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Abstracts

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Noninvasive method of liver fibrosis evaluation in patients with chronic hepatitis C

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Background: Assessment of liver fibrosis in chronic hepatitis C (CHC) is important for disease prognosis, management plan and choose of adequate scheme of antiviral treatment. Although liver biopsy has been considered the gold standard it is an invasive procedure that has contraindications. Not so long ago several noninvasive markers became available for liver fibrosis detection but their expensiveness makes continuous search for the new cost effective methods of noninvasive assessment of liver parenchyma the priority area. Ultrasound method with the use of three-dimensional imaging in combination with power Doppler gives an opportunity to receive information on the distribution of areas of fibrosis and fatty infiltration in the whole organ, evaluate the state of perivascular spaces, changes in the parameters of microcirculation of the liver parenchyma.

The aim of our work was to improve the diagnostics of liver fibrosis in patients with CHC using ultrasound method with three-dimensional reconstruction combined with power Doppler mode (3D + PD).

Materials & Methods: We examined 79 patients with CHC. All patients have undergone complete clinical and laboratory examination and morphological evaluation of liver fibrosis based on METAVIR score. Abdominal ultrasound was performed on Voluson 730 Expert ultrasound diagnostic device using convective sensors for two- and three-dimensional images. After conducting a standard two-dimensional survey using an ultrasound sensor for 3D visualization and a mode of energy dopplerography a 3D image was obtained with the visualization of small vessels. Then using the VOCAL (Virtual Organ Computer Aided Analysis) function 3D-histograms with the evaluation of the following indices were constructed: Mean Gray Value of liver parenchyma (MG), indicators of peripheral blood flow – VI which reflects the percentage of vascular elements in the volume of liver tissue; FI which reflects the number of cells transported at the time of the study, ie, the

intensity of the blood flow; VFI which reflects the amount of blood passing through this volume.

Results: According to results of liver biopsy F1 fibrosis was observed in 17 (21.5%) patients, F2 – in 21 (26.5%), F3 – in 23 (29.1%) and F4 – in 18 (22.7%) patients. We observed a significant reduction in the microcirculation indexes in liver parenchyma as well as a significant increase in the mean acoustic density of the liver parenchyma in the gray scale in all patients. The degree of severity of these changes correlated with the progression of fibrosis. The most significant changes in all groups were seen in VI: 10.2 ± 1.5 in F1 fibrosis; 6.2 ± 1.4 in F2; 2.3 ± 0.3 in F3 and 0.4 ± 0.03 in F4 and VFI: 2.5 ± 0.07 ; 1.9 ± 0.04 ; 1.0 ± 0.05 and 0.29 ± 0.007 for F1-F4 respectively.

Conclusions: The use of 3D + PD regimen of ultrasound is quite informative for assessing the liver parenchyma, evaluation of peripheral blood flow, determination of the presence of liver fibrosis and its score in patients with CHC. The combination of such features as a decrease in VI, FI and VFI and MG can be used as criteria for diagnostic of liver fibrosis in patients with CHC especially when other noninvasive methods are not available.