



УДК 616.149-008.341.1.

Мардиева Гульшод Маматмуродовна
к.м.н., доцент, заведующая кафедрой лучевой диагностики
и терапии Самаркандского государственного медицинского института,
Самарканд, Узбекистан.

Облобердиева Парвина Облоберди кизи
студентка магистратуры по специальности
«Медицинская радиология» кафедры лучевой диагностики и
терапии Самаркандского государственного медицинского института,
Самарканд, Узбекистан

УЛЬТРАЗВУКОВАЯ ВЕРИФИКАЦИЯ ПОРТАЛЬНОЙ ГИПЕРТЕНЗИИ ПРИ ЦИРРОЗЕ ПЕЧЕНИ

For citation: Mardieva Gulshod Mamatmurodovna, Obloberdieva Parvina Obloberdi qizi. Ultrasonic verification of portal hypertension in liver cirrhosis. Journal of hepato-gastroenterology research. 2020, vol. 3, issue 1, pp. 36-39



<http://dx.doi.org/10.26739/2181-1008-2020-3-9>

АННОТАЦИЯ

В основу работы положены результаты обследования больных с диффузными заболеваниями печени методом ультразвуковой доплерографии. Были выделены безусловные и условные типы ультразвуковых признаков, позволяющих обнаружить цирроз печени и сопровождающую его портальную гипертензию. У больных всех групп были проанализированы значения основных ультразвуковых параметров, отражающих структурные и гемодинамические изменения при циррозе печени. Ультразвуковой метод с доплерографией сосудов позволил проследить динамику нарастания проявлений портальной гипертензии у больных циррозом печени на разных стадиях развития патологического процесса. Ультразвуковая диагностика цирроза печени затруднена у больных при наличии начальных проявлений портальной гипертензии и имеет исключительно высокую информативность при исследовании больных со сформировавшимся синдромом портальной гипертензии.

Ключевые слова: ультразвуковая доплерография, портальная гипертензия, цирроз печени.

Mardieva Gulshod Mamatmurodovna
t.f.n., Samarqand davlat tibbiyot instituti,
Nurli diagnostika va terapiya kafedrası mudiri dotsent,
Samarqand, O'zbekiston

Obloberdieva Parvina Obloberdi qizi
Nurli diagnostika va terapiya kafedrası,
«Tibbiy radiologiya» yo'nalishi bo'yicha magistratura talabasi,
Samarqand, O'zbekiston

JIGAR SIRROZIDA PORTAL GIPERTENZIYANING ULTRATOVUSH TEKSHIRUVI

ANNOTATSIYA

Bizning tadqiqotimiz diffuz jigar kasalligi bilan og'rigan bemorlarni ultratovushli doppler tekshiruvı natijalariga asoslangan. Jigar sirrozi va unga hamroh bo'lgan portal gipertenziyasini aniqlashga imkon beradigan ultratovush belgilarining shartsiz va shartli turlari aniqlandi. Barcha guruhdagi bemorlarda ultratovush tekshiruvining asosiy parametrlarining qiymatlari tahlil qilindi, bu jigar sirrozidagi strukturaviy va gemodinamik o'zgarishlarni aks ettiradi. Tomirlarni ultratovush tekshiruvı patologik jarayonlarning rivojlanishining turli bosqichlarida jigar sirrozi bilan og'rigan bemorlarda portal gipertenziya rivojlanish

dinamikasini kuzatishga imkon beradi. Portal gipertenziyasi erta boshlangan bemorlarda jigar sirrozi diagnostikasi qiyin bo'lgan va portal gipertenziya va gipertoniya sindromi rivojlangan bemorlarda o'ta tashxis qo'yadi.

Kalit so'zlar: Doppler ultratovush tekshiruvi, portal gipertenziya, jigar sirrozi.

Mardieva Gulshod Mamatmurodovna

Candidate of Medical Sciences, Associate Professor,
Head of the Department of Radiation Diagnostics and Therapy,
Samarkand State Medical Institute,
Samarkand, Uzbekistan

Obloberdieva Parvina Obloberdi qizi

Master's student in the specialty "Medical Radiology"
Department of Radiation Diagnostics and Therapy,
Samarkand State Medical Institute,
Samarkand, Uzbekistan

ULTRASONIC VERIFICATION OF PORTAL HYPERTENSION IN LIVER CIRRHOSIS

ANNOTATION

The work is based on the results of examination of patients with diffuse liver diseases by ultrasound Doppler. Unconditional and conditional types of ultrasound signs were identified, allowing to detect cirrhosis of the liver and the accompanying portal hypertension. The values of the main ultrasound parameters reflecting structural and hemodynamic changes in liver cirrhosis were analyzed in patients of all groups. The ultrasound method with vascular Doppler imaging made it possible to trace the dynamics of the increase in the manifestations of portal hypertension in patients with liver cirrhosis at different stages of the development of the pathological process. Ultrasound diagnostics of liver cirrhosis is difficult in patients with initial manifestations of portal hypertension and is extremely informative in the study of patients with developed portal hypertension syndrome.

Key words: ultrasound Doppler sonography, portal hypertension, liver cirrhosis.

The urgency of the problem. The widespread occurrence of portal hypertension, the anatomical features of the portal vein system, variability of the clinical course, the significant frequency and multiplicity of complications (including fatal ones) put this disease on a par with the most severe pathologies of the human body. That is why knowledge of portal hypertension (its etiology, pathogenesis, clinical picture, diagnosis, differential diagnosis and complex treatment), as well as the complications of this disease, is an important factor in the preparation of a future doctor. Recently, there has been an increase in the incidence of liver cirrhosis, which is the main cause of the development of portal hypertension. It should be considered as an important link in the pathogenesis of hemodynamic disorders, leading to significant changes in blood circulation in the portal vein system and the development of portosystemic anastomoses [2,8].

Diffuse liver diseases occupy a significant place in the structure of diseases of the digestive system, being an extremely urgent clinical, epidemiological and socio-economic health problem. The number of patients with liver cirrhosis in Uzbekistan, European countries and the USA is constantly increasing [1,3].

Diagnosis of diseases of the hepatobiliary system has always been of great clinical and scientific interest, due to the rapid progress that methods of radiological diagnostics are

undergoing today. The complexity of diagnosis and differential diagnosis of diffuse liver lesions lies in the almost complete absence of specific signs, mainly in the early stages of the disease [2,4].

Purpose of the study: determination of the possibilities of ultrasound dopplerography of the liver in the diagnosis of portal hypertension and various diseases accompanied by a similar clinical picture due to this syndrome [5,6].

Material and research methods. The work is based on the results of a comprehensive clinical examination of 42 patients with diffuse liver diseases (Table 1). Thirty patients were diagnosed with liver cirrhosis, 12 - chronic hepatitis without signs of portal hypertension. The control group consisted of 20 healthy people [7,8].

Sonographic examination was carried out on a «SonoScape»-S-50 ultrasound scanner with a linear format transducer in real time, with an operating frequency of 7.5 MHz. Complex Doppler ultrasound was used as a highly informative method for diagnosing portal hypertension and associated diseases. A comparative assessment of the informativeness of the gray scale mode was carried out using ultrasound Doppler techniques: color Doppler and energy mapping, pulse-wave Doppler.

Table 1.

Distribution of patients by the nature of pathology

The nature of the pathology	Number of patients	Gender male / female human	Age, years
Chronic hepatitis	12	7 / 5	38,4 ± 15,3
Cirrhosis of the liver	30	18 / 12	59,1 ± 17,7

Control group	20	9 / 11	28,1 ± 16,6
---------------	----	--------	-------------

Research results. Were identified: unconditional and conditional types of ultrasound signs, allowing to detect cirrhosis of the liver and the accompanying portal hypertension. Unconditional signs included: unevenness of the liver contour, tortuous course of intrahepatic vessels, blood flow in the paraumbilical vein, and reverse direction of portal blood flow. In addition, they reflected direct signs of liver cirrhosis and portal hypertension - the processes of fibrosis and

regeneration of the liver parenchyma, shunting of the portal blood flow.

The conditional signs included: splenomegaly, ascites, dilatation of the veins of the portal system, a decrease in the portal blood flow velocity ($V_{pv} < 15$ cm / sec), an increase in the hepatic artery resistance index ($RI_{ha} \geq 0.74$), altered blood flow in the hepatic veins. A set of at least three conditional ultrasound signs was taken as the criterion for the formation of liver cirrhosis.

Table 2.

Frequency of occurrence of unconditional and conditional signs of liver cirrhosis and portal hypertension

Sign	Cirrhosis of the liver	Chronic hepatitis	Control
1. Unconditional signs			
Uneven liver contour	57%	0 %	0 %
Recanalization of PUV	40%	0 %	0 %
The twisted course of the liver vessels	43%	0 %	0 %
Hepatofugal portal blood flow	3%	0 %	0 %
2. Conditional signs			
Splenomegaly	73%	17%	0 %
Expansion of the veins of the portal system	63%	8%	0 %
Changes in blood flow in the hepatic veins	60%	33%	0 %
Decreased portal blood flow velocity	40%	8%	0 %
High Riha	33%	33%	5 %
Ascites	30%	0 %	0 %

In patients of all groups, the values of the main ultrasound parameters, reflecting structural and hemodynamic changes in liver cirrhosis, were analyzed. Thus, the speed of portal blood flow was reduced in patients with liver cirrhosis in comparison with the control group. Altered blood flow in the hepatic veins was found in 50% of patients with liver cirrhosis. The hepatic artery resistance index was increased in patients with liver cirrhosis as a result of chronic hepatitis (0.75 ± 0.07). Recanalization of the paraumbilical vein was observed in 30% of patients with liver cirrhosis.

The anterior - posterior size of the right lobe of the liver was increased in all groups of patients with liver cirrhosis (17.5 ± 2.0 cm). The spleen length did not differ significantly among patients with different etiological forms. Accurate differential diagnosis of the etiology of liver cirrhosis by ultrasound was not possible.

When determining the dynamics of the increase in manifestations of portal hypertension, the evolution of ultrasound signs was traced in patients with different functional classes according to the Child-Pugh classification, who had different degrees of esophageal varicose veins. In patients with chronic hepatitis, as well as in patients with liver cirrhosis with functional class A, who did not have esophageal varices, ultrasound criteria for liver cirrhosis and portal hypertension were not revealed. Differential ultrasound diagnostics of chronic hepatitis and preclinical stage of liver cirrhosis was not possible. There was a moderate expansion of the splenic vein - on average up to 0.86 ± 0.21 cm and a moderate increase in the spleen - on average up to 12.9 ± 5

cm. The velocity indicators of blood flow in the veins of the portal system in patients of this group tended to decrease, however their average values were added up to the limits of the permissible norm. In 33% of patients, blood flow in the paraumbilical vein was detected, in 42% there was an unevenness of the liver contour.

In patients with liver cirrhosis with functional class B and pronounced varicose veins of the esophagus, there was a further increase in ultrasound signs of portal hypertension: more pronounced expansion of the splenic vein - 0.98 ± 0.17 cm, splenomegaly (spleen length - 14.8 ± 2.7 cm). Blood flow in the paraumbilical vein was observed more often in 63% of patients. Ascites was found in 10% of cases. The contours of the liver were mostly uneven (73%). The values of the portal blood flow velocity corresponded to the lower limit of the norm.

At a late stage of liver cirrhosis, a significant expansion of the main trunk of the portal vein was noted - on average to 1.42 ± 0.10 cm, a pronounced decrease in the portal blood flow rate on average to 10.0 ± 2.3 cm / s, a significant increase in the diameter of the paraumbilical vein - on average, up to 0.76 ± 0.31 cm. Persistent ascites and uneven contours of the liver are characteristic of all patients in this group. The ultrasound method made it possible to make an accurate diagnosis in all patients with class C according to the Child-Pugh classification.

Based on the data presented, splenomegaly (spleen length more than 12.0 cm) and enlargement of the splenic vein (> 0.8 cm), which are the initial manifestations of portal

hypertension syndrome, can be attributed to the early ultrasound signs of formed liver cirrhosis. In parallel with progressive splenomegaly and expansion of the splenic vein, a collateral bed develops (varicose veins of the esophagus and recanalization of the paraumbilical vein). The structural reorganization of the liver parenchyma gradually increases, manifested by the unevenness of the contour, heterogeneity of the structure and deformation of the course of intrahepatic vessels. Late ultrasound signs of decompensated liver cirrhosis and severe portal hypertension include ascites, portal vein dilation, decreased portal blood flow velocity and a significant diameter of the paraumbilical vein, as well as, in some cases, the appearance of reverse blood flow in the branches of the portal vein.

Summarizing the above data, it should be noted that ultrasound diagnostics of liver cirrhosis is difficult in patients with initial manifestations of portal hypertension and is extremely informative in the study of patients with developed portal hypertension syndrome. In patients with extrahepatic portal hypertension, splenomegaly is more pronounced than in patients with liver cirrhosis, which, however, cannot be considered a reliable clinical sign of portal vein thrombosis. Lack of blood flow, parietal blood flow in the veins of the liver, and collateral blood flow during cavernous transformation of the portal vein made it possible to diagnose the extrahepatic form of portal hypertension caused by venous thrombosis.

Conclusions. Reverse blood flow in the branches of the portal vein, deformation of the vascular pattern of the liver and

the presence of blood flow in the paraumbilical vein are signs of hepatic cirrhosis. The absence of unconditional ultrasound signs does not allow to exclude the presence of liver cirrhosis and requires a quantitative assessment of the parameters of hepatic hemodynamics. The combination of a decrease in the portal blood flow rate with an increase in the hepatic artery resistance index, as well as monophasic blood flow in the hepatic veins, is characteristic of the formed liver cirrhosis. The absence of the changes listed above suggests a low probability of portal hypertension, which, however, does not exclude an early stage of its development.

When detecting low-specific diffuse changes in the liver parenchyma or signs of liver vein pathology in the gray scale mode, it is recommended to use the color Doppler mapping mode, which allows to assess the patency of the liver vessels, to determine the direction of blood flow in the branches of the portal vein, and to identify functioning port-system shunts.

The ultrasound method makes it possible to trace the dynamics of the growth of manifestations of portal hypertension in patients with liver cirrhosis at different stages of the development of the pathological process. Doppler ultrasound of the liver vessels is advisable to be performed in patients in order to identify signs of portal hypertension and differential diagnosis of the causes of its development. If it is necessary to exclude the extrahepatic form of portal hypertension caused by hepatic vein thrombosis, it is preferable to use the power Doppler mode.

Список литературы/Iqtiboslar/References

1. Comparison of Portal Vein Doppler Indices and Hepatic Vein Doppler Waveform with Nonalcoholic Fatty Liver Disease with Healthy Control / E. Solhjoo, M.-G. Fariborz, M.-L. Roghaeyh [et al.] // *Hepatol.* — 2011. — Vol. 11 (9). — P. 740—744.
2. De Stefano V., Za T., Ciminello A., Betii S., Rossi E. Causes of splanchnic vein thrombosis in the Mediterranean area. *Mediterr. J. Hematol. Infect. Dis.* 2011; 3 (1): e2011063. <https://doi.org/10.4084/MJHID.2011.063>. Published online: <http://europepmc.org/articles/PMCID3248340>.
3. Khanna R., Sarin S.K. Non-cirrhotic portal hypertension - diagnosis and management // *J. Hepatol.* - 2014. - 60(2). - P.421-441. <https://doi.org/10.1016/j.jhep.2013.08.013>.
4. Mardieva G.M., Giyasova N.K., Obloberdieva P.O., Bakhritdinov B.R. Assessment of diffuse liver diseases according to gamma topography // *Therapeutic Bulletin of Uzbekistan*, 2019, No 2.-S. 80.
5. Poddar U., Borkar V. Management of extra hepatic portal venous obstruction (EHPVO): current strategies. *Trop. Gastroenterol.* 2011; 32 (2): 94-102.
6. Sarin S.K., Kumar A., Angus P.W. Diagnosis and management of acute variceal bleeding: Asian Pacific association for study of the liver recommendations. *Hepatol. Int.* 2011; 5 (2): 607-624. <https://doi.org/10.1007/s12072-010-9236-9>.
7. Sherzinger A.G., Kitsenko E.A., Lyubiviy E.D. Portal vein thrombosis: etiology, diagnosis and treatment features. *Bulletin of Experimental and Clinical Surgery.* 2012; 1 (5): 83-91.
8. Tukhbatullin M.G., Akhunova G.R., Galeeva Z.M. Possibilities of echography in the diagnosis of liver cirrhosis and portal hypertension // *Modern problems of diagnosis.* -2014.-No.3 (79). - S. 54-61.