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## 244 | TOTAL ANTIOXIDANT STATUS IN SERUM AND AQUEOUS HUMOR IN PATIENTS WITH SENILE CATARACT

T.Pasoski<sup>1</sup>, D.Risteski<sup>2</sup>,  
A.Risteski<sup>2</sup>, J.Tuteska<sup>1</sup>

<sup>1</sup> Ward of Clinical Biochemistry,

<sup>2</sup> Ward of Ophthalmology,  
Medical Center – Prilep, Macedonia

Free radicals are atoms or molecules with an unpaired electron. In the broader sense free radicals are the main cause of body loss of vigour and involution, the two processes of physiological aging. Fortunately, the human body is equipped with antioxidant defence mechanisms to fight against free radical damages. The individual capacity for producing antioxidants is determined by genes, but it also depends on gender, age nutrition, life habits and environment. The ability for producing a normal level of antioxidants is considerably reduced in old persons, chronic patients, people with bad nutrition, smokers. The cataract is an opacity of the crystalline lens causing visual impairment. Cataracts may be classified according to the aetiology, age of onset, degree and location of opacification, and whether congenital or acquired. Ninety percent of all cataracts are of senile type. The word senile is commonly used in association with primary cataracts developing in old persons. We measured the level of total antioxidant state in serum and aqueous humor in eyes with immature or mature senile cataracts. We examined 19 patients. Aqueous humor was taken from the anterior chamber on the operative desk, just before the capsulotomy have been done. For total antioxidant status, RANDOX measuring kit were used. Finally, we tried to correlate the level of total antioxidant status in the serum and that in the aqueous humor.

## 245 | SERUM TOTAL ANTIOXIDANT STATUS IN ALZHEIMER'S DISEASE

A.Mitrevski, V.Petrova, S.Pajkovska

Department of Neurology, Skopje, Macedonia

There are indications for an increased activity of defence mechanisms of free oxygen radicals (antioxidants, antioxidant enzymes and prooxidants) in dementia of Alzheimers type. "Randox" has introduced the first kit to measure the total antioxidant status (TAS) of an individual and the purpose of this study was to assay TAS in sera obtained from subjects with Alzheimers disease (AD) and from controls. Blood samples were obtained from 13 patients with AD and from age-matched subjects without documented diagnosis of neurological disease, as well as from younger individuals (reference group). Since superoxide dismutase (SOD) is the main enzyme involved in cellular protection against damage due to oxygen-derived

free radicals, it was simultaneously assayed in red blood cells homogenates, obtained from the same subjects. Using appropriate statistical procedures, significant increase in sera of AD patients was observed in comparison to the reference group, and significant correlation between TAS and SOD was found ( $r=0.863$ ,  $p<0.001$ ). These results suggest that monitoring TAS may be advantageous, because it allows assessment of the performance of the entire antioxidant system, and this two-reagent-assay may be performed using either serum or plasma.

## 246 | ANTI-OXIDATIVE ENZYMES IN PULMONARY EMPHYSEMA

R.Rebić<sup>1</sup>, P.Rebić<sup>2</sup>, V. Đurđić<sup>3</sup>,  
S.Borožan<sup>3</sup>, S.Todorović<sup>3</sup>,  
S.Stojanović<sup>3</sup>

<sup>1</sup> University Clinical Center, Institute of Nuclear Medicine,

<sup>2</sup> University Clinical Center, Institute of Lung Diseases and TBC,

<sup>3</sup> University of Belgrade, University School of Chemistry, Belgrade, Yugoslavia

Oxygen radicals have been involved in pulmonary emphysema, where oxygen metabolites, derived from inflammatory cells such as neutrophils, may play a major role in damaging alveolar cells, although their role in airway inflammation is less certain. The source of these oxidants is varied including those generated by cells as a result of normal biochemical processes. The result is the high potential of oxidant stress and an efficient scavenging system is required. To study anti-oxidative enzymes (Cat, G-Px, G-red, G-6PDH and GSH) in patients with pulmonary emphysema, we analyzed the blood samples taken from 20 patients with global respiratory failure (10 males, mean age  $56 \pm 7.5$  yrs, and 10 females, mean age  $60 \pm 5$  yrs). All patients were heavy cigarette smokers, in average  $33 \pm 8$  pack-years. Chest radiographs of these patients were compatible with lung emphysema. Spirometric examinations revealed severe, irreversible pressure-dependent airflow limitations; body plethysmographic measurements revealed overinflation in increased total lung capacities, and transfer factors were greatly reduced. The control group consisted of 14 healthy smokers. Slightly elevated  $\alpha$ -1-antitrypsin in our pts.,  $3.55 \pm 0.76$  g/L, indicated an acute phase reaction. As compared to the control group, we found significantly increased activity of glutathione-peroxidase (G-Px,  $23.35 \pm 12.36 : 4.21 \pm 3.67$ ,  $p<0.001$ ), glutathione-reductase (G-Red,  $2.51 \pm 1.42 : 1.24 \pm 0.53$ ,  $p=0.001$ ), and glucose-6-phosphate dehydrogenase (G6PDH,  $6.64 \pm 2.72 : 1.16 \pm 0.42$ ,  $p<0.001$ ), and glutathione (GSH,  $490 \pm 156 : 301 \pm 96$  mg/L,  $p<0.001$ ). The mean values of catalase (Cat) were similar in the two groups ( $6.63 \pm 1.69 : 6.04 \pm 2.07$ ,  $p=0.414$ ). Enzyme values are expressed as  $\mu\text{mol}/\text{min}/\text{gHb}$ . Our data suggested that emphysema may induce an augmented oxidant stress. The enhanced production of oxygen radicals and increased membrane lipid peroxidation induce preferentially the

poxaemia ( $\text{PaO}_2 - 5.67 \pm 0.23$  kPa;  $\text{SaO}_2 - 0.78 \pm 0.02$  L/L) were directly related to the level of Cu in the blood. We noted a negative correlation between Cu and  $\text{SaO}_2$  ( $r = -0.36$ ,  $p < 0.05$ ) and between Cu and  $\text{PaO}_2$  ( $r = -0.35$ ,  $p < 0.05$ ). Lactic acid concentration was significantly elevated in COLD group to  $3.84 \pm 0.14$  mmol/L vs. control group  $1.86 \pm 0.11$  mmol/L,  $p < 0.001$ . LDH were significantly depleted -  $243.46 \pm 6.94$  U/L vs. control group  $339.54 \pm 9.34$  U/L,  $p < 0.001$ . The highly positive correlation was found between Cu and LDH ( $r = 0.81$ ,  $p < 0.001$ ) and between Cu and Mg ( $r = 0.47$ ,  $p < 0.01$ ). These results are correlated to the parameters of acid - base status, and they suggest that it is necessary to determine copper in the blood of patients with COLD in order to correctly evaluate hypoxia.

## 265 | CERULOPLASMIN, COPPER, AND ZINC IN PULMONARY EMPHYSEMA

R.Rebić<sup>1</sup>, P.Rebić<sup>2</sup>, V.Đurđić<sup>3</sup>,  
S.Borožan<sup>3</sup>, S.Todorović<sup>3</sup>,  
S.Stojanović<sup>3</sup>

<sup>1</sup> University Clinical Centre, Institute of Nuclear Medicine,

<sup>2</sup> University Clinical Center, Institute of Lung Diseases and TBC,

<sup>3</sup> University of Belgrade, University School of Chemistry Belgrade, Yugoslavia

The role of inflammation in emphysema and the involvement of oxidant stress in producing this inflammation are presented. The proposed mechanism of oxygen species formation is the modified Haber-Weiss reaction, also known as Fenton reaction. In Fenton reaction superoxide anion reacts with an oxidized form of a trace metal, such as Cu and Zn, causing reduction in that metal. Ceruloplasmin is the major antioxidant of plasma, and is the only protein capable of providing complete protection against inactivation of alfa 1-PI. Ceruloplasmin can also act as a scavenger of superoxide anions and may serve as the major copper transport protein of plasma. Extracellular zinc exerts a protective role on cells by preventing nonspecific leaks across the plasma membrane. We analyzed the blood samples from 20 patients with global respiratory failure (10 males, mean age  $56 \pm 7$  yrs. and 10 females, mean age  $60 \pm 5$  yrs.). All patients were heavy cigarette smokers, in average  $33 \pm 8$  pack-years. Spirometrics examinations suggested severe, irreversible pressure dependent airflow limitations; body plethysmographic measurements revealed overinflation in increased total lung capacities, and transfer factors were greatly reduced. The control group consisted of 20 healthy smokers. Slightly elevated alfa 1-PI in our patients,  $3.55 \pm 0.76$  g/L, indicated an acute phase reaction. As compared to the control group, we found significantly decreased concentration of zinc ( $74 \pm 24 : 105 \pm 34$   $\mu\text{g}/100$  mL,  $p < 0.001$ ). The mean values of ceruloplasmin were similar in the two groups ( $0.45 \pm 0.01 : 0.37 \pm 0.05$  g/L). Serum copper levels were also similar in both groups ( $126 \pm 46 : 134 \pm 14$

$\mu\text{g}/100\text{mL}$ ). The other authors have stated that in inflammation the copper concentration was increased. However our findings could not prove it. Decreased concentration of zinc pointed to the destabilization of lysosomal membranes and increased macrophage activity that liberates proteases.

## 266 | CONCENTRATION OF SOME TRACE ELEMENTS IN BLOOD SERUM OF MOTHER AND FOETUS IN PRETERM DELIVERY: ZINC

B.Marinov<sup>1</sup>, K.Tzatchev<sup>2</sup>,  
F.Kumanov<sup>3</sup>, B.Atanasova<sup>2</sup>

<sup>1</sup> Department of Obstetrics and Gynaecology,

<sup>2</sup> Department of Clinical Laboratory and Clinical Immunology,

<sup>3</sup> Clinical Center of Endocrinology and Geriatriy, Medical School, Sofia, Bulgaria

Zinc is an essential trace element, and its significance for normal progression of pregnancy and normal delivery is well known. Twenty six women with preterm delivery and their foetuses, and a control group of 66 patients with normal delivery and their foetuses, were included in the study. Zinc serum concentrations were measured with flame atomic absorption spectrometry (FAAS). The concentration of zinc in the blood serum of women with preterm delivery ( $8.7 \pm 1.5$   $\mu\text{mol}/\text{L}$ ) was significantly lower ( $p < 0.001$ ) than that in patients with normal pregnancy ( $10.5 \pm 1.5$   $\mu\text{mol}/\text{L}$ ). Zinc levels in blood serum of the cord blood of preterm newborns ( $14.7 \pm 3.4$   $\mu\text{mol}/\text{L}$ ) did not differ from that in normal newborns ( $14.9 \pm 2.8$   $\mu\text{mol}/\text{L}$ ). We discuss the possible mechanisms of the observed changes.

## 267 | CONCENTRATION OF SOME TRACE ELEMENTS IN BLOOD SERUM OF MOTHER AND FOETUS WITH PRETERM DELIVERY: COPPER

B.Marinov<sup>1</sup>, K.Tzatchev<sup>2</sup>,  
F.Kumanov<sup>3</sup>, B.Atanasovav<sup>2</sup>

<sup>1</sup> Department of Obstetrics and Gyneacology

<sup>2</sup> Department of Clinical Laboratory and Clinical Immunology

<sup>3</sup> Clinical Center of Endocrinology and Geriatriy, Medical School, Sofia, Bulgaria

Copper is an essential trace element and its concentration significantly increased in pregnancy. Twenty six women with preterm delivery and 78 with normal delivery were included in the study. Copper serum concentrations were measured with flame atomic absorption spectrometry.