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ANATOMY OF THE VASCULAR SYSTEM OF THE LIVER

(Vena portae, arteria hepatica, venous outflow)

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Annotation:

The vascular system of the liver is a complex and unique anatomical and functional structure that provides a double blood supply to the organ. The liver (hepar) receives blood from both the portal vein (vena portae) and the hepatic artery (arteria hepatica propria), which causes its high metabolic activity.

The relevance of the topic is due to the importance of studying the vascular architecture of the liver for clinical practice, especially in surgery, transplantology and diagnostics of vascular pathologies.

The purpose of this work is a comprehensive study of the anatomy of the vascular system of the liver, including the features of portal circulation, arterial inflow and venous outflow.

General characteristics of blood supply to the liver

The liver is the only organ that has a dual blood supply system. About 70–75% of blood enters through the portal vein (vena portae), while 25–30% is supplied by the hepatic artery (arteria hepatica propria).

This ratio allows you to combine the delivery of nutrients from the digestive organs with an adequate supply of oxygen.

Portal vein (Vena portae hepatis)

The portal vein is the main vessel that brings blood to the liver. It is formed as a result of the merger of:

superior mesenteric vein (vena mesenterica superior)

splenic vein (vena splenica)

The length of the portal vein is 6-8 cm, the diameter is about 1.5 cm.

the right branch (Ramus dexter)

left branch (Ramus sinister)

Further, the branches branch into segmental and interlobular vessels, providing blood supply to all functional segments of the liver.

Functionally, the portal vein transports blood that is rich in nutrients but relatively poor in oxygen.

Hepatic artery (Arteria hepatica propria)

The hepatic artery is a branch of the common hepatic artery (arteria hepatica communis), which branches off from the celiac trunk (truncus coeliacus).

In the hepatic hilum, it is divided into:

the right branch (Ramus dexter)

left branch (Ramus sinister)

The right branch usually gives rise to the cystic artery (arteria cystica).

The arterial system of the liver is characterized by pronounced anatomical variability, which must be taken into account during surgical interventions.

Liver microcirculation

Blood from the portal vein and hepatic artery enters the sinusoid capillaries (sinusoides hepatici), where it mixes.

Sinusoids have a specific structure:

Wide lumen

Intermittent basement membrane

the presence of Kupffer cells (cellulae Kupfferi)

This ensures an efficient metabolism between the blood and hepatocytes, including the processes of detoxification and immune defense.

Venous outflow (Venae hepaticae)

The outflow of blood from the liver is carried out through the hepatic veins (venae hepaticae), which flow into the inferior vena cava inferior.

Main veins:

правая (vena hepatica dextra)

средняя (vena hepatica media)

левая (left hepatic vein)

They are formed from the central veins (vena centralis) of the hepatic lobules.

Portocaval anastomoses

An important feature of the vascular system of the liver is the presence of portocaval anastomoses - connections between the portal vein system and the systemic blood flow.

Main areas:

esophagus

anterior abdominal wall

rectum

In portal hypertension, these anastomoses expand, which can lead to the development of serious complications.

Clinical significance

Knowledge of the anatomy of the vascular system of the liver is essential for:

liver resections

Transplantation

diagnosis of portal hypertension

Interventional Radiology

Anatomical variations of the vessels can significantly affect the outcome of surgical interventions.

Conclusion

The vascular system of the liver is a complex and highly organized structure that ensures the effective performance of metabolic and detoxification functions.

Dual blood supply, a developed microcirculation network and effective venous outflow make the liver a unique organ in the circulatory system.

A thorough understanding of its vascular anatomy is key to modern clinical medicine.

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