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COMPARISON OF ANATOMICAL AND ULTRASOUND SECTIONS OF THE HUMAN LIVER

ПОРІВНЯННЯ АНАТОМІЧНИХ І УЛЬТРАЗВУКОВОГО ПЕРЕРІЗУ ЛЮДСЬКОЇ ПЕЧІНКИ

Резюме. Дана робота присвячена порівняльному аналізу анатомічних і ультразвукових перерізів печінки людини, зроблених в сагітальній площині, з метою підвищення візуальних можливостей ультразвукового сканування печінки.

Ключові слова: печінка, УЗД, топографічні анатомічні розділу, меридіан

For the last time the ultrasound of internal organs is a priority among other noninvasive methods of human body examinations [1]. However, the interpretation of ultrasound tomography of the liver has no topographic anatomical basis and is often unsystematic descriptive. The solution to this problem involves the use of a universal system of coordinates [2, 3].

The goal of our research - the study of the anatomy of the liver on ultrasound and anatomical sections. Before us was task to type a comparative anatomical and ultrasound sections of the liver and give anatomical substantiation of additional approaches to the liver applying to the ultrasound scan.

Materials and methods. *The material of the study were 57 corpses of people of mature age, whose death was not associated with the pathology of the hepatobiliary system. We used: topometry of the liver, selective angiography of the portal system of the liver, liver ultrasound scanaccording to the topographic anatomical meridians.*

To solve the problem, on the surface of the liver, extracted from the corpse, applied the chart of topographical anatomical meridians (topometry) and then barium sulfate was injected into the portal system of the liver, and then carried out an ultrasound scan of the liver in the sagittal plane respectively to meridians on its surface. Ultrasound tomography confirmed the accordance of anatomical cuts made in the sagittal plane applied to meridians and received angiograms.

Results and discussion. When scanning of the liver on the right meridian (M_9) in the scanning area baseins of the right and left portal veins were present at the same time (Fig.1). On the topographic anatomical section at the appropriate meridian (Fig.2), except the right and left branches of the portal vein are visual free of contrast solution holes of the middle and right hepatic veins, located along the right and interlobular portal fissure. This makes it possible to identify the right paramedian and right lateral sectors of the liver, as well as left lobe of organ.

When scanning of the liver on the anterior middle meridian (M_0) scanner covers the territory, blood from which drains into the left portal vein. Here identifies a number of vascular elements in the upper

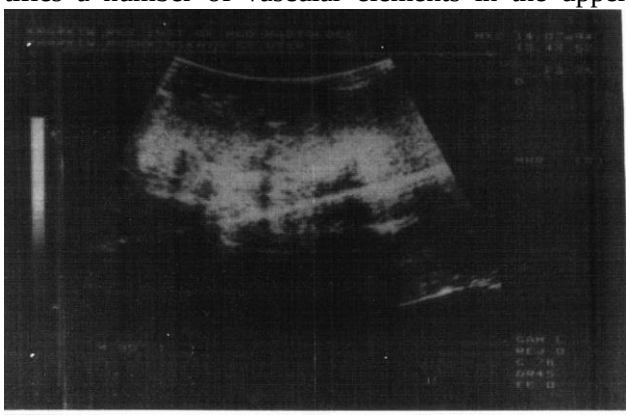

Fig.1. Ultrasound scan of the liver on the right meridian

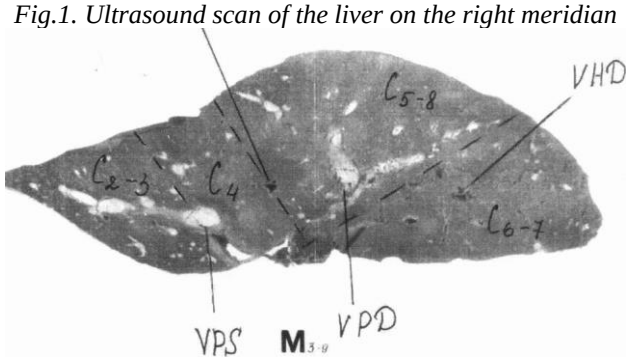

Fig.2. Topographic anatomical section in the frontal plane on the right meridian. Back view.

and lower parts of the scanning area. On the appropriate topographic anatomical section of liver fails to clearly define that the vascular elements, obtained from ultrasound scans of the front middle meridian, are vascular secretory trunks of the second and the

third segments. Apart from these, on the topographic anatomical section unfilled by the contrast solution the left hepatic vein is determined, located along the left portal fissure.

On ultrasound scans on the right anterior medial meridian (M_{11}) defined the contours of a large vessel in the longitudinal section of the upper and lower parts of the scan. Comparison of scans with topographic anatomical section allows to conclude that a large vessel on scan is unfilled by contrast solution the left hepatic vein on topographic anatomical section, small vessels - vascular secretory elements of the second, the third and the fourth segments.

On ultrasound scan on the right anterior lateral meridian (M_{10}) identifies a number of large and small vascular structures of longitudinal section. A comparison of this scan with the appropriate topographic anatomical section establishes that the large vascular structure with longitudinal section on the scan is the right hepatic vein, unfilled by contrast solution on topographic anatomical section and placed along the right portal fissure. In turn, the smaller vessels with longitudinal section are, respectively, vascular secretory elements of the fifth and the sixth segments of the liver.

On ultrasound scans of the right anterior lateral meridian (M8) a large of vascular structure with cross-section and a number of small vascular elements in the upper and lower parts of the scanning area are determined. When comparing the scans with the appropriate topographic anatomic section it is possible to determine that a large cross-section vascular structure is the right hepatic vein. On the topographic anatomical section it is not filled by contrast fluid and is located along the right portal fissure. Thus, small vascular formations are vascular secretory elements of the right paramedian and right lateral sectors of the liver.

Conclusions. The right lobe of the liver is located in the coordinates from the right posterior medial to the right anterior medial meridian (M_7 - M_{11}). The left lobe of the liver is determined in coordinates from the right anterior to the left anterior medial meridian (M_{11} - M_1). Anterior middle meridian (M_0) projects to the middle of the left lobe of the liver; ultrasound examination in the sagittal plane along this meridian visualizes vascular secretory elements of the second and the third segments (C_2 and C_3). Right anterior medial meridian (M_{11}) projects to the place, where the falciform ligament fixes to the diaphragmatic surface of the liver, scanning along this meridian visualizes the left portal fissure. Right anterior lateral meridian (M_{10}) projects on 1 cm to the right of the gallbladder bed; scanning along this meridian visualizes the gallbladder, right portal fissure and vascular secretory elements of the fifth and the sixth segments (C_5 and C_6). Right posterior lateral meridian (M_8) projects to the middle of the right posterior corner of the liver, scanning along this meridian visualizes vascular secretory elements of the right lateral and right paramedian sectors.

Thus, topographic anatomical meridians can be widely used in clinical practice as an additional ultrasonic accesses to the liver. They greatly simplify the visualization of structure-function relationships of sectors and segments of the liver.

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СРАВНЕНИЕ АНАТОМИЧЕСКИХ И УЛЬТРАЗВУКОВИХ СЕЧЕНИЙ ЧЕЛОВЕЧЕСКОЙ ПЕЧЕНИ

Резюме. Данная работа посвящена сравнительному анализу анатомических и ультразвуковых сечений печени человека, производимых в сагиттальной плоскости, в целях повышения визуальные возможности ультразвукового сканирования печени.

Ключевые слова: печень, УЗИ, топографическая анатомические раздела, меридиан

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Abstaract. This work deals with the comparative analysis of anatomical and ultrasound sections of the human liver, made in the sagittal plane, in order to enhance the visual capabilities of ultrasound scanning of the liver.

Key words: liver, ultrasound scan, topographic anatomical section, meridian

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