



FEATURES OF PORTAL BLOOD CIRCULATION AND ECHOGRAPHIC STRUCTURE OF THE LIVER IN PATIENTS WITH CHRONIC HEART FAILURE

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Resume

In recent years, remarkable progress has been made in prolonging the lives of patients with chronic renal insufficiency (CRI) through the widespread introduction into clinical practice of extra-renal blood purification techniques, in particular the use of a programmatic hemodialysis, as well as an increase in the number of successful renal transplantation operations. In the past, there was an inherently poor prognosis for life, the inevitable nature of rehabilitation, and the inevitable need for people with CRI to move away from active full-time social and occupational activities. At the same time, it was recognized that in substitution therapy CRI is not only about prolonging life, but also about ensuring high quality of life, this has led to a significant number of reports in medical research journals reflecting the findings of research on different aspects of quality of life (QOL) in the dialysis centres.

Keywords: chronic heart failure, Dopplerography, portal hemodynamics.



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Introduction

The state of the liver and hepatic hemodynamics plays an important role in assessing the severity of the condition and predicting the development of chronic heart failure (CHF). Perivenular fibrosis, which is a morphological substrate of a congestive liver and spreads deep into the hepatic lobules, passes to the periportal zones, leading to the development of cirrhosis and portal hypertension, the clinical manifestations of which aggravate the course of CHF. Ultrasonography allows you to detect an increase in size, a change in the structure of the liver, an expansion of the hepatic and portal veins. We have not found any literature data describing the ultrasonographic structural changes of the liver parenchyma characteristic of cardiac fibrosis. Characteristic changes in blood flow, determined by Dopplerography, consist in a violation of the phase of the Doppler spectrum in the hepatic veins, as well as in a decrease in the average linear velocity of blood flow and the appearance of pulsating blood flow in the portal vein. The relationship between the pressure level in the right atrium and the severity of such pulsation has been established. However, there are insufficient data to assess the significance of portal hemodynamic disorders for predicting the course of CHF.

Material and Methods

109 patients with various stages of CHF and 31 patients of the control group were examined. With I II functional classes (FC) according to NYHA there were 17 patients, with III G/ - 92. From this group, 14 patients were monitored in dynamics with a duration of one to 3 years. The causes of CHF were coronary heart disease, postinfarction cardiosclerosis (in 26), hypertension (in 15), rheumatic heart disease (42), dilated cardiomyopathy, myocarditis, congenital heart defects (9). All patients underwent general clinical and laboratory examinations, electrocardiography, chest X-ray, echocardiography, as well as ultrasound and Doppler studies of the liver. Aloka devices were used for ultrasound SSD-650 and Aloka SSD-4000 with sector (2-3.5 MHz) and convex (3.5 MHz) sensors. During echocardiography, the main morphometric parameters were evaluated: the dimensions of the left and right atria, the final diastolic and systolic dimensions of the left ventricle (FDD, SDD), the dimensions of the right ventricle, aorta and pulmonary artery, the thickness of the interventricular junction and the posterior wall of the left ventricle, as well as the ejection fraction (EF) and contractility (FS), the final diastolic (FDV) and final systolic (FSV) volumes of the left ventricle, stroke volume (SV), systolic pressure in the pulmonary artery (SPPA), the pressure level in the right atrium. In addition, the mass of the left ventricular myocardium and the mass index





(LVMMI) were calculated. Liver ultrasonography was used to determine its size and structure, the diameter of the portal vein and Dopplerographic parameters of portal hemodynamics, the average linear (ALBF) and volumetric (AVBF) blood flow rates in the portal vein (PV), as well as the velocity parameters of blood flow in the hepatic artery and the qualitative characteristics of the Doppler spectrum in the hepatic veins. All parameters studied on an empty stomach. Quantitative indicators of portal blood flow were also judged after a food load test, which is usually used to assess the functional reserve of the portal system in chronic diffuse liver diseases. At the same time, the percentage of increase in the size of the VP, ALBF and AVBF was calculated. The liver structure was studied by threshold video densitometry, based on preliminary calibration of the device using an anechoic reference medium (blood in the lumen of the vessels of the basin of the inferior vena cava and hepatic vein at such a maximum gain value at which the reference medium still remains anechoic). After that, the quantitative parameters of the amplitude histography characterizing the echogenicity and structure of the liver were calculated. Such parameters were the predominant gradation of the gray scale (PGGS), reflecting the average amplitude the brightness of the image (on a 64-gradation scale), and the dispersion (D), reflecting the degree of heterogeneity of liver tissue in % of the maximum number of gradations of the "gray scale" distinguished by an ultrasound scanner.

Results and Discussion

When analyzing the data obtained, we found that in patients with CHF I-II FC, the main initial parameters of portal hemodynamics on an empty stomach were similar to those in the control group and coincided with the literature data. In patients with CHF III-IV FC average Doppler indicators of portal blood flow on an empty stomach did not significantly differ from those in the control and in patients with CHF I-II FC. At the same time, the majority of patients with TII-TV FC had a portal phase blood flow corresponding to the 3-4-5 "gradations of pulsating blood flow" according to the classification of A.J. Duerrinckx et al.

In 54 (58%) patients, ALBF and AVBF in the portal vein were within the normative indicators, in 14 (15%) they significantly exceeded them, and in 25 (27%) they were reduced to 8.84 ± 0.47 cm/s ($p < 0.01$).

The results of samples with a food load in patients with FC 1-11 did not significantly differ in the results obtained during the examination of the control group, while patients with FC III-IV had 3 types of portal system reactivity. In 25 (27%) patients, the increase in AVBF was similar to that in the control group and patients with The 1st FC of CHF, in 45 (48%) - less than 70%, which corresponds to the phase of latent





portal hypertension [3], or its hypokinetic type, detected in a number of other chronic diffuse liver diseases (hepatitis, cirrhosis). In 23 (25%) patients an initial decrease in fasting USC was found with a significant (more than 2.5 times) increase in it after a test with a food load, which is unusual for other diseases and is specific for CHF. Comparison of liver Dopplerography and echocardiography data showed significant differences in a number of parameters between these groups. The quantitative assessment of the liver parenchyma structure in patients with CHF revealed characteristic changes in geographical parameters peculiar to cardiac fibrosis and different from the variants corresponding to various chronic diffuse liver diseases (hepatitis, portal cirrhosis). In 3groups, these indicators also differed among themselves.

Conclusions

Based on the results of clinical examination, echocardiographic data, quantitative parameters of the liver structure, as well as the results of dynamic observation of patients, we found that the most unfavorable type of reaction of the portal system, accompanied by progressive deterioration of patients, echocardiography and threshold video densitometry, is the 3rd type of reaction. The appearance of the 3rd type of reaction occurs against the background of an increase in the size and volume of the left ventricle, a decrease in the contractility fraction, an increase in systolic pressure in the pulmonary artery, mass and IMM of the left ventricle, an increase in structural changes of the liver by the type of cardiac fibrosis. Patients with Type 3 reactions require special attention due to the unfavorable prognosis of the course of CHF.

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