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### **DIFFERENTIATED ELECTROCARDIOGRAPHY TO IMPROVE DIAGNOSTICS**

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Cardio-vascular diseases, ischemic heart disease and arterial hypertension in particular, are one of the most important problems in modern medicine. Regression of left ventricular hypertrophy is known to be associated with decrease of cardio-vascular mortality. The study of left ventricular hypertrophy development is a topical issue as well as estimation of methods to detect it.

With the purpose to make a quantitative estimation of left ventricular hypertrophy more objective electrocardiograms of 202 patients with stable angina, arterial hypertension and heart failure were processed on computers followed by their digitizing and construction of the first derivative of differentiated T wave as a model suggested by E.S. Halfen.

Increase of maximal rate correlation (MRC) of differentiated electrocardiogram is proved to be dependent on the signs of heart failure. Effect of diastolic arterial pressure on MRC index is reliable with aggravation of signs of left ventricular hypertrophy for the lateral side of the left ventricle and decrease for membranous area of the left ventricle. Thus, systolic and diastolic arterial pressure cause remodeling of the left ventricle contrary to the view concerning independence of left ventricular hypertrophy on systolic arterial pressure.

The use of differentiated electrocardiogram enables to improve diagnostic value of making electrocardiography in patients with cardio-vascular pathology. Examination of MRC index is rather effective concerning effects of available left ventricular hypertrophy, arterial hypertension, stable angina and heart failure.

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### **CLINICAL FEATURES OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE COMBINED WITH ISCHEMIC HEART DISEASE**

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WHO statistics suggests that chronic obstructive pulmonary disease (COPD) ranks 4<sup>th</sup> place in the world among causes of death, and its prevalence worldwide reaches about 210 million patients. The Ministry of Public Health of Ukraine determines the prevalence of COPD in the country is about 3000 per 100 thousand people and growing every year. Approximately 61.7% of patients with ischemic heart disease (IHD) have comorbidity with COPD. In developed countries, COPD and cardiovascular diseases take the leading place among causes of mortality, and in recent years the clinical importance of comorbid conditions has increased. In its turn, the presence of comorbidity in patients with COPD causes more severe course of the disease and has more unfavorable outcomes. Acute cardiovascular events are a common cause of death in patients with COPD, while in patients with COPD reduced FEV<sub>1</sub> by 10 % increases cardiovascular mortality by 28 %.

The leading factor contributing to the development of cardiovascular disease in patients with COPD is endothelial dysfunction, influencing the rise of the vascular tone, pathological vasoconstriction to stimuli, platelets aggregation, proliferation and migration of smooth muscle cells, expression of adhesive molecules, and adhesion of monocytes. These conditions lead to the development of target organs failure, progression of hypertension, atherosclerosis progression and tendency to thrombosis.

The aim of the work was to assess the severity of respiratory function disorders and the effectiveness of the therapy in patients with combined pathology of COPD and IHD.

Under supervision there were 40 patients with COPD (mean age of 69.4±5.6 years). All patients were hospitalized due to acute exacerbations of COPD (infectious – 69%, non-infectious – 31%). IHD was diagnosed in 70% of patients, COPD without concomitant cardiac disease – in 30% of patients.

During the hospital period of treatment bronchodilation therapy included tiotropium bromide 18 mcg/day by inhalation. Twice before and after treatment assessment of clinical symptoms was carried out: severity of dyspnea (MRC scale), cough (scores), bronchial patency (spirometry), state of the cardiovascular system (ECG). 1<sup>st</sup> group consisted of 28 patients (70%) (COPD, associated with IHD) 2<sup>nd</sup> group – COPD without IHD, 12 patients (30%). Duration of COPD in patients of the 1<sup>st</sup> group lasted 10.3±2.2 years, in 2<sup>nd</sup> group - 8.8±1.6 years, duration of IHD – 8, 4±2.8 years.

Spirometry data revealed the presence of bronchial obstruction in all the patients (FEV<sub>1</sub> in patients of the 1<sup>st</sup> group was 61.3±5.6%, 2<sup>nd</sup> group - 68.3±6.3% predicted; Tiffeneau Index in patients of the 1<sup>st</sup> group was up to 24.9%, 2<sup>nd</sup> group - up to 25.3% less than normal range). In cases of comorbidity bronchial obstruction was prevalent in large caliber bronchi (MEF 25% - 41.2±5.3%), patients with COPD without IHD presented with more pronounced violation of the patency of small bronchi (MEF75% - 52.3±4.8%). The VC value was less than 80% of the proper levels in 50% of patients of the 1<sup>st</sup> group and in 25% of patients of the 2<sup>nd</sup> group. Bronchial obstruction was reversible in 27.5% of patients from the 1<sup>st</sup> group and in 50% of patients from the 2<sup>nd</sup> groups.

The course of in-patient treatment resulted with subjective improvement in the severity of dyspnea. The prominence of bronchial obstruction was significantly decreased (rise of FEV<sub>1</sub> by 10.3% and Tiffeneau index by 11.4% in patients of the 1<sup>st</sup> group; 12.4% and 14.2% relatively in patients of the 2<sup>nd</sup> group) without considerable changes of



VC. ECG data did not reveal the negative impact of the therapy with tiotropium bromide inhalation to the cardiovascular system.

Thus, the combination of COPD and IHD is a frequent comorbid disorder with the development of mutual aggravation syndrome. This combination is characterized by a more pronounced progression of COPD, is manifested by development of lung restriction and decreased reversibility of airway obstruction, reduced response to therapy with bronchodilators and worsening of quality of patients' life.

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### **THE IMPACT OF LIVER INFLAMMATION ON THE RENAL BLOOD FLOW IN HEPATORENAL SYNDROME**

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Hepatorenal syndrome (HRS) is a relatively common complication of cirrhosis and occurs in 39% of cirrhosis patients within five years since the diagnosis has been made. Generally accepted theory is that blood vessels of kidneys constrict because of the dilation of blood vessels in the visceral circulation, which is caused by factors of the liver disease. Histamine, prostaglandins, and nitrous oxide (NO) affects unstriated muscle structure of vessels, causing the dilation of blood vessels, which increases the blood flow and circulating leukocytes in it. But the role of inflammatory cytokines in the pathogenesis of hepatorenal syndrome is still under the study.

The objective of the study was to analyze the impact of liver inflammation on the renal hemodynamic disorders in HRS. We examined 90 patients in total: 30 – with alcoholic liver cirrhosis (ALC)+normal renal function (group 1); 30 ALC+renal failure, but without HRS criteria (group 2); 30 ALC+HRS (group 3). We measured IL-6 and TNF- $\alpha$  levels in the blood serum by the kits of Immunoassay Cytoscreen (Biosource International, Camarillo, CA, USA), and NO level by Griess reaction. The index of interlobar arterial resistance (IARI) was estimated with the data of duplex dopplerography.

The mean value of IARI in group 3 ( $0.76\pm 0.02$ ) was statistically higher than in group 1 ( $0.64\pm 0.04$ ) and group 2 ( $0.68\pm 0.01$ ) ( $p < 0.05$ ). The numbers of NO were the highest in group 3 –  $28.5\pm 3.2$  mmol/L in comparison with  $16.2\pm 2.5$  mmol/L in group 1. There was no statistically significant differences between NO levels in groups 1 and 2 ( $17.6\pm 2.3$  mmol/L) ( $p > 0.05$ ). TNF- $\alpha$  levels in the blood serum were significantly overstated in group 3 –  $2.79\pm 0.68$  pg/mL ( $p < 0.05$ ) in comparison with  $1.89\pm 0.34$  pg/mL - in group 2 and  $1.89\pm 0.34$  pg/mL – in group 1. Group 3 also revealed high level of IL-6 –  $15.35\pm 0.93$  pg/mL ( $p < 0.05$ ), while in group 1 and 2 it was  $12.39\pm 1.07$  pg/mL and  $11.64\pm 1.32$  pg/mL respectively.

Spearman's rank correlation analysis revealed the direct correlation between IARI and NO in the blood serum ( $r=0.86$ ), IARI and levels of TNF- $\alpha$  in the blood serum ( $r=0.73$ ), IARI and IL-6 in the blood serum ( $r=0.67$ ) ( $p < 0.05$ ).

Thus, this paper proves that proinflammatory cytokines, including TNF- $\alpha$ , IL-6 and NO, play a key role in the pathophysiology of HRS. The identification of serum levels of these cytokines, along with the routine biochemical and ultrasound examination, can help in early detection of renal hemodynamic disorders in patients with ALC even before renal dysfunction becomes clinically evident. It also makes possible the identification of a subgroup of ALC patients who have higher risks for HRS progression.

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### **STATE OF PLATELET-VESSEL HEMOSTASIS IN PATIENTS WITH HYPERTENSION, ABDOMINAL OBESITY AND NONALCOHOLIC FATTY LIVER DISEASE**

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The aim of the research was to investigate the association of nonalcoholic steatohepatitis and steatohepatosis in patients with essential arterial hypertension (EAH) and abdominal obesity (AO) with signs of platelet-vascular hemostasis depending on the degree of obesity.

96 patients with nonalcoholic fatty liver disease (NAFLD), EAH 2nd stage, 1-2 degree, high and very high risk with concomitant AO, metabolic syndrome (MS): men – 41,67 % (40), women – 58,33 % (56), the average age was  $53,70 \pm 5,34$  years, were involved in the prospective research. Abbreviated blood coagulogram has been studied by indexes of activated plasma recalcification time (APRT), recalcification time (RT), prothrombin index (PI), content of fibrinogen A (FGA); density of blood – by indexes of haematocrit (HT). Function of the liver has been studied by the activity of enzymes.

First degree abdominal obesity (AO) was found in 27,08% (26) people, OB II degree – in 58,33 % (56), OB III degree – in 14,58 % (14) patients; steatohepatitis with minimal activity of mesenchymal-inflammatory process has been established in 16,67 % (16) people, steatohepatosis – in the other 83,33 % (80) of patients. There has been established reliably higher level of PI, RT and CF in patients with EAH and AO I degree than in those with AO III degree by 9,94 % ( $p = 0,048$ ), 13,88 % ( $p = 0,029$ ) and 2,31 times ( $p = 0,003$ ), respectively. Obtained data confirm a slowdown in the clotting process in two levels at a time: extension of the period of active thrombin generation by an external mechanism in the activation of compensatory fibrogenesis (pas factor and fibrinogen). The increase of FGA plasma content in patients with AO I degree against the background of higher content of leukocytes in the peripheral blood 25,92 % ( $p =$