

for daily, monthly or yearly reports on the consumption of reagents and validated results.

**Conclusions:** By introducing IRATA program for managing stock, recording of overall process with in all clinical units in KZLD was significantly facilitated. The inventory of goods was significantly simplified, and for accreditation (ISO 15189), essential reagents traceability by serial numbers and expiry dates of arrival at the laboratory to its application to the analyzers was obtained.

## P02 – Cardiovascular diseases

### P02-01

#### CETP, LDL particle size and intima media thickness in patients with coronary heart disease

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**Background:** Cholesteryl ester transfer protein (CETP) plays a key role in reverse cholesterol transport and high density lipoprotein (HDL) metabolism. Predominance of small, dense LDL particles is associated with an increased risk of atherosclerosis and coronary heart disease (CHD).

**Aim:** to determine the potential relationship between the CETP concentration and low density lipoprotein (LDL) particle size and their association with intima media thickness (IMT) in patients with CHD.

**Materials and methods:** Lipid parameters, CETP concentration and LDL particle size were determined in 100 healthy subjects (control group) and in 100 patients with CHD, aged 43 to 77 years. Plasma CETP concentrations were measured by an enzyme-linked immuno-sorbent assay with two dif-

ferent monoclonal antibodies. LDL subclasses were separated by nondenaturing polyacrilamide 3-31% gradient gel electrophoresis.

**Results:** CETP concentration was higher in patients compared to controls ( $2.02 \pm 0.75$  mg/mL vs.  $1.74 \pm 0.63$  mg/mL,  $P < 0.01$ ). Mean LDL particle size (nm) was significantly smaller in patients than in controls ( $24.5 \pm 1.1$  vs.  $26.1 \pm 0.9$ ;  $P < 0.001$ ). There was no relation between LDL size and CETP concentration ( $r = -0.18$ ,  $P = 0.072$ ). Age, diastolic blood pressure, CETP concentration and LDL particle size were independent factors for determining IMT by multiple linear regression analysis. They accounted for 35.2 % of the observed variability in IMT.

**Conclusions:** CETP concentration and LDL particle size were independent factors for determining IMT. CETP might play a role in determining lipoprotein distributions, but did not seem to be the sole factor in the formation of small LDL particles.

### P02-02

#### NT-proBNP in anthracycline-induced cardiotoxicity in children

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**Background:** Anthracyclines (doxorubicin, daunorubicin and idarubicin) are highly efficacious anti-neoplastic agents for various malignancies in children but their usefulness has been limited by cardiotoxicity causing cardiomyopathy and heart failure. The aim of this study was to assess the diagnostic accuracy of N-terminal-prohormone brain natriuretic peptide (NT-proBNP) in recognizing anthracycline related cardiotoxicity in children. **Materials and methods:** Serum levels of NT-proBNP

were measured by electrochemiluminescence immunoassay (ECLIA) on the Cobas e 411 analyser (Roche Diagnostic, Mannheim, Germany).

**Results:** We included 32 patients with median age of 15 years, who received anthracyclines in their chemotherapy. All patients had undergone cardiac evaluation that included electrocardiography and echocardiography. Toxicity was assessed according to the National Cancer Institute (NCI) Common toxicity criteria (version 2.0). With cut off of 125.0 pg/mL, sensitivity of NT-proBNP was 55.5% and specificity only 40.0%. The area under the receiver operating characteristic (ROC) curve was 0.548 (95% confidence interval (CI): 0.363-0.724) and odds ratio 0.83. Positive predictive value was 83.3 (95% CI: 58.6-96.4) and negative predictive value 14.3 (95% CI: 1.8-42.8). There was no statistical difference between serum NT-proBNP levels of the patients with normal and abnormal echocardiographic and electrocardiographic findings ( $P = 0.736$ ).

**Conclusions:** Due to specificity and sensitivity of NT-proBNP, present study indicated that electrocardiographic and echocardiographic follow-up is more reliable than serum NT-proBNP levels for detecting cardiotoxicity. Further investigations in finding non-invasive and practical method for monitoring to identify cardiac damage at subclinical level are necessary.

## P02-03

### Cardiac biomarkers for monitoring patients with percutaneous coronary intervention

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**Background:** The purpose of the study is to monitor glycogen phosphorylase isoenzyme BB (GPBB), CK-MB mass and troponin I (TnI) from the injured myocardium after elective percutaneous coronary intervention (PCI), in correlation with ischemic incidents.

**Materials and methods:** Twenty-three consecutive patients undergoing elective PCI with baseline values of CK-MB mass and TnI below the upper limit of normal (ULN) were included in the study. Baseline blood samples and two more after the PCI (3 and 24 hours) were taken. The significance of cardiac markers was evaluated based on ischemic incidents after PCI. Logistic regression analysis was used to predict ischemic incidents after PCI based on increased values of the biomarkers.

**Results:** An overall comparison of the biomarkers of 18 patients without and 5 patients with ischemic incidents displayed significant differences only for the baseline GPBB and CK-MB mass 24 hours after PCI ( $P = 0.019$  and  $P = 0.048$ ). Ischemic incidents were able to be predicted independently only based on overall CK-MB mass measurements (OR = 1.68,  $P = 0.041$ ) and particularly GPBB at baseline (OR = 1.90,  $P = 0.008$ ) and CK-MB mass 24 hours after PCI (OR = 2.11,  $P = 0.022$ ).

**Conclusions:** Only significant increases in TnI were observed after elective PCI with the prediction of ischemic incidents only possible using GPBB and CK-MB mass measurements.

## P02-04

### Unexpectedly elevated cardiac Troponin I level in the patient without acute coronary syndrome: a case report

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Since cardiac Troponin I (cTnI) - assay is leading test in diagnostic of myocardial infarctions, and it is used for risk assessment in patients with acute coronary syndrome as well as unstable angina, it is very important to measure its concentration accu-

rately and precisely. Here we report a case where was significant difference in the cTnI concentrations measured by three different methods, which was detected in one patient's sera during preoperative evaluation for cardiac surgery. A 76-year-old male, with diagnosed chronic ischemic heart disease, essential hypertension, mitral insufficiency and diabetes mellitus type II, was preoperatively evaluated for elective surgical myocardial revascularisation. Due to variations in the results for the cTnI concentrations (0,62; 0,13; 0,89 µg/L) during the preoperative patient's evaluation in the reported case, the question was raised about the possibility of an interference known to occur in especially rare situations. The patient was operated at the Department of Cardiac Surgery and afterwards treated at the Department of Cardiac Intensive-Care Unit. Temporal elevation and subsequent decrease in the cTnI concentrations were monitored in the Clinical Department of Laboratory Diagnostic. It was observed that results obtain with different assays are not comparable. An elevated cTnI level alone should not be the only criterion used in establishing the diagnosis. The cTnI level should be considered in conjunction with patient's clinical symptoms, the ECG changes and other available information

## P02-05

### Levels of oxidized low density lipoproteins (oxLDL) and IgG autoantibodies against oxLDL in the sera

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**Background:** oxLDL is believed to play a critical role in the development progression of athero-

sclerosis and IgG autoantibodies against oxLDL can be used both as a parameter that consistently mirrors the occurrence of oxidation processes taking place in vivo and a criterium of an active including of immune system in pathological process.

**Materials and methods:** The present study aims to compare serum levels of oxLDL and IgGoxLDL in patients with atherosclerosis (N = 59) and healthy volunteers (N = 11). oxLDL and IgGoxLDL were assessed by ELISA.

**Results:** A preview showed that levels of oxLDL and IgGoxLDL were variable both in group of patients with atherosclerosis (1) and healthy group (2) (oxLDL (ng/mL): min 0.2, max 21.4 (1); min 0.3, max 20.6 (2); IgGoxLDL (mU/ml): min 13.74, max 1485 (1); min 73.7, max 694 (2). Median values of serum IgGoxLDL were higher in the 1st than the 2nd group: 422.8 mU/mL and 292.8 mU/mL (P < 0.005). At the same time median values of oxLDL did not differ.

**Conclusions:** IgGoxLDL was found to be increased in the sera for most of patients with atherosclerosis. The data need further consideration with detail study oxidant/antioxidant system.

## P02-06

### The association of inflammatory mediators and transient ischemic attack

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**Background:** Transient ischemic attack (TIA) develops as consequence of atherosclerosis. Our aim was to evaluate inflammatory mediators and early stages of macroangiopathy and microangiopathy in transient ischemic attack, within 12 hours from the onset of symptoms. **Materials and methods:** For-

ty-five patients (22 females, range 48-90 years) with transient ischemic attack and thirty-six controls (15 females, range 55-85 years) were included in study. Serum concentrations of cellular adhesion molecules (ICAM-1), interleukin-6 (IL-6), C-reactive protein (CRP), glucose, lipid profile and sedimentation rate were determined for all participants. Macroangiopathy was assessed by color doppler measurement of carotid intima media thickness. Degree of cerebral vasoreactivity as early marker of microangiopathy was determined by transcranial doppler ultrasound measurement of breath holding index.

**Results:** Levels of inflammatory mediators ICAM-1, IL-6 and CRP were significantly increased ( $371.6 \pm 161.8$  vs.  $301.9 \pm 91.6$  ng/L,  $P = 0.026$  for ICAM-1,  $6.76$  (2.72-18.3) vs.  $2.46$  (1.5-4.61) pg/mL,  $P < 0.001$  for IL-6 and  $8.5$  (6.7-14.9) vs.  $4.5$  (2.8-5.8) mg/L,  $P < 0.001$  for CRP) in patients with transient ischemic attack. Carotid intima-media thickness was significantly higher ( $1.22 \pm 0.17$  vs.  $0.86 \pm 0.19$  mm,  $P < 0.001$ ) and breath holding index was significantly lower ( $0.67 \pm 0.19$  vs.  $1.16 \pm 0.35\%/s$ ,  $P < 0.001$ ) in patients with TIA compared to controls.

**Conclusion:** Inflammatory mediator levels and carotid intima-media thickness measured within the first 12 hours after onset of TIA symptoms are higher than in controls, which together with breath holding index lower than controls indicates high risk of future stroke.

## P02-07

### Role of hemostatic and other markers in patients with coronary artery disease

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**Background:** D-dimer, fibrinogen, hs-CRP, IL-6 and other markers have considerable utility in

patients with acute coronary syndrome (ACS) and congestive heart failure (CHF). Atherosclerosis is a chronic inflammatory process, and coronary thrombosis is an important determinant of prognosis in patients with acute coronary syndromes.

**Materials and methods:** We examined 87 patients with coronary artery disease (CAD), mean age  $62 \pm 7.65$  years, body mass index (BMI)  $28.35 \pm 4.28$  kg/m<sup>2</sup> and 50 healthy patients with similar characteristics and with normal coronary angiograms. All test subjects were on regular diet and without any serious complications. We have determined for all their general biochemical status and complete lipid profile. All biochemical parameters were determined on Abbott's Architect C 8000, fibrinogen and D-dimer on a coagulation analyzer BCS XP Dade Behring, IL-6 on DPC Immulite 2000 from EDTA plasme, and hs-CRP was determined on nephelometer BN II Dade Behring from serum. All the samples were processed fresh.

**Results:** The values of fibrinogen for patients with coronary artery disease (CAD) were  $4.12 \pm 0.83$  g/L vs.  $3.06 \pm 0.67$ g/L ( $P < 0.01$ ), D-dimer was  $1.86 \pm 1.22$  mg/L ( $P < 0.001$ ), IL-6 was  $6.39 \pm 3.95$  pg/mL ( $P < 0.05$ ); hs-CRP values were significantly higher in patients  $2.5 \pm 2.47$  mg/L compared to control group  $1.04 \pm 0.17$ mg/L ( $P < 0.001$ ).

**Conclusions:** These findings suggest that increased levels of D-dimer and fibrinogen are indicative of a hypercoagulable state, as found in acute coronary syndromes. Plasma D-dimer levels are strongly and independently associated with the presence of CAD. The results indicate the importance of determining hemostatic markers and other risk factors for developing coronary artery disease.



## P02-08

### Serum uric acid levels and its association with coronary artery disease: an Indian Cohort Study

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**Background:** The role of high uric acid levels as a risk factor for Coronary Artery Disease (CAD) is highly debated. There are very few studies assessing the role of uric acid levels with increasing severity of CAD. The aim of our study was to study the association between high uric acid levels with CAD in an Indian population.

**Materials and methods:** 100 patients of angiographically proven CAD were studied of which 50 patients were of stable angina (Group I), 50 patients of acute coronary syndrome (Group II) (35 patients of unstable angina and 15 patients of MI) from a tertiary health center, New Delhi and a third group comprising of 50 age and sex matched healthy controls were also studied over a period of 1 year. Angiographic clinical vessel scoring was done for all patients.

**Results:** The mean age of the patients was  $49 \pm 8.8$  years (84% men, 16% women). The mean uric acid values for stable angina (Group I) ( $7.42 \pm 1.44$  mg/dL) and acute coronary syndrome (Group II) ( $7.47 \pm 1.49$  mg/dL) were significantly higher in CAD patients than controls ( $4.75 \pm 0.79$  mg/dL) ( $P < 0.001$ ). High serum uric acid values were associated with higher vessel scores indicating a more severe CAD ( $r = 0.580$ ,  $P < 0.001$ ).

**Conclusion:** Significant correlations were found between serum uric acid levels and the established risk factors of CAD and the angiographic clinical vessel score. Asymptomatic hyperuricemia is associated with both the presence and the severity of angiographically proven CAD patients.

## P02-09

### Matrix metalloproteases and their inhibitors in the treatment by omega-3 polyunsaturated fatty acids

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**Purpose:** To evaluate an influence of therapy by Omega-3 Polyunsaturated Fatty Acids (Omega-3 PSFA) on the levels of matrix metalloprotease 9 (MMP-9), pro-matrix metalloprotease 1 (proMMP-1) and their tissue inhibitor (TIMP-1) associated with left ventricular remodelling in patients with myocardial infarction (MI).

**Materials and methods:** 136 patients with MI were randomized on 2 groups: the 1<sup>st</sup>: 84 patients getting standard therapy, the 2<sup>nd</sup>: 52 patients getting additionally Omega-3 PSFA in doses 900 mg/day for 3 months. The levels of proMMP-1, MMP-9 and TIMP-1 were measured on the 4-5th day and over 3 months.

**Results:** An initial level of proMMP-1, MMP-9 and TIMP were not different in both groups. In the 1st group the levels of MMP-9 increased regarding to initial levels reaching over 3 months 361.8 (284.8; 409.0) ng/mL ( $P = 0.03$ ), it was connected with more marked degradation of the extracellular matrix and development of postinfarction remodelling; the levels of proMMP-1 were not changed. In the 2nd group the level of TIMP-1 over 3 months after an acute MI significantly exceeded the level of TIMP-1 in patients of the 1st group and was 1121.3 (955.2; 1612.2) ng/mL ( $P = 0.006$ ).

**Conclusions:** The therapy by Omega-3 PSFA influenced on the levels of matrix metalloproteases and their tissue inhibitor with probable restraining progression of the left ventricle remodelling.

**P02-10****Oxidative stress in hypertension induced congestive heart failure patients in Nigeria**

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**Background:** Congestive heart failure is a common end point of many abnormal cardiac conditions. Cardiovascular diseases have been linked with oxidative stress which provides the strongest evidence for the protective role of antioxidants. A high consumption of fruit and vegetables which are good sources of antioxidants has been associated with lower coronary risk.

**Materials and methods:** Changes in total antioxidant status (TAS), vitamins A, E, C levels and antioxidant trace metals (selenium, zinc, copper, manganese) were studied in the plasma of 61 participants aged between 30 and 79 years comprising 30 hypertensive subjects without heart failure (HTN), 11 hypertension induced congestive heart failure subjects (CHF) and 20 non-hypertensive apparently healthy individuals (control) using spectrophotometry, HPLC and atomic absorption spectrometry (AAS) respectively.

**Results:** TAS and Vitamin C in CHF were significantly lower compared with controls ( $P = 0.04$ ,  $P = 0.04$  respectively). Other parameters were not statistically different. TAS in HTN was significantly lower than controls ( $P = 0.01$ ) while vitamin E was significantly high ( $P = 0.00$ ). Other parameters were statistically not significant. Vitamin C was significantly lower in HTN compared with CHF ( $P = 0.049$ ). Significant negative correlation was observed between BMI and TAS, ( $r = -0.47$ ,  $P < 0.05$ ) as well as Age and TAS ( $r = 0.03$ ,  $P < 0.05$ ) in controls.

**Conclusion:** CHF and HTN patients have low TAS and increased oxidative stress which may aggravate the existing cardiovascular disease. Increased dietary intake of antioxidants may be beneficial.

**P02-11****New way of endothelial dysfunction research: flow cytometry testing of circulating endothelial cells**

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**Objectives:** The vascular endothelium plays a pivotal role in regulating blood flow, vascular permeability and thrombogenesis. While, endothelial dysfunction is a risk factor for cerebrovascular or cardiovascular diseases. The aim of our study was to investigate the quantity of circulating endothelial cells (EC) in patients with cerebrovascular and cardiovascular diseases and in healthy controls.

**Materials and methods:** We examined 63 healthy men and women (mean age  $49.5 \pm 1.5$ ), 31 patients with cerebrovascular disease (mean age  $70 \pm 2$ ) and 24 patients with cardiovascular disease (mean age  $60 \pm 2$ ). Level of circulating EC was determined in venous blood by flow cytometry using a fluorescently-labeled antibodies specific to CD45 and CD146 as number of nucleate cells with specified size and positive binding with anti-CD146, but negative binding with anti-CD45.

**Results:** mean level of circulating EC in controls was  $6.1 \pm 0.7$  cells/mL (0–25 cells/mL), in patients with cerebrovascular disease  $5.5 \pm 1.2$  cells/mL (0–33 cells/mL) and in group with cardiovascular disease  $6.4 \pm 1.0$  cells/mL (0–18 cells/mL). There were no differences in circulating EC number between studied groups. However, when we selected in cardiovascular group the patients with acute coronary syndrome due to acute myocardial infarction or unstable stenocardia and sex and age matched control, the significant differences were

found. The level of circulating EC was  $7.7 \pm 1.3$  cells/mL and  $4.9 \pm 0.6$  cells/mL in ACS patients and matched controls, respectively ( $P = 0.049$ ).

**Conclusion:** the determination of circulating EC by flow cytometry may indicate the vascular wall's damage in acute stage of cardiovascular disease and serve as accessible method of clinical laboratory diagnostics.

## P02-12

### Correlation between two methods for determination of cardiac troponin I

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**Background:** Cardiac troponin I (cTnI) is sensitive marker that reflects damage to myocardial cells, which is for years used in the Laboratory of Belgrade's University Zvezdara Medical Center. Siemens Immulite 1000 was regularly used for determination of cTnI. Aiming to improve care for our patients we have decided to examine new method for determination of cTnI by using Roche Cobas e411 analyzer. The purpose of this study was to test the method before its eventual adoption in clinical routine. We compared new method for determination of cTnI with the one already applied in our laboratory.

**Materials and methods:** The correlation between Roche Cobas e411 cardiac troponin I (x) and Siemens Immulite 1000 cardiac troponin I (y) was performed on 100 patients (59 males aged between 43 and 86 years, and 41 females aged between 47 and 87 years) with signs and symptoms of acute myocardial infarction (AMI) admitted to our emergency department in December of 2011.

**Results:** The correlation was not good ( $y = 1.95x + 4.73$ ;  $N = 100$ ;  $r = 0.92$ ). In 16 out of 100 patients

(16%) the results obtained by two methods were opposite, with one method indicating presence of AMI and the other absence of it.

**Conclusions:** Values of cTnI obtained with two compared methods were extremely different as indicated by low coefficient of correlation and high values of intercept and slope. In significant number of patients the results obtained by two methods were opposite, with one method indicating presence of AMI and the other absence of it.

## P02-13

### Biomarkers of inflammation and angiographic score in patients with peripheral arterial disease

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**Background:** Inflammation plays an important role in the pathophysiology of peripheral arterial disease (PAD). The aim of this study was to investigate association of C-reactive protein (CRP) concentrations and the platelet-activating factor acetylhydrolase (PAF-AH) activity, as novel biomarkers of inflammation with the angiographic score in patients with PAD.

**Materials and methods:** The study included 110 patients with angiographically confirmed diagnosis PAD and 118 control subjects. The serum PAF-AH activity was determined by spectrophotometric assay (Azwell Inc., Auto PAF-AH, Osaka, Japan). CRP concentration was determined by high-sensitivity immunoturbidimetric assay (Beckman Coulter, OSR 6229, Ireland). The distal aorta plus 10 arteries of each lower extremity were scored on the basis of vessel lumen reduction: 1 if stenoses involved a reduction in the vessel lumen of <50%, 2 if sten-

oses involved 50 to 99% reduction and 3 if total occlusion was present. The sum of the points was called the angiographic score.

**Results:** The patients had significantly higher concentrations of CRP, median (interquartile range): 3.70 (1.78-7.40) vs. 1.40 (0.60-2.43),  $P < 0,001$ . The serum PAF-AH activity did not differ between patients and control group 405 (330-471) vs. 406 (359-479),  $P = 0.591$ . CRP concentrations and PAF-AH activity in patients with PAD was not significantly associated with the angiographic score ( $r = 0.07$ ,  $P = 0.461$ ;  $r = -0.08$ ,  $P = 0.450$ , respectively). **Conclusions:** This study confirmed the role a low CRP concentrations as risk factors in the development of PAD, but there is no evidence that CRP concentrations or PAF-AH activity are related with the angiographic score.

## P02-14

### Differences in phenotyping heart failure patients- hsTroponin I versus hsTroponin T

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**Background:** The availability of high-sensitivity (hs) cardiac troponin (cTn) assays has allowed the detection of circulating cTn in patients with heart failure (HF) and without acute coronary syndrome. Some studies suggest that circulating cTn may define an intermediate phenotype in HF development. Our aim was to measure hscTnT and hscTnI in HF patients and compare the way these two different forms of cTn perform in classifying those patients.

**Material and methods:** Blood samples were collected from 165 HF patients (mean age of  $74 \pm 12$  years, 79 males and 86 females) on admission and

on discharge of the hospital. In both moments the concentration of hscTnI and hscTnT were measured (hscTnI by Abbott Architect® using CMIA; hscTnT by Roche Cobas® using ECLIA).

**Results:** The correlation coefficient was 0.876. The values for the 25%, 50%, 75% and the 95% percentiles were, for hsTnI (in ng/mL) 0.015, 0.033, 0.080 and 0.625, and for hsTnT (in pg/mL) 24.5, 39.9, 70.6 and 232.0, respectively. Observed agreement between quartis for both determinations was 52% (168), with 127 (39%) changing one quartile, 26 (8%) changing two quartiles and 4 (1%) changing three quartiles. Considering a cut-off value for acute myocardial infarction of 0.30 ng/mL for hscTnI and of 100 pg/mL for hscTnT we found ( $N = 325$ ) agreement in 299 (92.0%). Differences were found in 26: 3 (0.9%) with hscTnI  $>0.30$  ng/mL and 23 (7.1%) with hscTnT  $>100$  pg/mL.

**Conclusion:** Measuring cTn with different methods will lead to disagreement in HF patients' classification.

## P02-15

### Serum superoxide dismutase activity: A potential biomarker of atherogenesis

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**Aim:** The aim of this study is to assess association of nutritional status with serum copper, zinc-superoxide dismutase (SOD) and related atherosclerosis risk in light of "Reverse epidemiology" hypothesis in undernourished hemodialysed patients.

**Materials and methods:** Seventy male hemodialysed patients were enrolled in this clinical trial. Patients were divided into four subgroups according to the body mass index quartile ranges. Serum copper, zinc- superoxide dismutase activity was measured by commercial test reagent kit and reference materials; copper and zinc concentration



were measured by inductively coupled plasma mass spectrometry; and ceruloplasmin activity was spectrophotometrically measured by standard method. Analysis of variance (ANOVA) and appropriate *post hoc* analyses were performed by Statistica version 7.0 software.

**Results:** High SOD activity and copper-zinc ratio level in undernourished hemodialysed patients (ANOVA,  $P < 0.001$ ) were found. Thereafter, non-high-density lipoprotein-cholesterol (non-HDL-C) and triglyceride concentration were lower in undernourished hemodialysed patients (ANOVA,  $P < 0.001$ ). Macrophages, especially foam cells, and endothelial cells in atherosclerosis lesion produce high amount of SOD that can be expelled in the blood. SOD activity increase can be result of atherosclerosis progression.

**Conclusion:** These findings are consistent with "Reverse epidemiology" that explain higher atherosclerosis risk in hypocholesterolemic undernourished hemodialysed patients. Hypocholesterolemia can be atherosclerosis risk factor in hemodialysed patients according to SOD activity increase with concomitant non-HDL-C concentration decrease. Copper and zinc status disbalance (e.g. copper-zinc ratio increase) or hydrogen peroxide production increase by SOD in undernourished patient can cause oxidative stress which may contribute to acceleration of atherosclerosis.

## P02-16

### Serum neuron-specific enolase and procalcitonin as predictors of survival in comatose cardiac-arrest

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**Background:** Early prediction of neurological damage after cardiopulmonary resuscitation is a challenge to intensive care physicians. Serum neu-

ron-specific enolase (NSE) and procalcitonin (PCT) are two biochemical markers used to predict poor outcome in this patients. The aim of this study is to establish the prognostic value of NSE and PCT in survival comatose patients after cardiopulmonary resuscitation.

**Material and methods:** A retrospective study was conducted in 58 patients (age:  $62.7 \pm 14.7$  years) who suffered a cardiac arrest. Serum NSE and PCT were measured within three days after cardiac arrest using an enzyme immunoassay in Kriptor. Statistical analysis was performed using SPSS-15. Mann-Whitney test and Receiver Operator Characteristics (ROC) curves were used to compare groups and determine the best cut-off for NSE and PCT to predict exitus. Logistic regression was used to compare ROC curves.

**Results:** The mortality was 53%. The median and IQR levels of NSE and PCT (NSE: 52.1 ng/mL; [36.9-105.9]; PCT: 3.47 ng/mL; [1.7-7.7]) in patients who died were higher than survivors (NSE: 23.1 ng/mL; [15.9-33.9]; PCT: 1.13 ng/mL; [0.2-4.7]) statistically significant ( $P < 0.001$ ). The ROC curve showed a NSE cut-off of 35 ng/mL to predict a fatal outcome. Both specificity and sensitivity were 80%. PCT cut-off of 2.77 ng/mL showed a 71% of sensitivity and a 66% of specificity. However, no additional improvement in prediction of death was found with PCT measures.

**Conclusion:** Serum NSE is a helpful biochemical marker to predict neurological damage. Serum PCT concentrations did not provide additional information to assess neurological damage in comatose patients after cardiac arrest.