You always know where you are: landmark vessels

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ABDOMINAL VESSELS

• The identification of abdominal vessels using ultrasound is based on knowledge of their normal location, appearance and relationship to specific organs.

• **Vessels** - anechoic structures with hyperechoic walls.

• **Ultrasound exam**
  – vessels – landmarks for the recognition of other organs (for example pancreas)
  – vessels pathological findings (for example thrombosis).
• The evaluation of abdominal vessels is performed by:
  – “real time” standard (black and white) examination;
  – color or Power Doppler;
  – spectral Doppler;
  – CEUS (Contrast Enhanced US);
  – usually the combination of these methods.
Starting the evaluation of the abdomen we look always, *in longitudinal section*, for the main abdominal vessels: *aorta and inferior vena cava*.

- The *aorta* has well visible walls and typical movements.

- The *inferior vena cava* has an important variation in size during the inspiratory/expiratory movements.

- First of all we analyze the *size of these vessels*, the *movement* and their *patency*. 
In longitudinal scanning from upper part of the abdomen we shall see the main emergent vessels:

- celiac trunk,
- superior mesenteric artery (this vessels are well visible).
- Sometimes (infrequent) we can see the inferior mesenteric artery.
• In **transverse section** aorta is a round structure and we can see the emergency of celiac trunk, with the hepatic and respectively splenic artery.

• Below these (aprox. 1.5 cm) we can see the superior mesenteric artery in front of the aorta (and behind the spleno-portal vein).

• We can see the emergency of renal arteries (the right renal artery behind the IVC).
• Distally it is possible to see the bifurcation of the aorta, by making some pressure with the ultrasound probe on the abdominal wall.
INFERIOR VENA CAVA

• Usually is well seen behind the liver.
• The major branches are the renal and the hepatic veins.
  • Renal veins can be visualized in transverse section, with the left renal vein in front of the aorta.
The caliber of the inferior vena cava (IVC) is extremely variable (some authors have suggested characteristic changes in the cava caliber during inspiration, expiration and the Valsalva maneuver).

Sometime, in normal condition, inside the IVC we can demonstrate swirling echoes (normal feature in vessels where is low flow velocity).
INTRAHEPATIC VESSELS

- During the US evaluation of the liver there are 2 types of vessels that we can see:
  - hepatic veins
  - portal vein
• We can see very well the hepatic veins making an oblique subcostal section.

• The left, middle and right hepatic veins can be visualized, but unusually in the same plane.

- The entering of these vessels in IVC is well seen.
- The walls of hepatic veins are usually very thin.
- In longitudinal section we can see the IVC and the entering of hepatic veins.
PORTAL VEIN

- Is well visualized during the evaluation of the liver (usually in oblique subcostal section).

- The left and right branches, and many times also secondary branches can be seen.

- The walls of portal vein are hyperechoic, than well visualized (in contrast with the wall of hepatic veins).
In transverse epigastric section we can follow the continuation of splenic vein with the portal vein (splenico-mesenteric confluence).
In the section of the hepatic hilum the portal vein is well visualized, being behind the main biliary duct (MBD).

Between these 2 structures we can see the hepatic artery (transverse section).
Some sectional examples of vessels: