL-10 je određivana komercijalnim ELISA testovima. Najveći porast TNF-α je zabeležen kod bolesnika sa neurolupusom ($P<0,001$) i promenama na zglobovima ($P<0,01$), dok kožni i vaskularni oblik imaju manji stepen značajnosti ($P<0,05$). Poređenjem između grupa dobijeno je značajno povećanje TNF-α u A-SLE i N-SLE u odnosu na V-SLE ($P<0,05$). Porast koncentracije IL-10 je statistički značajan kod bolesnika sa neurolupusom (16,25 ± 4,31 pg/mL) i vaskularnim lupusom (15,23 ± 2,18 pg/mL) u odnosu na kontrolu (5,13 ± 1,51, za $P<0,01$), i kožnim oblikom oboljenja (12,87 ± 2,28 pg/mL) gde je značajnost nešto manja ($P<0,05$). Rezultati ovog rada ukazuju da TNF-α može biti od posebnog značaja u razvoju neurološke manifestacije bolesti. Oslobođen iz inflamatornih ćelija u cirkulaciji, indukuje perifernu vazodilataciju, porast vaskularnog permeabiliteta i menjanje funkcije endotela, favorizujući trombozu. Povećanje IL-10 može se pripisati porastu njegove produkcije u

A6
TUMOR NECROSIS FACTOR-α AND INTERLEUKIN-10 IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Systemic lupus erythematosus (SLE) is a prototype of systemic autoimmune diseases. Numerous factors can influence the onset of SLE and development of some clinical disease manifestations with various organ involvements and occurrence of characteristic symptoms and disease signs. This paper studies the values of tumor necrosis factor-α (TNF-α) and interleukin-10 in the serum of patients with SLE. Complete laboratory processing of the biomaterial enabled classification of SLE patients (n=55) into the following groups: patients with predominant cutaneous disease manifestation, D-SLE; patients with neurolupus, N-SLE; patients with joint changes, A-SLE; patients with blood vessel changes–vasculitis, V-SLE. Twenty blood donors comprised the control group. Concentration of TNF-α and IL-10 was determined by commercial ELISA tests. The increase of the TNF-α was highest in patients with neurolupus ($P<0.001$) and joint disease ($P<0.01$), while cutaneous and vascular forms were of lesser significance ($P<0.05$). Comparing the groups, we noticed significant TNF-α increase in joint and neurolupus related to vascular SLE ($P<0.05$). The increase of the IL-10 concentration is of statistical significance in neurolupus patients (16.25 ± 4.31 pg/mL) and in vascular disease (15.23 ± 2.18 pg/mL) compared to controls (5.13 ± 1.51, for $P<0.01$) as well as in skin disease (12.87 ± 2.28 pg/mL), with a somewhat lower significance of $P<0.05$. The results of this paper indicate that TNF-α can be of special importance in the N-SLE pathology. TNF-α released from inflammatory cells act synergistically in the circulation, inducing peripheral vasodilatation, increase of vascular permeability and alteration of endothelial function favoring

monocitima i vrlo često je povezano sa neuropsihijatrijskim manifestacijama bolesti. Inhibitori produkcije citokina se intenzivno istražuju kao potencijalna terapeutska sredstva u različitim imunološkim bolestima.

thrombosis. Increased IL-10 can be attributed to its increased production in monocytes and associated with neuropsychiatric menifestations of the disease. Inhibitors of cytokine production are being extensively studied as potential therapeutics in various immunologic diseases.

A7
ANEMIJA KAO INDIKATOR U ISHODU BOLESTI KOD PACIJENATA NA HEMODIJALIZI

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Uprkos uobičajenoj upotrebi rekombinantnog humanog eritropoetina (rhEPO), anemija je često prisutna kod pacijenata na hemodijalizi. Za nastanak anemije odgovorna su tri patofiziološka mehanizma: smanjena sinteza eritropoetina, skraćen životni vek eritrocita, inhibicija sinteze HEM-a i diferencijacija matičnih eritropoetskih ćelija koštane srži. Anemija kod pacijenata sa hroničnom bubrežnom insuficijencijom je normocitna i normohromna. Krvna slika pokazuje smanjen broj eritrocita i koncentraciju hemoglobina, uz normalnu ili blago sniženu vrednost prosečnog volumena eritrocita (MCV). Cilj ovog rada je bio da se proceni uticaj anemije na preživljavanje pacijenata sa hroničnom bubrežnom insuficijencijom i da se dokaže da je anemija glavni uzrok smanjenog odgovora na terapiju rekombinantnim humanim EPO. Laboratorijsku obradu pacijenata smo vršili pre i posle hemodijalize a kod pacijenata koji su bili na terapiji lekovima koji stimulišu eritropoezu analize su vršene samo pre početka terapije. Ispitivanje anemije je sprovedeno na 53 pacijenta na hemodijalizi, 26 muškaraca i 27 žena prosečne starosti 54,5 ± 10,0. Dijagnostička obrada je vršena kod koncentracija hemoglobina manjih od 110 g/L. Upoređivanje koncentracije hemoglobina i hematokrita je pokazalo statistički značajnu razliku ($p<0,001$), kao i upoređivanje procenta hipohromnih eritrocita sa hemoglobinom. Upoređivanje MCV sa vitaminom B12 nije pokazalo statistički značajnu razliku ($p=0,289$), kao ni upoređivanje sa folnom kiselinom ($p=0,274$). Jedno od ključnih područja nefrologije koje može uticati na ishod bolesti kod pacijenta na hemodijalizi je lečenje anemije u smislu poboljšanja kvaliteta života.

A7
ANEMIA AS AN OUTCOME PREDICTOR IN HEMODIALYSIS PATIENTS

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Despite the prevalent use of recombinant human erythropoietin (rhEPO), anemia is a frequent finding in hemodialysis patients. It develops due to: decreased synthesis of erythropoietin, shortened life cycle of erytrocytes, inhibition of HEM synthesis and differentiation of hemathopoesis matrix cells. Anemia in chronic kidney disease patients is normocytic and normochromic with normal or elevated erythrocyte volume and normal or slightly lower value of MCV. The aim of the study was to evaluate the impact of anemia on patient survival and characterize the determinants of hematopoiesis that may be amenable to therapeutic manipulation to enhance rhEPO responsiveness and reduce death risk. Laboratory analyses have been made before and after the hemodialysis procedure in patients receiving hemodialysis. Anemia examinations were made in 53 patients: 27 female and 26 male, average age 54.5 ± 10.0. Two groups of patients have been followed: one group with Hb values below 110 g/L and the other group with Hb values above 110 g/L. Using multiple linear regression, variables of rhEPO administration (rhEPO dose and percentage of treatments that were administered), variables of iron status (serum iron, transferrin saturation and ferritin) and the dose of dialysis were found to be significantly associated with hemoglobin concentration ($p<0.001$). Comparison between MCV and vitamin B12 values has not shown statistically significant difference ($p=0.289$). Also, comparison of MCV and folic acid values reveals no significant difference ($p=0.274$). Anemia may be predictive of an increased risk of mortality in some hemodialysis patients. The correction of anemia may be a relatively simple means in order to influence the outcome of the disease and to improve the quality of life for hemodialysis patients.

A8
ENZIMI I IZOENZIMI U KARCINOMIMA I DISPLAZIJAMA DOJKE

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Biohemijske analize, promena ukupne aktivnosti enzima i profil izoenzima (laktat-dehidrogenaza (LDH), piruvat-kinaza (PK), heksokinaza (HK), gama-glutamil-transpeptidaza (GGT), alkalna fosfataza (ALP) i AMP-dezaminaza) u karcinomima i displazijama dojke pružaju značajnu mogućnost za ranu dijagnostiku maligne neoplazme. Analizirano je ukupno 110 uzoraka karcinoma i 40 uzoraka displazija dojke. Najveći broj displazija dojke bio je I i II stepena. Aktivnost enzima merena je spektrofotometrijskim metodama, dok je izoenzimski profil analiziran disk-elektroforezom na gelu poliakrilamida. Nađeno je da je aktivnost pomenutih enzima signifikantno veća, i to deset puta više u svim ispitivanim uzorcima karcinoma dojke u odnosu na displazije dojke. Posebno velika razlika postoji u aktivnosti K_4-izoenzima piruvat-kinaze, koja je u karcinomima dojke oko 50 puta veća nego u displazijama dojke. Ni u jednom uzorku karcinoma dojke nije detektovan termostabilan oblik, tj. Reganov izoenzim alkalne fosfataze. Naši eksperimentalni podaci nedvosmisleno ukazuju da je veliki procenat karcinoma dojke (88%) povezan sa pojavom LDH_5 izoenzima, dok ovaj oblik izoenzima nije nađen ni u jednom analiziranom uzorku displazije dojke. Prema našim rezultatima, posebno onima koji se odnose na profil izoenzima LDH_5 i K_4-PK, može se zaključiti da bi njihovo određivanje pružilo značajne mogućnosti u proučavanju maligne transformacije.

A8
ENZYMES AND ISOENZYMES IN BREAST DYSPLASIA AND CANCER

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Biochemical analyses of the enzyme activity and isoenzyme profile (lactate dehydrogenase (LDH), pyruvate kinase (PK), hexokinase (HK), gamma-glutamyl transpeptidase (GGT), alkaline phosphatase (ALP), and AMP-deaminase) in breast cancer and dysplasia samples present an important biomarker for the early diagnosis of malignant neoplasm. We have analyzed 110 samples of breast carcinoma and 40 samples of breast dysplasias. The majority of dysplasia samples were grade I and II. The enzyme activity was analyzed spectrophotometrically by a kinetic method, and the isoenzyme profile was determined by disc electrophoresis on polyacrylamide gel. Our results show that the activity of enzymes is significantly increased (ten-fold) in all analyzed samples of breast cancer, in comparison to samples of breast dysplasia. Special emphasis is on the activity of the K_4-isoenzyme of PK, with a 50-fold increase in breast cancer compared to dysplasia samples. In our set of 110 breast cancer samples, we did not detect the thermostable Regan isoenzyme of ALP. Our results indicate that the majority of breast cancer samples (88%) show LDH_5 isoenzyme predominance, while this type of isoenzyme profile was not detected in any of the dysplasia samples. According to all our results, specially regarding the LDH_5 and K_4-PK isoenzyme profile, we may conclude that the enzyme activity estimation and isoenzyme profiling may be used as important biomarkers of malignant transformation.

A9
ISPITIVANJE POVEZANOSTI STAROSNE DOBI, POLA I DUŽINE DIJALIZE SA PARATHORMONOM U SERUMU PACIJENATA SA RENALNOM OSTEODISTROFIJOM

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Renalna osteodistrofija je prateća komplikacija renalne insuficijencije, naročito izražena kod uremičkih bolesnika na trajnoj dijalizi. Istraživana je korelacija parathormona (PTH) sa koncentracijom kreatinina, umnoskom kalcijuma i fosfora, i sa pojedinim

A9
INVESTIGATION OF THE RELATIONSHIP BETWEEN AGE, SEX AND LENGTH OF DIALYSIS AND PARATHORMONE IN SERUM OF PATIENTS WITH RENAL OSTEODYSTROPHY SYMPTOMS

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Renal osteodystrophy as a complication of renal failure is particularly marked in patients on permanent uremic dialysis. The correlation was studied between parathormone (PTH) and creatinine concentration,

faktorima: starosna dob, dužina trajanja dijalize i pol pacijenata sa dijagnozom renalne osteodistrofije na hemodijalizi (ROD). Koncentracije metabolita i elektrolita određene su standardnim metodama; PTH po principu hemiluminescencije, ref. vrednosti: 14.0–72.0 pg/mL. Analizom je obuhvaćeno 46 pacijenata oba pola u terminalnoj fazi HBI na programu hemodijalize sa simptomima ROD. Prosečna starost bolesnika iznosila je 58,2 ± 11,1 godina. Svi ispitanici su razvrstani prema dužini trajanja hemodijalize: I grupa (do 5 god.), II (5–10 god.) i III sa najdužim trajanjem >10 god, i prema nivou PTH u 4 grupe: I do 300 pg/mL, ($\bar{x}$=206,6 ± 67,9 pg/mL), II 300–600 pg/mL, ($\bar{x}$=445,9 ± 86,9 pg/mL), III 601–1000 pg/mL ($\bar{x}$=797,4 ± 104,8) i IV>1001 pg/mL ($\bar{x}$=1443,77 + 350,2). Rastući nivo hormona prati statistički značajno povećanje koncentracija fosfora i umnoška jona kalcijuma i fosfora (p=0,0021, p<0,05). Starosna dob i nivo PTH nemaju statističku značajnost p=0,0855 p>0,5. Takođe, nema značajne korelacije PTH i dužine dijalize, p=0,162 p>0,05. Sekundarni hiperparatireoidizam sa izraženim nivoom PTH>1000 pg/mL imalo je 14 pacijenata a 6 bolesnika >2000 pg/mL. Adekvatno lečenje renalne osteodistrofije doprinosi smanjenju mortaliteta pacijenata na dijalizi i poboljšanju kvaliteta života.

multiple calcium and phosphorus, and certain factors: age, length of service and gender of hemodialysis patients diagnosed with renal osteodystrophy (ROD). The concentrations of metabolites and electrolytes were determined by standard methods, the principle of PTH chemiluminescence, ref. values: 14.0–72.0 pg/mL. The analysis included 46 patients of both sexes in the terminal phase of HBI on a hemodialysis program with symptoms of ROD. The average patient age was 58.2 ± 11.1 years. All subjects were classified according to: the length of hemodialysis treatment Group I (up to 5 years), II (5–10 years) and III with the longest duration >10 years, and the level of PTH into 4 groups – up to 300 pg/mL ($\bar{x}$ = 206.6 ± 67.9 pg/ml/L), II 300–600 pg/mL ($\bar{x}$ = 445.9 ± 86.9 pg/mL), III 601–1000 pg/mL ($\bar{x}$ = 797.4 ± 104.8) and IV >1001 pg/mL ($\bar{x}$ =1443.77 ± 350.2). Growing levels of hormones followed the significantly increased concentration of phosphorus, and multiple ions of calcium and phosphorus (p=0.0021, p<0.05). Age and PTH levels are not statistically significant, p=0.0855, p>0.5. Also, no significant correlation of PTH and the length of dialysis was found, p=0.162, p>0.05. Secondary hyperparathyroidism with a pronounced level of PTH>1000 pg/ml was present in 14 patients, and in 6 patients PTH>2000 pg/ml. Adequate treatment of renal osteodystrophy contributes to the reduction of mortality in dialysis patients and improves quality of life.

A10
POVEZANOST KONCENTRACIJE GVOŽĐA I GVOŽĐE-VEZUJUĆIH PROTEINA SA PARAMETRIMA ANTIOKSIDATIVNE ZAŠTITE KOD PACIJENATA SA SENILNOM DEGENERACIJOM MAKULE

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Senilna degeneracija makule (SDM) predstavlja vodeći uzrok ireverzibilnog gubitka centralnog vida kod starijih osoba u razvijenim zemljama. Gvožđe se danas smatra veoma moćnim generatorom oksidativnog oštećenja. Njegove koncentracije rastu sa starenjem što potencijalno pogoršava već postojeće bolesti koje su vezane za starenje. Cilj ovog rada je bio da se odrede serumske koncentracije gvožđa i gvožđe-vezujućih proteina (transferin, feritin i haptoglobin) kod pacijenata sa SDM, zajedno sa parametrima antioksidativne zaštite: superoksid-dizmutaze (SOD), glu-

A10
THE ASSOCIATION OF IRON AND IRON-BINDING PROTEINS WITH ANTIOXIDANT PARAMETER LEVELS IN PATIENTS WITH AGE-RELATED MACULAR DEGENERATION

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Age-related macular degeneration (AMD) is the leading cause of irreversible central visual loss among the elderly in the developed countries. Iron is considered a potent generator of the oxidative damage whose levels increase with age, potentially exacerbating the age-related diseases. The aim of this study was to assess the serum values of iron and iron-binding proteins (transferrin, ferritin and haptoglobin) in patients with AMD along with the parameters of antioxidant defense: superoxide dismutase (SOD), glutathione peroxidase (GPx), glutathione reductase

tation-peroksidaze (GPx), glutation-reduktaze (GR) i totalnog antioksidantnog statusa (TAS), kako bi se ispitao međusobni uticaj ovih parametara kao i njihov zajednički uticaj na patogenezu SDM. U studiju preseka uključeno je 55 pacijenata sa SDM i 75 kontrolnih ispitanika. Pacijenti sa SDM su imali značajno snižene koncentracije serumskog feritina (P=0,034) kao i parametre antioksidativne zaštite: P_{SOD}=0,026; P_{GPx}=0,019; P_{TAS}=0,004 u odnosu na kontrolne ispitanike. Statistički značajno sniženje aktivnosti SOD (P=0,039) i GPx (P=0,013) dobijeno je kod žena sa SDM u odnosu na žene iz kontrolne grupe, dok su niže vrednosti feritina (P=0,035) i TAS (P=0,018) dobijene u odnosu na muškarce sa SDM. Niže vrednosti feritina (P=0,043), TAS (P=0,025) i GPx (P=0,041) dobijene su kod pacijenata sa »suvom« i »vlažnom« formom SDM u odnosu na zdrave ispitanike. Stoga, može se zaključiti da pacijenti sa SDM imaju značajno niže vrednosti parametara antioksidativne zaštite kao i gvožđe-vezujućih proteina, što može biti od značaja za nastanak senilne degeneracije makule u starijoj dobi.

(GR), and total antioxidant status (TAS), in order to analyze the possible impact of iron and iron-binding proteins on the pathogenesis of AMD, as well as the association of these parameters with antioxidant parameter values in these patients and in control subjects. A cross-sectional study included 55 patients with AMD and 75 control subjects. Significantly lower ferritin (P=0.034) and antioxidant defense parameter values were found in patients with AMD compared to the controls (P_{SOD}=0.026; P_{GPx}=0.019; P_{TAS}=0.004). Significantly reduced SOD (P=0.039) and GPx values (P=0.013) were established in AMD females compared to females in the control group, and lower values of ferritin (P=0.035) and TAS (P=0.018) were noted compared to male AMD patients. Lower values of ferritin (P=0.043), TAS (P=0.025) and GPx (P=0.041) were obtained in the »wet« and »dry« forms of AMD compared to the controls. Significantly reduced capacity of the antioxidant defense system and the reduction of iron-binding proteins (ferritin) found in AMD could have an important role in the pathogenesis of AMD.

A11
BIOHEMIJSKI MARKERI U DIJAGNOSTICI PRIMARNE BILIJARNE CIROZE

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Primarna bilijarna ciroza (PBC) jeste hronična, autoimuna holestatska bolest jetre. Usled granulomatoznog zapaljenja, dolazi do oštećenja interlobularnih bilijarnih puteva, što dovodi do progresivne holestaze, fibroze i ciroze. Bolest se predominantno javlja kod žena starosti preko 40 godina. Cilj našeg rada je procena biohemijskih markera u dijagnostici primarne bilijarne ciroze. Ispitivano je 20 pacijenata (19 žena starosti 32–57 godina i 1 muškarac starosti 21 godinu). Svi ispitivani pacijenti su bili hospitalizovani na Klinici za gastroenterologiju KCS. Dijagnoza PBC je potvrđena patohistološki. Urađena je kompletna biohemijska i imunološka dijagnostika. Od biohemijskih markera određivani su sledeći parametri: albumini, holesterol, ukupan bilirubin, AST, ALT, ALP i γ-GT, standardnim biohemijskim metodama na aparatu Vitros 350 Ortho-Clinical Diagnostics (Johnson& Johnson Comp.). Srednje vrednosti biohemijskih parametara, prikazanih kao $\bar{x} \pm SD$, bile su: AST (69 ± 57 U/L), ALT (69 ± 57,4 U/L), ALP (204 ± 134 U/L), γ-GT (107 ± 134 U/L), albumini (36 ± 7,2 g/L), holesterol (4,04 ± 1,10 mmol/L) i ukupan bilirubin (24,65 ± 18,85 μmol/L). Dobijeni biohemijski rezul-

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BIOCHEMICAL MARKERS IN THE DIAGNOSIS OF PRIMARY BILIARY CIRRHOSIS

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Primary biliary cirrhosis (PBC) is a chronic, autoimmune, cholestatic liver disease. Due to granulomatous inflammation, damage of the interlobular bile ducts occurs, which leads to progressive cholestasis, fibrosis and cirrhosis. The disease occurs predominantly in women over 40 years of age. The aim of our study was to evaluate the biochemical markers in the diagnosis of primary biliary cirrhosis. Twenty patients were studied (19 women aged 32–57 years and 1 man aged 21 years). All tested patients were hospitalized at the Clinic for Gastroenterology, Clinical Centre of Serbia. The diagnosis of PBC was confirmed by pathohistology. Complete biochemical and immunological diagnostics was performed. Of the biochemical markers the following parameters were determined: albumin, cholesterol, total bilirubin, AST, ALT, ALP and γ-GT, with standard biochemical methods on the device 350 Vitros Ortho-Clinical Diagnostics (Johnson & Johnson Comp.). Mean values of the biochemical parameters shown as $\bar{x} \pm SD$ were: AST (69 ± 57 U/L), ALT (69 ± 57.4 U/L), ALP (204 ± 134 U/L), γ-GT (107 ± 134 U/L), albumini (36 ± 7.2 g/L), cholesterol (4.04 ± 1.10 mmol/L) and total

tati ukazuju na povećanu aktivnost enzima ALP kod 65% pacijenata; γ-GT (45%); ALT (55%), AST (70%) i ukupnog bilirubina (40%), dok je smanjena koncentracija albumina zabeležena kod 55% pacijenata a holesterola kod 40% pacijenata. Glavni serološki marker ovog oboljenja su antimitohondrijalna antitela, koja su bila pozitivna kod 95% pacijenata. U hepatogramu pacijenata obolelih od PBC dominantno je povišenje ALP i γ-GT, uz srednje povišene vrednosti ukupnog bilirubina, AST i ALT, dok su snižene vrednosti albumina i holesterola. Određivani biohemijski parametri su od velikog značaja u dijagnostici i praćenju PBC.

bilirubin (24.65 ± 18.85 μmol/L). The obtained biochemical results indicate increased activity of the enzymes ALP in 65% patients, γ-GT (45%), ALT (55%), AST (70%) and total bilirubin (40%), and decreased albumin concentration was recorded in 55% patients, and cholesterol in 40% of patients. The main serological marker of this disease are antimitochondrial antibodies, which were positive in 95% of patients. In the hepatogram of patients with PBC increase of ALP and γ-GT is predominantly expressed, with medium elevation of total bilirubin, AST and ALT, while the value of albumin and cholesterol is reduced. Determined biochemical parameters are of great importance in the diagnosis and monitoring of PBC.

A12
BIOMARKERI NEONATALNE SEPSE

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Neonatalna sepsa je jedan od najznačajnijih uzročnika morbiditeta i mortaliteta novorođenčadi. Kao najčešći uzročnici neonatalne sepse izdvajaju se oboljenja i socijalno ponašanje majke u trudnoći. Dokazivanje prisustva sepse kod novorođenčadi je teško zbog nedovoljno specifičnih parametara i nedovoljne količine uzorka krvi u kojoj bi se oni određivali. Prokalcitonin se pokazao kao vrlo koristan parametar jer se njegove vrednosti povećavaju samo u slučaju bakterijske infekcije. Cilj rada je bio određivanje vrednosti prokalcitonina (PCT), antitrombina III (AT III) i broja leukocita (WBC) kao markera sepse u krvi uzetoj iz umbilikalne vene kod novorođenčadi. U radu su analizirana 62 uzorka krvi i to: 31 uzorak dobijen od zdravih beba (kontrolna grupa) i 31 uzorak dobijen od beba, kod kojih se sumnjalo na prisustvo sepse. Prokalcitonin je određen u serumu, AT III u plazmi a WBC u punoj krvi. Koncentracija PCT je određivana na analizatoru Kryptor (BRAHMS Aktiengesellschaft, Germany), AT III na BCS Coagulation Systemu (Dade Behring Diagnostics GmbH, Marburg, Germany), a WBC na ADVIA® 120 Hematology System (Bayer, Germany). Izračunate medijane za ispitivane parametre (PCT, AT III i WBC) u uzorcima krvi novorođenčadi suspektnih na bakterijsku infekciju/ zdravih beba redom su bile 0,188 ng/L/0,121 ng/L; 52%/64,5% aktivnosti od normale; $16x10^9$/L/ $12x10^9$/L. Novorođenčad sa bakterijskom infekcijom su imala značajno veće vrednosti PCT (Mann-Whitney U=227,000 za P<0,005) i WBC (Mann-Whitney U=155,500 za P<0,005) u odnosu na zdravu novorođenčad. Nije bilo statistički značajne razlike između ispitivanih grupa za AT III (Mann-Whitney U=329,000 za P<0,005). Na osnovu dobijenih rezultata može se

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BIOMARKERS OF NEONATAL SEPSIS

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Neonatal sepsis is one of the major causes of morbidity and mortality of infants. The most common causes of neonatal sepsis are diseases and the social behavior of the mother during pregnancy. Evidencing the presence of sepsis in newborns is difficult because of the lack of specific parameters and the insufficiency of blood samples in which they have to be determined. Procalcitonin proved to be a very useful parameter because its value increases only in the case of bacterial infection. The aim of this study was to determine the values of procalcitonin (PCT), antithrombin III (AT III) and the number of white blood cells (WBC) as markers of sepsis in the umbilical vein blood of newborns. In this study 62 blood samples were analyzed as follows: 31 samples obtained from healthy babies (control group) and 31 samples from babies who were suspected for the presence of sepsis. The PCT serum concentration was determined on the analyzer Kryptor (Brahms Aktiengesellschaft, Germany), plasma AT III levels on the BCS Coagulation System (Dade Behring Diagnostics GmbH, Marburg, Germany), and the WBC in whole blood on the ADVIA® 120 Hematology System (Bayer, Germany). The obtained median values for PCT, AT III, and WBC in the blood samples of infants suspected of bacterial infection / healthy babies were respectively 0.188 ng/L/0.121 ng/L, 52% / 64.5% of normal activity; $16x10^9$/L/$12x10^9$/L. Neonates with bacterial infection had significantly higher PCT values (Mann-Whitney U = 227.000, P<0.005) and WBC (Mann-Whitney U = 155.500, P<0.005) compared to healthy infants. There were no statistically significant differences between the studied groups for AT III (Mann-Whitney U = 329.000, P <0.005). Based on

zaključiti da je prokalcitonin vrlo značajan parametar za ranu dijagnostiku neonatalne sepse.

A13
INDEKS IZOTIPA LAKIH LANACA IMUNOGLOBULINA (κ/λ) KAO PROGNOSTIČKI FAKTOR TOKA I PREŽIVLJAVANJA KOD PLAZMAPROLIFERATIVNIH BOLESTI

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Kvantitativno određivanje monoklonskih imunoglobulina (Ig) i njihovih fragmenata se koristi za praćenje toka plazmaproliferativnih bolesti i efekta citostatske terapije. Relativno novi testovi za laboratorijsko određivanje koncentracije slobodnih (S) kapa (κ) i lambda (λ) lakih lanaca (LL) Ig u serumu predstavljaju dodatne pokazatelje maligne plazmocitne produkcije. Cilj određivanja SLL je bio da se proveri značaj njihovog količnika (k/λ index) kao prognostičkog faktora progresije, remisije i preživljavanja po grupama bolesnika. Koncentracije Ig i SLL su određivane imunonefelometrijskom metodom na »SIEMENS« DADE Behring II analizatoru. U rad je uključeno 83 bolesnika u periodu od 7 godina, razvrstanih u 6 grupa: 1. monoklonske gamapatije neutvrđenog značaja–MGNZ (31); 2. bolest lakih lanaca – BLL ili *Bence Jones* mijelom (28); 3. bolest depozita lakih lanaca–BDLL (3); 4. primarna AL amiloidoza (3); 5. nesekretorni multipli mijelom–NSMM (3) i 6. multipli mijelom – MM (15). Referentni interval za k/l index je 0,26–1,65. Prema ISS Modelu stratifikacije rizika progresije bolesti vrednosti <0,26 do 0,03 za λ i >1,65 do 4,0 za κ-izotip predstavljaju nizak relativni rizik (RR) progresije bolesti. Vrednosti u intervalima <0,03 do 0,001 i >4,0 do 32 su pokazatelji srednje visokog, a iznad 32 visokog RR. Rezultati su pokazali da je u grupi MGNZ 10/31 (32%) imalo povišene vrednosti SLL i κ/λ index (<0,25 ili >4), tj. srednje visok RR; 17/28 bolesnika (61%) iz grupe BLL ima visok RR, dok je 5/28 (18%) egzitiralo u intervalu od 24 do 36 meseci. Oko 30% bolesnika iz grupa NSMM, BDLL i AL koji su pod terapijom imali sniženje koncentracije SLL za više od 50% su ostvarili remisiju bolesti. Ovaj indeks nije bio signifikantan pokazatelj promene toka bolesti u poređenju sa koncentracijom osnovnog izotipa Ig u grupi sa MM. Abnormalan κ/λ indeks u ostalim ispitivanim grupama može predstavljati nezavistan faktor rizika za progresiju i lošu prognozu bolesti.

the results we can conclude that procalcitonin is a very important parameter for the early diagnosis of neonatal sepsis.

A13
FREE LIGHT CHAINS RATIO (κ/λ) AS A PROGNOSTIC MARKER OF THE COURSE AND SURVIVAL IN PLASMAPROLIFERATIVE DISEASES

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The quantitation of the monoclonal immunoglobulins (Ig) and their fragments is used for the monitoring of plasmaproliferative disease course and effect of introduced therapy. Relatively new laboratory tests in serum for the quantitation of kappa (κ) and lambda (λ) free light chains (FLC) and the calculation of the FLC ratio represent additional parameters of malignant plasmocytic production. The aim of FLC examination was to evaluate the significance of κ/λ ratio as a prognostic factor for the progression, remission and survival in different disease groups. The concentrations of Ig and FLC were measured by an immunonephelometric method on a »SIEMENS« DADE BN II analyser. In this examination 83 patients from 6 different disease groups were investigated during a period of 7 years: 1. monoclonal gammopathy of undefined significance – MGUS (31); 2. light chain disease-LCD or Bence Jones myeloma (28); 3. Light chains deposit disease–LCDD (3); 4. primary AL amyloidosis (3); 5. nonsecretory multiple myeloma – NSMM (3) and 6. multiple myeloma – MM (15). The reference interval for κ/λ ratio is 0.26–1.65. According to the ISS Model of risk stratification of disease progression, values < 0.26 to 0.03 for λ and >1.65 to 4.0 for k-isotype represent low relative risk (RR) of disease progression. Values inside intervals <0.03 to 0.001 as well as >4.0 to 32 implicate intermediate and >32 are connected with high RR of disease progression. Results showed that in the MGUS group 10/31 (32%) patients had elevated κ/λ ratio of intermediate RR; 17/28 (61%) from the LCD had high RR, while 5/28 (18%) patients died during a period of 24–36 months. About 30% patients who had lowered FLC values by more than 50% under therapy, achieved disease remission in the NSMM, LCDD and AL groups. FLC ratio did not show additional diagnostics aid in the MM group. Abnormal FLC ratio in the other examined groups could be an independent risk factor for progression and poor disease prognosis.

A14
EVALUACIJA NOVIH LIPIDSKIH BIOINDEKSA I LIPIDSKIH PARAMETARA KOD PACIJENATA NA NISKO I VISOKOPROTOČNOJ HEMODIJALIZI I HEMODIJAFILTRACIJI

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Kod pacijenata sa hroničnom bubrežnom insuficijencijom kardiovaskularni morbiditet i mortalitet su značajno povećani. Jedan od najvažnijih faktora rizika za razvoj prevremene ateroskleroze je dislipidemija. Cilj ove studije je bila evaluacija novih lipidskih bioindeksa i lipidskih parametara kod hemodijaliziranih (HD) pacijenata u odnosu na vrstu dijaliznog tretmana. Kod 46 pacijenata na hroničnoj HD (prosečne starosti 50,4 ± 13,1 godina, 15 na nisko, 31 na visokoprotočnoj dijalizi i hemodijafiltraciji) određivali smo nivoe ukupnog, LDL i HDL holesterola (H) i triglicerida standardnim biohemijskim metodama; apolipoproteina (apo) A-I, apo B i lipoproteina(a) imunoturbidimetrijski; i računali smo tradicionalne i nove bioindekse (LPI–Lipid pentada indeks, LTI–Lipid tetrada indeks i AIP–Aterogeni indeks plazme). Dobijene rezultate poredili smo sa rezultatima kontrolne grupe od 48 osoba (prosečne starosti 52,4 ± 10,7 godina). Takođe, rezultati pacijenata na niskoprotočnoj HD su upoređivani sa rezultatima pacijenata na visokoprotočnoj HD i hemodijafiltraciji. Kod HD pacijenata nivo triglicerida bio je značajno viši ($p<0,01$), dok su nivoi ukupnog ($p<0,001$), HDL ($p<0,001$), LDL-H ($p<0,001$), apoA-I ($p<0,001$) bili značajno niži u odnosu na kontrolnu grupu. Nivoi LPI, LTI i AIP bili su značajno viši kod HD pacijenata u odnosu na kontrolnu grupu ($p<0,05$), ali bez dobrog razdvajanja upotrebom Box-Whisker plotova. Vrednosti AIP>0,11 (umereno i visokorizične vrednosti) bile su prisutne u 71,7% HD pacijenata, što je bilo značajno više ($p<0,001$) u poređenju sa kontrolnom grupom, gde su 31,3% osoba imali ove vrednosti. Odnos apoB/A-I bio je značajno viši kod pacijenata na niskoprotočnoj dijalizi u poređenju sa pacijentima na visokoprotočnoj dijalizi i hemodijafiltraciji. Vrednosti ostalih lipidskih parametara, tradicionalnih i novih bioindeksa bile su slične u grupama HD pacijenata ($p>0,05$). Uzimajući u obzir sve naše rezultate, aterogeni indeks plazme bi mogao biti pogodan marker za evaluaciju rizika za razvoj prevremene ateroskleroze kod hemodijaliziranih pacijenata. Pored toga, apoB/A-I odnos bi mogao biti dopunski marker kod HD pacijenata na niskoprotočnoj hemodijalizi. LTI i LPI zahtevaju dalja istraživanja.

A14
EVALUATION OF NEW LIPID BIOINDICES AND LIPID PARAMETERS IN PATIENTS ON LOW- AND HIGH-FLUX HEMODIALYSIS AND HEMODIAFILTRATION

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In chronic renal failure patients cardiovascular morbidity and mortality are markedly increased. Dyslipidemia is one of the most important risk factors for the development of premature atherosclerosis. Aim of this study was to evaluate new lipid bioindices, and lipid parameters in hemodialysed (HD) patients according to the treatment modality. In 46 chronic HD patients (average age 50.4 ± 13.1 years, 15 on low-flux dialysis and 31 on high-flux dialysis and hemodiafiltration), we measured levels of total, LDL, and HDL cholesterol (C), triglycerides, by standard biochemical methods, and apolipoprotein (apo) A-I, apo B, and lipoprotein(a) by immunoturbidimetric methods, and calculated the traditional and new bioindices (LPI–Lipid pentad index, LTI–Lipid tetrad index, and AIP–Atherogenic index of plasma). Obtained results were compared with the results of a control group of 48 subjects (average age 52.4 ± 10.7 years). Also, the results of patients on low-flux HD were compared with the results of patients on high-flux HD and hemodiafiltration. In HD patients the level of triglycerides was significantly higher ($p<0.01$), and the levels of total ($p<0.001$), HDL ($p<0.001$), LDL-C ($p<0.001$), apoA-I ($p<0.001$) were significantly lower compared with controls. Values of LPI, LTI, and AIP were significantly higher in HD patients compared with controls ($p<0.05$), without a good delineation by Box-Whisker plots. AIP>0.11 (intermediate and high risk values) was found in 71.7% HD patients, which was significantly higher ($p<0.001$) compared with the control group, where 31.3% of subjects had these risk values. Ratio apoB/A-I was significantly higher in patients on low-flux dialysis compared with patients on high-flux dialysis and hemodiafiltration. Other lipid parameters, the traditional and new bioindices were similar in those groups of HD patients ($p>0.05$). Having in sight all our results, the atherogenic index of plasma could be a suitable marker for the evaluation of risk for premature atherosclerosis in hemodialysed patients. Also, the apoB/A-I ratio could be an additional marker in low-flux HD patients. LTI and LPI need to be further investigated.

A15
ODREĐIVANJE AUTOANTITELA NA MIŠIĆ-SPECIFIČNU TIROZIN-KINAZU (MUSK-AB) – ZNAČAJ ZA DIJAGNOZU MIJASTENIJE GRAVIS

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Myasthenia gravis (MG) jeste bolest sa poremećajem neuromišićne transmisije, sa simptomima abnormalne mišićne zamorljivosti i slabosti. Najčešći oblik je stečena autoimuna MG, koju karakteriše prisustvo autoantitela na receptor za acetilholin (AChR). U INEP-u se poslednjih sedam godina redovno određuju antitela na AChR (AChRAb) u serumima pacijenata sa sumnjom na MG. Prisustvo AChRAb potvrđuje dijagnozu MG, što ima značaja posebno kod klinički nejasnih slučajeva. Podaci iz literature, kao i naši rezultati pokazuju da oko 80% pacijenata sa MG ima antitela na AChR i oni su okarakterisani kao pacijenti sa seropozitivnom MG. Novija istraživanja pokazuju da od preostalih 20% pacijenata koji nemaju AChRAb (seronegativna MG), 40–50% imaju simptome MG izazvane antitelima na membranski enzim, mišić-specifičnu tirozin-kinazu (MuSK). Za određivanje ovih antitela u serumu nabavljen je radioimunodijagnostički (RIA) test (RSR Ltd, Cardiff, UK), koji se zasniva na upotrebi prečišćene rekombinantne mišić-specifične tirozin-kinaze obeležene radioaktivnim jodom (^{125}I-MuSK). Radioaktivno obeleženi MuSK se inkubira sa serumima u kojima se potencijalno nalaze anti-MuSK antitela. Kompleks obeleženog MuSK i autoantitela se zatim precipitira antihumanim IgG. Posle centrifugiranja i ispiranja imunoprecipitata, radioaktivnost taloga se meri u gama brojaču i ona je proporcionalna koncentraciji anti-MuSK antitela u ispitivanim serumima. Validacija testa izvršena je međulaboratorijskim ispitivanjem sa laboratorijom Univerzitetske bolnice u Mastrihtu (Holandija). Uvođenje testa za određivanje MuSKAb omogućava kliničarima veću sigurnost i brzinu u dijagnostikovanju MG kod pacijenata koji nemaju AChRAb, kao i primenu adekvatne terapije, imajući u vidu specifične karakteristike anti-MuSK pozitivne MG.

A15
DETERMINATION OF AUTOANTIBODIES TO MUSCLE-SPECIFIC TYROSINE KINASE (MUSK) – SIGNIFICANCE FOR THE DIAGNOSIS OF MYASTHENIA GRAVIS

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Myasthenia gravis (MG) is a disease with a disorder of transmission at the neuromuscular junction, characterized by weakness and fatigability of the skeletal muscle. The most frequent is acquired autoimmune form of MG, where acetylcholine receptor autoantibodies (AChRAb) are present. During the last seven years, in a number of sera of patients with suspected MG, the concentrations of AChRAb have been measured at INEP. Presence of AChRAb confirmed the diagnosis of MG, even when symptoms were unclear. According to the literature data as well as our results, approximately 80% of patients with MG have detectable serum AChRAb, and they are characterized as seropositive MG patients. Recent studies have shown that from the remaining 20% of patients who do not have AChRAb (seronegative MG), about 40–50% have antibodies against a surface membrane enzyme, muscle-specific tyrosine kinase (MuSK). A radioimmunoassay (RIA) kit (RSR Ltd, Cardiff, UK) was employed for the determination of anti-MuSK antibodies. The assay is based on ^{125}I-labeled recombinant muscle-specific tyrosine kinase. ^{125}I-MuSK is incubated with sera which may contain autoantibodies to MuSK. The complex of labeled MuSK and autoantibodies was precipitated with anti-human IgG. After centrifugation and washing of immunoprecipitate, the radioactivity of pellet was measured on a gamma counter, and was in correlation with the MuSKAb concentration in the examined serum samples. Validation of the test applied was achieved by interlaboratory testing, with the laboratory of the University Hospital in Maastricht (The Netherlands). Measurement of MuSKAb enabled greater certainty and speed during the diagnostic procedure in MG patients without AChRAb, and rapid introduction of suitable therapy, concerning the specific characteristics of MuSKAb positive MG.

A16
PRAĆENJE NEISPRAVNIH PRIMLJENIH UZORAKA U POLIKLINICI NEOLAB

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Veliki procenat laboratorijskih grešaka dešava se u preanalitičkoj fazi. Pravilna priprema pacijenta za uzorkovanje, kao i postupak uzorkovanja i pripreme uzorka po standardizovanim pavilima su preduslovi za pouzdan rezultat ispitivanja. Praćen je procenat neadekvatno pripremljenih uzoraka za ispitivanje u periodu od 7 meseci, od novembra 2009. do juna 2010. god. (u oktobru 2009. su naručiocima ispitivanja dostavljene informacije sa jasno definisanim kriterijumima za neprihvatanje neispravnih uzoraka). Za prikupljanje podataka korišćen je laboratorijski informacioni sistem i registar neispravnih primljenih uzoraka. Od ukupnog broja primljenih uzoraka za ispitivanje, u analiziranom periodu primljeno je 25 neispravnih uzoraka. Od ukupnog broja neispravnih uzoraka 12% su uzorkovani u prostorijama Poliklinike Neolab, 88% van prostorija Poliklinike. Analizirajući tip neispravnosti uzoraka, zapaža se da je najviše bilo hemoliziranih uzoraka, 40%, lipemičnih uzoraka 28%, nepravilne identifikacije 8%, ostalo 24%. Treba raditi na intenzivnijoj edukaciji osoba koje učestvuju u postupcima uzorkovanja i pripreme uzoraka, ali i na edukaciji pacijenata kako bi se adekvatno pripremili za uzorkovanje.

A16
RECORD OF DEFECTIVE SAMPLES RECEIVED BY THE POLYCLINIC NEOLAB

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A large percentage of laboratory errors occur in the preanalytical phase. Proper preparation of the patient for sampling, and the procedure of sampling and sample preparation according to standardized regulations are the postulates for a reliable test result. The percentage of inadequately prepared samples for testing was estimated during a period of 7 months, from November 2009 to June 2010 (in October 2009 the test clients were provided the information with clearly defined criteria for accepting defective samples). For data collecting the laboratory information system and the registry of received defective samples were used. Out of the total samples received for testing in the analyzed period 25 samples were defective. Out of the total number of defective samples, 12% were sampled at Neolab Polyclinic, 88% outside the area of the Polyclinic. Analyzing the type of sample defects, it was observed that the majority of samples were hemolyzed – 40%, 28% of specimens were lipemic, 8% inadequate identified, other – 24%. A great effort should be made towards more intensive education of people who participate in the sampling procedures and preparation of samples, but also to educate patients to adequately prepare for sampling.

A17
ODREĐIVANJE $iPF_{2\alpha}$-III U URINU ZDRAVIH OSOBA I BOLESNIKA SA SRČANOM INSUFICIJENCIJOM

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Izoprostani su jedinjenja slična prostaglandinima, koja nastaju peroksidacijom arahidonske kiseline pod uticajem slobodih radikala kiseonika, a imaju značajnu ulogu u aterosklerozi i razvoju srčane insuficijencije (SI). S obzirom na to da je primarne slobodne radikale teško odrediti, najčešće se određuju sekundarni produkti oksidativnog stresa kao što su malondialdehid i iPs (izoprostani), posebno $iPF_{2\alpha}$-III. Cilj ovog istraživanja je bio da se utvrdi da li postoji razlika između izlučivanja $iPF_{2\alpha}$-III u urinu kod 48 pacijenata sa SI, koji su klasifikovani po NYHA klasifikaciji (New York Heart Association) u četiri funkcionalne grupe, i 25 zdravih ispitanika. $iPF_{2\alpha}$-III je određivan u uzorcima 24-časovnog urina, reagen-

A17
QUANTIFICATION OF $iPF_{2\alpha}$-III IN HUMAN URINE SAMPLES OF HEALTHY SUBJECTS AND PATIENTS WITH HEART FAILURE

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Isoprostanes are prostaglandin-like compounds that are produced *in vivo* by a free radical oxygen in the process of peroxidation of arachidonic acid. They play an important role in atherosclerosis and the pathogenesis of heart failure (HF). Considering the fact that free radicals are hard to be determined, we usually determine secondary products of oxidative stress such as malondialdehyde and isoprostanes (iPs), especially $iPF_{2\alpha}$-III. The aim of this study is to find out the difference between the urinary levels of $iPF_{2\alpha}$-III among 48 patients with HF, classified by the New York Heart Association (NYHA) into four functional groups, and 25 healthy subjects. Concentration of $iPF_{2\alpha}$-III was examined in the 24-hour urine using

sima proizvođača OxisResearch (BIOXYTECH Urinary $iPF_{2\alpha}$-III), kompetitivnom ELISA metodom na analizatoru ELISA LKB. U istim uzorcima urina je određivan kreatinin Jaffeovom metodom a ejekciona frakcija leve komore (LVEF) utvrđivana je ultrazvučnim pregledom. Statističkom obradom podataka je dokazano da bolesnici imaju više vrednosti $iPF_{2\alpha}$-III a najviša je izmerena u IV grupi. Nije dokazano statistički značajno povećanje izlučivanja kod NYHA I i II grupe ($p>0,05$) u odnosu na kontrolnu grupu, ali je to povećanje bilo statistički veoma značajno kod NYHA III i IV grupe ($p<0,001$) u odnosu na kontrolnu grupu. Utvrđeno je i da postoji statistički veoma značajna povezanost između izlučivanja $iPF_{2\alpha}$-III u urinu i ejekcione frakcije leve komore (visokoznačajna negativna korelacija $r = –0,765$; $p<0,001$). Na osnovu svega navedenog se može zaključiti da izlučivanje $iPF_{2\alpha}$-III u urinu zavisi od težine SI i da određivanje može biti koristan parametar u proceni oksidativnog stresa i stepena SI.

A18
AKTIVNOST KATALAZE KOD PACIJENATA SA SISTEMSKIM LUPUSOM ERITEMATODESOM

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Sistemski lupus eritematodes (SLE) jeste kompleksno multisistemsko oboljenje nepoznate etiologije u kome su tkiva i ćelije oštećeni patološkim antitelima na sopstvene proteine. Poremećen imuni odgovor uključuje prolongiranu proizvodnju patogenih autoantitela i imunih kompleksa. Slobodni radikali imaju važnu ulogu u produkciji autoantitela u B ćelijama i posreduju u nastanku oštećenja tkiva u ciljnim organima. Katalaza (CAT, 1.11.1.6) jeste antioksidativni enzim koji ima značajne efekte u redukciji stvaranja slobodnih radikala, pošto razgrađuje vodonik-peroksid do vode i molekulskog kiseonika, ispoljavajući katalazni ili peroksidazni tip reakcije, zavisno od količine stvorenog supstrata. Zato je katalaza jedan od najvažnijih enzima antioksidativne zaštite. Ispitivanje je obuhvatilo uzorke krvi (hemolizat eritrocita i plazma) 55 bolesnika sa različitim kliničkim manifestacijama SLE u fazi akutnog relapsa oboljenja i 20 zdravih ispitanika (kontrolna grupa). Dijagnoza i klasifikacija obolelih je izvršena prema ARA kriterijumima i korišćenjem dopunskih dijagnostičkih metoda. Pacijenti su podeljeni u 4 grupe: kožni (K-SLE), neurološki (N-SLE), zglobni (Z-SLE) i vaskularni SLE (V-SLE). Određivanje aktivnosti katalaze u eritrocitima vršeno je klasičnom metodom po Beutleru, dok je aktivnost u plazmi merena kinetičko-spektrofotometrijskom metodom po Gothu.

A18
CATALASE ACTIVITY IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Systemic lupus erythematosus (SLE) is a complex, multisystem disorder with unknown etiology and is distinguished by antibodies to self-proteins. Disturbed immune response includes production of pathogen auto-antibodies and immune complexes. Free radicals have an important role in the production of autoantibodies out of self-reactive B cells and in the mediation of tissue damage in the target organ. Catalase (CAT, 1.11.1.6) is an antioxidative enzyme with significant effects in the reduction of free radical production, because it catalyses the decomposition of hydrogen peroxide into water and oxygen, expressing either a catalase or a peroxidase type of reaction, depending on the substrate quantity. Therefore, catalase is one of the major enzymes of antioxidative defence. This study included the biological material (erythrocytes and plasma) of SLE patients (55) with different clinical manifestations of the disease (in the acute phase) and 20 healthy volunteers, blood donors as a control group. Diagnosis and classification of the patients were done according to the ARA criteria as well as additional diagnostic methods. Patients were divided into 4 groups: the patients with predominant skin desease manifestation (S-SLE), the patients with neurolupus (N-SLE), the patients with predominant joint changes (J-SLE) and the patients with vasculitis (V-SLE). To deter-

Aktivnost katalaze u eritrocitima pacijenata bila je značajno povišena u odnosu na kontrolu (8,89 ± 1,38 U/gHb × 10^4, p<0,001). Srednje vrednosti aktivnosti katalaze po grupama su iznosile: K-SLE – 11,57 ± 1,84 U/gHb × 10^4; N-SLE –12,19 ± 1,60 U/gHb × 10^4; Z-SLE – 11,49 ± 1,52 U/gHb × 10^4; V-SLE – 11,67 ± 1,28 U/gHb × 10^4. Aktivnost katalaze u plazmi je takođe statistički značajno povišena u odnosu na kontrolne vrednosti zdravih ispitanika (p<0,001). Srednje vrednosti po grupama su: K-SLE – 96,14 kU/L; N-SLE – 96,32 kU/L; Z-SLE – 95,60 kU/L; V-SLE – 102,90 kU/L, dok je u kontroli srednja vrednost iznosila 39,70 kU/L. Dobijeni rezultati ukazuju da kod pacijenata sa sistemskim lupusom eritematodesom dolazi do značajnog povećanja aktivnosti katalaze u eritrocitima i plazmi. Povećana aktivnost katalaze može biti kompenzatorni fenomen u uslovima oksidativnog stresa ili može nastati kao rezultat indukcije nekim citokinima.

mine catalase activity in the erythrocytes the traditional Beutler method was used, while the same enzyme in the plasma was measured by the Goth kinetic-spectrophotometric method. Erythrocyte catalase activity was significantly increased in patients in comparison with the control group (8.89 ± 1.38 U/gHb × 10^4, p<0.001). Average catalase values in erythrocytes were as follows: S-SLE – 11.57 ± 1.84 U/gHb × 10; N-SLE – 12.19 ± 1.60 U/gHb × 10^4; J-SLE – 11.49 ± 1.52 U/gHb × 10^4; V-SLE – 11.67 ± 1.28 U/gHb × 10^4. Significantly elevated values of catalase activity in the plasma were also obtained compared to the control values of healthy individuals. The results were: S-SLE – 96.14 kU/L; N-SLE – 96.32 kU/L; J-SLE – 95.60 kU/L; V-SLE – 102.90 kU/L, while in control group it was 39.70 kU/L (p<0.001). Obtained results in patients with SLE showed a significantly elevated catalase activity in both plasma and erythrocytes. The increased catalase activity may be a compensatory phenomenon in the condition of oxidative stress or a consequence of increased synthesis induced by some cytokines.

A19
MARKERI STATUSA GVOŽĐA U KRVI

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Ispitivani su alternativni markeri statusa gvožđa, tako što su upoređivani nivoi: Hb, Fe, sTfR, CHr, s-feritina i procenta hipohromnih eritrocita, kao i njihova korelativnost. Prospektivnu grupu činile su žene koje su obuhvaćene preventivnim pregledom, prosečne starosti 35 godina (raspon 20–62 god.). Hb je bio analiziran na »Celly« aparatu. Fe je analizirano na »Architect c8000«-Abbottovom aparatu, serumski feritin je analiziran na aparatu Abott Imx tehnikom, microparticle enzyme immunoassay. Serumski transferin receptor je analiziran metodom »Dade Behring«, N latex sTfR. CHr i procenat hipohromnih eritrocita su analizirani na hematološkom aparatu Abbott. Da bi se isključili zapaljenski procesi, bolesti jetre i bubrega, testirani su sledeći parametri: CRP, ALT, AST, γ-GT, ALP i kreatinin. Od 78 žena 45,3% je imalo normalne vrednosti hemoglobina (125–132 g/L), serumski feritin (15–200 μg/L), sTfR (0,84–1,54 mg/L), CHr (31,5–35,5 pg) i procenat hipohromnih eritrocita (0,1–1,1%). Kod 31,4% žena vrednosti Hb 116–125 g/L. Vrednosti serumskog feritina, sTfR i CHr su bile unutar referentnih vrednosti. Kod 23,2% žena vrednosti Hb su bile 115 g/L. Kod žena sa patološki visokim vrednostima sTfR ili patološki niskim CHr hemoglobin je bio signifikantno (p=0,005) korelativniji sa sTfR (r=0,91) od CHr (r=0,78). Među-

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BLOOD IRON STATUS MARKERS

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Alternative iron status markers were studied by comparing the levels of: Hb, Fe, sTfR, CHr, s-ferritin and the percentage of hypochromic red blood cells, as well as their correlativity. The prospective group was comprised of 78 women, who were involved in a preventive examination, with an average age of 35 (span 20–62 yrs). Hb was analyzed on a »Celly« device. Fe was analyzed on an »Architect c8000« Abbott's device, serum ferritin was analyzed on a device Abott Imx, by a microparticle enzyme immunoassay. Serum transferrin receptor was analyzed with the method »Dade Behring«, N latex sTfR. CHr and the percent of hypochromic red blood cells were analyzed on an Abbott-hematological device. To exclude any possible inflammation processes, liver and kidney diseases, the following analytes were tested: CRP, ALT, AST, γ-GT, ALP and creatinine. Of the 78 women who were examined 45.3% had normal values for hemoglobin (125–132 g/L), serum ferritin (15–200 μg/L), sTfR (0.84–1,54 mg/L), CHr (31.5–35.5 pg) and hypochromic red blood cells (0.1–1.1%). 31.4% of the women had Hb values 116–125 g/L. Values for serum ferritine, sTfR and CHr were within the reference ranges. 23.2% of the women had Hb values 115 g/L. The women with pathologically high sTfR values or pathologically low

tim, kod žena sa patološki povišenim procentom hipohromnih crvenih krvnih zrnaca, bila je korelacija sa sTfR bolja nego sa Hb,ali ne i statistički signifikantna. To pokazuje da povezanost između serumskog feritina i praznih depoa gvožđa nije tako egzaktna kao što bi mnogo korišćene donje vrednosti od 15 μg/L trebalo da nalažu. Naši rezultati ukazuju da su depoi gvožđa prazni kod pojedinih pacijenata već kod serumskog feritina na 30–35 μg/L ili više. Pokazana je pouzdana nepouzdanost za vrednosti Hb i serumskog feritina koje bi mogle da otkriju prelazak u eritropoezu kod nedostatka gvožđa. To je od značaja za ispitivanje dijagnostičkog potencijala za alternativne markere statusa gvožđa. Dobijene naznake da je porast sTfR praćen redukcijom CHr rani stadijum razvoja eritropoeze kod nedostatka gvožđa, dok se redukcija Hb i porast % hipohromnih crvenih krvnih ćelija pokazuju kasnije u procesu.

CHr had hemoglobin noticeably (p=0.005) more correlative with sTfR (r=0.91) than with CHr (r=0.78). However, in the case where women had a pathologically high percentage of hypochromic red blood cells, correlation with sTfR was better than with Hb, but statistically not very significant. That tells us that the connection between serum ferritin and empty iron depots is not that exact as the lower value of 15 μg/L should show. Our results can indicate that some patients have empty iron depots already at 30–35 μg/L or higher values of serum ferritin. A certain uncertainty was shown for Hb values and serum ferritin, that may reflect transition to erythropoiesis in the case of iron deficiency. That is quite important for research on the diagnostic potential of alternative iron status markers. There were some indications that growth of sTfR followed by reduction of CHr are early stages of development of erythropoiesis in the case of iron deficiency, and reduction of Hb and growth of % hypochromic red blood cells show later in the process.

A20
KONCENTRACIJE ELEKTROLITA ZA VREME DRUGOG TRIMESTRA NORMALNE TRUDNOĆE – KALCIJUM, FOSFOR, NATRIJUM, KALIJUM I HLOR

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Trudnoća je normalan fiziološki fenomen, ali u njenom toku mnogi biohemijski parametri su promenjeni i mogu biti pogrešno interpretirani kao patološki. Porast cirkulišućeg volumena krvi i glomerularne filtracije mogu izazvati promene u koncentracijama eletrolita u krvi. U trećem trimestru trudnoće većina parametara ima niže koncentracije. Predmet našeg ispitivanja je bio da utvrdi ima li promena u koncentraciji elektrolita – kalcijuma, fosfora, natrijuma, kalijuma i hlora u drugom trimestru normalne trudnoće. Parametri su određivani u serumu 65 zdravih trudnica doba od 17 do 35 godina, korišćenjem biohemijskih analizatora Advia 1650 i Advia Chemistry komercijalnih testova. Srednji serumski nivoi bili su: Ca – 2,42 ± 0,11 mmol/L, P – 1,21 ± 0,16 mmol/L, Na – 140,5 ± 2,03, K – 4,78 ± 0,31 mmol/L, Cl – 107,73 ± 2,25 mmol/L. Dobijeni rezultati kreću se u granicama referentnih vrednosti zasnovanih na podacima dobijenim ispitivanjem žena koje nisu trudne ili muškaraca. Nema mnogo istraživanja o vrednostima biohemijskih parametara u prva 2 trimestra normalne trudnoće. Za korektnu kliničku interpretaciju biohemijskih ispitivanja potrebno je da laboratorije odrede referentne vrednosti za trudnice u svojim populacijama.

A20
ELECTROLYTE CONCENTRATIONS DURING SECOND TRIMESTER OF NORMAL PREGNANCY – CALCIUM, PHOSPHATE, SODIUM, POTASSIUM AND CHLORIDE

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Pregnancy is a normal physiological phenomen, but many biochemical parameters are changed and may be mistakenly interpreted as abnormal. Increase in circulating blood volume and increased glomerular filtration rate may result from alternations in electrolyte concentrations. Most of the analytes have lower concentrations in the third trimester of pregnancy. The objective of this study was to investigate the changes in electrolytes – Ca, P, Na, K and Cl in the second trimester of normal pregnancy. Parameters were measured in the serum of 65 healthy pregnant women aged 17 to 35 years, using the biochemical analyzer Advia 1650 and Advia Chemistry tests. Mean serum levels in the studied tests were: Ca – 2.42 ± 0.11 mmol/L, P – 1.21 ± 0.16 mmol/L, Na – 140.5 ± 2.03 mmol/L, K – 4.78 ± 0.31 mmol/L, Cl – 107.73 ± 2.25 mmol/L. Results were within the reference intervals based on the blood samples of healthy men or non-pregnant women, for all examined parameters. There are not many studies on the variation of laboaratory tests during the first two trimesters of normal pregnancy. For the correct clinical biochemistry tests, each laboratory should develop its own reference ranges for pregnant women.

A21
ODREĐIVANJE MIKROALBUMINURIJE KOD PACIJENATA SA DIJABETES MELITUSOM TIPA II

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Mikroalbuminurija (McA) označava izlučivanje albumina u urinu u količini od 30 do 300 mg/24 h ili više od 20 μg/min. Otkrivanje mikroalbuminurije je od izuzetnog značaja, jer ona predstavlja indikator rane faze oštećenja bubrega i prethodi klinički manifestnoj nefropatiji kod pacijenata sa dijabetesom. Istovremeno, McA predstavlja i marker povišenog kardiovaskularnog rizika. Cilj ovog ispitivanja je bio da se utvrdi učestalost mikroalbuminurije kod pacjenata sa dijabetes melitusom (DM) tipa II. Ispitivanjem su obuhvaćeni pacijenti (n=104) oba pola, sa DM tipa II dijagnostikovanim najmanje godinu dana ranije. Pored mikroalbuminurije, određivane su vrednosti glukoze i kreatinina u serumu. Mikroalbuminurija je određivana semikvantitativno MIKRAL test trakama (Roche) a glukoza i kreatinin standardnim biohemijskim metodama. Kod pacijenata bez mikroalbuminurije (n=58), prosečne starosti 64 godine, prosečna vrednost glukoze (Glc) iznosila je 8,59 ± 0,33 mmol/L, a vrednost kreatinina (Cr) 77, 72 ± 2,03 mmol/L. Pri tome, zapaženo je postojanje statistički značajne korelacije između uzrasta i vrednosti kreatinina (p=0,002). Mikroalbuminurija je dijagnostikovana kod 46 pacijenata, prosečne starosti 66 godina. Prosečne vrednosti glikemije i kreatinina kod pacijenata sa McA su bile nešto više (Glc= 8,72 ± 0,36 mmol/L; Cr=85,90 ± 2,67 mmol/L) u poređenju sa pacijentima bez McA, ali pri tome nije dostignuta statistička značajnost. Kod pacijenata sa McA postojala je statistički značajna korelacija između uzrasta i vrednosti glikemije (p=0,047). Kod približno polovine uključenih pacijenata (44,23%) otkrivena je mikroalbuminurija. Na ovaj način identifikovali smo pacijente koji zahtevaju dalje praćenje i adekvatnu terapiju, u cilju usporenja bolesti i prevencije nastanka njenih komplikacija.

A21
DETERMINATION OF MICROALBUMINURIA IN PATIENTS WITH DIABETES MELLITUS TYPE 2

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Microalbuminuria (McA) represents the appearance of abnormal amounts of albumin in the urine, in the amount between 30 and 300 mg during a 24 hour period, or more than 20 μg/min. Microalbuminuria detection is of great importance because it represents the earliest indicator of renal damage, and precedes clinically expressed nephropathy in patients with diabetes. At the same time, microalbuminuria is also an independent risk factor for cardiovascular disease. The aim of our study was to determine the frequency of microalbuminuria in patients with diabetes mellitus type 2. The investigation included patients (n=104) of both sexes, with DM type 2 diagnosed at least one year earlier. In addition, the concentrations of glucose and creatinine in serum were also determined. Microalbuminuria was determined semiquantitatively by MIKRAL strips (Roche) and glucose and creatinine were determined using standard biochemical methods. In patients without McA, mean age 64 years, the mean glucose and creatinine values were 8.59 ± 0.33 mmol/L and 77.72 ± 2.03 mmol/L, respectively. In addition, a significant correlation between patient age and creatinine values was observed. Microalbuminuria was detected in 46 patients, mean age 66 years. The mean glucose and creatinine values were higher (Glc =8.72 ± 0.36 mmol/L; Cr= 85.90 ± 2.67 mmol/L) in comparison to the values obtained in patients without McA, but statistical significance was not reached. In patients with McA, there was a statistically significant correlation between patient age and glucose values (p=0.047). Microalbuminuria was detected in approximately half of the enrolled patients (44.23%). In this way, we have identified the patients who require follow-up and appropriate treatment, in order to slow down the disease and to prevent its complications.

A22
ZNAČAJ AUTOMATIZACIJE HEMIJSKOG I MIKROSKOPSKOG PREGLEDA MOKRAĆE U RANOJ DIJAGNOSTICI OBOLJENJA BUBREGA I URINARNOG TRAKTA

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Ispitivanje urina je i dalje neophodan prvi korak za većinu, ako ne i za sve lekare u dijagnostičkom pristupu pacijentima sa sumnjom na oboljenje bubrega. Pregled sedimenta urina i hemijsko ispitivanje, kao pouzdana, neinvazivna, brza i jednostavna metoda je prva dijagnostička linija za rano otkrivanje renalne disfunkcije. Mikroskopski pregled sedimenta urina je posebno važna dijagnostička procedura u ranoj proceni oboljenja bubrega i urinarnog trakta. Tradicionalno, manuelne mikroskopske tehnike podrazumevaju nekoliko metodoloških koraka koji mogu da doprinesu netačnosti i nepreciznosti a dobijeni netačan rezultat može dovesti do prekasnog postavljanja dijagnoze. Cilj ovog istraživanja bio je utvrđivanje dijagnostičke osetljivosti automatskog analizatora za hemijski i mikroskopski pregled urina u ranoj dijagnostici bubrežnih bolesti. Uzorci su analizirani na automatskom analizatoru Iricell za hemijski i mikroskopski pregled urina koji koristi softver za prepoznavanje čestica koje klasifikuje u 12 kategorija i daje kvantitativni izveštaj. Takođe, pruža brzo semikvantitativo određivanje fizičko-hemijskih parametara, specifične gustine i boje i zamućenosti uzoraka urina i objedinjuje ih sa rezultatima mikroskopskog pregleda. Svi naknadni rezultati pacijenata dobijeni pomoću drugih dijagnostičkih postupaka sa sumnjom na bubrežna oboljenja su praćeni korišćenjem integrisanog zdravstvenog informacionog sistema koji pruža kompletnu istoriju bolesti i u većini slučajeva je potvrđena radna dijagnoza. Automatizovani sistem analize urina Iricell nudi visok stepen standardizacije i visoku osetljivost a integrisano izveštavanje o razultatima fizičko-hemijskog i pregleda urinarnog sedimenta predstavlja moćno sredstvo u ranoj dijagnostici oboljenja bubrega i urinarnog trakta.

A22
ROLE OF CHEMICAL AND MICROSCOPIC URINANALYSIS AUTOMATION IN EARLY KIDNEY AND URINARY TRACT DISEASE DIAGNOSTICS

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The examination of urine is still the indispensable first step for most, if not all, clinicians in approaching the patient with suspected kidney disease. Urine cytology and chemical investigation as a reliable, non-invasive, fast and simple method is appropriate as the first diagnostic line for detecting renal dysfunction. Microscopic examination of the urine sediment is an essential part in the evaluation of renal and urinary tract diseases. Traditionally, manual microscopic techniques have several methodological steps that may contribute to inaccuracy and imprecision, are time-consuming and can lead to a false laboratory report followed by late diagnosis of disease. The aim of this study was to determine the diagnostic sensitivity of automated urinanalysis in early diagnosis of renal disease. Samples were analyzed by the Iricell automated urine analysis system that uses Results Recognition software to classify urine constituents into 12 analyte categories and quantitatively report. It also provides rapid semiquantitative measurement of the chemical constituents, specific gravity, color and clarity of urine samples and consolidates them with results of microscopic examination. Results of further investigation were obtained from clinicians using an integrated health information system that provides complete patient diagnostic and treatment history regarding the presence or absence of urinary tract or renal disease states in these patients after use of other diagnostic procedures. Working diagnosis was confirmed in most cases. Iricell automated urine analysis system offers a high degree of standardization and its high sensitivity and integrated reporting are powerful tools in the early diagnostics of kidney and urinary tract diseases.

A23
NIVO FOLNE KISELINE I AKTIVNOST TRANSAMINAZA U SERUMU PACIJENATA NA TERAPIJI METOTREKSATOM

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Metotreksat (MTX) jeste uspešan lek koji se koristi u terapiji psorijaze, atopičnog dermatitisa, nekih formi artritisa, posebno reumatoidnog i psorijatičnog, i Kronove bolesti. U značajno većim dozama se koristi u hemoterapiji leukemije i drugih formi kancera. Metotreksat inhibira dihidrofolat-reduktazu čime sprečava konverziju folne kiseline u aktivnu formu i dovodi do opadanja nivoa folata u plazmi. Terapija MTX može da dovede do brojnih neželjenih efekata, uključujući i disfunkciju jetre udruženu sa histološkim promenama. U ovoj studiji određivana je aktivnost AST i ALT i koncentracija folne kiseline u serumu 38 pacijenata podvrgnutih terapiji MTX i to 12 i 24 h nakon ordinirane terapije. Folna kiselina određivana je imunohemijskom metodom a ALT i AST standardnim biohemijskim metodama. Rezultati pokazuju povećanu aktivnost ALT/AST kod 25% (10) pacijenata 12 h posle terapije MTX. Povećana aktivnost ALT/AST bila je prisutna kod 13% (5) pacijenata 24 h nakon terapije. Radi se o neznačajnom i prolaznom povećanju. Vrednosti transaminaza ne prelaze 96 IU/L za ALT i 62 IU/L za AST. Kod 60,5% (23) pacijenata utvrđene su povećane vrednosti folne kiseline >20,0 ng/mL i aktivnost transaminaza u referentnom opsegu. Radi se o pacijentima sa redovnom supstitucionom terapijom folnom kiselinom (1 mg dnevno). Kod 21,5% (8) pacijenata prisutne su niske vrednosti folne kiseline <3,0 ng/mL uz povećanu aktivnost jetrinih enzima. Zadovoljavajući nivo folne kiseline u serumu ima 18,4% (7) pacijenata. Dopuna terapije MTX preparatima folne kiseline dovodi do ređe pojave neželjenih efekata pa i hepatotoksičnosti što se manifestuje izostankom porasta serumskih transaminaza.

A23
SERUM FOLIC ACID LEVEL AND TRANSAMINASE ACTIVITIES IN PATIENTS ON METHOTREXATE THERAPY

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Methotrexate (MTX) is a drug successfully used for treating severe psoriasis, atopic dermatitis, some forms of arthritis, especially rheumatoid and psoriatic arthritis, as well as Crohn's disease. In much higher doses it is used as a chemotherapy agent for leukaemia and some other forms of cancer. MTX inhibits the activity of dihydrofolate reductase, resulting in a decreased supply of folates. Therapy with MTX can induce a lot of side effects, one of which is liver dysfunction with histological changes. This study was undertaken to determine serum AST and ALT activities and folic acid levels in samples obtained from 38 patients treated with MTX, 12 and 24 hours after administered therapy. Folic acid was measured by an immunochemical technique, and AST, ALT using standard biochemical methods. The results showed elevated ALT/AST levels in approximately 25% (10) of patients, 12 hours after MTX therapy. Elevated ALT/AST levels were found in 13% (5) of patients, 24 hours after MTX therapy. Most abnormalities were insignificant and transient. The highest level of ALT was 96 IU/L, and AST 62 IU/L. 60.5% (23) of patients had elevated levels of serum folic acid (> 20.0 ng/mL) and transaminase activities within the normal range. These patients were under supplementation with oral folic acid in a dose of 1 mg per day. 21.5% (8) of patients had low levels of serum folic acid (<3.0 ng/mL) associated with elevated liver enzyme activites. 18.4% (7) of patients had a normal serum folic acid level. Supplementation therapy with folate in a dose of 1 mg per day is associated with a reduced incidence of serum transaminase elevation. Thus, folate supplementation may prevent hepatotoxicity in patients taking MTX.

A24
SRČANI NATRIURETSKI PEPTID I TROPONIN KAO INDIKATORI SRČANE BOLESTI ILI AKUTNOG KORONARNOG SINDROMA

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Srčani natriuretski peptid (NT pro-BNP) i troponin (cTnI) jesu kvantitativni markeri za srčane bolesti ili akutni koronarni sindrom. Dokazano je da određivanje NT pro-BNP i cTnI kod pacijenata sa srčanim bolestima ili akutnim koronarnim sindromom unapređuje lečenje i smanjuje troškove tretmana. Zato se NT pro-BNP i cTnI koriste za trijažu pacijenata sa srčanom insuficijencijom ili akutnim koronarnim sindromom prema riziku, kako bi se identifikovali oni pacijenti kojima je potrebno intenzivnije lečenje i pratili pacijenti kod kojih postoji najveći rizik od smrti ili ponovne hospitalizacije. Cilj rada bio je uporediti koncentracije cirkulišućih NT pro-BNP i cTnI u serumu kardioloških bolesnika. Unutar grupe kardioloških bolesnika analizirali smo vrednosti NT pro-BNP i cTnI s obzirom na stepen srčane bolesti ili akutnog koronarnog sindroma. Upoređene su vrednosti NT pro-BNP i cTnI u serumu 65 kardioloških pacijenata koji su bili podeljeni u tri grupe (A, B i C) s obzirom na stepen srčane bolesti ili akutnog koronarnog sindroma: grupa A (Br = 15); grupa B (Br = 25) i grupa C (Br = 25). Srednje vrednosti NT pro-BNP (pg/mL) i cTnI (μg/L) prema grupama: grupa A* 328 i 0,01; grupa B** 7051 i 0,05; grupa C** 6596 i 1,0. *p< 0,01 A u odnosu (B, C); **p< 0,01 C u odnosu (A, B). Značajno više vrednosti NT pro-BNP nađene su u grupi B i C u odnosu na grupu A. Značajno više vrednosti cTnI nađene su u grupi C u odnosu na grupe A i B. Dobijeni rezultati upućuju na mogućnost neinvazivnog ispitivanja srca na osnovu serumskog određivanja NT pro-BNP i cTnI, što bi bilo veoma važno za srčane bolesnike ili akutni koronarni sindrom.

A24
BRAIN NATRIURETIC PEPTIDE AND CARDIAC TROPONIN ARE INDICATORS OF HEART FAILURE OR ACUTE CORONARY SYNDROME

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Brain natriuretic peptide (NT pro-BNP) and cardiac troponin (cTnI) are quantitative markers for heart failure or acute coronary syndrome. The use of NT pro-BNP and cTnI in patients with heart failure or acute coronary syndrome has consistently shown improvement of patient management and reduction of the treatment cost. Therefore, NT pro-BNP and cTnI can be used for the evaluation of risk in patients with heart failure and acute coronary syndrome. They can also be used for identification of those patients who require more intensive treatment and for the follow up of patients who are most at risk from death or rehospitalisation. The aim of the study was to compare the levels in NT pro-BNP and cTnI determined in patients with cardiovascular disease and to assess the difference of NT pro-BNP and cTnI concentrations between the patients with heart failure and acute coronary syndrome. Serum values of NT pro-BNP and cTnI of 65 cardiology patients divided into three groups (A, B and C) according to the grade of heart failure or acute coronary syndrome are: group A (No=15); group B (No=25) and group C (No=25). Median values of NT pro-BNP (pg/mL) and cTnI (μg/L) in the groups: group A* 328 and 0.01; group B** 7051 and 0.05; group C** 6596 and 1.0. *p<0.01 A vs. B, C; **p< 0.01 C vs. A, B. NT pro-BNP was significantly higher in the cardiology patients than in group A. cTnI was significantly higher in group C. The results suggest that the measurement of basal NT pro-BNP and cTnI is to be a noninvasive parameter for the evaluation of heart failure in patients with various forms of heart failure or acute coronary syndrome.

A25
UČINAK ESTROGEN-PROGESTIN TERAPIJE NA KOAGULACIJU KRVI KOD ŽENA U MENOPAUZI

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Primena hormonske terapije ne sprečava samo pojavu neprijatnih simptoma koji prate menopauzu (noćno znojenje, valunzi, depresija) već štiti kardiovaskularni sistem i sprečava pojavu osteoporoze. Takođe, zahvaljujući uticaju na različite parametre koagulacije krvi predstavlja faktor rizika za nastanak duboke venske tromboze ili plućne embolije. Cilj rada je bio da se utvrdi rizik za nastanak poremećaja koagulacije krvi tokom primene hormonske terapije. Studija je obuhvatila 50 zdravih žena u postmenopauzi starosti 46–58 godina koje su bile na hormonskoj estrogen-progestin terapiji i 20 zdravih žena u postmenopauzi iste starosti koje su primale placebo, a koje su predstavljale kontrolnu grupu. Učinak hormonske terapije na parametre koagulacije krvi određen je pre početka terapije i 3, 6, i 12 meseci od početka tretmana. Antitrombin i protein C su određivani hromogenom metodom (Instrumentation Laboratory, Italy), protein S je određivan koagulantnom metodom (Instrumentation Laboratory, Italy) a trombin-antitrombin kompleks je određivan Elisa metodom (Dade Behring Diagnostics). U grupi ispitanica koje su bile na hormonskoj terapiji posle tri meseca od primene nivo trombin-antitrombin kompleksa bio je statistički značajno viši u odnosu na vrednost pre tretmana ($p<0,001$) i nije se menjao do kraja ispitivanog perioda. Antitrombin i protein C nisu se menjali tokom ispitivanog perioda dok je posle tri meseca upotrebe hormonske terapije došlo do statistički značajnog smanjenja aktivnosti proteina S. U kontrolnoj grupi nije bilo promena ispitivanih parametara tokom 12 meseci. I pored uočenih promena u aktivnosti nekih parametara koagulacije može se reći da je u našoj grupi ispitanica postojao mali rizik za nastanak tromboze.

A25
EFFECT OF ESTROGEN-PROGESTIN HORMONAL THERAPY ON BLOOD COAGULATION IN POSTMENOPAUSAL WOMEN

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Postmenopausal hormone therapy helps not only to alleviate the unpleasant symptoms associated with the menopause (night sweats, hot flushes, depressed mood), but also to prevent cardiovascular diseases and osteoporosis. Hormone therapy with some effects on various parameters of coagulation may contribute to an increased risk of venous thromboembolic events. The aim of this study was to determine the effects of hormone therapy on certain parameters of coagulation in healthy early postmenopausal women. The study included 50 healthy early postmenopausal women, aged 46–56 years, on hormone therapy and 20 healthy postmenopausal women of the same age, receiving placebo. Participants were followed by a regular visit at baseline and then after 3, 6 and 12 months. Antithrombin activity and protein C were determined by chromogenic methods (Instrumentation Laboratory, Italy) but the protein S was measured by a coagulant method (Instrumentation Laboratory, Italy). Thrombin-antithrombin complex (TAT) was measured using Elisa method (Dade Behring Diagnostics). Hormone users had significantly higher levels of TAT after 3 months of treatment in comparison with baseline value. Antithrombin and protein C were not changed during the investigation period, but after 3 months of treatment there was a statistically significant reduction in protein S. In the control group there were no statistically significant changes of any parameters during the investigation period. Our results suggest the presence of coagulation activation with a relatively low risk of thrombosis in our population.

A26
ODREĐIVANJE LIPIDNOG STATUSA KOD ZDRAVE DECE UZRASTA 12 GODINA

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Hiperlipidemija je značajan faktor rizika za razvoj ateroskleroze i može početi u detinjstvu. Još uvek ne postoji dovoljno informacija o vrednostima ovog faktora kod zdrave dece različitog uzrasta, što je od suštinskog značaja za uspostavljanje zdravog načina života. Cilj rada je bio da se utvrde vrednosti lipida u serumu kod zdrave dece uzrasta 12 godina radi procene rizika za nastanak kardiovaskularnih oboljenja u odraslom dobu. Ukupni holesterol (TC), triglyceridi (TG) i lipoproteini velike gustine (HDL-C) određivani su na biohemijskom analizatoru ILAB 300+ (Instrumentation Laboratory, Milan, Italy) i korišćeni su reagensi firme Randox (Armdore, UK). Koncentracija lipoproteina male gustine (LDL-C) izračunata je pomoću Friedewaldove formule. Dobijene su sledeće vrednosti (srednja vrednost ± standardna devijacija): TC (4,33 ± 0,74 mmol/L), TG (0,70 ± 0,03 mmol/L), HDL-C (1,31 ± 0,29 mmol/L), LDL-C (2,70 ± 0,61 mmol/L). Vrednosti ukupnog holesterola su veće kod devojčica ($p<0,05$), dok ostali parametri nisu pokazali statistički značajnu razliku. Prema preporukama American Academy of Pediatrics za vrednosti indeksa telesne mase (BMI) za decu uzrasta 12 godina, našli smo da 27,20% dece ima povećani rizik od prekomerne težine dok 11,20% dece ima prekomernu težinu. Deca sa većim BMI imala su niže vrednosti HDL-C i veće koncentracije holesterola. Vrednosti lipida u serumu kod dece treba što ranije određivati kako bi se otkrio povećan rizik od kardiovaskularnih bolesti i kako bi se primenile preventivne mere.

A26
DETERMINATION OF THE LIPID STATUS IN HEALTHY CHILDREN AGED 12

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Hyperlipidemia is a significant risk factor for the development of atherosclerosis and may begin in childhood. There is not enough information yet about the values of risk factors in healthy children of different age. Such information is essential for establishing healthy lifestyle programmes. The aim of the study was to determine the value of lipids in school children aged 12 to asses the degree of risk of cardiovascular disease in adulthood. Total cholesterol (TC), triglycerides (TG) and high-density lipoprotein cholesterol (HDL-C) were assayed using the ILAB 300+ analyzer (Instrumentation Laboratory, Milan, Italy) and Randox Laboratories reagents (Armdore, UK). The concentration of low-density lipoprotein (LDL-C) was calculated using the Friedewald formula. The obtained values were (mean ± standard deviation): TC (4.33 ± 0.74 mmol/L), TG (0.70 ± 0.03 mmol/L), HDL-C (1.31 ± 0.29 mmol/L), LDL-C (2.70 ± 0.61 mmol/L). Values of TC were higher in girls ($p<0.05$), while the other parameters did not show a statistically significant difference. According to the recommendations by American Academy of Pediatrics for body mass index (BMI) in children aged 12, we found that 27.20% of the children are at risk of overweight and 11.20% children are overweight. Children with higher BMI had lower HDL-C and higher concentrations of TC. Serum lipid values in children should be determined as early as possible in order to establish an increased risk of cardiovascular disease and to implement preventive measures.

SEKCIJA/SESSION
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UDK 577.1 : 61 **ISSN 1452-8258**

J Med Biochem 29: 437–459, 2010

Posterske sekcije
Poster sessions

B27
DIJAGNOSTIČKI ZNAČAJ SKRININGA ANEMIJA KOD MLADIH

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Svetska populacija svih uzrasta pati od anemije u oko 30% slučajeva. Najčešći uzrok anemije je nedostatak gvožđa koji je odgovoran za oko 50% svih slučajeva anemije, dok su oni u oko 20% slučajeva uzrokovani deficijencijom vitamina B_{12} i folata. Cilj rada je bio skrining slučajeva anemije kod mladih osoba koji su praćeni tokom perioda od 9 godina, kao i to da na se na osnovu naših razultata odrede referentne vrednosti. Studija je obuhvatila 4299 studenata Novosadskog univerziteta. Ispitivana studentska populacija iste starosne strukture je bila podeljena u tri grupe i u svim grupama je određena kompletna krvna slika a pacijenti su praćeni tokom 1991, 2000. i 2009. godine. U pogledu srednjih vrednosti eritrocita i hemoglobina u svim ispitivanim grupama studentske populacije zapaža se da nije bilo statistički značajne razlike (NS). Statistički značajna razlika dobijena je kod minimalnih vrednosti hemoglobina koje su u poslednjoj godini ispitivanja bile značajno više ($p<0,05$). Maksimalna vrednost eritrocita pokazala je statistički značajnu razliku u poslednjoj godini ispitivanja ($p<0,05$). Dobijeni rezultati ukazuju da studentska populacija u svim godinama ispitivanja ima konstantne prosečne vrednosti eritrocita i hemoglobina i na osnovu njih su izvedene naše sopstvene referentne vrednosti koje za broj eritrocita iznose za muškarce 4,30–5,94 x 10^{12}/L i za žene 3,80–5,28 x 10^{12}/L, a za koncentraciju hemoglobina za muškarce 138–179 g/L i za žene 119–158 g/L. Statistički značajna razlika je potvđena u pogledu distribucije anemije u sve tri ispitivane grupe ($p<0,05$), tako da se signifikantno sniženje pojave anemije u studentskoj populaciji u oba pola zapaža u poslednjem vremenskom razdoblju ispitivanja. Dobijeni rezultati ukazuju na potrebu skrininga anemija u studentskoj populaciji, primenu mera primarne prevencije kroz promenu načina života, promociju zdravog načina života, kao i obogaćivanje hrane gvožđem i vitaminima, zatim kroz dijagnostikovanje i lečenje preanemijskih stanja i aktivnu dijagnozu anemije i sprovođenje adekvatne terapije prema kliničkim smernicama u pojedinim utvrđenim kliničkim slučajevima.

B27
DIAGNOSTIC SIGNIFICANCE OF SCREENING FOR ANAEMIA IN YOUNG PEOPLE

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Roughly 30% of the world's population of all ages suffers from anaemia. Around half of the cases are caused by iron deficiency, while approximately 20% are caused by vitamin B_{12} and folate deficiencies. The aim of the study was screening for anaemia cases in young people by following the subjects participating in sistematic examinations over a 9-year period from 1991 to 2009 and to established own reference values according to our results. Complete blood count (CBC) was determined in randomly selected age-matched (4299) students of the University of Novi Sad in 1991, 2000 and 2009. The results show that statistically significant differences were not detected between the mean values of erythrocytes and hemoglobin in all examined groups of the student population. In both sexes minimal hemoglobin values and maximal erythrocyte values showed statistically significant differences ($p<0.05$), which are higher in the last period of examination. Results of our study show that the student population has constant mean values of CBC and our own reference values were established which are for men erythrocytes 4.30–5.94 x 10^{12}/L and women 3.80–5.28 x 10^{12}/L, hemoglobin men 138–179 g/L and women 119–158 g/L. Statistically significant difference was found ($p<0.05$) in the distribution of anaemia a with lower percentage of the appearance of anaemia in both sexes in the last year of examination. These data suggest that screening for anaemia is necessary in the student population, and that primary prevention is very important and can be achieved through lifestyle changes, promotion of a healthy way of life, as well as supplementation of food with iron and vitamins, diagnosis of preanaemic states, active diagnosis of anaemia and therapeutic intervention in established clinical cases.

B28
ORGANSKI HIDROPEROKSIDI, KATALAZA I SUPEROKSID-DIZMUTAZA U OČNOJ VODICI PACIJENATA SA SENILNOM KATARAKTOM

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Reaktivni metaboliti kiseonika, superoksid anjon i hidroksilni radikali, kao i H_2O_2 mogu izazvati oštećenje očnog sočiva i izazvati kataraktu. Superoksid-dizmutaza (SOD) jeste enzim koji u prisustvu H^+ donora redukuje superoksidni anjon radikal do H_2O_2. Paradoksalno međutim, iako je ova reakcija u principu zaštitna, stvaranje H_2O_2 bez njegove efikasne eliminacije katalazom (CAT) i/ili peroksidazama može biti uzrok peroksidativnog oštećenja organskih molekula kada nastaju nestabilni hidroperoksidi. Iako očna vodica ima sposobnost stvaranja H_2O_2, njena uloga u kataraktogenezi je neizvesna. U ovom radu je određivana aktivnost SOD i CAT kao i koncentracija organskih hidroperoksida u 35 uzoraka očne vodice pacijenata sa nezrelom (n=25) i maturnom (n=10) kataraktom. Organski hidroperoksidi određivani su metodom FOX-2 nakon redukcije prethodno postojećih peroksida trifenil-fosfinom. Aktivnost SOD je određivana metodom inhibicije autooksidacije adrenalina, a CAT je određivana UV-kinetičkom metodom. U odnosu na nezrelu, koncentracija hidroperoksida je bila veća u maturnoj katarakti ($p<0,001$), kao i aktivnost CAT ($p=0,011$), dok se aktivnost SOD nije značajno razlikovala ($p=0,103$). Veći odnos SOD/CAT kod nezrele u odnosu na maturnu kataraktu ($p=0,034$) ukazuje na disbalans metabolisanja H_2O_2. Korelacionom analizom je utvrđena povezanost odnosa SOD/CAT i hidroperoksida u nezreloj ($p<0,001$), za razliku od zrele katarakte ($p>0,50$). Prezentovani rezultati ukazuju na to da je kod nezrele katarakte H_2O_2 dominantan oksidans očne vodice, dok u maturnoj katarakti pojačanju oksidacionog stresa najverovatnije doprinose organski peroksidi.

B28
ORGANIC HYDROPEROXIDES, CATALASE AND SUPEROXIDE DISMUTASE IN AQUEOUS HUMOR OF PATIENTS WITH AGE-RELATED CATARACT

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Reactive oxygen species, such as superoxide anion and hydroxyl radicals, and H_2O_2, may inflict injury to the eye lens, leading to the development of cataract. In the presence of an H^+ donor, superoxide dismutase (SOD) catalyses the reduction of superoxide to H_2O_2. Paradoxically, this protective reaction may give rise to peroxidative modifications of various molecules with formation of unstable organic hydroperoxides, if catalase (CAT) or/and peroxidases fail to detoxify thus formed H_2O_2. Even though the aqueous humor is capable to produce H_2O_2, its role in cataractogenesis is still uncertain. A total of 35 aqueous humor samples were collected from patients with immature (n = 25) and mature (n = 10) age-related cataract. Organic hydroperoxides were determined by the FOX-2 method after reduction of preexisting peroxides with triphenylphosphine. Activity of SOD was measured by the rate of inhibition of autooxidation of epinephrine, while CAT was determined by the UV-kinetic method. In comparison with immature cataract, hydroperoxides ($p<0.001$), as well as CAT ($p=0.011$) were higher in mature cataract, while SOD showed no significant differences between the maturity stages ($p=0.103$). SOD/CAT ratio was increased in immature cataract, pointing to imbalanced production of H_2O_2 in the aqueous of these patients. Correlation analysis revealed a significant association between the SOD/CAT ratio and hydroperoxides in immature cataract ($p<0.001$), and not in the mature ($p>0.50$). These results suggest that enhanced aqueous oxidative stress in immature cataract is due to increased production of H_2O_2, while organic hydroperoxides are most likely contributing peroxidizing species in mature cataract.

B29
EFEKAT AKUTNOG NAPORA NA AKTIVNOST KSANTIN-OKSIDAZE KOD SPORTISTA

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Novije studije pokazaju značajan uticaj oksidativnog stresa na funkciju skeletnih mišića za vreme fizičke aktivnosti, što dovodi do smanjenja fizičkih mogućnosti sportista. Te studije ukazuju da je prooksidantni enzim ksantin oksidaza (XO – EC 1.1.3.22) glavni izvor slobodnih radikala za vreme mišićne aktivnosti u stanju hipoksije u uslovima narušavanja ADP/ATP ravnoteže. Određivali smo XO aktivnost kao i marker procene lipidne peroksidacije – koncentraciju supstanci koje reaguju sa tiobarbiturnom kiselinom (thiobarbituric acid reactive substances – TBARS), pre (T_p), 15 min nakon akutnog napora (T_{15}) i 2 časa (T_{2h}) kasnije. Dobijeni rezultati su upoređivani međusobno kao i sa odgovarajućom grupom nesportista. U grupi sportista zabeležen je statistički značajan porast XO aktivnosti nakon napora (T_{15}) ($p < 0,01$) u poređenju sa vrednostima pre testa. Takođe, porast je statistički značajno veći kod nesportista nego kod sportista. Slične vrednosti beleži i koncentracija TBARS-a: visoke vrednosti nakon vežbe u poređenju sa bazalnim vrednostima sa najvišom vrednošću u T_{2h} periodu i to višom vrednošću u grupi nesportista. Dinamika aktivnosti prooksidantnog enzima i koncentracija markera lipidne peroksidacije ukazuje na povećano stvaranje slobodnih radikala za vreme napora kao i na to da su kompenzatorni mehanizmi kod sportista na višem nivou u poređenju sa grupom nesportista što je posledica kontinuiranog stvaranja slobodnih radikala za vreme treninga i posledičnog neutralisanja istih. Rezultati su u visokoj korelaciji sa drugim pokazateljima utreniranosti sportista. Naši rezultati ističu potrebu za određivanjem parametara oksidativnog stresa kod sportista, pogotovu XO, koji mogu biti relevantni pokazatelji procene trenažnog procesa.

B29
EFFECT OF ACUTE EXERCISE ON XANTHINE OXIDASE ACTIVITY IN ATHLETES

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Current studies demonstrate an important role of oxidative stress in the skeletal muscle function during physical exercise leading to reduced physical opportunities in athletes. These studies involve the prooxidant enzyme xanthine oxidase (XO – EC 1.1.3.22) as a major source of reactive oxygen species during muscle activity in the state of hypoxia when disarrangement of the ADP/ATP ratio occurs. Activities of XO and the concentrations of thiobarbituric acid reactive substances (TBARS), a biomarker of lipid peroxidation, were determined in athletes before (T_p), 15 min after acute exercise (T_{15}) and 2 hours (T_{2h}) later. The obtained results were compared mutually and with non-athletes. We noted significant increase in the XO activity of athletes after exercise T_{15} ($p<0.01$) vs. athletes before the test. Additionally, this increase is higher in non-athletes than in athletes. Simultaneously, the values of TBARS showed similar changes: high levels after exercise vs. basal values, with the highest level in the T_{2h} period, especially in non-athletes. The activity of XO and concentration of the lipid peroxidation marker show high generation of free radicals during exercise, and that compensatory mechanisms in athletes are on a higher level vs. non-athletes as a consequence of the continuing generation of free radicals during the training process and their neutralization. The results were in strong correlation with other trained status markers in athletes. Our results suggest that investigation of oxidant stress parameters, especially XO can be a relevant marker in the estimation of the training process.

B30
TPO-ANTITELA U DIJAGNOSTICI OBOLJENJA ŠTITNE ŽLEZDE

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S obzirom na povećanu učestalost kliničke i subkliničke tiroidne disfunkcije i njen uticaj na opšte zdravstveno stanje populacije, potrebno je što ranije dijagnostikovati ove poremećaje. Standardno se

B30
TPO-ANTIBODIES IN THE DIAGNOSIS OF THYROID DISEASES

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Given the increased incidence of clinical and subclinical thyroid dysfunction and its impact on the general health of the population, it is necessary to diagnose early these disorders. The standard is to

određuju nivoi tiroidnih hormona, najčešće TSH kao najosetljivijeg parametra, a sada, zbog visoke incidence autoimunih bolesti, i koncentracije tiroidnih antitela. U ovom radu određivane su koncentracije TPO antitela. Antiperoksidazna antitela (TPO) jesu antitela usmerena protiv enzima tireoidne peroksidaze. Ovaj enzim katalizuje jodinaciju tirozina iz tireoglobulina u toku biosinteze T_3 i T_4. Zbog svoje visoke senzitivnosti i specifičnosti TPO antitela su veoma dobar dijagnostički parametar autoimune bolesti tiroidee. Preporučuje se njihovo određivanje u svakoj novootkrivenoj hiper- ili hipotireozi. U gotovo svim slučajevima Hashimotove i većini slučajeva Gravesove bolesti, TPO antitela su povišena. U našem radu određivana su TPO antitela kod 70 pacijenata sa normalnim i povišenim vrednostima TSH. Parametri su određivani na aparatu DPC-IMMULITE 1000, njihovim komercijalnim testovima, metodom hemiluminiscencije. TSH od 4–10 mIU/L imalo je 23 pacijenta, ali su TPO antitela bila povišena kod 17 pacijenata. Devet pacijenata imalo je TSH>10 mIU/L i svi su imali povišene vrednosti TPO antitela, čime je uz kliničku sliku hipotireoidizma potvrđena dijagnoza Hashimotove bolesti. Dobijeni rezultati potvrđuju opravdanost široke upotrebe tiroidnih antitela u diferencijalnoj dijagnostici autoimune tiroidne bolesti.

determine the levels of thyroid hormones, often TSH as a sensitive parameter, and now because of the high incidence of autoimmune diseases, also the concentration thyroid antibodies. In this paper the concentration of TPO antibodies was determined. Antithyroid peroxidase (TPO) antibodies are directed against the enzyme thyroid peroxidase. This enzyme catalyzes the iodination of tyrosine in thyroglobulin during the biosynthesis of T_3 and T_4. Because of high sensitivity and specificity, TPO antibodies are a very good diagnostic parameter in thyroid autoimmune diseases. Their determination is recommended in each newly discovered hyper- or hypothyroidism. In almost all cases of Hashimoto and most cases of Graves' disease, TPO antibodies are elevated. In our study TPO antibodies were determined in 70 patients with normal and elevated TSH values. The parameters were determined by the device DPC IMMULITE 1000, using their commercial tests, and the chemiluminescent method. TSH of 4–10 mIU/L had 23 patients, but TPO antibodies were elevated in 17 patients. Nine patients had a TSH> 10 mIU/L and all had higher values of TPO antibodies, which along with the clinical diagnosis of hypothyroidism confirmed Hashimoto disease. Obtained results justify the widespread use of thyroid antibodies in the differential diagnosis of autoimmune thyroid disease.

B31
SISTEMSKA SKLEROZA, PRIKAZ PACIJENTA

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Sistemska skleroza je autoimuna bolest, karakteristična po progresivnoj kožnoj i visceralnoj fibrozi, funkcionalnim i strukturalnim vaskulopatijama i poremećajima ćelijskog imuniteta; pojavljuje se u svim rasama, na 4 žene oboleva 1 muškarac, većina pacijenata je doba od 30 do 50 godina. Naš pacijent je šezdesetjednogodišnja žena, koja od 1995. boluje od sistemske skleroze, hroničnog cervikalnog i lumbalnog sindroma i osteoporoze. Lična internistička anamneza: promene na koži lica i prstiju, sklerodaktilija sa ograničenim i bolnim pokretima zglobova. Rtg. nalaz – Discartrosis vratnog dela kičme C5–C6 i lumbalna skolioza, cholycistitis calculosa, rtg. pluća b.o. Ulcerozni kolitis dijagnostikovan je kolonoskopski, sa simptomima dijareje. Promene na kapilarima tipa IV. Laboratorija: SE 16, Er. 3,89, Leu. 8,0, serumski kreatinin 48,5 μmol/L, klirens kreatinina 0,86 mL/min, AP 98,5 U/L, AST 112 U/L, ALT 136 U/L, Ca 2,38 mmol/L, P 1,07 mmol/L, D vitamin 8,1 ng/mL, Anti DNK 0,5, ANA 1/20, proteinurija, 1 g/L, Ø cilindri, urinokultura: Ešerihija koli. Terapija: Methotrexate 7,5 mg na dve nedelje, Salazopirin 500

B31
SYSTEMIC SCLEROSIS, A PATIENT'S CASE

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Systemic sclerosis is an autoimmune disease characterized by progressive cutaneous and visceral fibrosis, functional and structural vasculopathy and cellular immunological abnormalities; it occurs in all races, affects four females for every male, mostly patients aged 30–50 years. Our patient is a 61 year old woman; since 1995 she has been suffering from sclerosis sistematica, sindroma cervicalis et lumbalis chronica and osteoporosis. Personal and internistic anamnesis: changes in the skin of face and fingers, scleroda, actions in articulation are limited and very painful. Rtg. – discartrosis vertebre cervicalis C5–C6, scoliosis vertebre lumbalis, cholecystitis calculosa, rtg pulmo b.o. Colitis ulcerosa, diagnosed with colonoscopy, with simptoms of diarrhoea. Capillary changes – type IV. Laboratory: SE –16, Hb –11.6, Er. 3.89, Leu 8.0, creatinine 48.5 μmol/L, creatinine clearance 0.86 mL/min, AP 98.5 U/L, AST 112 U/L, ALT 136 U/L, Ca 2.38, P 1.07, Glic. 5.47 mmol/L, vit D 8.1 ng/mL, Anti DNK 0.5, ANA 1/20, proteinuria 0.1 g/L, Ø cilinder, urinocult. Escherichia coli. Therapy: Methotrexate tbl. 7.5 mg in two weeks, Salazopirin

mg 2x1, Prinelap 5 mg, Vasotal 5 mg, Ranisan 1 dnevno, Alendronat 1 dnevno, Ideos 1 dnevno, Diklofenak Duo 2x1, Rivotril 2 x ¼. Laboratorijska ispitivanja su važna za dijagnostikovanje i praćenje sistemske skleroze. Bubrežna oboljenja su glavni razlog umiranja obolelih od sistemske skleroze i laboratorijski testovi bubrežne funkcije pomažu u poboljšanju kvaliteta njihovog života.

B32
ELIMINACIJA ATEROGENE DISLIPIDEMIJE BOLESNIKA SA SINDROMOM X

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Insulinska rezistencija (IR) prisutna u sindromu X, predijabetesu ili metaboličkom sindromu tesno je povezana sa prisustvom abdominalne gojaznosti i aterogene dislipidemije tj. hipertrigliceridemije, povećanja LDL-holesterola i sniženja HDL holesterola. Kao što je poznato, TG nisu prisutni u ateromatoznom plaku, ali zato svaki neutrošeni višak kalorijskog unosa završava kao bela masna kapljica koja može da bude odložena u visceralnim organima (u jetri) ili gluteofemoralno, kao i oko korenova nerava kičmene moždine. Cilj ovog rada je bio da se uporedi lipidni profil 2 grupe bolesnika sa sindromom X (BIH i DIJ), podloženih dijetoterapiji i fizičkim vežbama, s tim da je u grupi BIH sprovedena i bihevioralna terapija u cilju trajne eliminacije IR i pokazatelja aterogene dislipidemije. Kod 70 pacijenata sa sindromom X (54 žena i 16 muškaraca) i 35 zdravih nesrodnih osoba bili su istovremeno određeni pokazatelji IR i parametri lipidnog statusa, u tri faze merenja: inicijalno, pre početka terapije, posle dva meseca intenzivnog tretmana (fizičke vežbe, određena dijeta) kao i posle 2 godine od završetka druge faze terapije. Eksperimentalne grupe su označene kao DIJ i BIH a s ciljem stavljanja naglaska na bihevioralnu terapiju koja je sprovedena samo u grupi BIH. Svi pokazatelji su bili određivani iz istog uzorka krvi, našte, iz koga su određivane i konc. glukoze, insulina i hormona rasta. Određene su: koncentracije ukupnih triglicerida (TG) u serumu (s.), ukupnog holesterola (uH), HDL-holesterola (HDL-C), LDL-holesterola (LDL-C), lipoproteinskih čestica veoma niske gustine (VLDL). Stepen aterogenog rizika lipidnog porekla izračunat je u odnosu između »zaštitnog« HDL-holesterola i aterogenih frakcija holesterola, odnosno aterogeni indeks I, tj. odnos LDL-C i HDL-C (Indeks LDL-C/HDL-C), kao i indeks odnosa ukupnog holesterola (uH) i HDL-C (Indeks uH/HDL-C). Rezultati pojedinačnih pokazatelja lipidnog statusa grupisani su prema vrsti terapije i polu. U svakoj grupi bilo je 35 ispitanika (27 žena i 8 muškaraca). Pored prosečnih koncentracija (aritmetičke sredine i medijane) prikazane su i vrednosti

500 mg 2x1, Prinelap 5 mg, Vasotal 5 mg, Ranisan 1x1, Alendronat 1x1, Ideos 1x1, Diklofenak Duo 2x1, Rivotril 2 x ¼. Now receives treatment in a hyperbaric chamber. Laboratory tests are important for diagnostic and monitoring of systemic sclerosis. Kidney disease is the most common cause of death in people with scleroderma and blood tests can be used to study the kidney function and help to improve their life.

B32
ATHEROGENIC DYSLIPIDEMIA ELIMINATION IN PATIENTS WITH SYNDROME X

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Insulin resistance (IR) present in syndrome X, prediabetes or methabolic syndrome is closely associated with the presence of abdominal obesity and atherogenic dyslipidaemia, ie. hypertriglyceridemia, increased LDL-cholesterol and decreased HDL-cholesterol. It is known that TG is not present in atheromatous plaque, but any excess calorie intake ends up as a white oily droplet that could be deposited in the visceral organs (the liver) or gluteofemoral region or around the nerve roots of the spinal cord. The aim of this study was to compare the lipid profile of 2 groups of patients with syndrome X (BIH and DIJ) undergoing dietotherapy and physical exercises, with bihevioral therapy conducted in the BIH group with the purpose to eliminate permanently IR and other indicators of atherogenic dyslipidaemia. In 70 patients with syndrome X (54 women and 16 men) and 35 healthy unrelated persons the indicators of IR and parameters of lipid status were measured in three phases: initially, before therapy, after two months of intensive therapy (physical exercise, diet) as well as after 2 years from the end of the second phase of therapy. Experimental groups are indicated as DIJ and BIH in order to focus on behavioral therapy that was conducted only in the BH group. All parameters were determined from the same sample of blood glucose, from which were determined and concentrations of glucose, insulin and growth hormone. Concentrations (conc.) of total triglycerides (TG) in serum (s.), fasting in mmol/L concentration, total cholesterol (UH) in the serum in mmol/L conc., HDL-cholesterol (HDL-C) in mmol/L conc., LDL-cholesterol (LDL-C) in mmol/L, and conc. of VLDL– very low density lipoprotein particles in arbitrary units were determined. The degree of atherogenic risk was calculated in the relations between »protective« HDL-cholesterol and atherogenic fraction of cholesterol, namely: atherogenic index, ie. ratio of LDL-C and HDL-C (Index LDL-C/HDL-C) and the index ratio of total cholesterol (UH) and HDL-C (Index TH / HDL-C). The measu-

standardne devijacije, zatim granične vrednosti gornje i donje kvartile (25% i 75%), kao i minimalna i maksimalna vrednost izmerene u određenoj seriji merenja. Inicijalne vrednosti svih ispitanih pokazatelja lipidnog statusa bile su patološki povećane osim koncentracija VLDL čestica u serumu bolesnika grupe DIJ. Delotvornost se može utvrditi testiranjem značajnosti razlike prosečnih vrednosti u istoj grupi u odnosu na inicijalno stanje pri čemu se razmatra da li se radi o povećanju ili sniženju prosečne vrednosti datog pokazatelja i njegov značaj za ispitivanu bolest ili sindrom u pojedinim fazama svakog programa terapije pojedinačno (inicijalno prva kontrola i inicijalno-finalno) na nivou $p<0,05$ (parni t-test ili Wilcoxonov test sume rangova) tj. primenom RM ANOVA tehnike. Pri tom su nadene i procentualne promene prosečnih vrednosti ispitivanih pokazatelja u odnosu na inicijalno stanje, nakon dva meseca, tj. do prve kontrole, i finalno, nakon 26 meseci. Da bi se utvrdilo koji od ispitivanih programa terapije deluje bolje na pojedine pokazatelje lipidnog statusa bolesnika sa sindromom X ispitana je i stat. značajnost razlike u dinamici promena broja patoloških nalaza obe eksperimentalne grupe. Pored značajnosti razlika u dinamici ovih promena, daje se podatak o pravcu promena ispitivanog pokazatelja u svakoj grupi posebno. Vidljivo je da ponekad i pored istog pravca promena (povećanja ili sniženja), može biti prisutna statistički značajna razlika u dinamici promena prosečnih vrednosti dve eksp. grupe. Pri tom je utvrđeno da su značajne samo razlike u dinamici promena patoloških nalaza konc. LDL-C i VLDL u prvoj fazi terapije (inicijalno-prva kontrola) dok su u toku 26 meseci značajno različite pored konc. LDL-C i konc. VLDL, značajne i konc. ukupnog holesterola i indeksa ukupni holesterol/ HDL-C. U tom smislu evidentno je da su ispitanici obe grupe u proseku različito korigovali inicijalne patološke vrednosti lipida.

rement results of the lipid status of the individual indicators were grouped according to type of therapy and sex. In each group there were 35 patients (27 women and 8 men). In addition to the average concentration (arithmetic average and median) and the value of standard deviation are shown, then the limits of the upper and lower quartile (25% and 75%), and minimum and maximum values measured in a particular series of the measurement. Initial values of all tested parameters were abnormal except the increased VLDL particle conc. in the serum of patient group DIJ. Effectiveness can be determined by testing the significant difference in average values of the same group with respect to the initial state and by considering whether it is an increase or reduction of the average value of the indicators, as well as their significance for the syndrome observed in certain phases of each treatment individually (first initial-control and initial-final) at the level $p<0.05$ (paired t-test or Wilcoxon rank sum test), using RM ANOVA techniques. At the same time, the percentage change in the average values of investigated indicators in relation to the initial state, so after two months, ie. to the first control, and final, after 26 months is provided. To determine which of the tested programs works better on some indicators of lipid status in patients with syndrome X significant differences in the dynamics of change in a number of pathological findings of both experimental groups were tested and ranked. Moreover, it was found that the only significant differences in the dynamics of concentration changes pathological findings were inside the LDL-C and VLDL concentrations in the first phase of therapy (initial-first control), while in the course of 26 months in addition to parameters, significantly different concentrations of previous two parameters, the concetrations of overall index of total cholesterol and cholesterol/ HDL were also significantly different. In this sense it is evident that examinees in both groups averaged differently corrected initial pathological lipid values.

B33
FAKTOR TUMORSKE NEKROZE-α I INTERLEUKIN-10 KOD BOLESNIKA SA SISTEMSKIM LUPUSOM ERITEMATODESOM

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Prototip sistemskih autoimunskih bolesti je sistemski lupus eritematozus (SLE). Mnogobrojni faktori mogu bitno uticati na nastanak SLE ali i na dalji

B33
TUMOR NECROSIS FACTOR-α AND INTERLEUKIN-10 IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Systemic lupus erythematosus (SLE) is a prototype of systemic autoimmune diseases. Numerous factors can influence the onset of SLE and develop-

razvoj bolesti sa zahvatanjem različitih organa i pojavom karakterističnih simptoma i znakova bolesti. U ovom radu su određivane vrednosti faktora tumorske nekroze-α (TNF-α) i interleukina-10 (IL-10) u serumu bolesnika sa SLE. Kompletna laboratorijska obrada biološkog materijala omogućila je klasifikaciju bolesnika sa SLE (n=55) na sledeće grupe: pacijenti sa predominantnom kožnom manifestacijom bolesti, D-SLE; pacijenti sa neurolupusom, N-SLE; pacijenti sa promenama na zglobovima, A-SLE; pacijenti sa manifestnim promenama na krvnim sudovima–vaskulitisom, V-SLE, dok je kontrolnu grupu sačinjavalo 20 dobrovoljnih davalaca krvi. Koncentracija TNF-α i IL-10 je određivana komercijalnim ELISA testovima. Najveći porast TNF-α je zabeležen kod bolesnika sa neurolupusom (P<0,001) i promenama na zglobovima (P<0,01), dok kožni i vaskularni oblik imaju manji stepen značajnosti (P<0,05). Poređenjem između grupa dobijeno je značajno povećanje TNF-α u A-SLE i N-SLE u odnosu na V- SLE (P<0,05). Porast koncentracije IL-10 je statistički značajan kod bolesnika sa neurolupusom (16,25 ± 4,31 pg/mL) i vaskularnim lupusom (15,23 ± 2,18 pg/mL) u odnosu na kontrolu 5,13 ± 1,51, za P < 0,01, i kožnim oblikom oboljenja (12,87 ± 2,28 pg/mL) gde je značajnost nešto manja P<0,05. Rezultati ovog rada ukazuju da TNF-α može biti od posebnog značaja u razvoju neurološke manifestacije bolesti. Oslobođen iz inflamatornih ćelija, u cirkulaciji indukuje perifernu vazodilataciju, porast vaskularnog permeabiliteta i menjanje funkcije endotela favorizujući trombozu. Povećanje IL-10 se može pripisati porastu njegove produkcije u monocitima i vrlo često je povezan sa neuropsihijatrijskim manifestacijama bolesti. Inhibitori produkcije citokina se intenzivno istražuju kao potencijalna terapeutska sredstva u različitim imunološkim bolestima.

ment of some clinical disease manifestations with various organ involvements and occurrence of characteristic symptoms and disease signs. This paper studies the values of tumor necrosis factor-α (TNF-α) and interleukin-10 in the serum of patients with SLE. Complete laboratory processing of the biomaterial enabled classification of SLE patients (n=55) into the following groups: patients with predominant cutaneous disease manifestation, S-SLE; patients with neurolupus, N-SLE; patients with joint changes, J-SLE; patients with blood vessel changes–vasculitis,V-SLE. Twenty blood donors comprised the control group. Concentrations of TNF-α and IL-10 determined by commercial ELISA tests. The increase of the TNF-α was highest in patients with neurolupus (P<0.001) and joint disease (P<0.01), while cutaneous and vascular forms were of lesser significance (P<0.05). Comparing the groups, a significant TNF-α increase in joint and neurolupus related to vascular SLE (P<0.05) was noticed. The increase of the IL-10 concentration is of statistical significance in neurolupus patients (16.25 ± 4.31 pg/mL) and in vascular disease (15.23 ± 2.18 pg/mL) compared to controls 5.13 ± 1.51, for P < 0.01 and skin disease (12.87 ± 2.28 pg/mL), with a somewhat lower significance of P<0.05. The results of this paper indicate that TNF-α can be of special importance in the N-SLE pathology. TNF-α released from inflammatory cells act synergistically in the circulation, inducing peripheral vasodilatation, increase of vascular permeability and alteration of endothelial function favoring thrombosis. Increased IL-10 can be attributed to its increased production in monocytes and associated with neuropsychiatric manifestations of the disease. Inhibitors of cytokine production are being extensively studied as potential therapeutics in various immunologic diseases.

B34
KONCENTRACIJE FAS/FASL KOD PACIJENATA SA ISHEMIJSKOM BOLEŠĆU SRCA

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Ishemijska bolest srca najčešće je posledica ateroskleroze. Put smrti Fas7Fas ligand(FasL)/kaspaza je aktivan u lezijama ateroskleroze. Cilj ove studije je procena dijagnostičkih vrednosti rastvorljivih formi Fas i FasL kod pacijenata sa stabilnom anginom pektoris (SAP), nestabilnom anginom pektoris (NSAP) i akutnim infarktom

B34
SERUM FAS/FAL LEVELS IN PATIENTS WITH ISCHEMIC HEART DISEASE

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Ischemic heart disease is mostly a consequence of atherosclerosis. The Fas/Fas ligand (FasL)/caspase death pathway is activated in atherosclerotic lesions. The goal of this study is to estimate the diagnostic values of soluble forms of Fas and FasL in patients with stable angina pectoris (SAP), unstable angina

miokarda (AIM). Ispitivano je 30 pacijenata sa stabilnom anginom pektoris (SAP), 27 sa nestabilnom anginom pektoris (NSAP) i 39 sa akutnim infarktom miokarda sa elevacijom ST-segmenta (STEMI) i 27 zdravih dobrovoljaca (kontrolna grupa). Koncentracije Fas/APO1 i FasL određivane su komercijalnim ELISA testom. Koncentracije Fas kod pacijenata sa STEMI (6,981 ± 2,689 ng/mL) bile su značajno više od nivoa Fas u kontroli (5,092 ± 1,252 ng/mL), ali nisu značajno više od nivoa Fas u SAP (5,952 ± 2,069 ng/mL) i NSAP (5,627 ± 2,270 ng/mL). Vrednosti FasL ne pokazuju značajne razlike između ispitivanih grupa. Kod SAP pacijenata Fas/APO1 pokazuje značajnu pozitivnu korelaciju sa hsCRP ($p<0,05$) i negativnu korelaciju sa HDL-C ($p<0,05$). Koncentracije Fas kod pacijenata sa normalnim i povišenim vrednostima holesterola značajno se razlikuju ($p<0,05$) samo kod NSAP. Vrednosti Fas i FasL kod pacijenata sa hsCRP višim od 3,0 mg/L i onih sa hsCRP višim od 3,0 mg/L pokazuju značajne razlike ($p<0,001$, odnosno $p<0,05$). Ovi rezultati pokazuju da je apoptoza disregulisana kod pacijenata sa ishemijskom bolešću srca a markeri Fsa i FasL povezani su sa inflamatornim i lipidnim markerima.

pectoris (USAP) and acute myocardial infarction (AMI). We studied 30 patients with chronic stable angina pectoris (SAP), 27 with unstable angina pectoris (USAP), 39 with acute ST-elevation myocardial infarction (STEMI) and 27 age-matched healthy volunteers (Control group). Serum Fas/APO1 and FasL concentrations were determined using commercially available immunoassays (ELISA). Fas/APO1 levels in STEMI patients (6.981 ± 2.689 ng/mL) were significantly higher than Fas levels in controls (5.092 ± 1.252 ng/mL, $p<0.01$), but not significantly higher than Fas values in SAP (5.952 ± 2.069 ng/mL) and USAP patients (5.627 ± 2.270 ng/mL). Levels of FasL did not show any significant difference between studied groups. In SAP patients Fas/APO1 showed a significant positive correlation with hsCRP ($p<0.05$) and a negative correlation with HDL-C ($p<0.05$), while FasL showed a significant positive correlation with LDL-C ($p<0.05$). Fas levels compared between the patients having cholesterol within the normal range and those whose cholesterol was above normal range showed a significant difference ($p<0.05$) only in USAP patients. Fas and FasL levels between the patients with hsCRP lower than 3.0 mg/L and those with hsCRP higher than 3.0 mg/L of SAP group showed significant differences ($p<0.001$, $p<0.05$, respectively). These results demonstrate that the apoptotic process is dysregulated in patients with ischemic heart disease and Fas and FasL show interdependence with inflammatory and lipid markers.

B35
UTICAJ VIŠESTRUKOG DAVANJA PLAZME NA BIOHEMIJSKE PARAMETRE DAVALACA

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Plazmafereza je procedura izdvajanja plazme tj. tečnog dela krvi pri čemu se ćelijski elementi krvi vraćaju (reinfunduju) davaocu kao autologni. Cilj plazmafereze je da se dobije plazma koja se koristi za proizvodnju stabilnih lekova iz krvi. Sadržaj serumskih ukupnih proteina ne sme biti niži od 60 g/L a aktivnost enzima ALT ne sme biti iznad granica normale (Pravilnik o uslovima za prikupljanje, obradu i preradu ljudske krvi, njenih sastojaka i derivata, Preporuke Saveta Evrope). U ovom ispitivanju praćen je uticaj višestrukog davanja plazme postupkom plazmafereze na biohemijske parametre davalaca. Analizirano je 108 uzoraka krvi davalaca plazme u kojima je određivan sadržaj ukupnih proteina, albumina i ALT. Prvu kontrolnu grupu čine davaoci pre prvog davanja plazme, drugu grupu oni koji su plazmu dali do 100 puta a treću grupu oni koji su se postupku plazma-

B35
EFFECTS OF MULTIPLE PLASMA DONATIONS ON DONORS' BIOCHEMICAL PARAMETERS

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Plasmapheresis is a procedure based on the separation of plasma, i.e. the liquid part of blood, during which autologous blood cell elements are reinfused to donors. Objective of plasmapheresis is to obtain plasma used for the preparation of stable human blood drugs. Content of the total serum proteins should not be below 60 g/L, and the enzyme activity should not exceed normal values (The Statutes on Conditions for the Collection and Processing of Human Blood, its components and derivatives, Council of Europe Recommendations). The study presents results of the follow-up of multiple plasma donations by plasmapheresis procedure and their effect on donors' biochemical parameters. Analysis of 108 plasma donors' samples was performed, wherein total protein, albumin and ALT contents were determined. The first group consisted

fereze podvrgli 100–200 puta. Određivanja su vršena standardnim biohemijskim metodama na automatskom analizatoru Abbott Spectrum reagensima proizvođača Bioanalytica. Dobijeni rezultati za ukupne proteine, albumin i ALT pokazuju da su srednje vrednosti ovih parametara u okvirima referentnih vrednosti (ukupni proteini 72,15 g/L, albumin 44,20 g/L, ALT 23,6 U/L). Takođe je potvrđeno da ne postoji statistički značajna razlika ($p>0,05$) u sadržaju ovih parametara u odnosu na broj davanja plazme (do 100 puta, do 200 puta), kao i da ne postoji razlika u odnosu na vrednosti parametara pre davanja plazme. Ispitivanje je pokazalo da kod dugotrajnih plazmafereza nije zapažena hipoproteinemija, ni hipoalbuminemija, kao ni povišena aktivnost enzima jetre. Uz uobičajenu ishranu nadoknađuje se izgubljena količina proteina. Davanjem plazme davaoci podležu redovnom lekarskom pregledu, kontroli krvne slike i biohemijskih parametara, čime je obezbeđena stalna kontrola i briga o njihovom zdravlju.

of donors before the first plasma donation, the second group consisted of plasma donors who donated plasma up to 100 times, and the third group of plasma donors who donated plasma from 100 to 200 times. Determinations were made by standard biochemical methods using an automated analyzer Abbott Spectrum, and reagents manufactured by Bioanalytica. Obtained results referring to total protein contents, albumin and ALT show that mean values of these parameters are within the reference values range (total proteins 72.15 g/L, albumin 44.20 g/L, ALT 23.6 U/L). Likewise, it was confirmed that there is no statistically significant difference ($p>0.05$) in the contents of these parameters regarding the number of plasma donations (up to 100 times, up to 200 times), as well as that there is no difference with regard to the values of these parameters before plasma donation. This investigation shows that hypoproteinemia, hypoalbuminemia and increased activity of the liver enzymes were not observed in the multiple, long lasting plasmapheresis procedures. Proper nutrition compensates the lost quantity of proteins. Plasma donation implies regular medical check-ups of plasma donors, their blood count and biochemical parameters control, which provides permanent follow-up and care of the health condition of plasma donors.

B36
BIOHEMIJSKI MARKERI METABOLIZMA KOSTI KOD ŽENA SA PERIMENOPAUZALNOM OSTEOPOROZOM

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Populacione studije pokazuju da oko 3 do 5% žena u perimenopauzi ima osteoporozu, prema definiciji SZO (BMD t-skor ≤ –2,5). Nema idealnog biohemijskog markera, koji sa sigurnošću može da ukaže na dijagnozu osteoporoze. Uobičajeno je da se istovremeno određuje više biohemijskih markera. Cilj ovoga rada bila je procena biohemijskih markera metabolizma kosti žena sa perimenopauzalnom osteoporozom. Određivali smo koncentracije N-MID osteokalcina u serumu kao markera formiranja kosti i kalcijuma i fosfata u serumu i mokraći, kao markere koštane resorpcije. Osteokalcin je nekolageni peptid uključen u proces mineralizacije kosti, često korišćen u ranoj dijagnostici primarne osteoporoze. Navedeni parametri su određeni kod 50 žena sa perimenopauzalnom osteoporozom (starosna dob 51,06 ± 1,66 godina; t-skor –3,1 do –2,2) i u kontrolnoj grupi od 50 žena u perimenopauzi bez znakova osteo-

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BIOCHEMICAL MARKERS OF BONE METABOLISM IN PERIMENOPAUSAL OSTEOPOROSIS

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Population studies have shown that about 3–5% of perimenopausal women already have osteoporosis according to the WHO definition of osteoporosis for postmenopausal women (BMD t-score ≤ –2.5). There is no ideal biochemical marker that could be used alone to make a diagnosis of osteoporosis. Therefore, a common practice is to assess several biochemical markers at the same time. The aim of this study was to assess the biochemical markers of bone metabolism in women with perimenopausal osteoporosis. N-MID osteocalcin in sera was investigated as a marker of bone formation, and calcium and phosphate in sera and urine as markers of bone resorption. Osteocalcin is a non-collagenous peptide involved in the bone mineralization process. It is used for early diagnosis of primary osteoporosis. The investigated parameters were determined in 50 perimenopausal women with osteoporosis (mean age

poroze (starosna dob 50,63 ± 3,29 godina). BMD je merena tehnikom DXA. Koncentracija N-MID osteokalcina u serumu je određena elektrohemiluminiscentnom tehnikom reagensima firme ROCHE na biohemijskom analizatoru Elecsys 2010. Rezultati su pokazali signifikantan porast ($p<0,05$) koncentracije N-MID osteokalcina u serumu i signifikantan pad ($p<0,005$) kalcijuma u serumu žena u perimenopauzi sa osteoporozom, u odnosu na kontrolnu grupu. Poređenjem rezultata drugih ispitivanih parametara nije utvrđena statistički značajna razlika između dve ispitivane grupe. Ovakvi rezultati upućuju na zaključak da je određivanje koncentracije N-MID osteokalcina i kalcijuma u serumu značajno kod žena sa perimenopauzalnom osteoporozom.

B37
UTICAJ HEMOLIZE NA VREDNOST GLUKOZE U SERUMU

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Cilj rada bio je procena uticaja različitog stepena hemolize na vrednosti glukoze u uzorcima. Ispitivanje je obuhvatilo 30 ispitanika glukoza je određivana standardnom GOD-PAP metodom na aparatu Hitachi 902. Ispitivanje je obuhvatilo *in vivo* i *in vitro* eksperimente, u kojima je hemoliza dobijena postupkom po Meitesu (Meites S. Reproducibly simulating hemolysis for evaluating its interference with chemical methods. (Letter) Clin Chem 1973; 19: 1319.). Za ispitivanja *in vitro* korišćene su koncentracije hemoglobina od 1 do 10 g/L i rastvori glukoze od 2,85 do 11,1 mmol/L. Dobijeni podaci uneti su u bazu podataka, testirani na validnost i statistički obrađeni pomoću studentovog T testa za vezane uzorke. Ispitivanje je pokazalo statistički značajan porast nivoa glukoze sa porastom stepena hemolize. Kod ispitivanja *in vivo* dobijen je linearni porast koncentracije glukoze sa porastom koncentracije hemoglobina u uzorku (serumu). Stepen hemolize kretao se od 1 do 5 g/L, čemu je odgovarao linearni porast koncentracije glukoze od 0,12 do 0,54 mmol/L. Diskutuje se o mehanizmu interferencije kao i o praktičnoj primeni rezultata.

51.06±1.66 years; t-score between –3.1 and –2.2) and in a control group of 50 postmenopausal women without signs of osteoporosis (mean age 50.63 ± 3.29 years). BMD were measured by dual energy X-ray absorptiometry (DXA). Concentrations of serum N-MID osteocalcin were determined by an electrogenerated chemiluminescence technique (ECL) using reagents produced by ROCHE and an Elecsys 2010 analyzer. The results showed a significant increase in the serum concentrations of N-MID osteocalcin and a significant decrease in the serum concentrations of calcium in the perimenopausal group of women with osteoporosis, when compared with the control group. No statistically significant difference was found between the groups in the cases of the other investigated parameters. This enables as to assume that determination of the serum concentration of N-MID osteocalcin and the calcium in sera are significant in perimenopausal women with osteoporosis.

B37
INFLUENCE OF HEMOLYSIS ON GLUCOSE VALUES IN SERUM

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The aim of the paper was to evaluate the influence of different degrees of hemolysis on glucose values in serum. Thirty patients were examined and glucose was determined by using the standard GOD-PAP method on a Hitachi 902. *In vitro* and *in vivo* experiments were done and the hemolysis was performed by using the standard method of Meites (Meites S. Reproducibly simulating hemolysis for evaluating its interference with chemical methods. (Letter) Clin Chem 1973; 19: 1319.). *In vitro* experiments were done by using hemoglobin concentrations from 1.0 to 10.0 g/L and glucose solutions from 2.85 to 11.0 mmol/L. The data were tested for validity and statistical evaluation was done using the Student T-test for linked samples. The examination showed a statistically significant increase in glucose values during the increase of the degree of hemolysis. At *in vivo* investigations, a linear increase of glucose concentrations during augmentations of hemoglobin concentrations in serum was received. The degree of hemolysis varied from 1.0 to 5.0 g/L corresponding to a linear increase in glucose from 0.12 to 0.54 mmol/L. The mechanism of interference is discussed as well as practical applications of the results.

B38
FAKTOR ANALIZA DETERMINANTI KARDIOVASKULARNOG RIZIKA POVEZANIH SA POVIŠENOM KONCENTRACIJOM C-REAKTIVNOG PROTEINA

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Prema poslednjim vodičima Nacionalne akademije za kliničku biohemiju (*National Academy of Clinical Biochemistry Laboratory Medicine Practice Guidelines*) za upotrebu novih laboratorijskih biomarkera kardiovaskularnog rizika u primarnoj prevenciji, među brojnim novim faktorima rizika, samo je visokoosetljivi C-reaktivni protein (*high sensitivity C-reactive protein*, hsCRP) zadovoljio sve neophodne kriterijume biomarkera za procenu rizika u primarnoj prevenciji. Cilj ovog istraživanja je bio da se redukuje veliki broj međusobno zavisnih promenljivih povezanih sa hsCRP-om na ograničen broj nezavisnih faktora. Korišćena je *principal component* analiza za ispitivanje grupisanja inflamatornih markera – fibrinogen, serumski amiloid A (SAA), α_1-kiseli glikoprotein (A1AGP), haptoglobin, C3 i C4 komponente komplementa, lipidnih parametara – LDL, HDL i nonHDL holesterol i trigliceridi, indikatora metaboličkog statusa – starost, pol, indeks telesne mase (BMI) i koncentracija glukoze na tašte, i determinanti srčane funkcije – sistolni krvni pritisak (SBP), troponin I (TnI) i N-terminalni pronatriuretički peptid tipa B (NT-proBNP), povezanih sa koncentracijom hsCRP-a koja ukazuje na visok kardiovaskularni rizik (≥3 mg/L). Koncentracije hsCRP, HDL i LDL holesterola i triglicerida su određene na analizatoru Olympus AU2700. Haptoglobin, A1AGP, C3 i C4 komponente komplementa i TnI su određeni na analizatoru Architect ci8200 (Abbott). SAA je određen na BN II nefelometru (Dade Behring), fibrinogen na analizatoru ACL 7000 (Instrumentation Laboratory) a NT-proBNP je određen na analizatoru Elecsys 2010 (Roche). Svi navedeni parametri su određeni u uzorcima seruma uzetim od 242 osobe bez dijagnoze koronarne srčane bolesti. Kaiser-Meyer-Olkinov koeficijent adekvatnosti uzorka je bio 0,73. Faktor analizom su identifikovana četiri klastera, kojima se objašnjava 59,5% ukupne varijanse (30,4% faktor 1, 12,2% faktor 2, 9,4% faktor 3 i 7,5% faktor 4). Na osnovu koeficijenta korelacije između faktora i promenljivih (tzv. *factor loadings*) od ≥0,5, ovi klasteri su označeni kao (1) faktor »sistemske inflamacije«, koji obuhvata fibrinogen, SAA, A1AGP, haptoglobin, C3 i C4; (2) »metabolički« faktor, gde spadaju pol, BMI, HDL i trigliceridi; (3) faktor »srčane funkcije«, koji uključuje starost, SBP, TnI i NT-proBNP; i (4) »aterogeni holesterol« sa LDL i nonHDL holesterolom. Povezanost faktor skorova sa koncentracijama hsCRP

B38
FACTOR ANALYSIS OF CARDIOVASCULAR RISK DETERMINANTS ASSOCIATED WITH ELEVATED C-REACTIVE PROTEIN CONCENTRATION

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According to the latest National Academy of Clinical Biochemistry Laboratory Medicine Practice Guidelines for the use of emerging laboratory biomarkers of cardiovascular risk in primary prevention settings, among a number of emerging risk factors only high sensitivity C-reactive protein (hsCRP) met all of the criteria for acceptance as a biomarker for risk assessment in primary prevention. The objective of this study was to reduce a large body of intercorrelated variables associated with hsCRP to a limited number of independent factors. Principal component analysis was used to investigate clustering of inflammatory markers – fibrinogen, serum amyloid A (SAA), α_1-acid glycoprotein (A1AGP), haptoglobin, C3 and C4 complement components, lipid parameters – LDL, HDL and nonHDL cholesterol, and triglycerides, indicators of metabolic state – age, gender, body mass index (BMI), and fasting glucose concentration, and determinants of cardiac function – systolic blood pressure (SBP), troponin I (TnI) and N-terminal proB-type natriuretic peptide (NT-proBNP), associated with a high cardiovascular risk hsCRP concentration (≥3 mg/L). The concentrations of hsCRP, HDL and LDL cholesterol, and triglycerides were measured on an Olympus AU2700 automated analyzer. Haptoglobin, A1AGP, C3 and C4 complement components, and TnI were determined on the Architect ci8200 (Abbott). SAA was measured using a BN II nephelometer (Dade Behring), fibrinogen was determined on an ACL 7000 analyzer (Instrumentation Laboratory) and NT-proBNP was measured using an Elecsys 2010 analyzer (Roche). All of these parameters were determined in 242 individuals without known coronary disease. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.73. Factor analysis identified four clusters, which explained 59.5% of the total variance (30.4% factor 1, 12.2% factor 2, 9.4% factor 3 and 7.5% factor 4). According to a factor loading of ≥0.5, these clusters were interpreted as (1) »systemic inflammation« factor, including fibrinogen, SAA, A1AGP, haptoglobin, C3 and C4; (2) »metabolic« factor, with gender, BMI, HDL and triglycerides; (3) »cardiac function« factor, which included age, SBP, TnI and NT-proBNP; and (4) »atherogenic cholesterol« factor, including LDL and nonHDL cholesterol. Associations of factor scores with high risk hsCRP

koje ukazuju na visok rizik je određena multiplom logističkom regresionom analizom. Značajni prediktori koncentracija hsCRP visokog rizika dobijeni multivarijabilnom analizom su bili »sistemska inflamacija« (OR 5,11, 95% CI 3,02–8,66, $P<0,001$), »metabolički« (OR 1,59, 95% CI 1,08–2,35, $P=0,020$) i faktor »srčane funkcije« (OR 1,54, 95% CI 1,04–2,27, $P=0,032$), dok je »aterogeni holesterol« klaster imao graničnu značajnost (OR 1,44, 95% CI 1,00–2,09, $P=0,052$). Sposobnost logističkog regresionog modela zasnovanog na faktorima da predvidi koncentraciju hsCRP visokog rizika je upoređena sa multivarijabilnim logističkim modelom koji je sadržao svih 17 promenljivih. Površina ispod ROC krive za model sa četiri faktora iznosi 0,87 a za multivarijabilni logistički model 0,93. *Principal component* analizom su identifikovana četiri faktora među 17 promenljivih povezanih sa koncentracijom hsCRP, kojima je najvećim delom objašnjena varijabilnost originalnih podataka. Faktori označeni kao »sistemska inflamacija«, »metabolički«, »srčana funkcija« i »aterogeni holesterol«, na osnovu svoje povezanosti sa povišenom koncentracijom hsCRP, mogu predstavljati osnovne dimenzije koje prate povišenu koncentraciju hsCRP i povećan kardiovaskularni rizik.

B39
HOMOCISTEIN – BIOHEMIJSKI MARKER KARDIOVASKULARNIH BOLESTI

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Kardiovaskularna oboljenja se danas u savremenom svetu nalaze na prvim mestima lista bolesti sa tendencijom porasta obolevanja a u mnogim zemljama i smrtnosti. U Srbiji je standardizovana stopa mortaliteta od kardiovaskularnih bolesti viša nego u Evropi, dok je u Vojvodini viša nego u ostalim delovima Srbije. Faktori rizika za kardiovaskularne bolesti su dobro poznati, međutim, nisu prisutni kod svih pacijenata. Zbog toga se intenzivno traga za novim faktorima a jedan od potencijalnih je i povišena koncentracija homocisteina. U ovom radu su određivani koncentracija homocisteina kod pacijenata sa infarktom miokarda i pacijenata sa ishemijskim moždanim inzultom i faktori koji dovode do porasta

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HOMOCYSTEINE – A BIOCHEMICAL MARKER OF CARDIOVASCULAR DISEASE

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Cardiovascular disease (CVD) takes the leading position on the list of diseases of the modern world, showing an increasing tendency and high mortality rates in many countries. CVD mortality rate in Serbia is higher than in Europe, reaching even higher values in the area of Vojvodina. Risk factors for cardiovascular disease are well established, though not necessarily present. In that respect, intensive research has been conducted on identifying new risk factors for CVD. Homocysteine is considered one of the possible risk factors. In this work homocysteine concentrations were measured in groups of patients with myocardial infarction (IM) and ischemic stroke. Concentrations of folic acid and B_{12} vitamin were also determined.

levels were determined using multiple logistic regression analysis. In the multivariable analysis, significant predictors of high risk hsCRP levels were »systemic inflammation« (OR 5.11, 95% CI 3.02–8.66, $P<0.001$), »metabolic« (OR 1.59, 95% CI 1.08–2.35, $P=0.020$) and »cardiac function« (OR 1.54, 95% CI 1.04–2.27, $P=0.032$) factors, while »atherogenic cholesterol« cluster had borderline significance (OR 1.44, 95% CI 1.00–2.09, $P=0.052$). The ability of the factor-based logistic regression model to predict a high risk hsCRP concentration was compared with a multivariable logistic model containing all 17 variables. The area under the receiver operator characteristics curve of the four factor models was 0.87 and of the full logistic model was 0.93. Principal component analysis identified four factors among the 17 variables associated with the hsCRP concentration, which accounted for most of the variability of the original data. Factors interpreted as »systemic inflammation«, »metabolic«, »cardiac function« and »atherogenic cholesterol«, according to their connection with an elevated hsCRP concentration, suggest that they might represent underlying dimensions accompanying the elevation of hsCRP concentration and increased cardiovascular risk.

njegove koncentracije, na prvom mestu vitamin B_{12} i folna kiselina. Homocistein je određivan metodom FPIA (fluorescentno polarizaciona imunološka analiza). Srednja vrednost koncentracije homocisteina kontrolne grupe je 9,89 μmol/L sa referentnim rasponom od 6,11 do 13,67 μmol/L. Kod pacijenata sa infarktom miokarda, povišene koncentracije homocisteina su bile prisutne kod 41,1% pacijenata. Hiperhomocisteinemija je bila prisutna kod 26,7% pacijenata sa moždanim inzultom dok su u kontrolnoj grupi samo kod 10% ispitanika dobijene povišene koncentracije homocisteina. Srednja vrednost koncentracije homocisteina od 12,5 μmol/L kod pacijenata muškog pola sa infarktom miokarda je statistički značajno viša u odnosu na kontrolnu grupu ($p<0,001$). Pacijenti muškog pola sa ishemijskim moždanim inzultom su takođe imali statistički više koncentracije homocisteina, ali na nivou $p= 0,05$. Kod žena nisu dobijene statistički značajne razlike u koncentracijama ove aminokiseline. Kod pacijenata sa infarktom miokarda i hiperhomocisteinemijom dobijene su snižene koncentracije folne kiseline, dok su koncentracije vitamina B_{12} bile u granicama referentnih vrednosti. Na osnovu dobijenih rezultata smatramo da određivanje homocisteina ima svoje mesto u paleti analiza za procenu rizika od kardiovaskularnih bolesti, na prvom mestu kod pacijenata muškog pola kod kojih je i ROC kriva dala najveću AUC vrednost od 0,760.

B40
PROCENA JAČINE GLOMERULARNE FILTRACIJE PRIMENOM BETA-TRACE PROTEINA

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Tačna procena jačine glomerularne filtracije (GFR) kritična je za dijagnozu i klasifikaciju hronične bolesti bubrega (HBB). Jedan broj jednačina je razvijen u pokušaju da se poboljša procena GFR (eGFR) iz serumskih koncentracija kreatinina i cistatina C. Skraćena jednačina iz studije *Modification of Diet in Renal Disease* (MDRD) za eGFR je trenutna preporuka. Beta-trace protein (BTP) pojavljuje se kao obećavajući novi marker GFR. Nekoliko jednačina za procenjivanje GFR zasnovanih na serumskom BTP je takođe predloženo. Cilj ovog rada je bio da se uporede vrednosti BTP i eGFR zasnovanih na BTP sa klirensom kreatinina i GFR izračunatim iz jednačina zasnovanih na kreatininu i cistatinu C kod 134 pacijenta sa HBB. MDRD i CKD-EPI zasnovane jednačine na kreatininu i na cistatinu C zasnovana

Homocysteine level was determined using the FPIA method. In a control group the median value of homocysteine concentration was 9.89 μmol/L with a reference range 6.11–13.67 μmol/L Elevated homocysteine levels were determined in 41.1% of patients with myocardial infarction history; 26.7% of patient with stroke history were hyperhomocysteinemic, whereas only 10% of participants from the control group had homocysteine concentrations above 12 μmol/L. Men with myocardial infarction history had significantly increased homocysteine levels ($p<0.001$), as well as male patients with stroke ($p=0.05$). Women from both groups were not characterized by significantly higher homocysteine concentrations. Decreased concentrations of folic acid in the group with myocardial infarction history and hyperhomocysteinemia were observed, whereas the concentrations of B_{12} vitamin were within the range of reference values. On the basis of the obtained results we can suggest that determination of homocysteine levels plays an important role in evaluating the risk factors for development of cardiovascular disease, particularly for the male population with history of myocardial infarction.

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ESTIMATION OF GLOMERULAR FILTRATION RATE USING BETA-TRACE PROTEIN

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Accurate estimation of glomerular filtration rate (GFR) is critical for the diagnosis and classification of chronic kidney disease (CKD). A number of equations have been developed in an attempt to improve GFR estimation (eGFR) from serum creatinine or cystatin C concentrations. Abbreviated Modification of Diet in Renal Disease (MDRD) study equation for eGFR is the current recommendation. Beta-trace protein (BTP) has emerged as a promising new marker of GFR. A few equations for estimating GFR based on serum BTP have also been proposed. The aim of this study was to compare the values of BTP and eGFR based on BTP with creatinine clearance and GFR calculated from creatinine-based and cystatin C-based equations in 134 patients with CKD. The MDRD study and CKD-EPI creatinine-based equations and cystatin C-

Hoekova jednačina su korišćene. eGFR iz serumske koncentracije BTP je izračunata prema jednačini objavljenoj od strane White i sar. Beta-trace protein je značajno korelisao sa kreatininom (r=0,890) i cistatinom C (r=0,904) u serumu. Na BTP zasnovana eGFR je značajno korelisala (Pearson test, P<0,0001) sa klirensom kreatinina i svim izračunatim eGFR. Korelacioni koeficijenti su bili od 0,818 do 0,928. Najviša korelacija je dobijena sa eGFR iz jednačina zasnovanih na kreatininu. Koncentracije BTP su takođe bile u značajnoj negativnoj korelaciji (Pearson test, P<0,0001) sa klirensom kreatinina i svim izračunatim eGFR. Prema tome, rezultati našeg rada podržavaju druge objavljene podatke tome da su izračunavanja GFR zasnovana na BTP pouzdana i mogu služiti kao alternativa MDRD i drugim trenutno važećim jednačinama.

based Hoek's equation were used. eGFR from the serum BTP concentration was calculated according to the equation published by White et al. Beta-trace protein correlated significantly with creatinine (r=0.890) and cystatin C (r=0.904) in serum. BTP-based eGFR correlated significantly (Pearson test, P<0.0001) with creatinine clearance and all calculated eGFRs. The correlation coefficients were from 0.818 to 0.928. The highest correlation was obtained with eGFRs from creatinine-based equations. The concentrations of BTP were also in significant negative correlation (Pearson test, P<0.0001) with creatinine clearance and all calculated eGFRs. Therefore, the results of our study support other reported data that BTP-based GFR calculations are reliable and may serve as an alternative to the MDRD and other currently used equations.

B41
ELISA TEST ZA ODREĐIVANJE PANKREASNE ELASTAZE 1 U FECESU: KARAKTERISTIKE IZVOĐENJA I STABILNOSTI UZORKA

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Pankreasna elastaza 1 (PE1), EC 3.4.21.36, je specifična proteaza koja se sintetiše u acinarnim ćelijama pankreasa. Usled stabilnosti PE1 tokom prolaska kroz intestinum, njena koncentracija u fecesu odražava sekretorni kapacitet egzokrinog pankreasa. ELISA test za određivanje PE1 u fecesu (ScheBo Biotech AG, Giessen, Germany) odskora se koristi u laboratoriji kao standardna metoda. Cilj rada je bio da se utvrde neke analitičke karakteristike i praktični aspekti određivanja PE1 u fecesu. Nepreciznost određivanja je ispitana na tri nivoa koncentracija PE1. Nepreciznost unutar serije, izračunata iz 15 uzastopnih određivanja tri uzorka fecesa (niske, srednje i visoke koncentracije), bila je u opsegu između 4,8% i 7,5%. Koeficijenti varijacije za nepreciznost između serija su izračunati na nivoima od 96±14,1, 203±17,3 i 351±27,4 μg/g fecesa i bili su u opsegu između 7,8% i 14,6%. Ponovljena određivanja tokom tri uzastopna dana kod pet osoba su dale intraindividualnu varijabilnost sa koeficijentima varijacije između 11% i 22%, sa srednjom vrednosti od 17%, što ukazuje da određivanje PE1 u fecesu ne zahteva više uzastopnih uzoraka fecesa, izuzev kada se dobiju granične vrednosti od 200 μg/g fecesa. U ispitivanju stabilnosti analita koristili smo uzorke čuvane na sobnoj

B41
ELISA TEST FOR DETERMINATION OF PANCREATIC ELASTASE 1 IN FECES: ASSAY PERFORMANCES AND SAMPLE STABILITY

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Pancreatic elastase 1 (PE1), EC 3.4.21.36, is a specific protease synthesized by acinar cells of the pancreas. Since PE1 is stable during intestinal passage its concentration in feces reflects the secretory capacity of the exocrine pancreas. ELISA measurement of fecal PE1 (ScheBo Biotech AG, Giessen, Germany) has been recently used in laboratory as a standard method. The aim of the study was to determine the performance characteristics and practical aspects of fecal PE1 analysis. Assay imprecision was examined at three concentration levels of PE1. The intraassay CV computed from 15 consecutive determinations of three different fecal samples (low, medium and high value) were from 4.8% to 7.5%. Between run precision was calculated at 96±14.1, 203±17.3 and 351±27.4 μg/g stool generating CV from 7.8% to 14.6%. Repeated daily measurements in five persons on three consecutive days showed CV between 11% and 22% with a mean value of 17%. Consequently, determination of fecal PE1 does not require analysis of different stool samples and should be repeated only in cases with borderline fecal PE1 concentrations of 200 μg/g of stool. For stability studies, stool samples stored at room temperature during two days were used and no remarkable rate of

temperaturi u toku dva dana i nije se uočio značajan gubitak imunoreaktivnosti. Može se zaključiti da ScheBo monoklonski ELISA test za određivanje PE1 u fecesu obezbeđuje prihvatljive karakteristike izvođenja i PE1 je koristan neinvazivan marker za skrining i praćenje insuficijencije egzokrine funkcije pankreasa.

immunoreactivity loss was detectable in stool samples. It can be concluded that the ScheBo monoclonal ELISA test for the determination of PE1 in feces provides acceptable performance characteristics and PE1 is useful noninvasive marker for screening and monitoring pancreatic exocrine insufficiency.

B42
RESTANDARDIZACIJA *JAFFE* METODE ZA ODREĐIVANJE KREATININA NA TRI RAZLIČITA ANALIZATORA

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Nakon standardizacije metode za određivanje kreatinina prema IDMS (masena spektroskopija sa izotopskom dilucijom) koja predstavlja referentnu metodu, dobijene su niže vrednosti koncentracije kreatinina u uzorcima pacijenata. Budući da su se referentne vrednosti preporučene od strane različitih proizvođača razlikovale, bilo je neophodno da se odrede referentne vrednosti za našu populaciju. Referentne vrednosti su određene neparametarskom metodom u grupi od 267 zdravih dobrovoljaca (101 muškarac, 17–76 godina; i 167 žena, 18–70 godina) na biohemijskom analizatoru Olympus AU 2700. Izračunate srednje vrednosti (medijana) za muškarce su 82 (82) μmol/L a za žene 65 (64). Slaganje srednjih vrednosti i medijana pokazuje normalnu raspodelu koncentracija kreatinina. Izračunati referentni intervali su 63–104 μmol/L za muškarce i 48–86 μmol/L za žene, što se slaže sa vrednostima koje preporučuje proizvođač reagenasa firme Olympus Diagnostica (sada Beckman Coulter). Nakon uvođenja novih referentnih vrednosti, izvršeno je poređenje četiri komercijalna test reagensa za određivanje koncentracije kreatinina u serumu na tri sistema: Architect ci8200 (enzimska i Jaffe metoda), Olympus AU2700 (kompenzovana Jaffe metoda) i Dimension RxL (Jaffe metoda). Poređenje testova je vršeno primenom Passing Bablock regresione analize i dijagrama apsolutnih razlika prema Bland-Altmanu. Dobijeni rezultati su pokazali da su četiri metode za određivanje koncentracije kreatinina u korelaciji i dobijeni koeficijenti korelacije su bili u opsegu od 0,963 do 0,987. Srednje vrednosti apsolutnih razlika sa Bland-Altmanovog dijagrama su bili: –8,16 do 6,05 μmol/L. Na osnovu dobijenih rezultata zaključuje se da restandardizacija Jaffe metode za određivanje koncentracije kreatinina obezbeđuje dobro slaganje rezultata na različitim analizatorima.

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RESTANDARDIZATION OF JAFFE METHOD FOR MEASURING CREATININE ON THREE DIFFERENT ANALYZERS

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After standardizing the method for measuring creatinine according to IDMS (isotop dilution mass spectrometry), the values of creatinine concentration in sample patients were lower. Due to the differences in reference values recommended by various manufacturers, it was necessary to define new reference values for our population. The reference values have been determined by a non-parametric method in a group of 267 healthy individuals (101 men, 17–76 years of age; and 167 women, 18–70 years of age) on a biochemical analyzer Olympus AU 2700. Calculated mean values (median) for men are 82 (82) μmol/L and for women 65 (64) μmol/L. The correspondence between the mean values and the medians shows normal distribution of creatinine concentration. The calculated reference interval is 63–104 μmol/L for men and 48–86 μmol/L for women. The obtained reference values correspond to the reference values recommended by the manufacturer of reagents Olympus Diagnostics (now Beckman Coulter). Having introduced new reference values, four commercial test reagents for measuring the creatinine concentration in serum on three systems: Architect ci8200 (Jaffe method and enzymatic method), Olympus AU2700 (compensated Jaffe method) and Dimension RxL (Jaffe method) have been compared. The Passing Bablock regression analysis with absolute differences plot according to Bland-Altman were used for comparing the tests. The achieved results show that the four methods for measuring the creatinine concentration are in correlation; correlation coefficients were: from 0.963 to 0.987. Mean absolute differences from the Bland-Altman plot were: from –8.16 to 6.05 μmol/L. Based on the obtained results it has been concluded that restandardization of the Jaffe method for determination of creatinine concentration in serum provides good comparison of results on different systems.

B43
PREVALENCIJA HELICOBACTER PYLORI KOD PACIJENATA KOJI SU BILI PODVRGNUTI OPERACIJAMA ABDOMENA

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Cilj ovog istraživanja je bio da se ispita odnos i prevalencija infekcije sa Helicobacter pylori (HP) kod 15 različitih hirurških oboljenja. Analizirali smo 207 pacijenata koji su bili podvrgnuti hirurškom tretmanu u Odeljenju za urgentnu hirurgiju Kliničkog centra Srbije u periodu od osam meseci. Podaci o pacijentima su uključivali starosnu dob, pol, dijagnozu i prisustvo Helicobacter pylori. Najčešći dijagnostički pristup, komercijalni test Enzignost Anti-Helicobacter pylori II/IgA(IgG) (DADE-Behring) korišćen je za kvantitativno određivanje humanih antitela IgA i IgG. Ispitivano je 94 muškaraca (45,4%) i 113 žena (54,6%); 159 pacijenata je bilo mlađe od 65 godina, a 48 pacijenata je bilo starije od 65 godina. Incidenca HP infekcije u našoj studiji je bila 68,6%. Pacijenti su bili podeljeni u četiri grupe u odnosu na dijagnozu: u grupi sa holecistom, holelitijazom i žuticom (112) većina pacijenata, 73 (65,18%) bili su HP pozitivni; u grupi (14) koju su činili pacijenti sa ulcerom, hemoragijskim ulcerom i stenozom pylori 11 su bili HP pozitivni; kod 36 pacijenata sa apendicitisom, subokluzijama i ileusom nađena je statistički signifikantna inverzna veza između HP seropozitivnog i akutnog apendicitisa; pozitivan HP je potvrđen kod svih 45 pacijenata sa malignitetom (želuca, pankreasa, hepatocelularni, creva, debelog creva i rektuma). Ovo ispitivanje je pokazalo da pozitivan HP može biti indikator kod populacije visokog rizika kod različitih hirurških oboljenja.

B43
PREVALENCE OF HELICOBACTER PYLORI IN ABDOMINAL SURGERY PATIENTS

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The aim of this study was to explore the relationship and prevalence of Helicobacter pylori (HP) infection in 15 different surgical diseases. Two hundred and seven consecutive patients were analyzed who underwent surgical treatment at the Department of Emergency Surgery of the Clinical Center of Serbia, over eight months. Patient data included age, gender, diagnosis and HP status by serology. The most common diagnostic approach, commercial test Enzignost Anti-Helicobacter pylori II/IgA(IgG) (DADE-Behring) was used for quantitative determination of human IgA and IgG antibodies. There were 94 males (45.4%) and 113 females (54.6%). There were 159 patients <65 years and 48 patients >65 years old. The incidence of HP infection in our study was 68.60%. The patients were divided into four groups with respect to diagnosis: in the group with cholecystitis, cholelithiasis and jaundice (112) most patients, 73 (65.18%), were HP positive; in the group (14) which comprises ulcer disease, ulcer hemorrhage and stenosis pylori 11 were HP positive; in 36 patients with appendicitis, subocclusion und ileus a statistically significant inverse association between HP seropositive and the acute appendicitis was found; positive HP was confirmed in all 45 patients with malignancy (gastric cancer, pancreatitis cancer, hepatocellular cancer, intestinal cancer, colon cancer and rectal cancer). This study has shown that positive HP may be indicated in high-risk populations in different surgical diseases.

B44
PRIMENA IMMUNO PLT CD61 MERENJA U LABORATORIJSKOJ PROCENI TROMBOCITOPENIJE

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Savremeni pristup određivanju broja trombocita počiva na »triplet« testiranju, koje je zasnovano na impedancijskom i optičkom brojanju u kombinaciji sa

B44
APPLICATION OF IMMUNO PLT CD61 MEASUREMENT IN LABORATORY ESTIMATION OF THROMBOCYTOPENIA

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Contemporary approach to determining the number of thrombocytes rests on the »triplet« testing, based on the impedance and optical counting com-

kvantitativnom analizom površinski eksprimiranih antigena metodom immunoflow-citometrije. Najčešće se određuje CD61, koji je deo glikoproteinskog kompleksa gpIIIa/IIb. U radu su predstavljena preliminarna iskustva u vezi sa značajem Immuno Plt CD61 merenja u laboratorijskoj proceni trombocitopenije. Test je urađen u grupi od 18 bolesnika, kod kojih je nalaz trombocitopenije, dobijen na analizatoru SAPPHIRE, Abbott Diagnostics, bio okarakterisan razlikom u impedancijskom i optičkom brojanju trombocita. Podaci dobijeni primenom sva tri merna metoda su upoređeni sa brojem trombocita dobijenim mikroskopskom metodom. Medijane broja trombocita su iznosile: 37 x 10^9/L za optički, 82 x 10^9/L za impendancijski princip, 41 x 10^9/L za imunometodu i 40 x 10^9/L za mikroskopiju. Dobijeni rezultati ukazuju da je impedancijska metoda merenja najpodložnija varijacijama koje mogu trombocitopeniju lažno proceniti kao manje intenzivnu, te da se u slučajevima neslaganja rezultata impedancijskog i optičkog merenja trombocitopenija može tačno proceniti kako manuelnim brojanjem, tako i testom Immuno Plt CD61. Dodatno se može smatrati da je, sa stanovišta kliničke laboratorije, Immuno Plt CD61 test prihvatljiviji, jer se rezultati dobijaju brže i ne postoje varijacije koje potiču od osoblja koje izvodi test.

bined with quantitative analyses of surface exprimed antigens by an immuno-flowcytometric method. The most frequently determined is CD61, a part of the glycoprotein complex gpIIIa/IIb. This work presents preliminary experiences regarding the significance of Immuno Plt CD61 measurements in the laboratory estimation of thrombocytopenia. The test was performed in a group of 18 patients, where the result of thrombocytopenia, obtained on the SAPPHIRE analyzer, Abbott Diagnostics, was characterized by a difference in the impedancy and optical counting of thrombocytes. The data obtained by the application of all three measurement methods were compared with the number of thrombocytes obtained by microscopy. Medians of the thrombocyte number were: 37 x 10^9/L for optical, 82 x 10^9/L for the impedance principle, 41 x 10^9/L for the immuno-method and 40 x 10^9/L for microscopy. The results obtained imply that the impedance method of measurement is most subject to variations which could falsely estimate thrombocytopenia as less intensive, and that in cases of disagreement between impedance and optical results, thrombocytopenia could be correctly estimated by manual counting, as well as by the Immuno Plt CD61 test. It could also be said, from the point of clinical laboratory, that the Immuno Plt CD61 test is more acceptable, because results are obtained move quickly and there are no variations generated by the staff performing the test.

B45
ISTOVREMENA DETEKCIJA FAKTOR V LEIDEN, FAKTOR II G20210A, MTHFR C677T AND MTHFR A1298C MUTACIJA PRIMENOM PCR UMNOŽAVANJA I REVERZNE HIBRIDIZACIJE SA ALEL SPECIFIčNIM OLIGONUKLEOTIDIMA

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Mutacije faktor V Leiden, faktor II G20210A kao i C677T i A1298C na genu za metilentetrahidrifolat reduktazu (MTHFR) se smatraju najčešćim genetskim faktorima rizika za trombofiliju. Rad procenjuje značaj primene testa ThromboType® plus (HAIN LIFESCIENCE) u grupi od 18 bolesnika sa trombofilijom.

B45
SIMULTANEOUS DETECTION OF FACTOR V LEIDEN, FACTOR II G20210A, MTHFR C677T AND MTHFR A1298C MUTATIONS USING PCR AMPLIFICATION AND REVERSE ALLELE SPECIFIC OLIGONUCLEOTIDE HYBRIDIZATION

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Mutations factor V Leiden, factor II G20210A, as well as C677T and A1298C in the methylenetetrahydrofolate reductase (MTHFR) gene are considered the most common hereditary risk factors for thrombophilia. The work evaluates the usefulness of ThromboType® plus test (HAIN LIFESCIENCE) in the

Princip ovog testa, koji istovremeno dokazuje prisustvo sve četiri navedene mutacije, je zasnovan na PCR umnožavanu i reverznoj hibridizaciji sa alel-specifičnim oligonukleotidima. Za jednog ispitanika je dokazano da je heterozigotni nosilac sve četiri mutacije. Za četiri bolesnika je potvreno heterozigotno prisustvo faktor V Leiden kombinovano sa heterozigotnim prisustvom MTHFR mutacije, i to sa A1298C mutacijom kod tri, a sa C677T kod jednog ispitanika. Testiranje je kod 5 bolesnika dokazalo kombinovano heterozigotno prisustvo obe ispitivane mutacije na MTHFR genu, uz odsustvo mutacija faktor V Leiden i faktor II G20210A. Heterozigotno prisustvo faktor V Leiden mutacije je kod jednog ispitanika bio jedini genetski faktor rizika za trombofiliju. Pojedinačno prisustvo MTHFR mutacija, kao jedinog faktora rizika, je utvrdjeno kod 4 bolesnika: jednog homozigotnog i dva heterozigotna nosioca C677T, odnosno jednog heterozigotnog nosioca A1298C mutacije. Navedeni preliminarni rezultati označavaju ThromboType® plus test kao pouzdan za primenu u kliničkim laboratorijama. Dalja ispitivanja, uključivanjem većeg broja bolesnika i korelacijom sa nalazima funkcionalnih testova hemostaze, će povećati efikasnost testiranja i omogućiti identifikaciju i procenu kliničkog značaja novih genetskih faktora rizika za trombofiliju.

group of 18 patients with thromophilia. This test, which simultaneously detects the above-mentioned mutations, is based upon a combination of PCR amplification and reverse hybridization with allele-specific oligonucleotides. One patient was identified as the heterozygous carrier of all four mutations. The heterozygous presence of factor V Leiden mutation combined with heterozygous presence of MTHFR mutations was confirmed in four patients, precisely with C677T in three and A1298C in one of them. Results showed that five patients were heterozygous carriers of both MTHFR mutations, with no factor V Leiden and factor II G20210A mutations detected. In five participants, only one genetic risk factor was confirmed. One was heterozygous carrier of factor V Leiden mutation. The individual presence of MTHFR mutations was confirmed as homozygousity for C677T in one patient, while four participants were heterozygous carriers of the same mutation. Additionally, in one patient the only mutation identified was MTHFR A1298C in the heterozygous form. These preliminary results confirm reliability of application of ThromboType® plus test in clinical laboratories. Further studies will, through enrollment of more patients and correlation with functional tests, improve testing efficiency and enable identification and clinical evaluation of novel genetic risk factors for thrombophilia.

B46
UTICAJ SMANJENOG UNOSA HRANE NA ACTH ĆELIJE PERIPUBERTALNIH ŽENKI PACOVA

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Smanjen unos hrane kod ženki pacova aktivira sistem uključen u odgovor na stres (hipotalamo-hipofizno-nadbubrežni sistem). Dobro je poznato da različiti tipovi hipofiznih ćelija (adrenokortikotropne-ACTH, prolaktin-produkujuće i somatotropne ćelije) učestvuju u odgovoru na stres. Cilj ove studije je bio da se ispitaju efekti smanjenog unosa hrane na imunohistomorfometrijske karakteristike hipofiznih ACTH ćelija kao i nivo ACTH hormona u krvi. Peripubertalne (38 dana stare) ženke Wistar pacova su gajene pojedinačno u kavezu, pod standardnim ambijentalnim uslovima (12:12 h svetlo-tama, 22±2°C) sa hranom i vodom *ad libitum*. Ženke eksperimentalne grupe su hranjene 50% manjom količinom hrane nego kontrolna grupa ženki, tokom šest nedelja. ACTH ćelije su obeležene korišćenjem peroksidaza-antiperoksidaza imunohistohemijske procedure te je sprovedena stereološka analiza. Nivo ACTH u krvi određen je radioimuno testom (ACTH-

B46
DIETARY RESTRICTION AFFECTS ACTH CELLS OF PERIPUBERTAL FEMALE RATS

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Dietary restriction (DR) in female rats presumably activates the stress (hypothalamo-pituitary-adrenal) system. It´s well known that various pituitary cell types are involved in the reaction to stress, i.e. adrenocorticotropic hormone (ACTH), prolactin and growth hormone cells. The aim of this study was to examine the effects of DR on the immunohistomorphometric features of pituitary ACTH cells and blood levels of ACTH. Peripubertal (38 days old) female Wistar rats were housed one per cage, under standard environmental conditions (12 h light/dark cycle, 22 ± 2 °C) with food and water *ad libitum*. Experimental females were fed with 50% of the total amount of food consumed by the controls, during 6 weeks. The ACTH cells were stained using the peroxidase-antiperoxidase immunohistochemical procedure and stereological analyses were conducted. The blood ACTH was measured by radioimmunoassay (ACTH-IMMULITE kit). In the experimental group body weight was

IMMULITE kit). U eksperimentalnoj grupi ženki prosečna telesna masa je smanjena (p<0,05) za 48,8%, dok je relativna masa hipofize povećana (p<0,05) za 76,9% u poređenju sa odgovarajućim parametrima kod kontrola. Volumen ACTH ćelija, kao i njihova volumenska gustina su povećani (p<0,05) kod eksperimentalnih ženki za 17,6%, odnosno 12,5%. Nivo ACTH u krvi je povećan (p<0,05) u eksperimentalnoj grupi za 13,4%. Naši razultati ukazuju da smanjen unos hrane kod peripubertalnih ženki pacova stimuliše sistem uključen u odgovor na stres, što potvrđuju povećani morfofunkcionalni parametri ACTH ćelija.

B47
ULOGA CITOLOŠKOG PREGLEDA LIKVORA U DIJAGNOSTIFIKOVANJU MULTIPLE SKLEROZE

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Multipla skleroza (MS) je upalna autoimuna demijelinizacijska bolest centralnog nervnog sistema koja se karakteriše multifokalnom inflamatornom destrukcijom mijelina, oštećenjem aksona i gubitakom oligodendrocita. Dijagnoza se postavlja magnetnom rezonancom, sveobuhvatnim anamnestičkim, kliničkim praktičnim i laboratorijskim analizama. Pored elektroforetskog, izoelektričnog fokusiranja likvora kojim se utvrđuje prisustvo oligoklonalnih traka IgG u CSF-u, analizira se i broj, vrsta ćelija u CSF-u, kao i nivo ukupnih protein u likvoru. Cilj rada je bio da se utvrdi koji procenat pacijenata kojima je elektroforezom i izoelektro-fokusiranjem likvora utvrđeno prisustvo oligoklonalnih traka IgG i potvrđena dijagnoza MS, ima patološki nalaz ćelija u likvoru i povišen nivo proteina. Svim pacijentima (182 pacijenata obuhvaćena istraživanjem) je citološki pregledan likvor i određen je nivo proteina u njemu. Iz orginalne epruvete pre nego što je materijal centrifuguran 5 minuta na 2000 obrtaja, 100 μL likvora je obojeno pomoću 20 μL Genciane violet. Nakon 10 minuta likvor je postavljen u Fush-Rosenthal ovu komoru za brojanje ćelija i mikroskopiran na elektronskom mikroskopu na uveličanju 40x. Ukupni proteini u likvoru su određivani na biohemijskom analizatoru Vitros 350 (Johnson & Johnsons Company), po principu suve hemije sa pirokatehol violet. Dobijeni rezultati su prema nalazu ćelija razvrstani u dve grupe. Prvu grupu su činili pacijenti koji su imali povećan broj ćelija (≥5 ćelija). Drugu grupu su činili pacijenti sa ćelijama u granici normale (<5 ćelija). Od svih pacijenata obuhvaćenih istraživanjem, 25,3% je imalo patološki nalaz ćelija, a 74,7% normalan nalaz ćelija. U grupi koja je imala patološki nalaz ćelija, 43,5%

(p<0.05) decreased by 48.8%, while the relative pituitary weight was (p<0.05) increased by 76.9% in comparison with corresponding parameters in controls. The volume of ACTH cells, as well as their volume density was significantly increased (p<0.05) in the experimental group, by 17.6% and 12.5% respectively. The blood ACTH level was increased (p<0.05) in experimental group by 13.4%. Our findings show that the DR in peripubertal female rats stimulates the stress system, which was confirmed by increased morphofunctional parameters of ACTH cells.

B47
THE ROLE OF CITOLOGICAL CSF EXAMINATION IN DIAGNOSIS OF MULTIPLE SCLEROSIS

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Multiple sclerosis (MS) is an autoimmune inflammatory demyelinating disease of the central nervous system and is characterized by multifocal inflammatory myelin destruction, damage and loss of axon oligodendrocit. The diagnosis is set by magnetic resonance imaging, comprehensive anamnesis, clinical practice and laboratory analysis. In addition to isoelectric focusing (electrophoresis) where the presence of IgG in oligoclonal bands in CSF is determined, analysis of the number and type of cells in the CSF and the total level of protein are done. The aim of this study was to determine what percentage of patients had pathological finding of CSF cells and proteins (with whom the presence of IgG oligoclonal bands was determined and who were confirmed the MS diagnosis). Cell examination of the liquid and the level of protein in it were determined to all the patients (182 patients were included in the study). Before the material was centrifuged for 5 min. at 2000 rpm, 100 μL of fluid from the original test tube was painted using 20 μL Genciane violet. After 10 min. the fluid was placed in the Fushë-Rosenthal cell counting chamber and microscoped on electronic microscope at 40x magnification. Total proteins in the liquor were determined on a biochemical analyzer Vitros 350 (Johnson & Johnsons Company), on the principle of dry chemistry with pirokathehol violet. The results are divided into two groups according to cell findings. The first group consisted of patients who had an increased number of cells (≥5 cell). The second group consisted of patients with cells in normal range (<5 cells). Of all patients surveyed, 25.3% had pathological findings of cells, and 74.7% had normal cell finding. In the group that had a

imalo je i povišen nalaz protein (≥0,45 g/L), a 56,5% proteine u granicama normale (<0,45 g/L). U drugoj grupi pacijenata njih 29,4% imalo je i povišen nivo ukupnih proteina, a 70,6% imalo je potpuno normalan nalaz i ćelija i vrednosti proteina. Dobijeni rezultati ukazuju na to da pacijenti kojima je potvrena dijagnoza MS-a, ne moraju da imaju patološki nalaz ćelija i ukupnih proteina u likvoru. Kao zlatan standard potvrde MS preporučuje se elektroforeza likvora i izoelektrično fokusiranje i dokazivanje oligoklonalnih traka IgG u cerebrospinalnoj tečnosti.

pathological finding of cells, 43.5% had increased findings of protein (≥0.45 g/L), and 56.5% had protein in normal range (<0.45 g/L). In the second group of patients 29.4% of them had also high levels of total protein, and 70.6% had completely normal findings both of the cells and protein value. The results indicate that patients with a confirmed diagnosis of MS need not necessarily have to have a pathological finding of cells and total protein in liquor. Electrophoresis of liquid, isoelectric focusing and proving of IgG oligoclonal bands in cerebrospinal fluids is recommend standard of verification of MS.

B48
ODREĐIVANJE KONCENTRACIJE KARBOKSIHEMOGLOBINA KOD DECE SKOLSKOG UZRASTA SA PERZISTENTNOM ASTMOM

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Kada se udahne ugljen monoksid (CO) reaguje veoma brzo sa hemoglobinom u krvi stvarajući karboksihemoglobin (COHb), smanjujući dotur kiseonika u vitalne organe, što dovodi do povećane produkcije slobodnih radikala i oslobadjanja citokina. Da se ispita veza između štetnih efekata CO na respiratorni sistem, koristeći COHb kao marker hroničnog izlaganja ugljen monoksidu i njegov uticaj na simptome astme kod dece skolskog uzrasta. Ispitivali smo koncentracije COHb u krvi dece školskog uzrasta koja pate od umerenog i lakšeg oblika astme (n=40, starosti od 8–16 godina), koja žive u gradskim i seoskim sredinama. COHb je meren u krvi pacjenata odmah posle uzimanja spectrofotometrijskom metodom i izražavan kao procenat krvnog hemoglobina. Naša ispitivanja pokazuju da deca školskog uzrasta, sa umerenim i lakšim oblikom perzistentne astme imaju statistički znaćajno povećanje koncentracije COHb (3.53%±0.97) u odnosu na koncentraciju COHb iznad dozvoljene bezbedne koncentracije od 2.5%. Takoe smo proučavali uticaj faktora životne sredine: aerozagađenja, pasivnog pušenja, grejanja na drva, gustine saobraćaja, načina življenja u gradskim i seoskim sredinama. Postoji pozitivna povezanost između koncentracije aerozagađenja i pogoršanja astme u dece. Poznato je da dugotrajno izlaganje malim nivoima CO izaziva promene u srčanom i plućnom tkivu, sprečavanjem distribucije kiseonika u tkiva. Naši rezultati pokazuju da koncentracija COHb u krvi dece školskog uzrasta iznad bezbednog nivoa od 2.5%, može biti uključena u patogenezu mnogih respiratornih bolesti, naročito astme i pokretač asmatičnih napada i alergija.

B48
DETERMINATION OF CARBOXYHEMOGLOBIN CONCENTRATION IN SCHOOL-AGE CHILDREN WITH PERSISTENT ASTHMA

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When inhaled, carbon monoxide(CO)reacts very rapidly with hemoglobin in the blood and forms carboxyhemoglobin (COHb), decreasing the oxygen delivery to vital organs, leading to free-radical production and cytokines releasing. To investigate the link between the adverse effects of CO on the respiratory system using COHb as a marker for chronic CO exposure and influence on asthma symptoms in school-age children. We examined blood COHb concentrations in school-age children who suffer from moderate and easy form of asthma (n=40, between the ages of 8–16), living in urban and suburban areas. COHb was measured in patient's blood immediately after obtaining by spectrophotometric method and expressed as a percentage of blood hemoglobin. Our study show that school-age children, with moderate and easy form of persistent asthma have statistically significante elevation of COHb concentration (3.53%±0.97) in relation to COHb concentrations above the considered safe level of 2.5%. We also studied the influence of environmental factors: air pollution, secondhand smoking, wood- heating, heavy traffic, aspect of living in urban and rural areas. There is positive associations between air pollution concentrations and asthma aggravation in children. It is known that long-term, low-level CO exposure causes changes in heart and lung tissue, impeding distribution of oxygen to body tissue. Our results sugests that blood COHb concentration above safe level of 2.5% in school-age children can be involved in pathogenesis of many respiratory diseases, especially asthma and trigger asthma attacks and allergies.

B49
POREĐENJE TRI METODE ZA ODREĐIVANJE SEDIMENTACIJE ERITROCITA I ISPITIVANJE PRECIZNOSTI APARATA MONITOR V100 I SEDIMATIC 100

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Sedimentacija eritrocita (SE) je jeftin, nespecifični test koji se često koristi u biohemiji, jer ukazuje na težinu oboljenja i dinamiku patoloških promena. Cilj ovoga rada je bio da se uporede tri metode za određivanje SE i da se proceni preciznost aparata Monitor V100, proizvođača Terumo (A) i Sedimatic 100, proizvođača Analys Instrument (B). U poređenju su korišćeni uzorci pacijenata. SE je određena na aparatima A i B, kao i manuelnom metodom (korišćenjem kompleta Sedispekt, proizvođača Spektar). U toku poređenja uticaj nekih od faktora na SE je poništen, a za druge je dokazano da u uslovima merenja ne utiču na SE. Između rezultata sa aparata A i B postoji dobra korelacija (r=0,9772, y=0,49x+1,9209). Korelacije su nešto lošije, ali zadovoljavajuće, kada se uporede aparat A i manuelna metoda (r=0,9390, y=1,2566x –3,8364) i aparat B i manuelna metoda (r=0,9229, y=0,8202x–1,1084). Preciznost aparata A i B je određena ponovljenim određivanjem SE u uzorcima pacijenata. Koeficijent varijacije se kretao između 0% i 40,82% (prosečna vrednost 13,82%, medijana 11,76%) za aparat A i između 0% i 26,73% (prosečna vrednost 10,27%, medijana 9,58%.) za aparat B. Na osnovu ovih rezultata može se zaključiti da je korelacija između ovih metoda zadovoljavajuća, da najbolja korelacija postoji između rezultata sa aparata Monitor V100 i Sedimatic 100, kao i da je aparat Sedimatic 100 precizniji od aparata Monitor V100.

B49
COMPARISON OF THREE METHODS FOR THE MEASUREMENT OF THE ERYTHROCYTE SEDIMENTATION RATE AND PRECISION EVALUATION OF MONITOR V100 AND SEDIMATIC 100 ANALYZERS

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The erythrocyte sedimentation rate (ESR) is an inexpensive, non-specific test, which is often used in biochemistry since it indicates the severity of disease and dynamics of pathological changes. The purpose of this study was to compare three methods for the measurement of the ESR and to evaluate the precision of Terumo's Monitor V100 (A) and Analys Instrument's Sedimatic 100 (B) analyzers. The comparison was performed on patient samples. ESR was determined by analyzers A and B, and also by manual method (using Spektar's Sedispekt). During comparison the influence of some factors on ESR annulled, and others proved not to affect ESR in conditions of measurement. A good correlation was found between analyzer A and B results (r=0.9772, y=0.49x+1.9209). Correlations were slightly worse, but satisfactory between analyzer A and manual method (r=0.9390, y=1.2566x–3.8364) and analyzer B and manual method results (r=0.9229, y=0.8202x–1.1084). The precision of analyzers A and B was determined by repeated measurement of ESR in patient samples. Coefficients of variation ranged from 0% to 40.82% (mean 13.82%, median 11.76%) for analyzer A and from 0% to 26.73% (mean 10.27%, median 9.58%) for analyzer B. In conclusion, the correlation between these methods is satisfactory. However, the best correlation is found between Monitor V100 and Sedimatic 100 results. It can also be stated that Sedimatic 100 analyzer is more precise than Monitor V100 analyzer.

B50
NIVO CISTATINA C KOD ŽENA SA PIH TRUDNOĆOM IZAZVANOM HIPERTENZIJOM

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Zapaženo je da cistatin c u serumu može da odražava jačinu glomerulske filtracije u različitim stanjima uključujući i trudnoću. Trudnoća može da dove-

B50
LEVEL OF CYSTATIN C IN WOMEN WITH PIH

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It has been recognized that serum cystatin C might well reflect glomerular filtration rate in various conditions, including pregnancy. Pregnancy can

de do anatomskih i funkcionalnih promena bubrega, hipertenzije i drugih komplikacija. Cilj ovog rada je da utvrdi nivo cistatina c kod žena sa PIH (trudnoćom izazvanom hipertenzijom) i da utvrdi njegovu ulogu kao prognostičkog parametra u komplikovanoj trudnoći. Ispitivanje je izvedeno prema Helsinškoj deklaraciji i sve učesnice su dale pisanu saglasnost za učešće. Ukupno 72 trudnice je uključeno: Grupa I – 33 trudnice (prosečna starost 28,91 ± 6,10 godina) u trećem trimestru trudnoće sa PIH i grupa II, kontrolna grupa – 39 trudnice (prosečna starost 30,1 ± 6,95 godina) u trećem trimestru normalne trudnoće. Kod svih trudnica su određivani cistatin c i kreatinin Cistatin c u serumu je određivan PENIA metodom (Particle-Enhancesd Nephelometric Immuno-Assay) komercijalnim testom Dade Behring na Behring Nephelometer II (DADE Behring, Marburg, Germany). Kreatinin u serumu i 24 satnom urinu je određivan modifikovanom kinetičkom Jaffe-ovom metodom na automatskom analizatoru Olympus 640 (Olympus, Munich, Germany) uz IDMS sledivim kalibratorom. Klirens kreatinina je izračunavan. Rezultati su statistički obrađeni primenom ANOVA testa. Utvrđena je statistički značajna razlika u nivou cistatina c kod trudnica trećeg trimestra koje su imale PIH (1,45± 0,43 mg/L u odnosu na 1,21 ± 0,30 mg/L). Cistatin c se može koristiti kao prognostički parametar kod trudnica sa PIH.

induce anatomical and functional changes of the kidneys, hypertension and other complications. The aim of this study was to determine the levels of cystatin C in women with PIH (pregnancy induced hypertension) to defining its role as a prognostic parameter in complicated pregnancies. The investigation was performed according to the Declaration of Helsinki and all subjects gave informed written consent for participation. A total of 72 pregnant women were included: group I – 33 pregnant women (average age 28.91 ± 6.10 years) in the third trimester with PIH and group II, control group, – 39 pregnant women (average age 30.1 ± 6.95 years) in the third trimester, normal pregnancy. Cystatin C and creatinine were measured in the serum samples of all pregnant women. Serum cystatin C was determined by the PENIA (Particle-Enhancesd Nephelometric Immuno-Assay) method, using the Dade Behring tests, on a Behring Nephelometer II (DADE Behring, Marburg, Germany). Creatinine in serum and 24 hour urine was determined with modified kinetic Jaffe method using the Olympus 640 analyzer (Olympus, Munich, Germany) and the calibrator was IDMS standardized. Creatinine clearance was calculated. Results were statistically analyzed using the ANOVA. A statistically significant increase in serum cystatin C level was found in the third trimester of PIH pregnancy (1.45± 0.43 mg/L vs. 1.21 ± 0.30 mg/L). Cystatin C can be used as prognostic parameter in PIH pregnancy.

B51
HOMOCISTEINEMIJA KOD PACIJENATA SA KAROTIDNOM STENOZOM

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Homocisteinemia se smatra jednim od faktora rizika za nastanak aterotromboze. Cilj rada je bio, ispitivanje promena u koncentraciji homocisteina (Hcy) i učestalost hiperhomocisteinemije (HHcy), definisanih kao koncentracija Hcy preko 12 μmol/L, kod pacijenata sa karotidnom stenozom.U radu su poređeni nivoi Hcy i učestalost HHcy, između grupe od 70 pacijenata sa karotidnom stenozom (39 muškaraca i 31 žena) i kontrolne grupa od 55 zdravih ispitanika (29 muškaraca i 26 žena). Hcy je određivan u serumu, koristeći HPLC metodu sa fluorescentnom detekcijom. Rezultati su poređeni korišćenjem Studentovog t i chi-kvadrat testa. Srednje vrednosti Hcy kod pacijenata (14.3 μmol/L) i u kontrolnj grupi (10.8 μmol/L),

B51
HOMOCYSTEINE LEVELS IN PATINENTS WITH CAROTID STENOSIS

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Hyperhomocysteinemia is considered as one of the factors related to atherothombosis. The aim of the study was to evaluate changes in homocysteine concentrations (Hcy) and incidence of hyperhomocysteinemia (HHcy), defined as Hcy concentration above 12 μmol/L, in patients with carotid stenosis.The study compared Hcy level and HHcy incidence between the group of 70 patients with carotid stenosis (39 men and 31 women) and control group of 55 age-matched controls (29 men and 26 women). Hcy was measured in serum, using HPLC method with fluorescence detection. Results were compared by Student's and chi-square tests.Mean Hcy levels in patients (14.3 μmol/L) and in control (10.8 μmol/L) were

se značajno razlikuju (p<0.001). HHcy je bila prisutna sa značajno višom učestalosti (P=0.037) kod pacijenata (65.2 %), u odnosu na kontrolu grupu (23.2 %). Razlika u koncentraciji između muških (14.9 μmol/L) i ženskih (13.1 μmol/L) pacijenta nije značajna Muškarci sa karotidnom stenozom su imali znatno više vrednosti Hcy u poređenju sa kontrolnom grupom (14.9 vs. 12.2 μmol/L, p= 0.032). Slični rezultati su dobijeni i u ženskoj populaciji, gde je nivo Hcy je značajno (p=0.001) viši kod pacijenata (13.1 μmol/L) nego u kontrolnoj grupi (9.3 μmol/L). Pacijenti sa karotidnom stenozom imaju povišen nivo Hcy i veću učestalost HHcy. Ne postoji uticaj pola na povećanje homocisteinemije kod pacijenata sa karotidnom stenozom.Postoji potreba za daljim razjašnjenjem činjenice da kod pacijenata oba pola, sa stenozom karotide, postoje povišene vtrednosto Hcy i HHcy u odnosu na zdravu populaciju.

significantly different (p<0.001). HHcy was present with significantly higher incidence (p=0.037) in patients (65.2%) than in controls (23.2%). The difference in Hcy concentrations between male (14.9 μmol/L) and female (13.1 μmol/L) patients was not significant, while the opposite was observed in controls (males 12.2 μmol/L vs. 9.3 μmol/L, p=0.013). Men with carotid stenosis had significantly higher Hcy levels comapred with healthy men (14.9 vs. 12.2 μmol/L, p=0.032). Similar results were observed in female population of our study: Hcy levels were significantly (p=0.001) higher in patients (13.1 μmol/L) than in cotrols (9.3 μmol/L).We conclude that patients with carotid stenosis have increased Hcy levels and higher HHcy incidence. Generally, gender related differences in homocysteinemia increase in these patients are not significant, but there is a need to highlight the fact that patients of both sexes have higher Hcy levels than their matches in control group.

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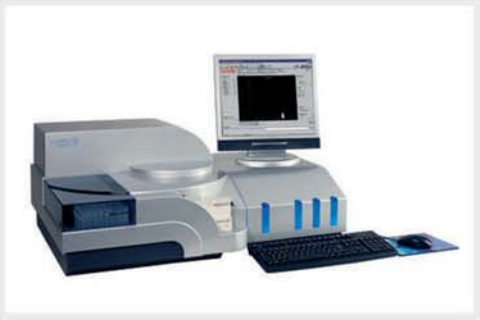

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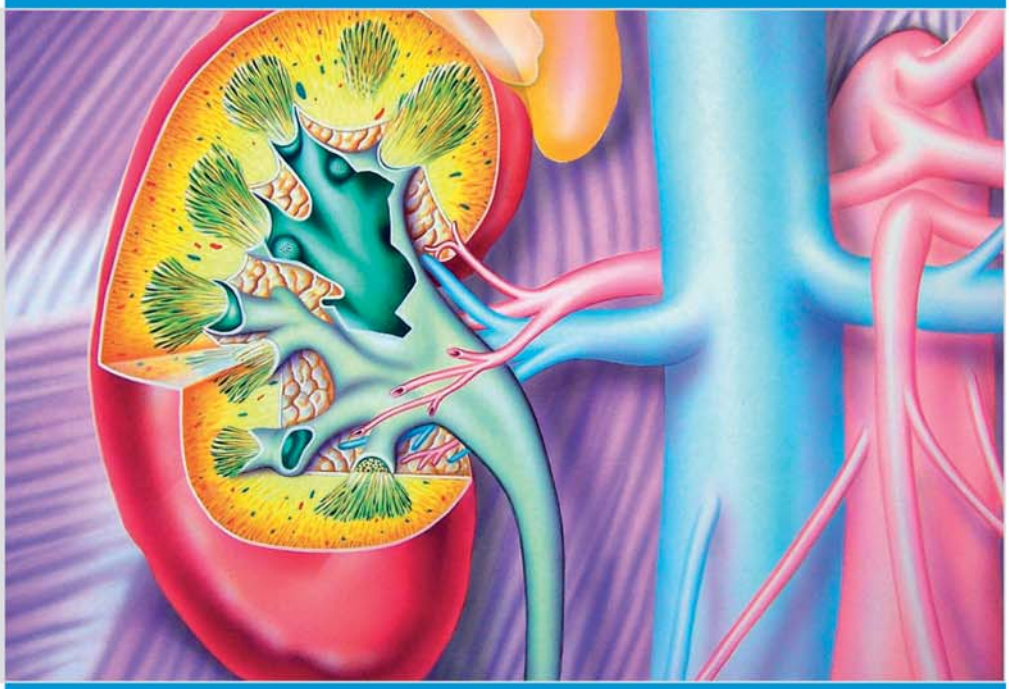

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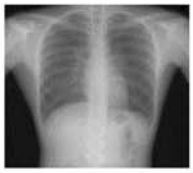

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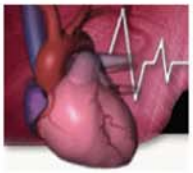

Infektivni

Neinfektivni

CHF

ACS

Bakterijskil

Virusni

PE

Ostali
Akutna astma/bronhitis
Akutno pogoršanje COPD

NT-proBNP

TNIU

MYO

CK-MB

PCT

D-Dimer

SOB: shortness of breath (otežano disanje)
CHF: congestive heart failure (kongestivni srčani zastoj)
ACS: acute coronary syndromes (akutni koronarni sindromi)
PE: pulmonary embolism (plućna embolija)
COPD: chronic obstructive pulmonary disease (hronična opstruktivna plućna bolest)

...zato što brza dijagnoza ne ostavlja prostor za kompromise...

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VERUJTE U INOVACIJE

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Uzorak iz iste epruveta sa EDTA kao antikoagulansom se koristi i na AliFax-ovom ESR analizatoru. Potpuna uniformnost autosamplera oba analizatora, omogućava da Vaši nalazi budu spremni za evaluaciju za manje od 5 minuta,odnosno 80 testova na sat. Ako uz ovo dodamo i mogućnost dvosmernog povezivanja oba analizatora u centralni laboratorijski informacioni sistem, dobićemo performanse o kojima se do sada samo sanjalo.




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