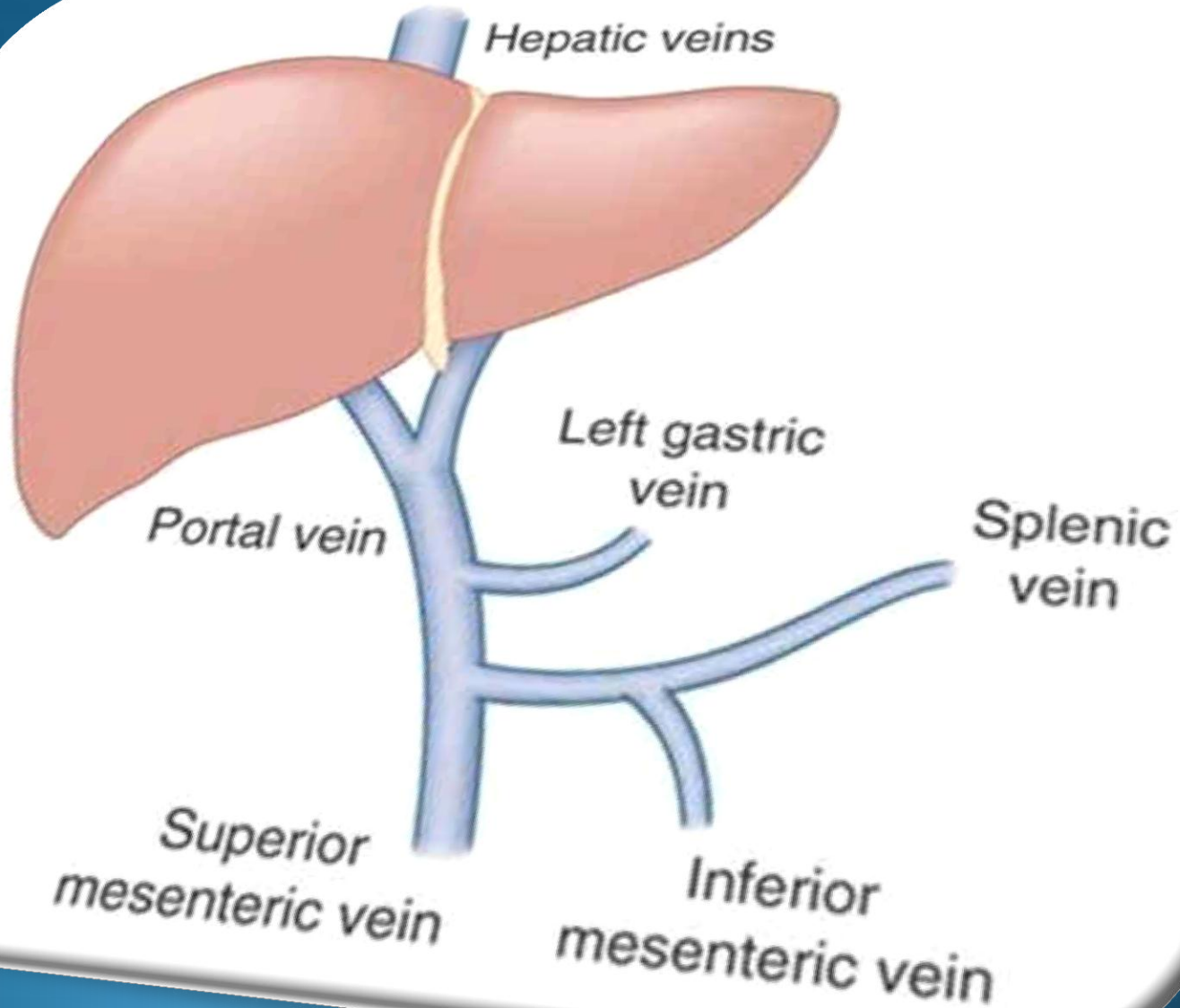
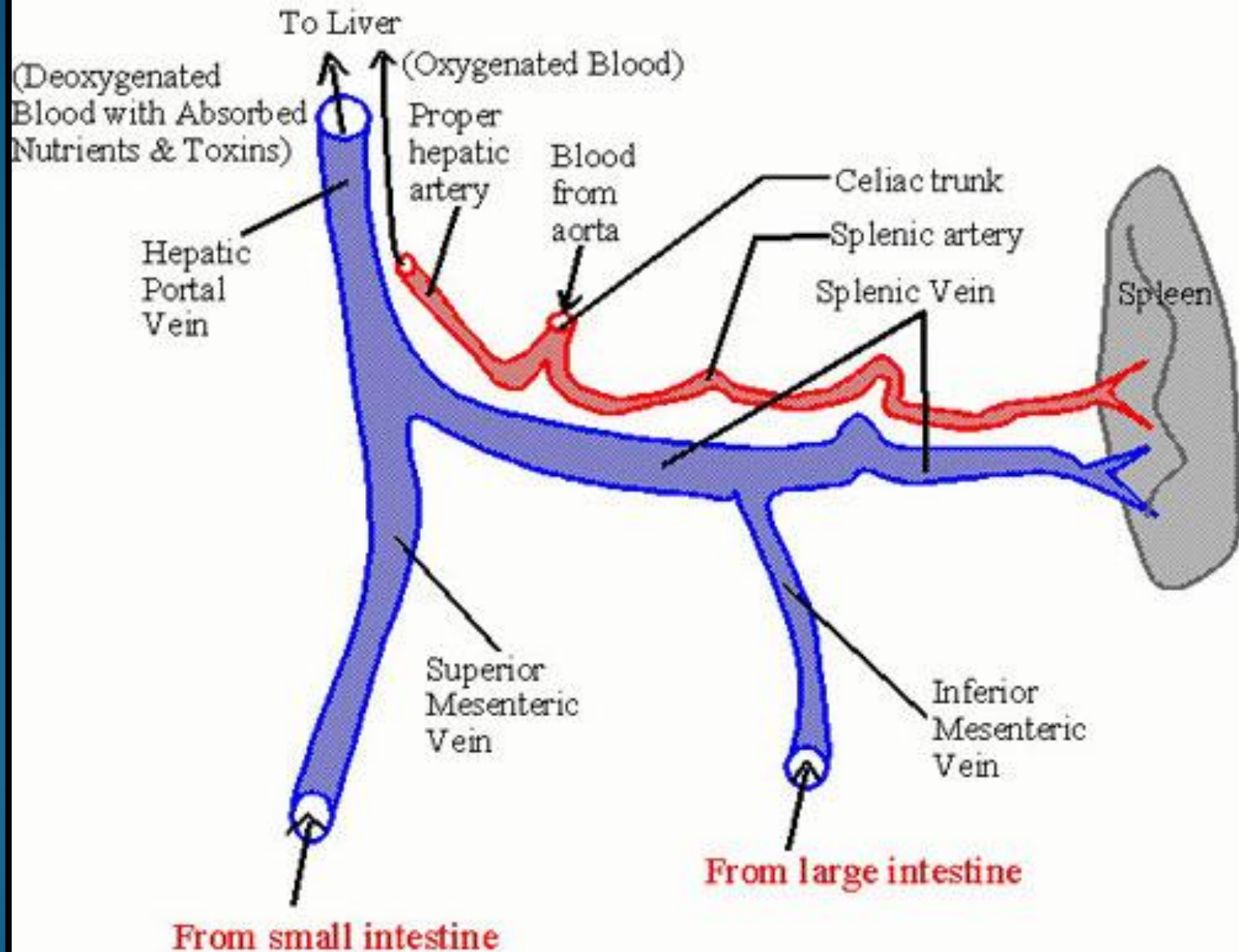


Assessment of Portal Venous System using Ultrasound

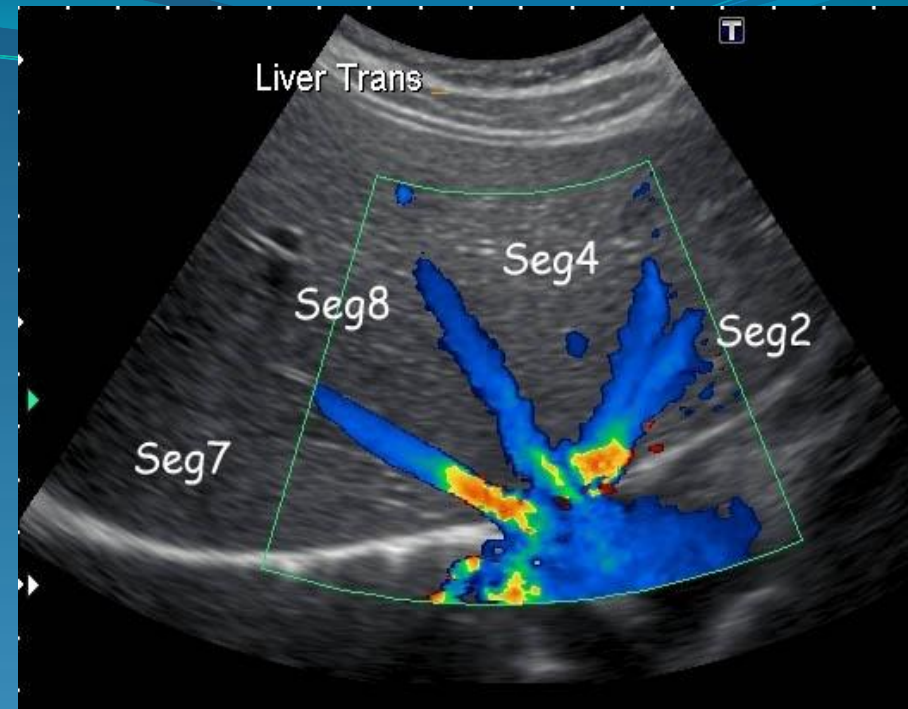
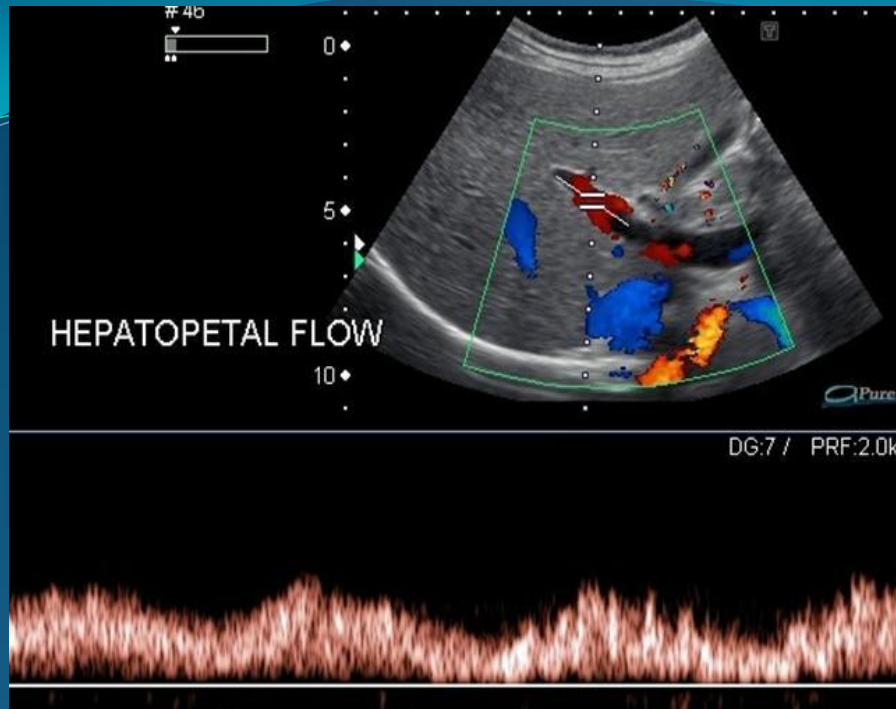


Major Vessels of the Hepatic Portal System





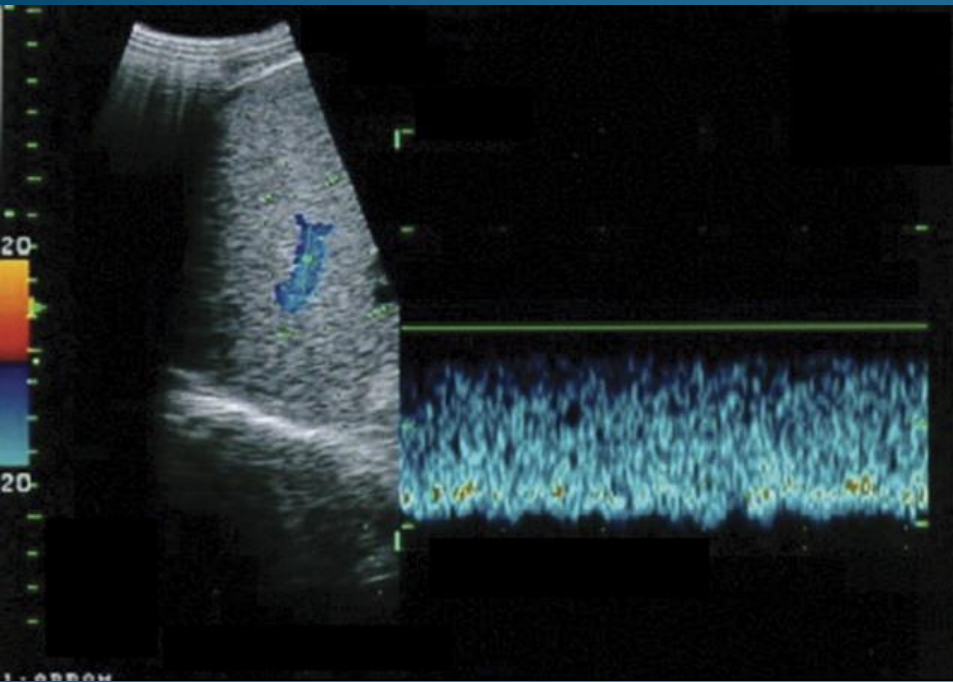
Caption: Portal vein, coloured ultrasound scan. The portal vein (red) transports nutrient-rich blood from the digestive organs to the liver. This scan shows the point at which the portal vein enters the liver and splits into two main branches. The cells of the liver remove digested fats, carbohydrates, vitamins and iron from the blood, for storage or distribution to the body's tissues. Ultrasound is a diagnostic technique that sends high-frequency sound waves into the body via a transducer. The returning echoes are recorded and used to build an image of an internal structure. Sonography of the portal vein may diagnose conditions such as thrombosis (blood clot).



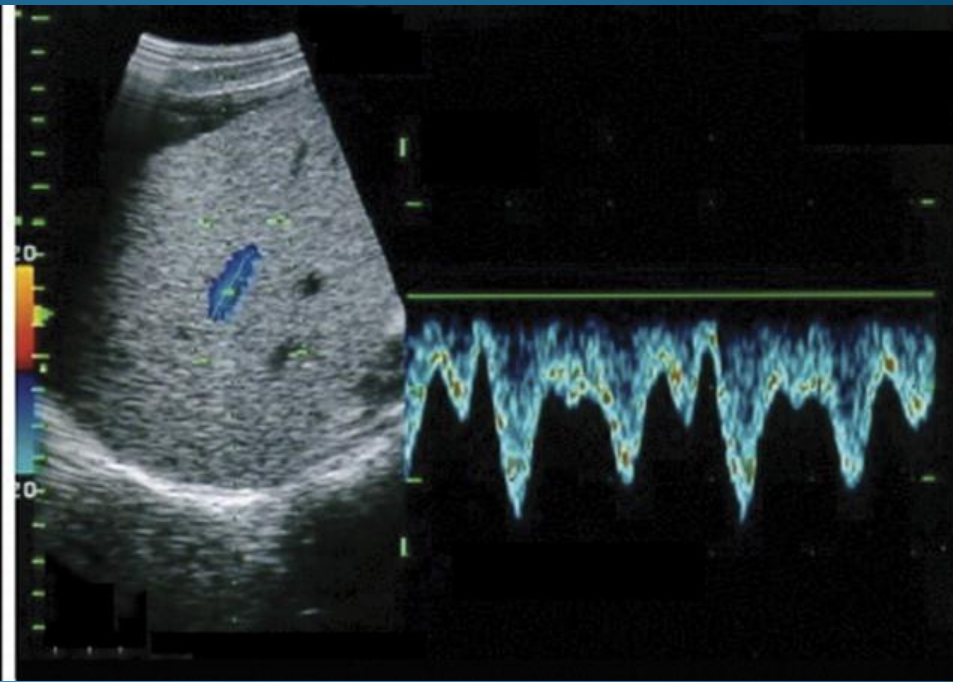
The portal vein should have constant forward flow into the liver (hepatopetal).

If there is flow reversal, this is hepatofugal (tip:Fugitive=run away) and represents portal hypertension.

Because the hepatic veins drain into the IVC immediately prior to the right atrium, they have phasic flow reflective of cardiac motion.



Portal Flow Showing
Continuous Flow



Hepatic Vein Showing
Phasic Flow

PORTAL HYPERTENSION

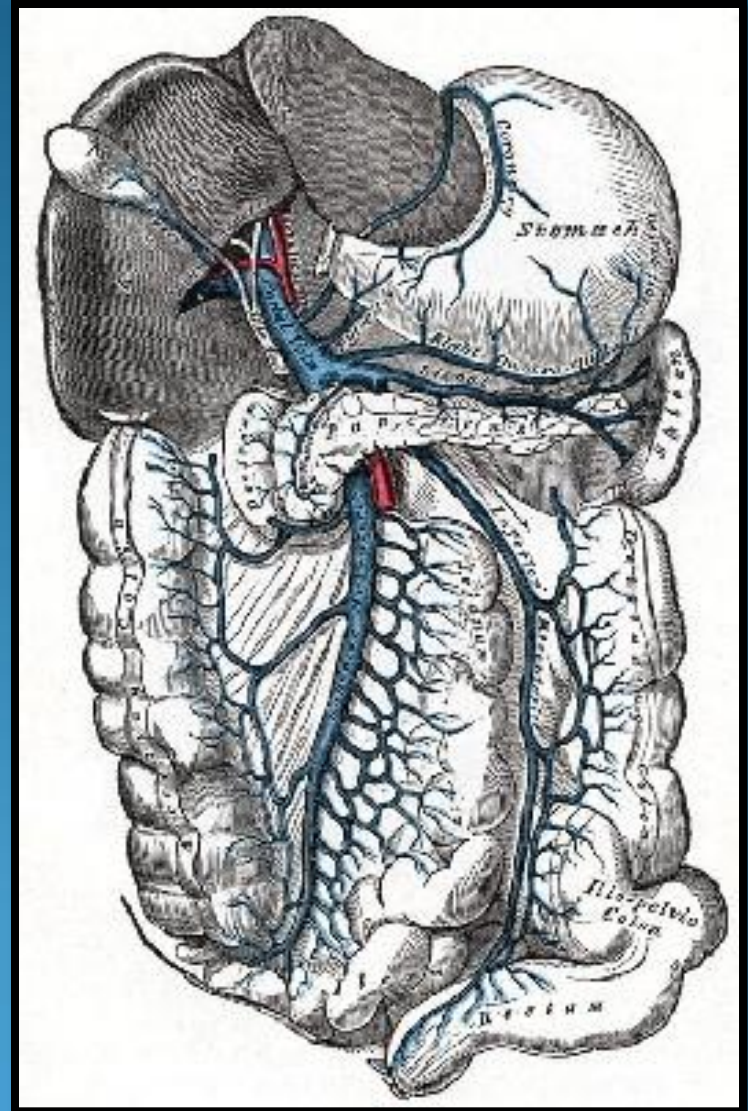
- Is the increase in blood pressure in the Portal vein.
- The portal vein is formed from the junction of the Splenic vein and the Superior mesenteric vein and takes blood into the liver.
- Portal hypertension is usually secondary to chronic liver disease, often alcoholic cirrhosis.

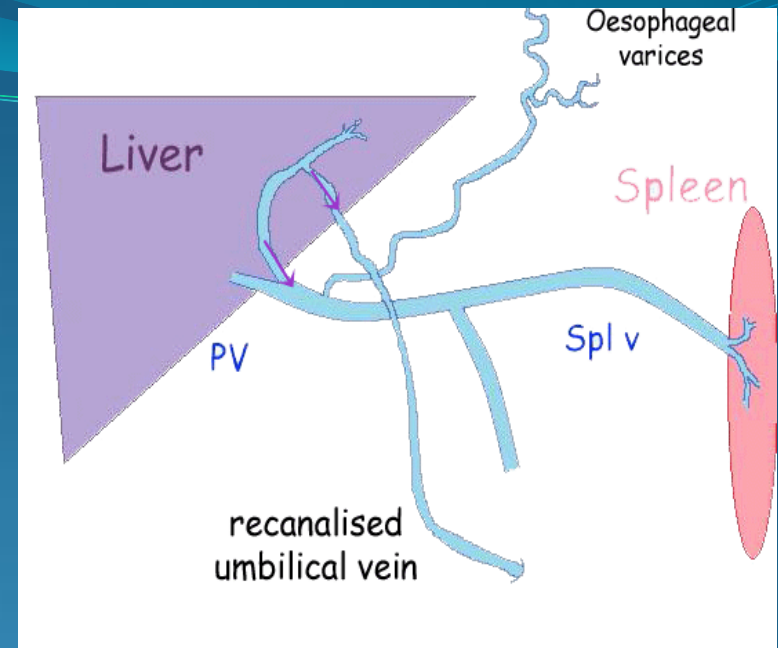
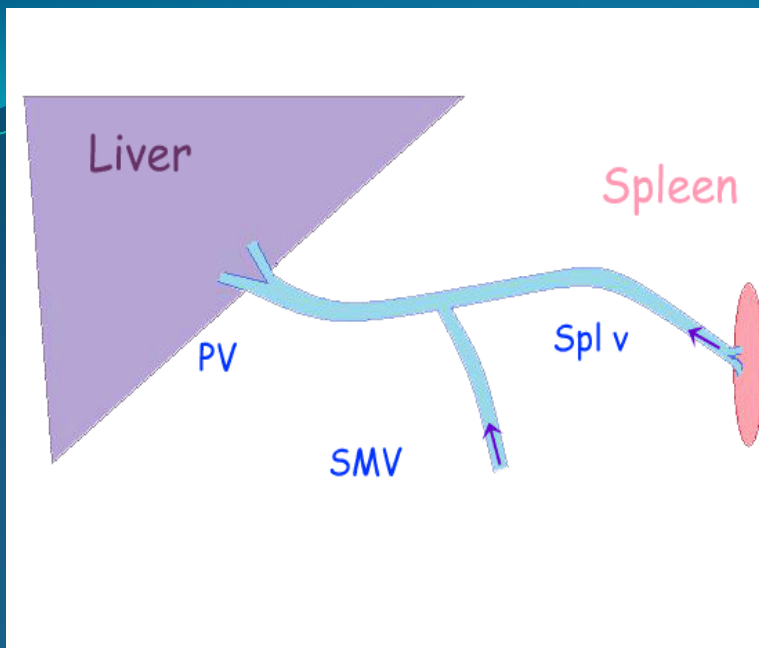
Terms:

- Hepatopetal = into the liver.
- Hepatofugal = away from the liver.

Remember:

Fugal-Fugative = run away





Normal Hepatopetal
flow.

PV=Portal Vein

SMV= Superior

Vesenteric Vein

Spl V= Splenic Vein

Hepatofugal.

Reversed flow in the portal venous
system.

The back pressure can result in
splenomegally and abdominal varices.

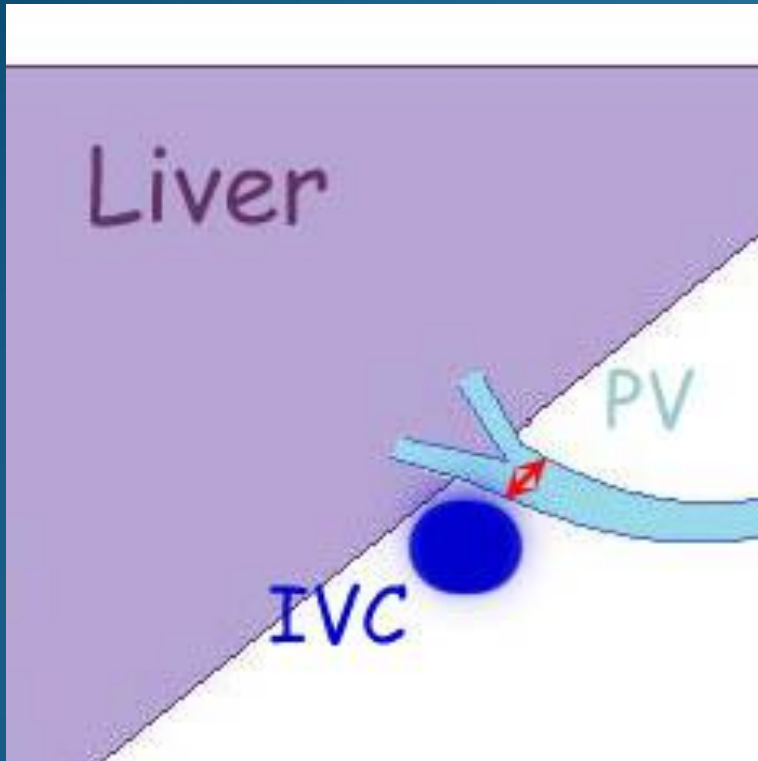
The most common varices are:

Gastric/oesophageal

Recanalisation of the ligamentum
teres and Umbilical vein.

Abdominal wall varices

Portal vein diameter:

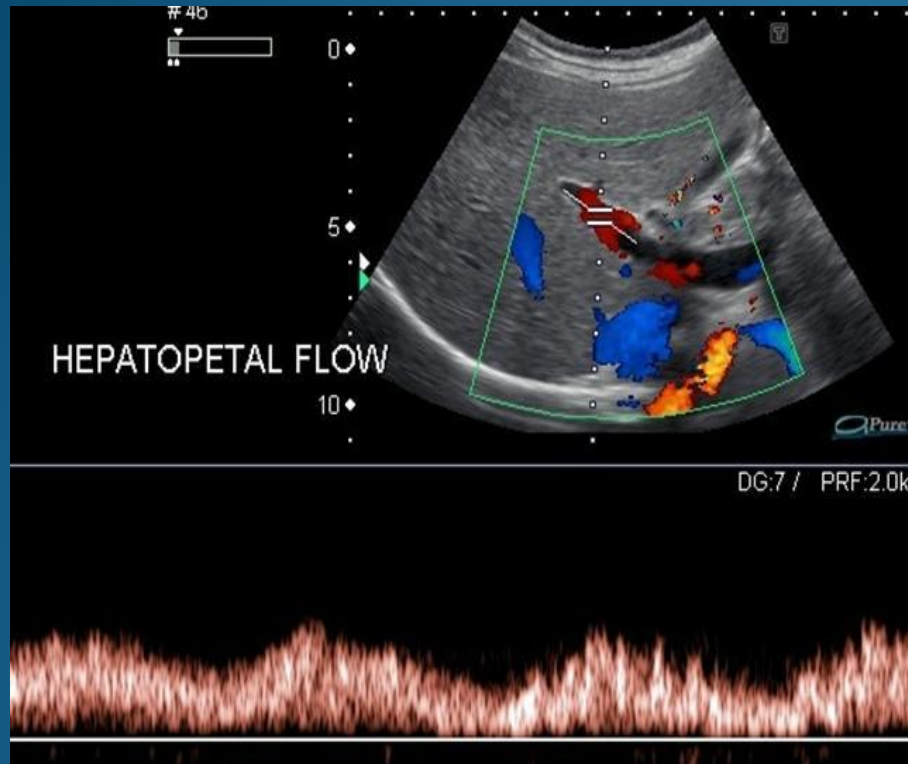


Portal hypertension may only produce reversed flow during acute episodes. Therefore, the diameter of the portal vein should be measured.

For consistency, measure at porta hepatis when the IVC is directly beneath.

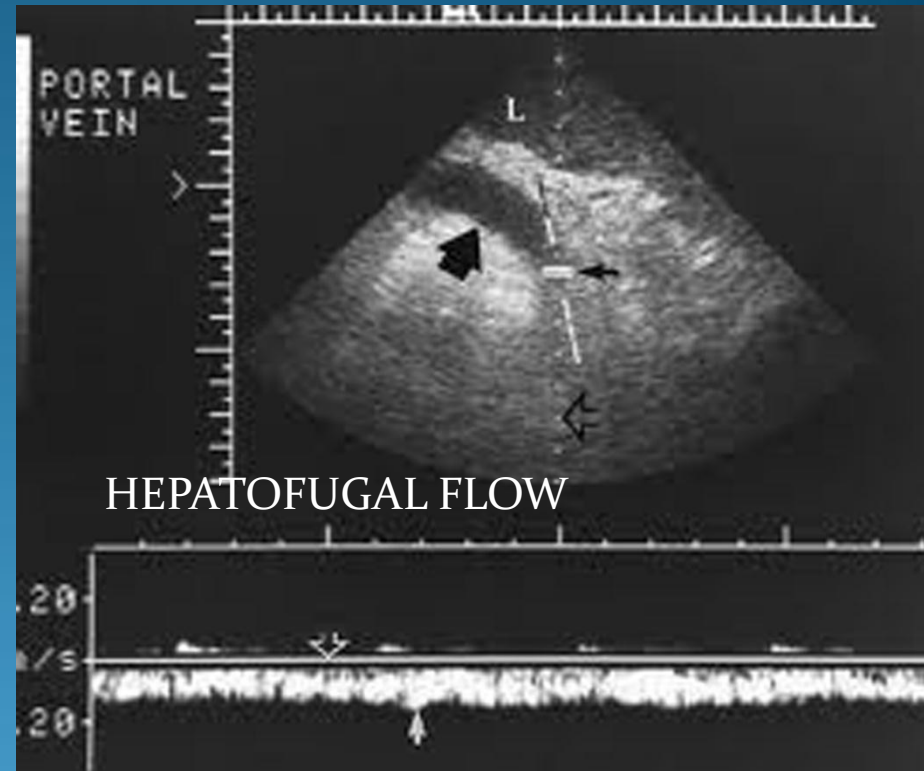
13mm is the accepted upper limit of normal. An accurate measurement of greater than this warrants careful searching for:

- Varices
- Subtle re-canalization of the ligamentum teres
- Splenomegally



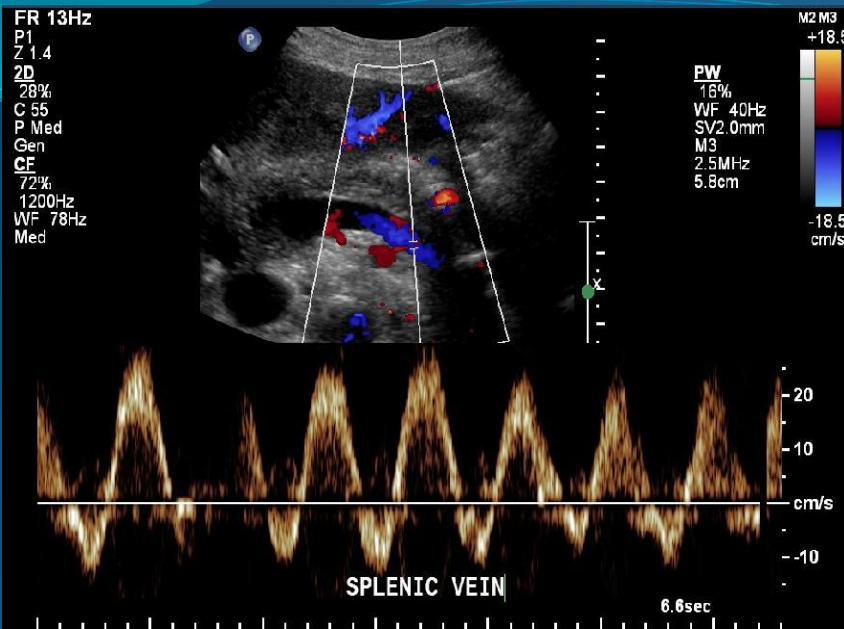
NORMAL

Going towards the liver

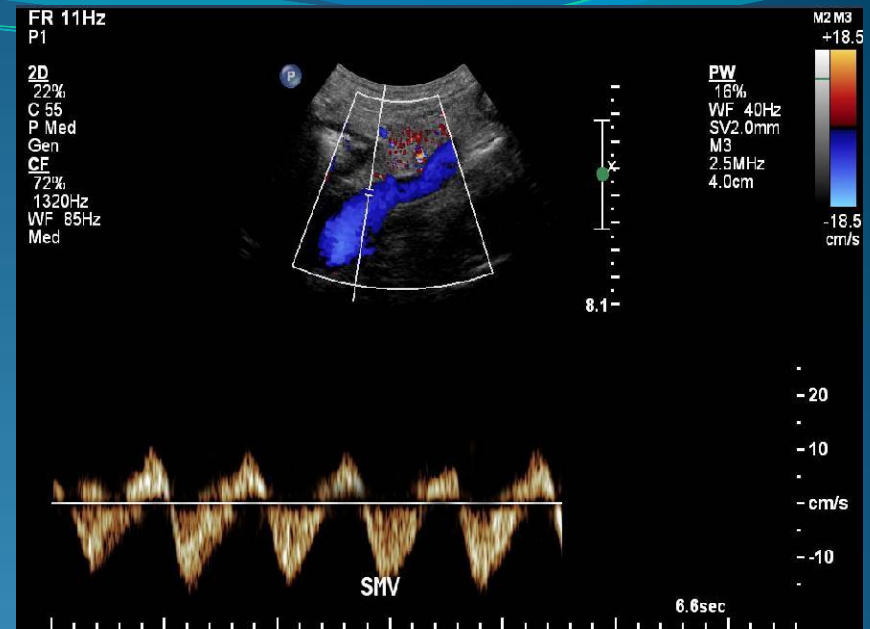


ABNORMAL

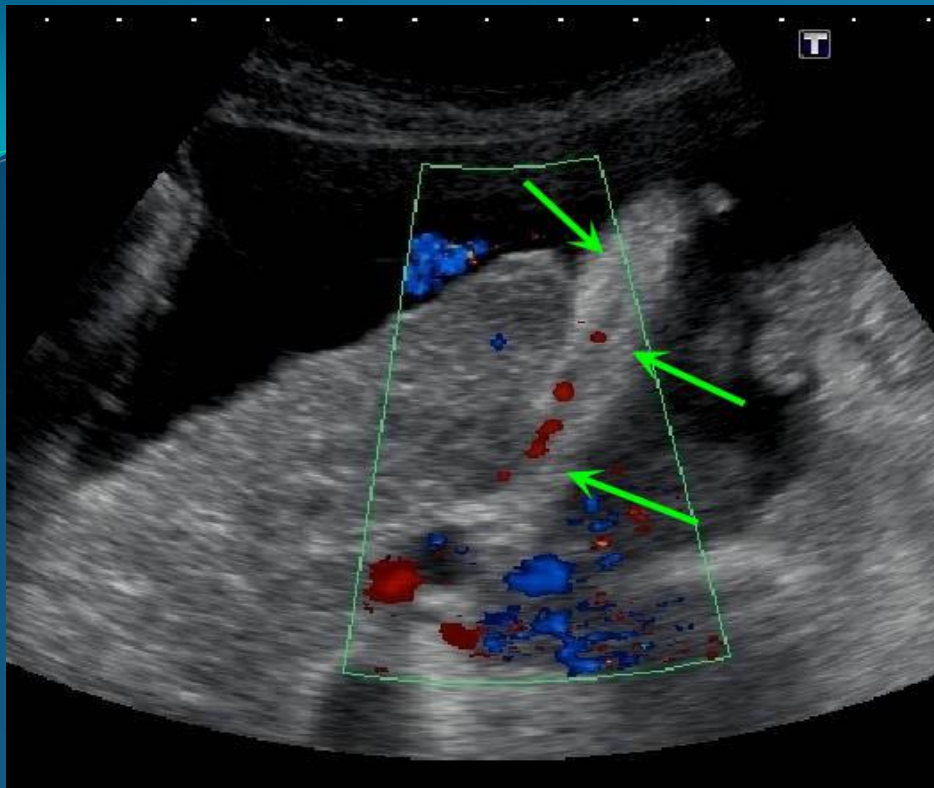
Going away from the liver



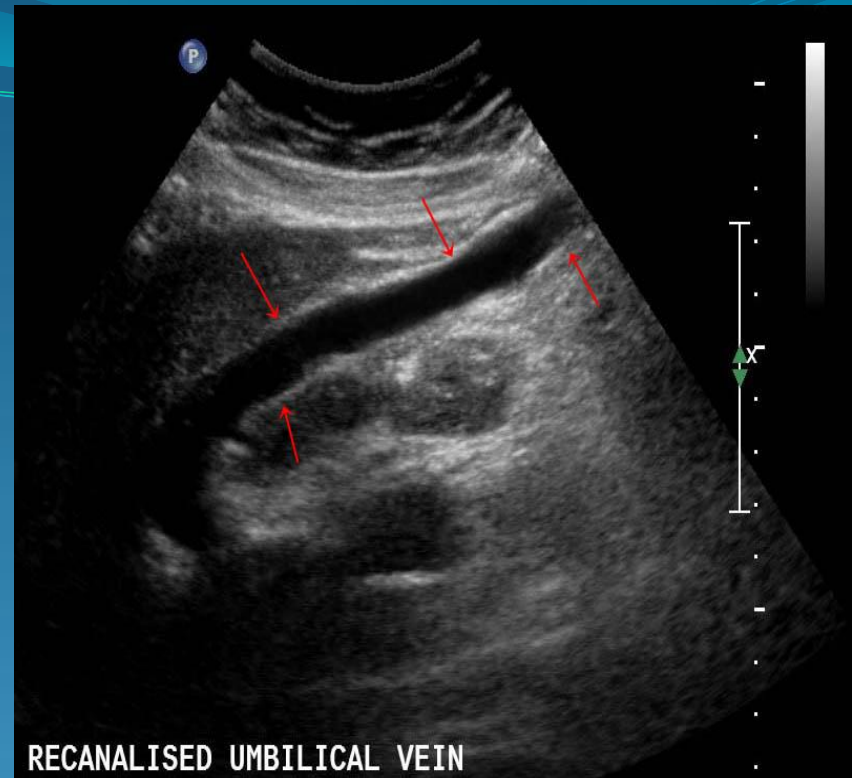
There is significant retrograde flow in the splenic vein.



The Superior mesenteric vein also shows a component of retrograde flow but less than the Splenic vein..

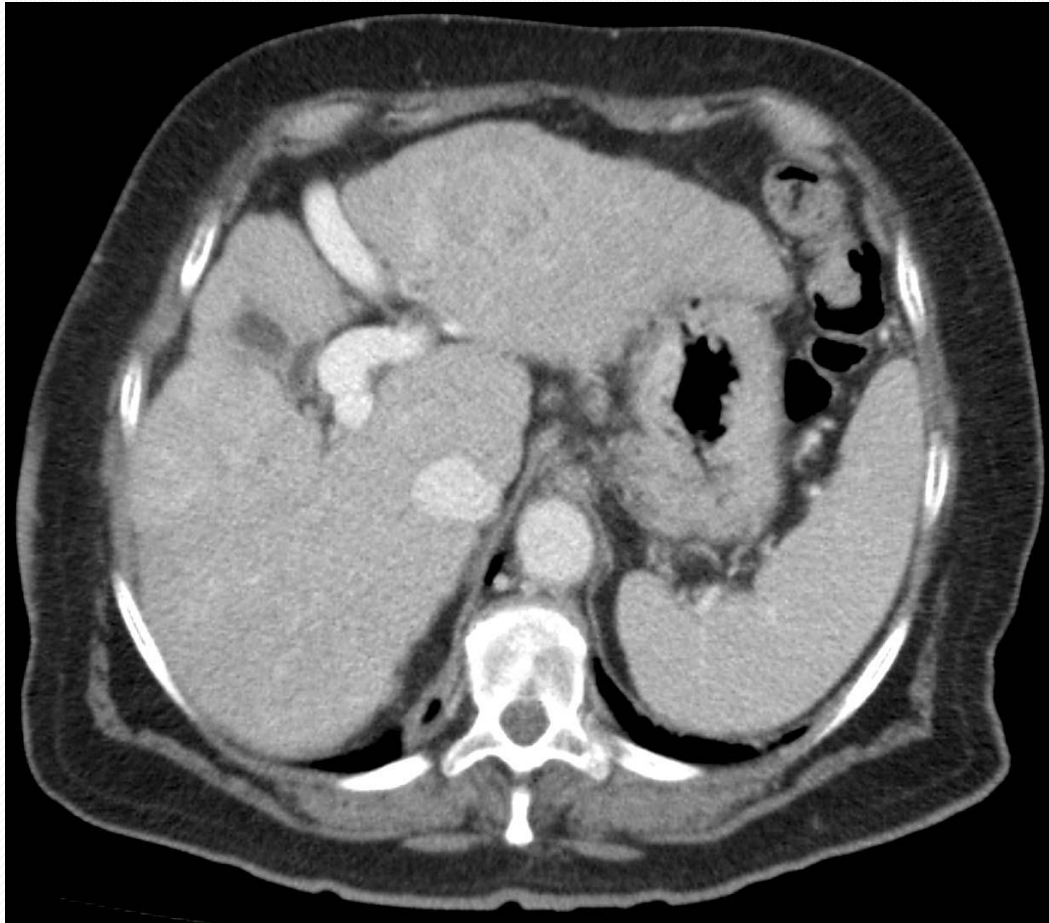


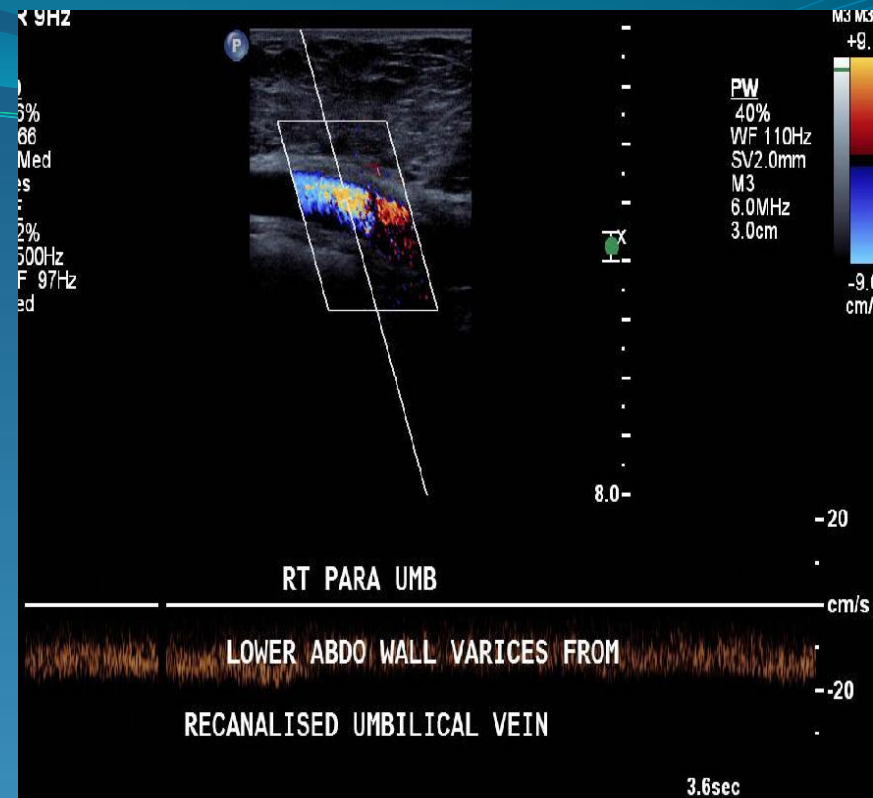
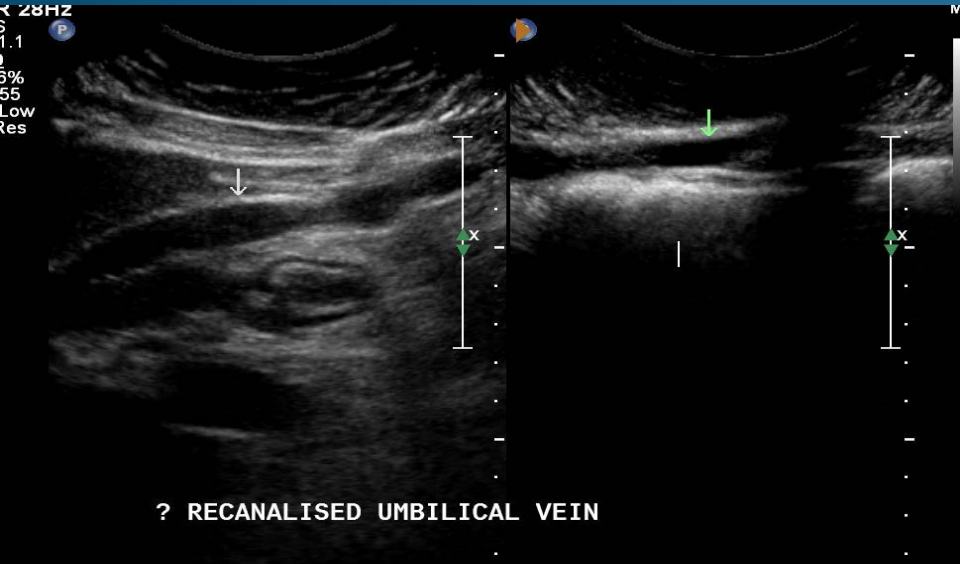
Recanalisation of
the Ligamentum
Teres:



Recanalisation, and
dilatation of the
Ligamentum Teres.

CT of Recanalized Umbilical Vein

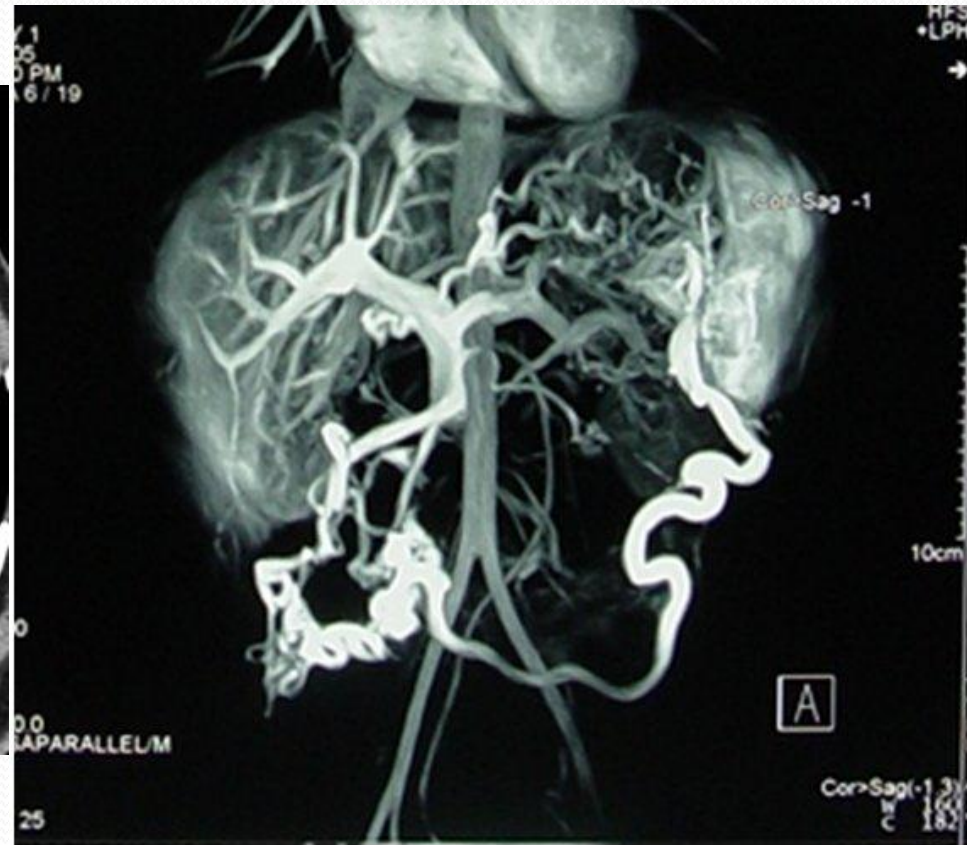


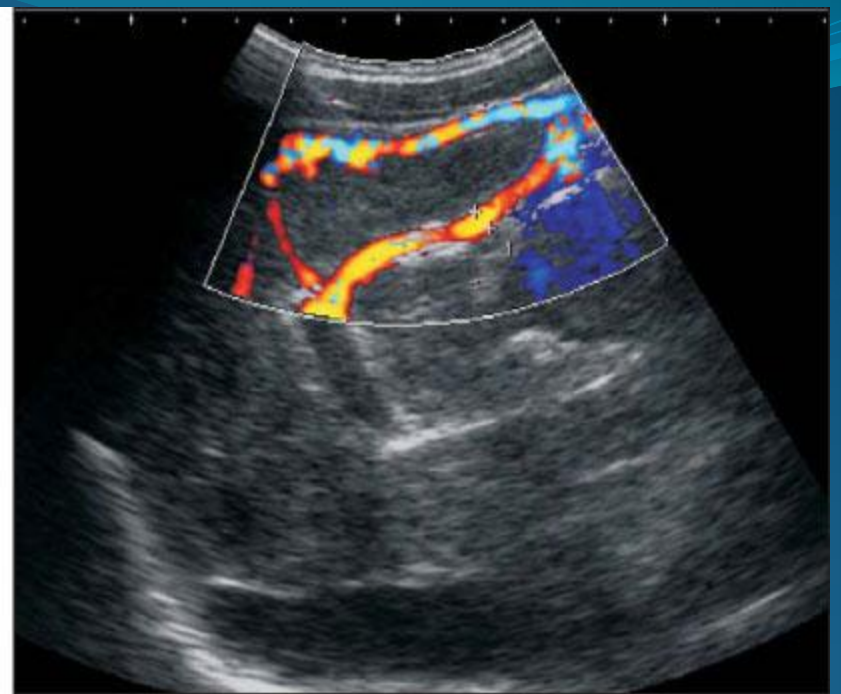


Subsequent
recanalisation and
dilatation of the
Umbilical vein may
occur

Lower Abdo wall
varices from re-
canalized umbilical
vein

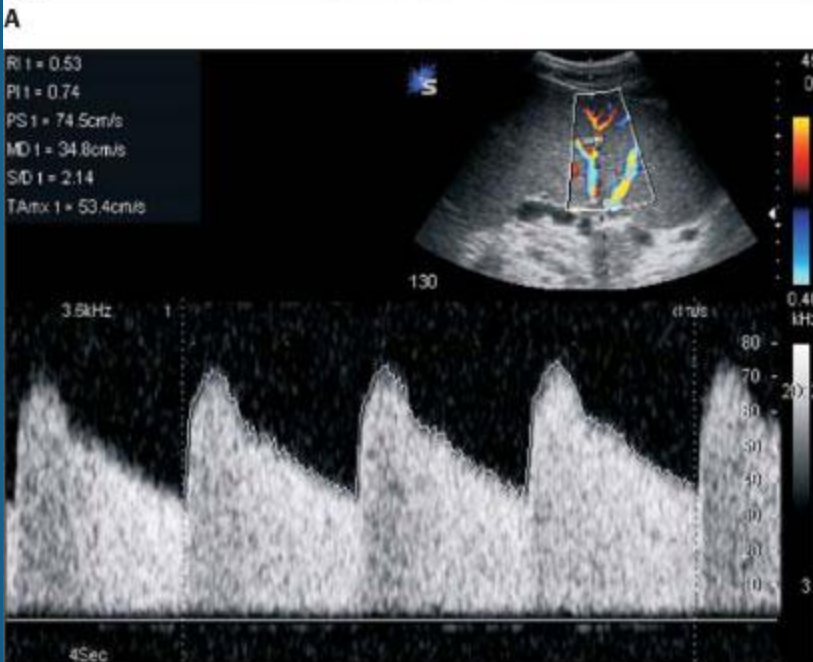
CT of varices





B

Figure 3. Cirrhotic patient with perisplenic and retroperitoneal collateral circulation (A), and umbilical vein recanalization (B). The spectral curve of the splenic artery (C) shows a low resistance pattern, with RI = 0.53 and PI = 0.74.



C

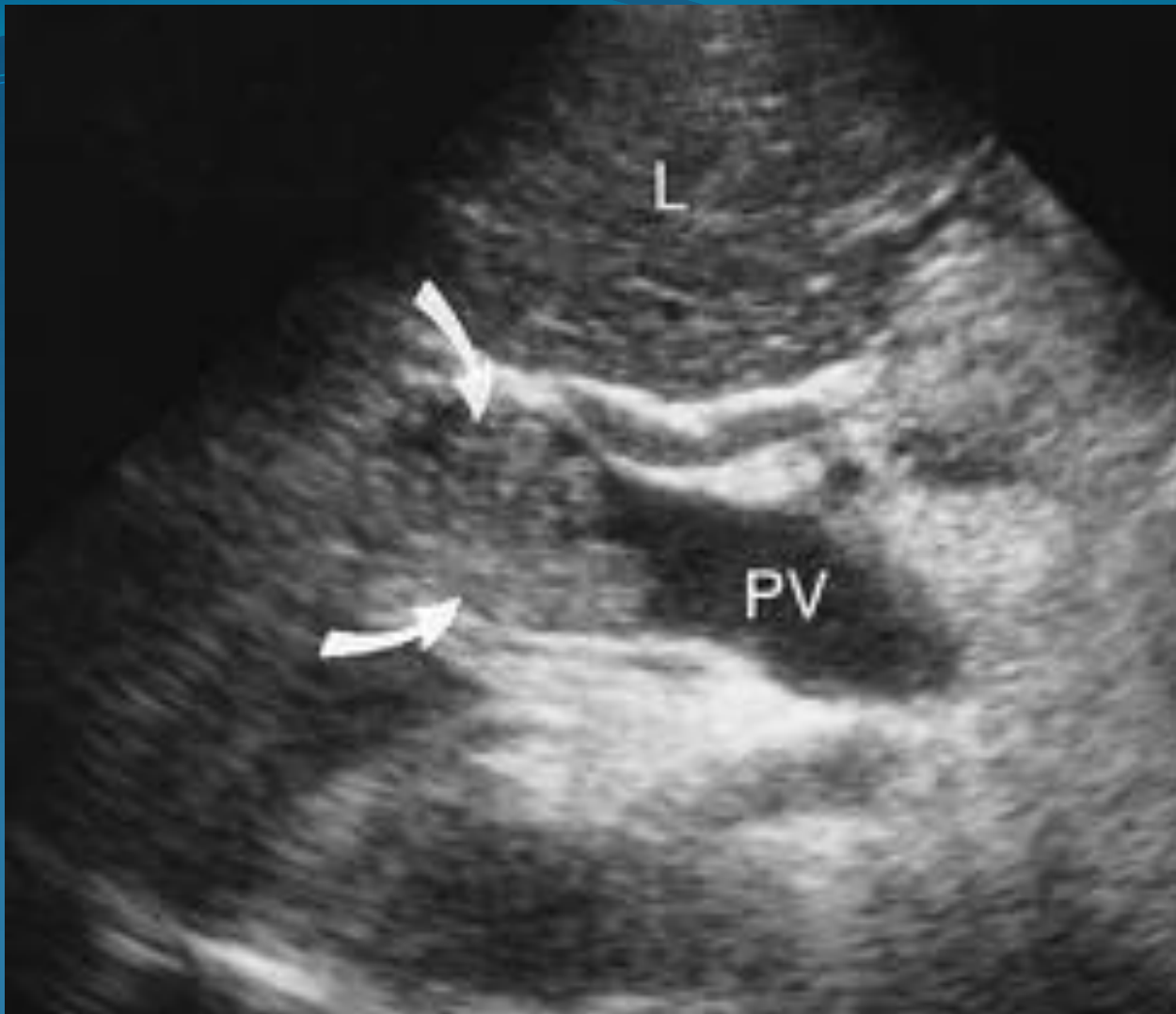


Splenomegaly:

Resultant splenomegaly can be diagnosed if the spleen is greater than 14cm in length or has rounded, lobulated margins and is greater than 13cm.

CT of splenomegaly



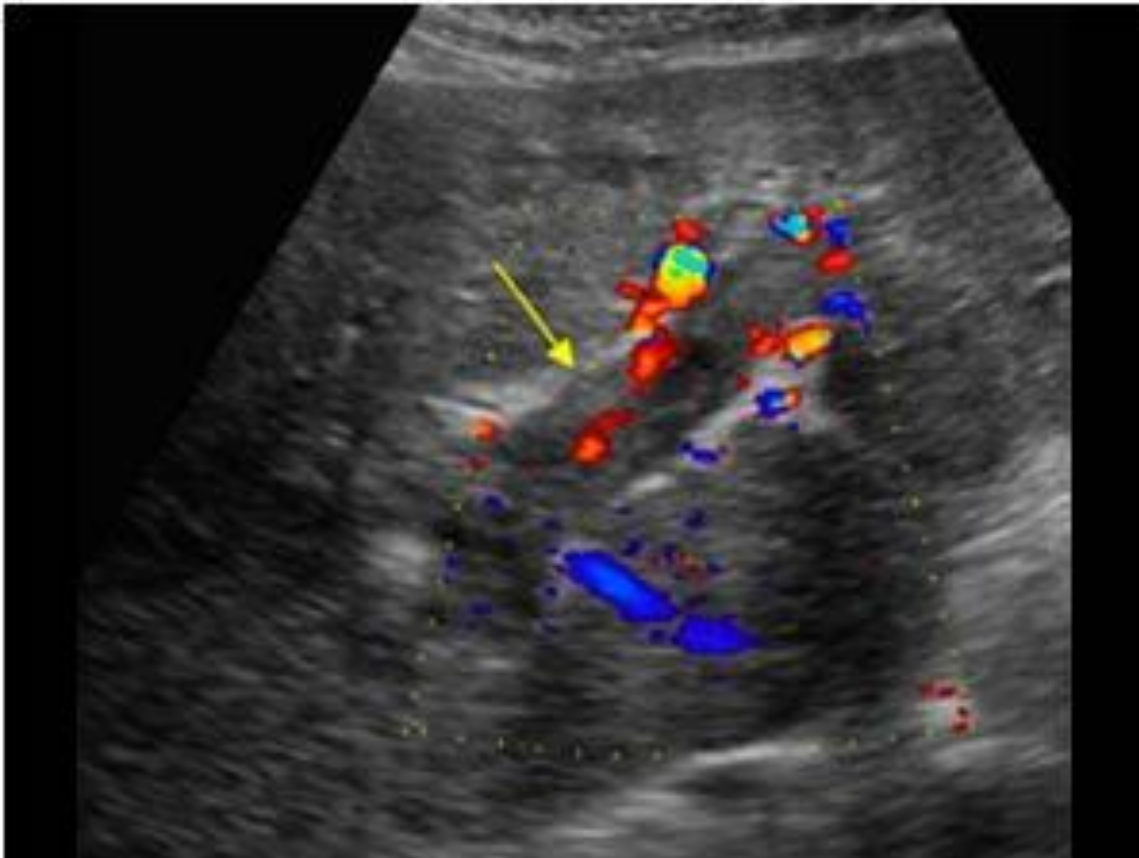


Portal Vein Thrombus

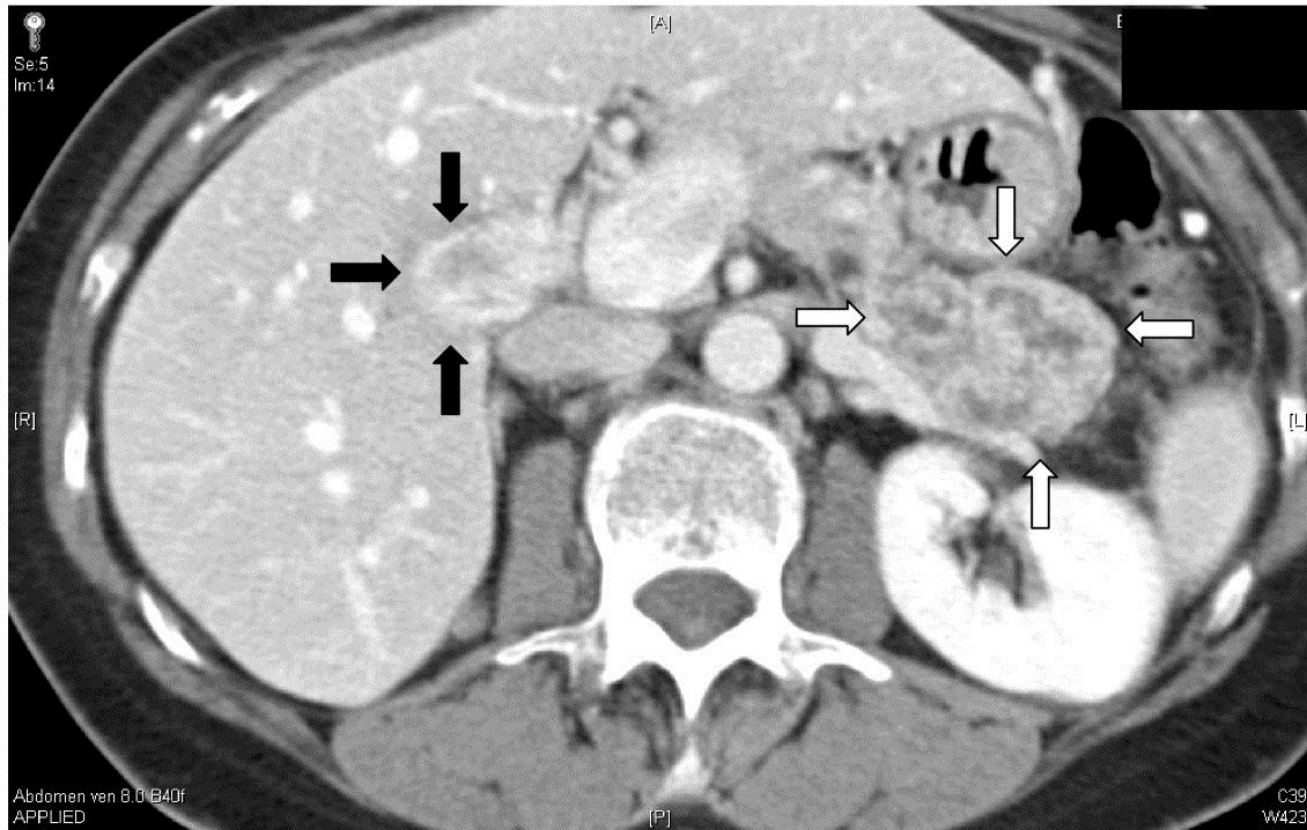
CT of Portal Vein Thrombosis



Partial Portal Vein Thrombosis



CT of Portal Vein Thrombus and Tail Mass



Cavernous transformation of thrombosed portal vein





MICRONODULAR CIRRHOSIS:

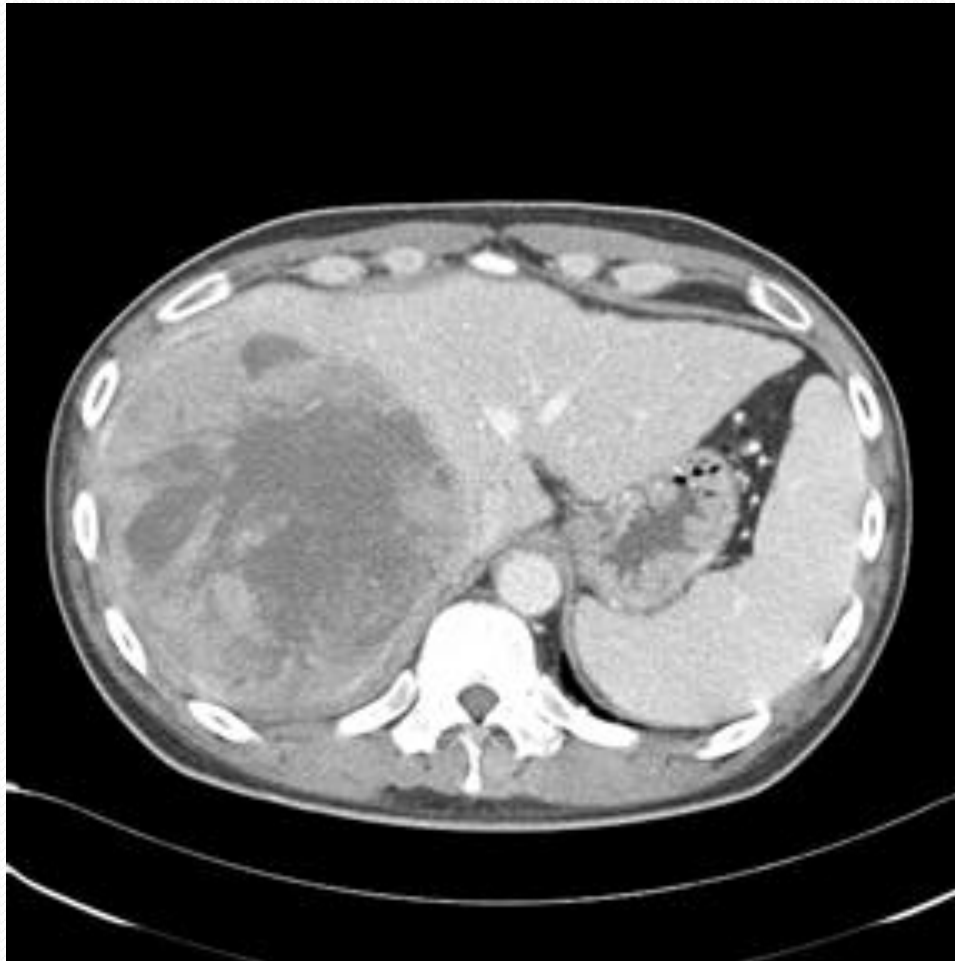
Cirrhosis is the result of chronic liver disease. There is the development of fibrosis within the regenerating liver. On the surface this manifests as a nodular appearance. It also accounts for the heterogenous coarse parenchymal echogenicity. Micronodular is often referred to as *Laenec's cirrhosis* after the person who coined the term 'cirrhosis'. Laenec's cirrhosis is often used to describe alcoholic cirrhosis. Importantly, micronodular cirrhosis DOES NOT have to be alcohol related.



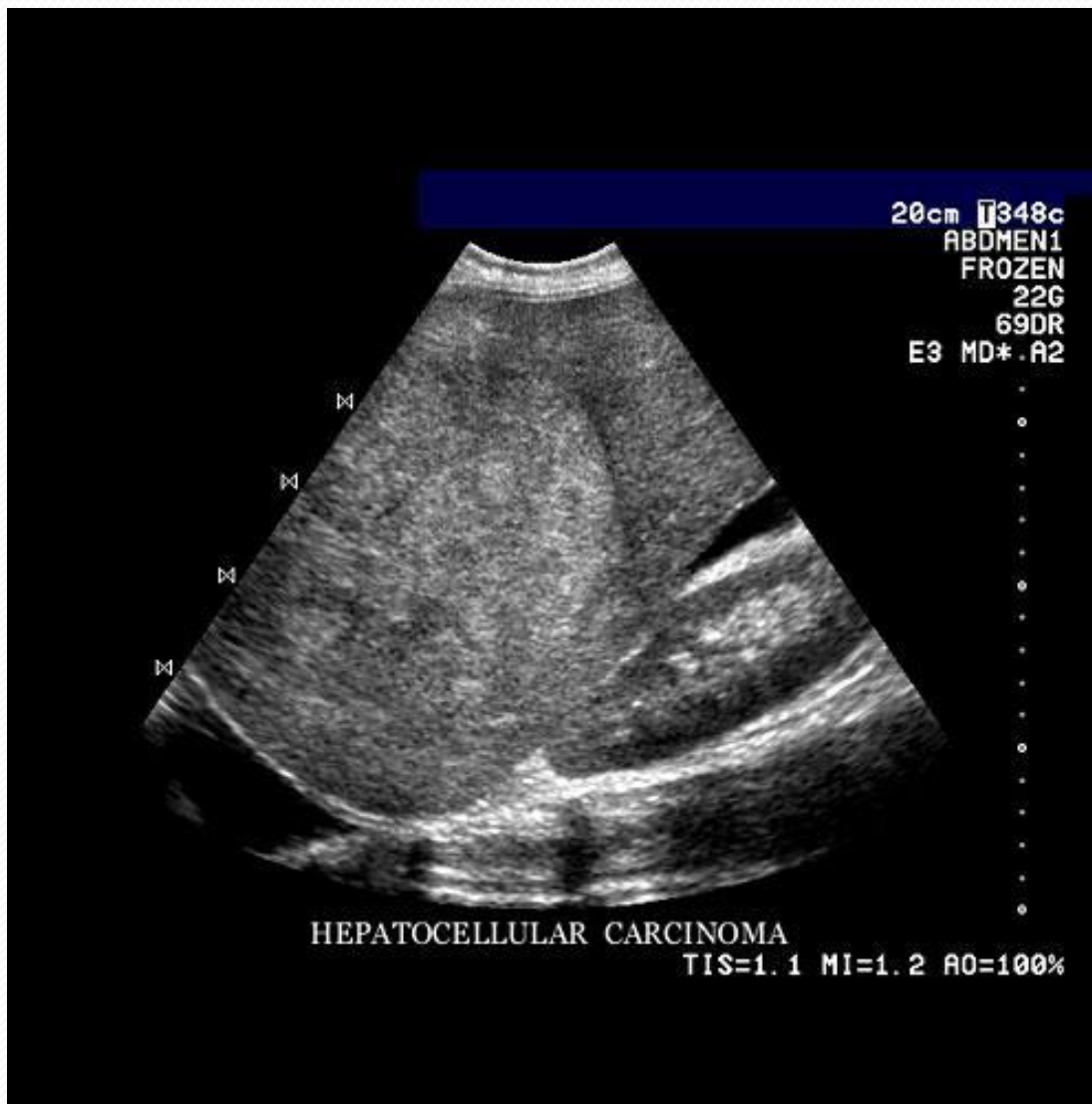
MACRONODULAR CIRRHOSIS:

Is defined as surface nodules greater than 3mm in size. It is thought to generally be the progression from micronodular cirrhosis. All cirrhosis patients should have regular thorough investigations due to the increase risk of developing hepatocellular carcinoma

CT of Hepatocellular carcinoma



Ultrasound of Hepatocellular Carcinoma



Ultrasound of Hepatocellular Carcinoma

