


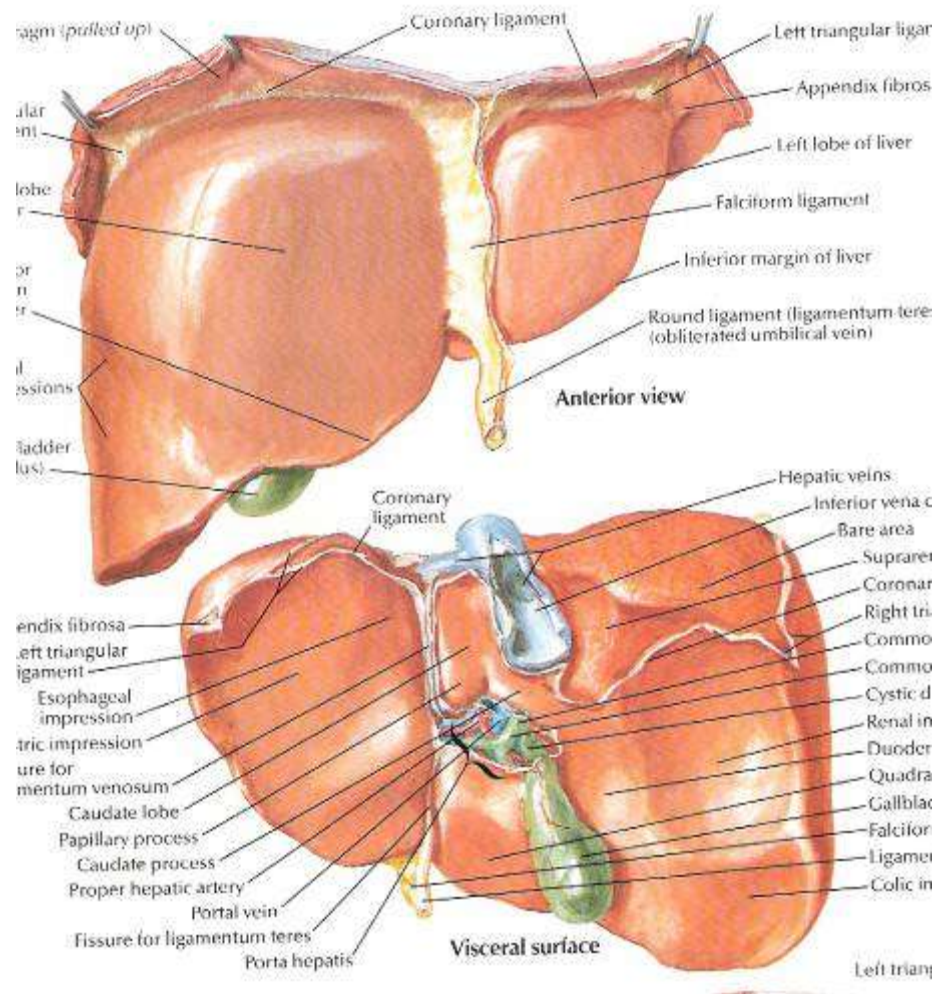
Surgical Anatomy of the Liver and CT interpretations

Aloka Pathirana



“Surgical practice is intimately related to developments in surgical techniques and anatomical understanding”

Liver – external anatomy

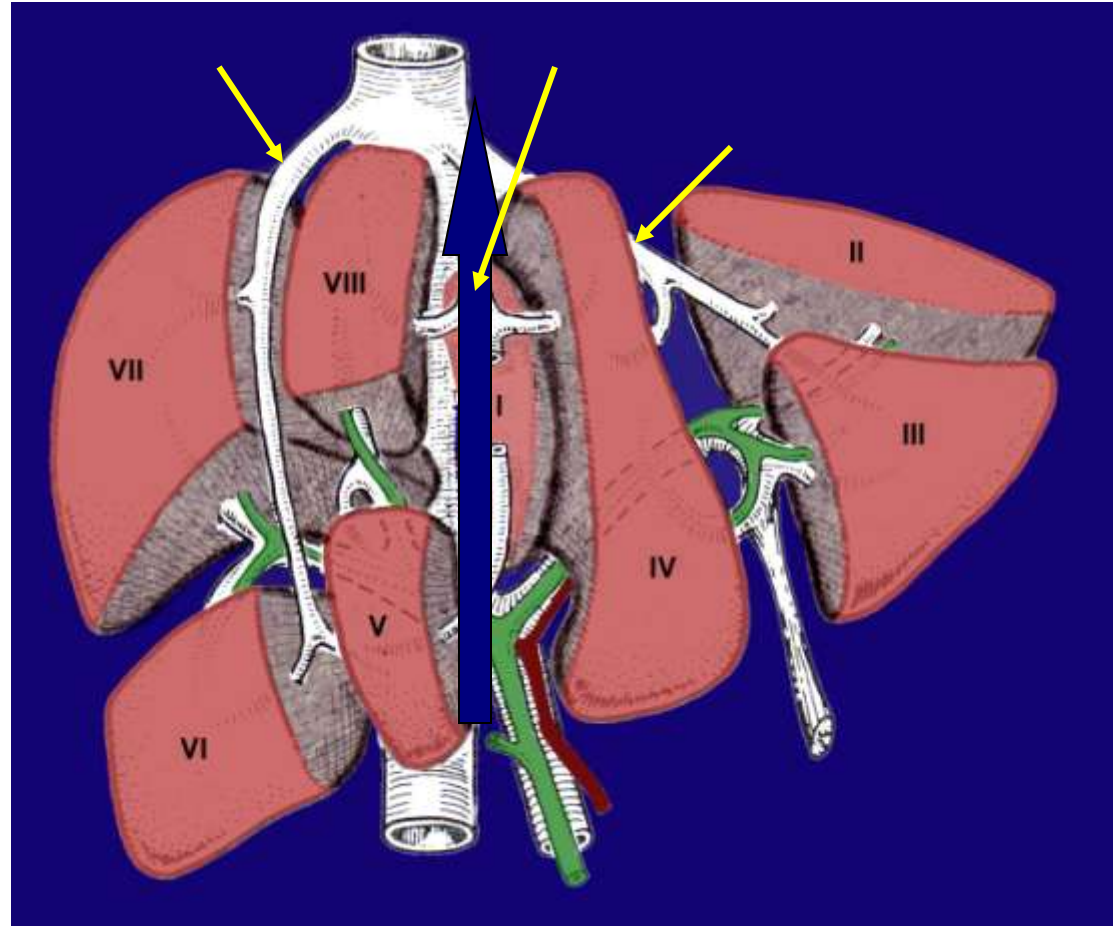


Liver

- not a single organ
- right and left hemi livers
- organized in to segments
 - branch of portal vein, hepatic artery, bile duct (portal triad)
 - drained by hepatic veins
 - limited anastomoses between (c.f. Lung)
 - **allows limited resections with minimal risk of bleeding, devascularization and biliary leaks**

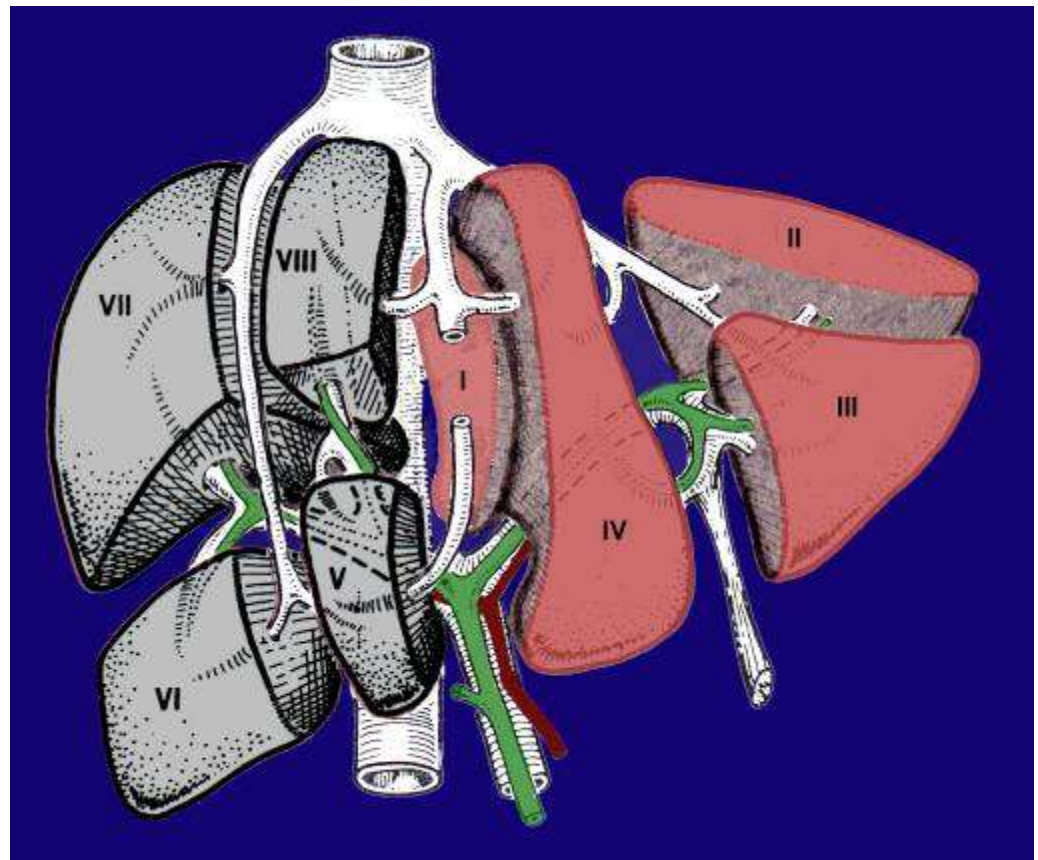
Liver - segmental anatomy

- Cantlie's line
- 4 sectors divided by the hepatic veins
 - Scissures
 - Sectors
 - Segments
- Hepatic veins are at a higher level than the porta



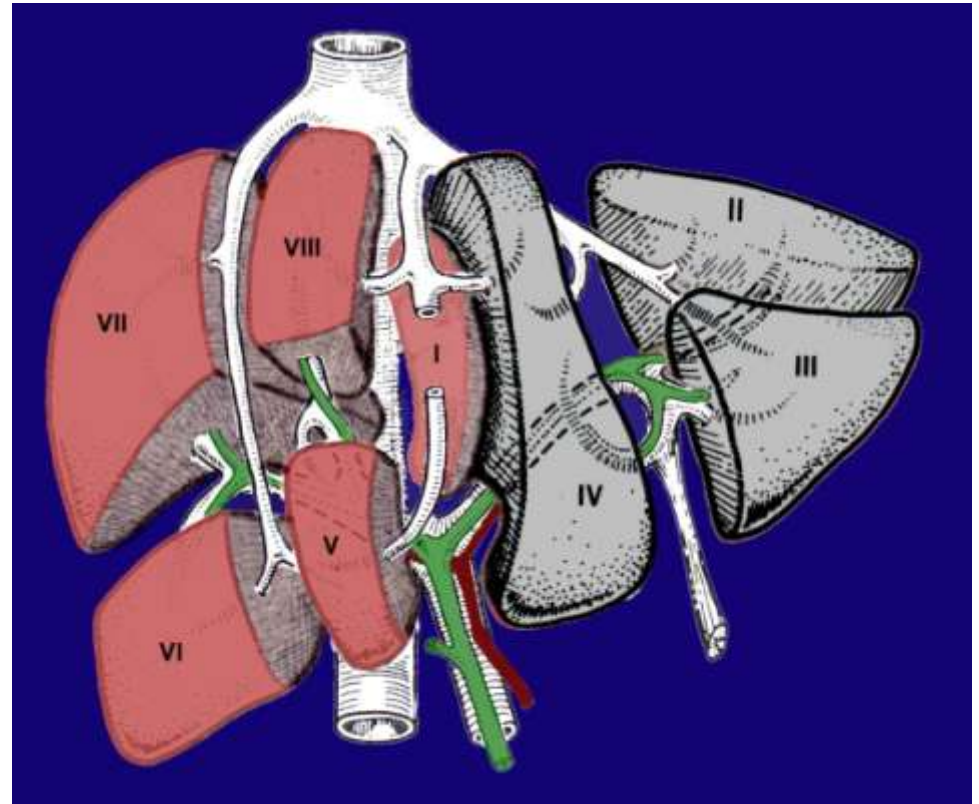
Left hemiliver

- Segments – II, III, IV (IVa and IVb)
- Sectors – anterior and posterior, left hepatic vein (left portal scissura)
- Posterior sector – segment II – **only sector with a single segment**



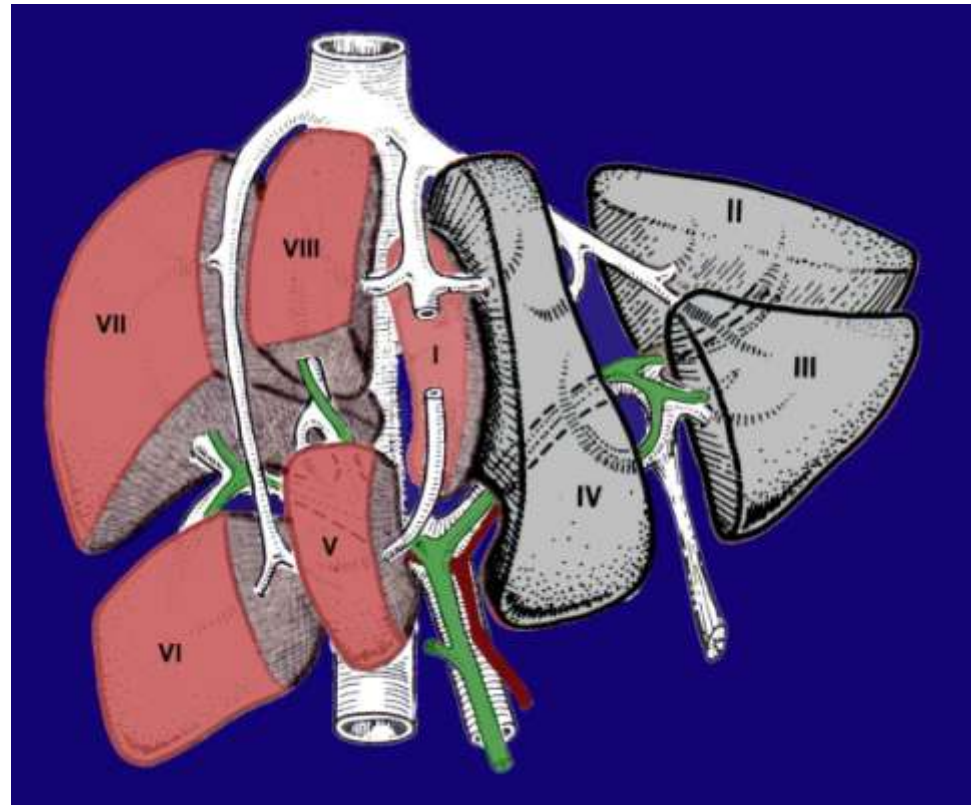
Right hemiliver

- Segments – V - VIII
- Sectors – anterior and posterior, right hepatic vein (right portal scissura)
- Scissure - frontal plane



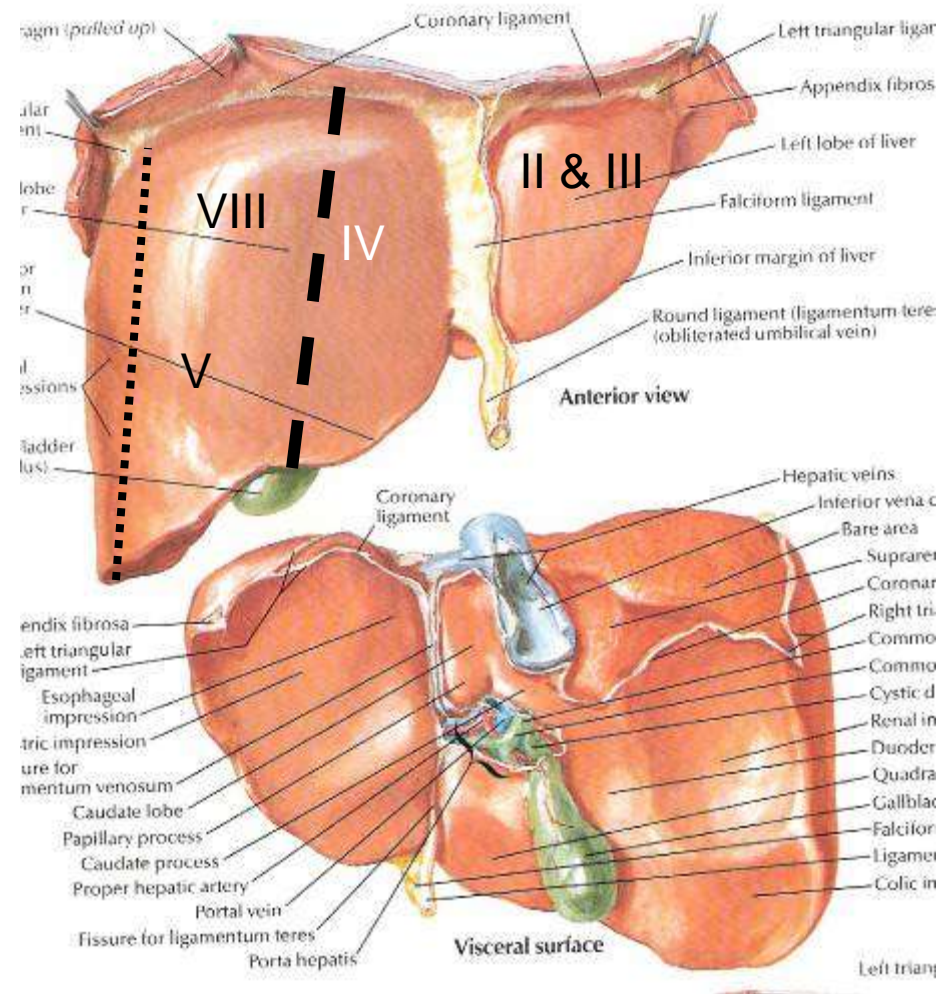
Caudate lobe

- Separate vascular and biliary connections
- Small right and larger left component
- Could encircle the IVC posteriorly
- Hepatic venous tributaries drain directly to the IVC



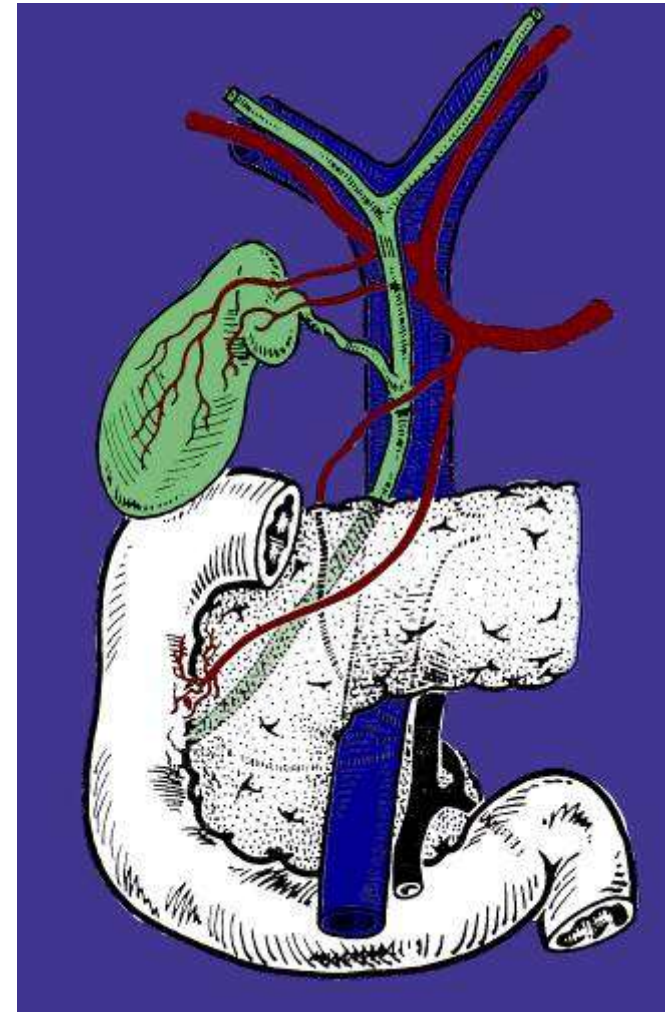
Liver segments

-identification in vivo

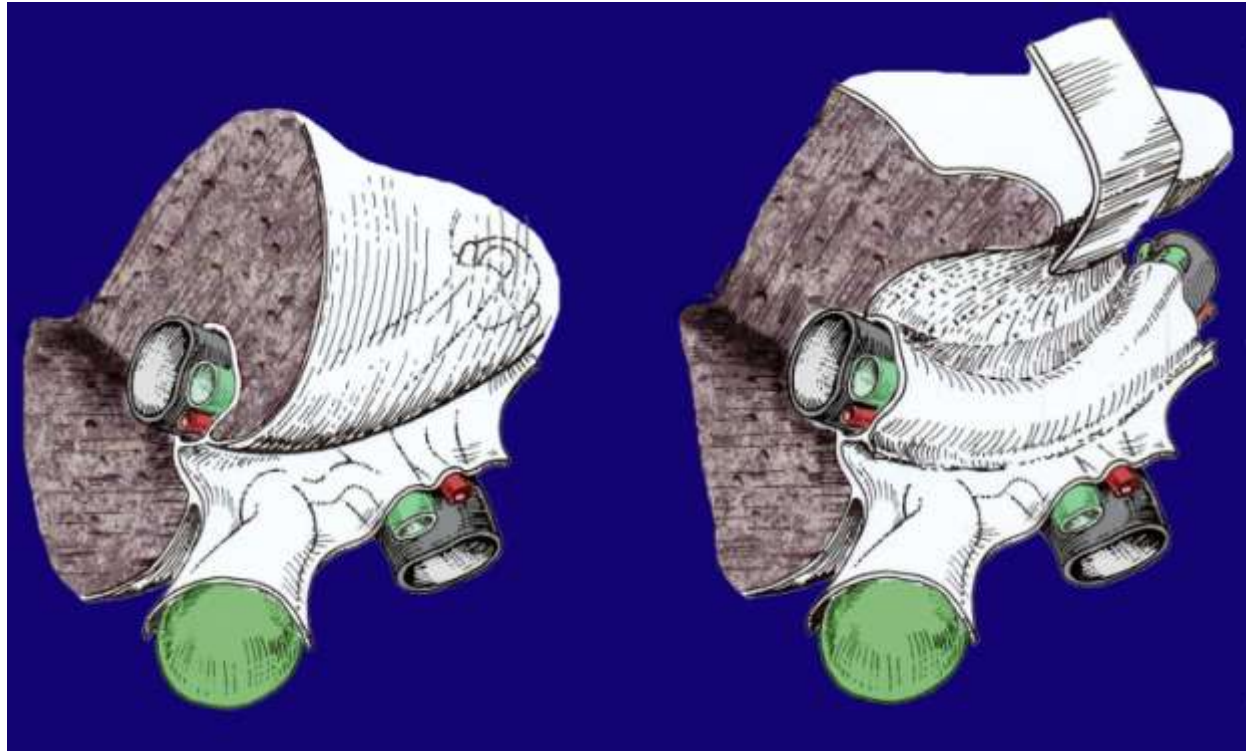


Porta Hepatis

- Bile ducts are the anterior/superior most of the three
- Hepatic duct confluence is anterior to the origin of the right branch of the portal vein
- Right duct is short - left is longer and horizontal
- Arteries are the lower most
- Anatomy useful for
 - biliary reconstruction
 - extra hepatic control of portal triad structures

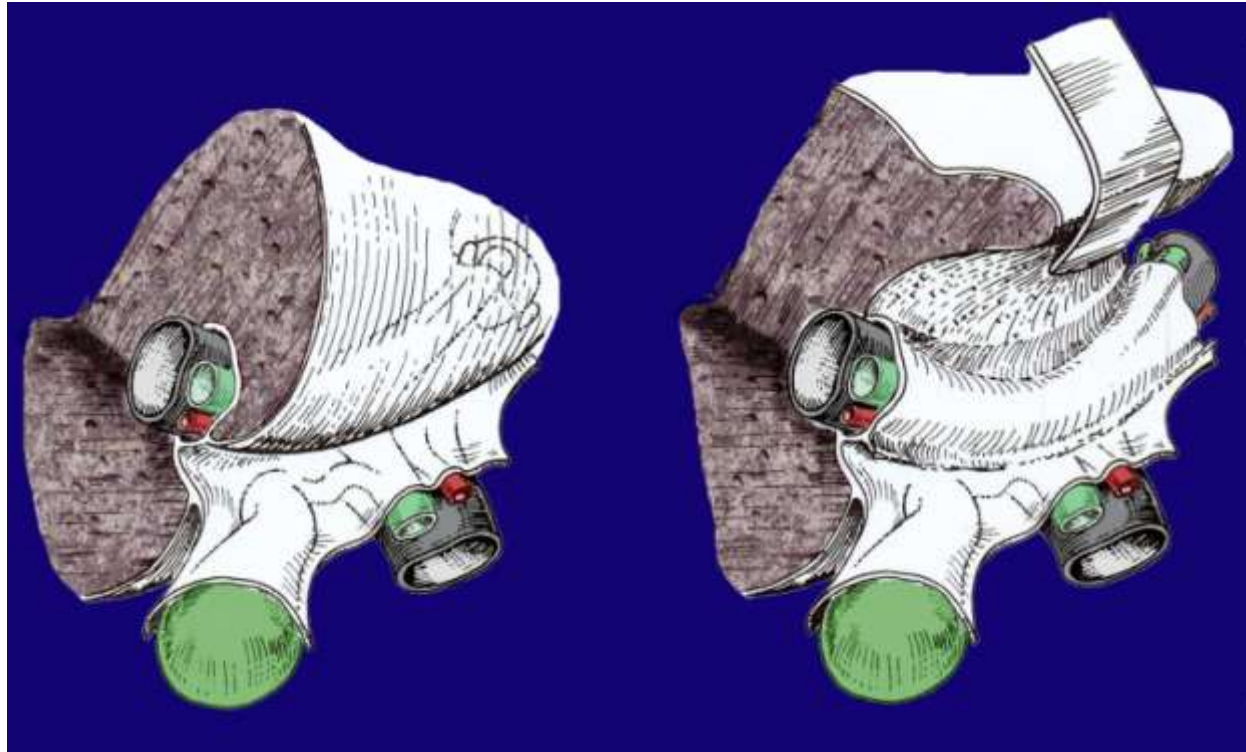


Hilar plate



- fascial condensation
- fusion of connective tissue enclosing the biliary and vascular elements with Glisson's capsule

Hilar plate

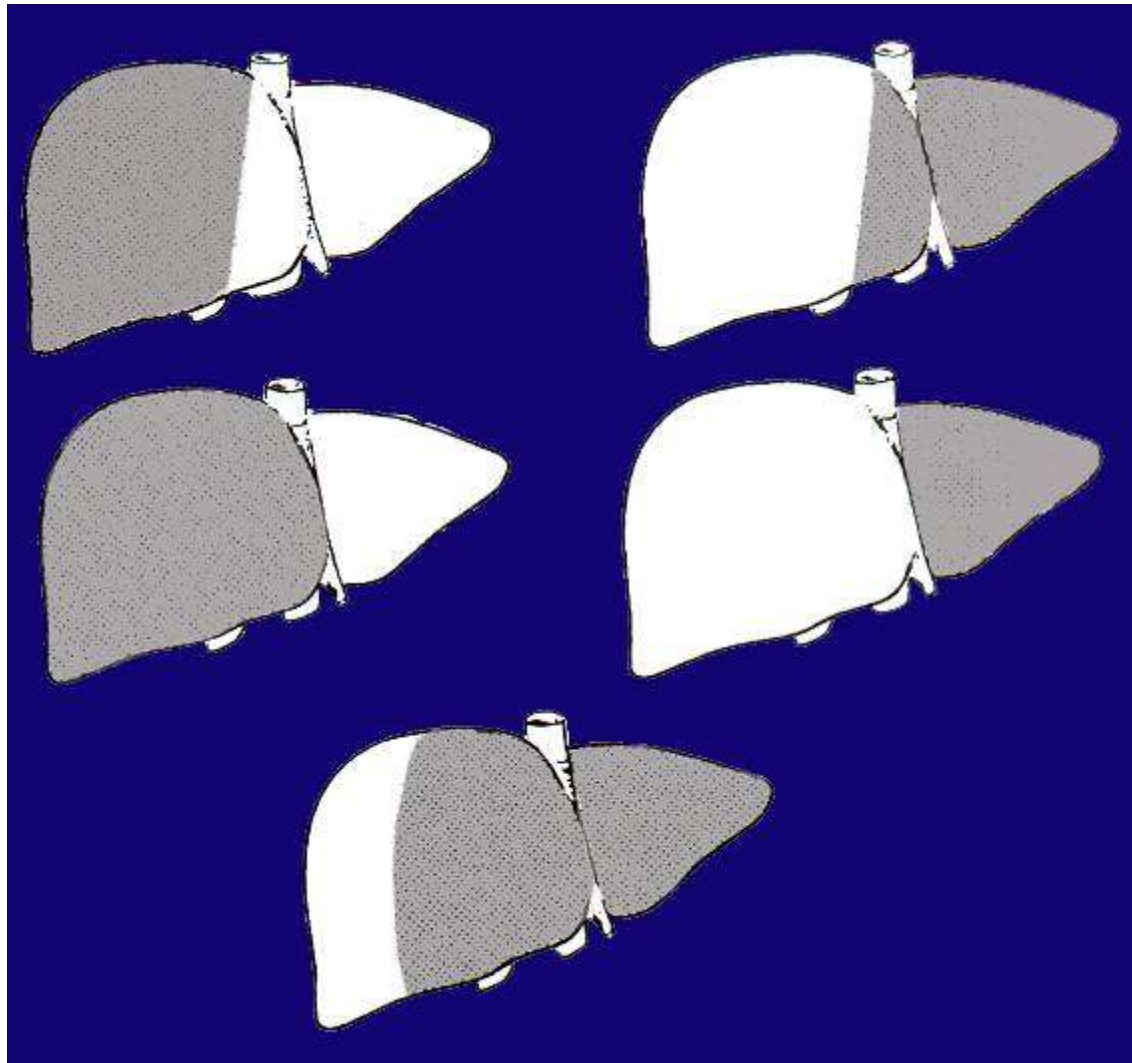


- avascular
- continuous with the cystic plate and umbilical plate
- lowering of the hilar plate - exposure of LHD

Hepatic veins

- Drain directly from the upper part to IVC
- RHV – larger, shorter extra-hepatic course(1cm)
- LHV and MHV – usually join outside the liver, common vein -2cm
- Additional hepatic veins
 - umbilical vein
 - smaller veins – troublesome bleeding

Nomenclature of liver resections



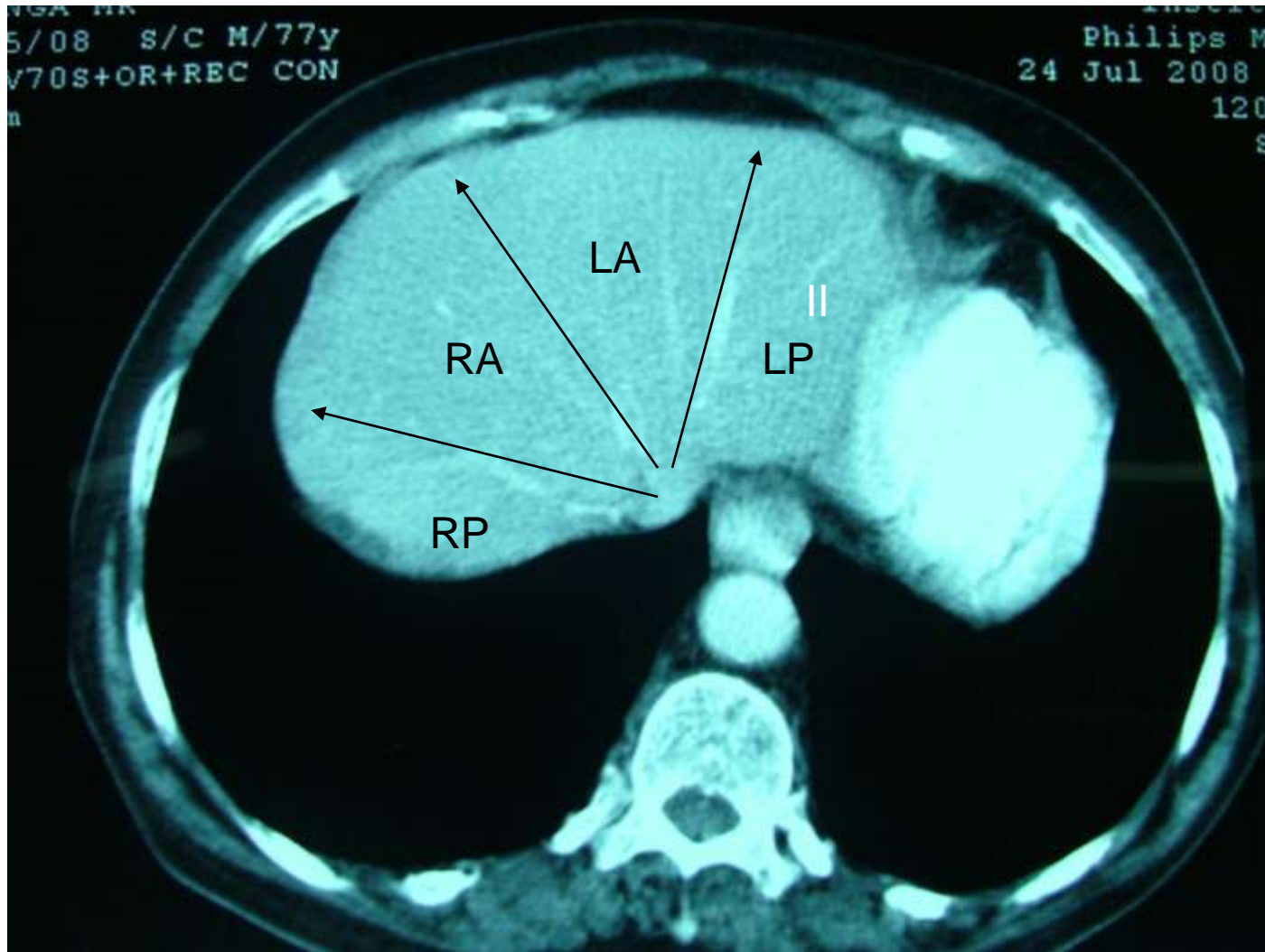


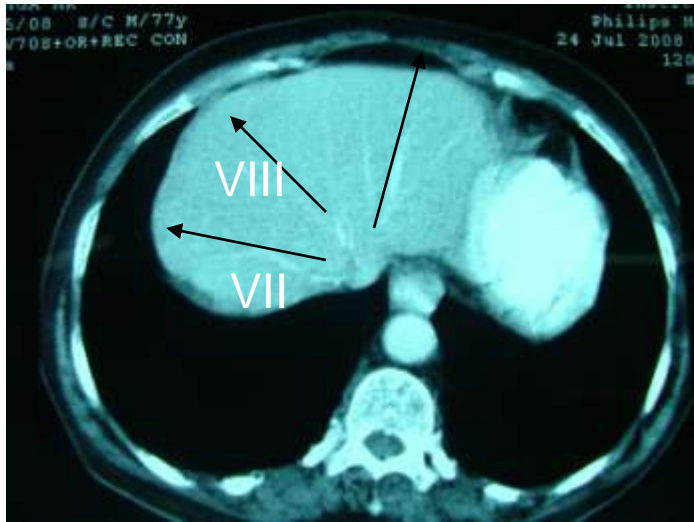
CT interpretation of liver

CT interpretation of segments



CT interpretation contd.







CT interpretation of lesions

- Aim is to characterize the lesion to arrive at a pathological diagnosis
- CT is considered “Gold standard”
- Recent advances in imaging has helped immensely

CT....

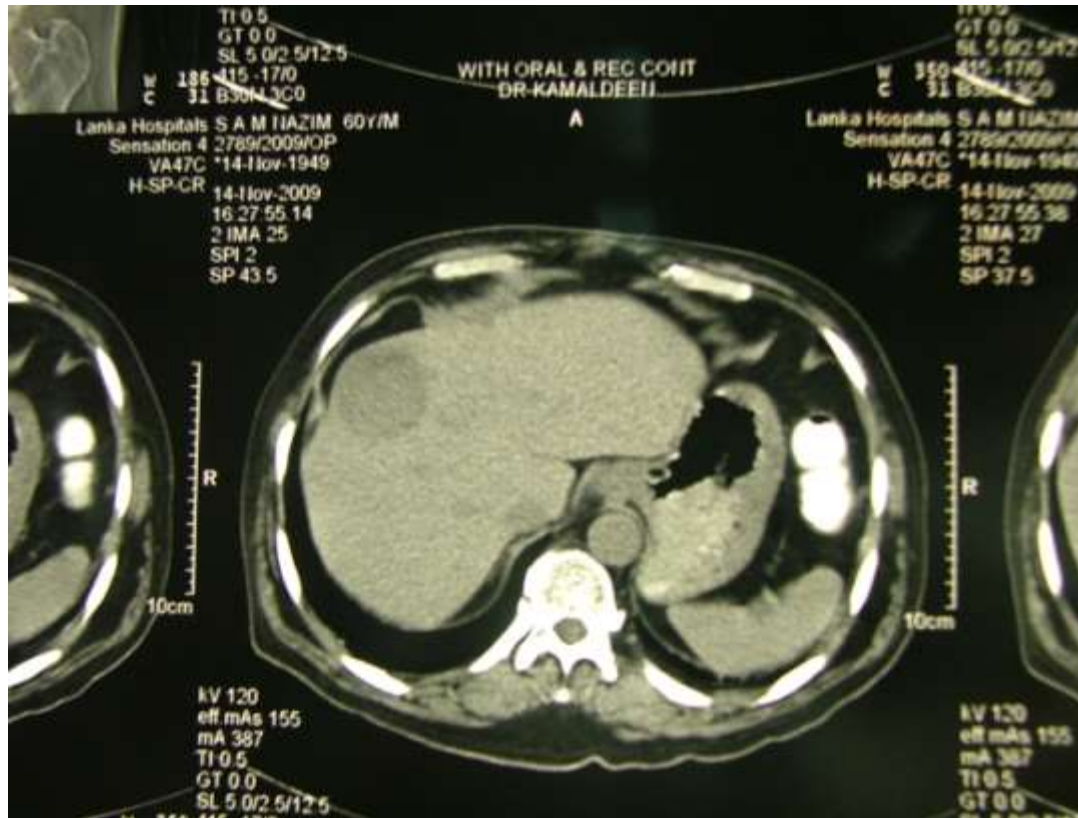
- Is an x ray
- Depends on varying tissue density to generate a picture
- To identify a lesion – it should “look different” from the surroundings
- Liver is homogenous – except for vessels (blood and bile)
- Tissue density – measured in Hounsfield units (Liver slightly higher than the spleen)

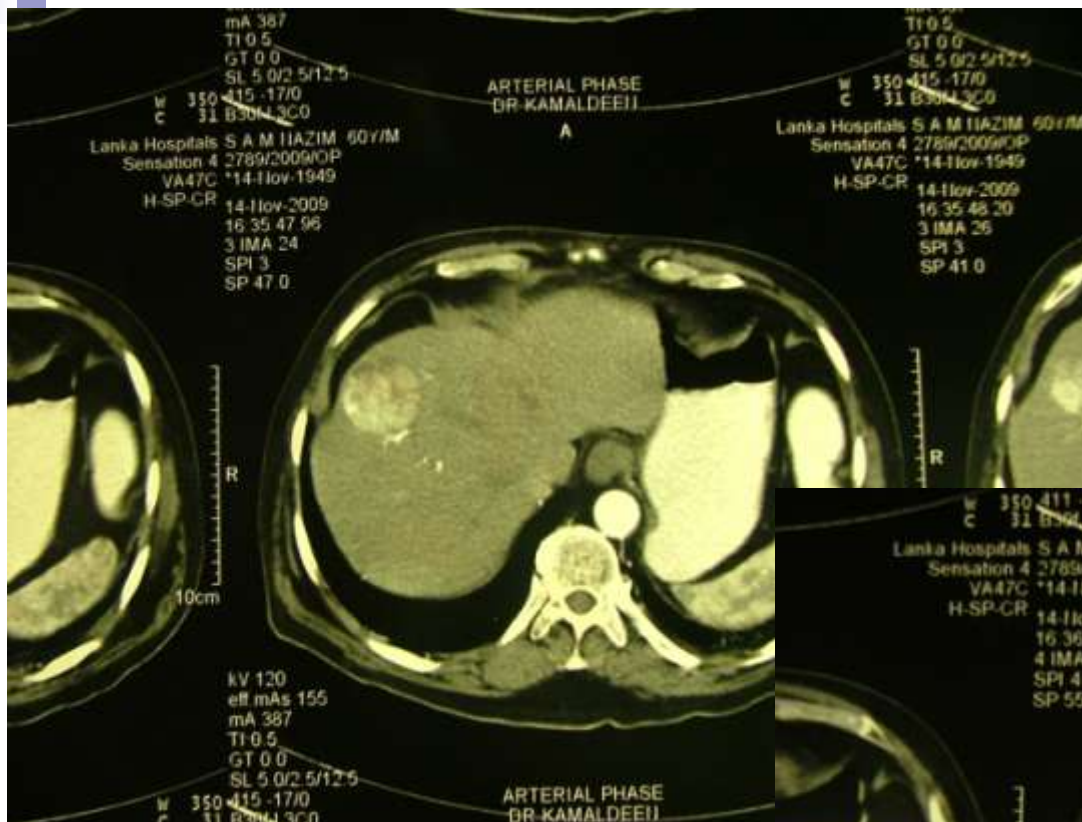
- Liver – receives it's blood supply mainly from the portal veins (75-80%)
- Portal veins opacify 70s after IV (cardiac output, hydration)
- Neoplasms – high water content, mostly supplied by the hepatic arteries
- Therefore most malignant neoplasms
 - Hypodense on non contrast CT (vessels may give a false +)
 - This is more obvious on portal venous phase
 - Vascular lesions (HCC, NET) – seen in the arterial phase
- Triphasic – a MUST for evaluation

Usefulness of CT

- Diffuse changes (cirrhosis, fatty infiltration)
- Discrete lesions – diagnosis, staging, assessment of operability (number, relation to vital structures, volumetry)
- Advances
 - MDCT – multidetectors increase the resolution and speed of acquisition
 - CT angiography – hepatic vasculature

Hepatocellular carcinoma





Colorectal metastases



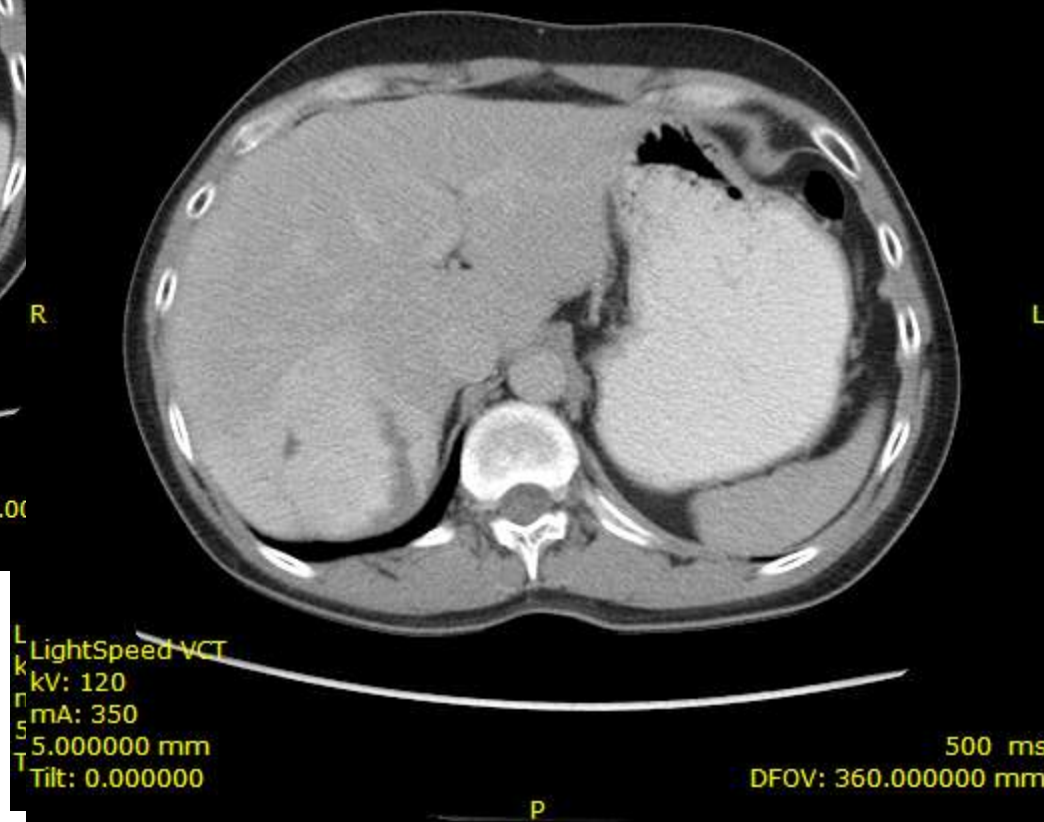
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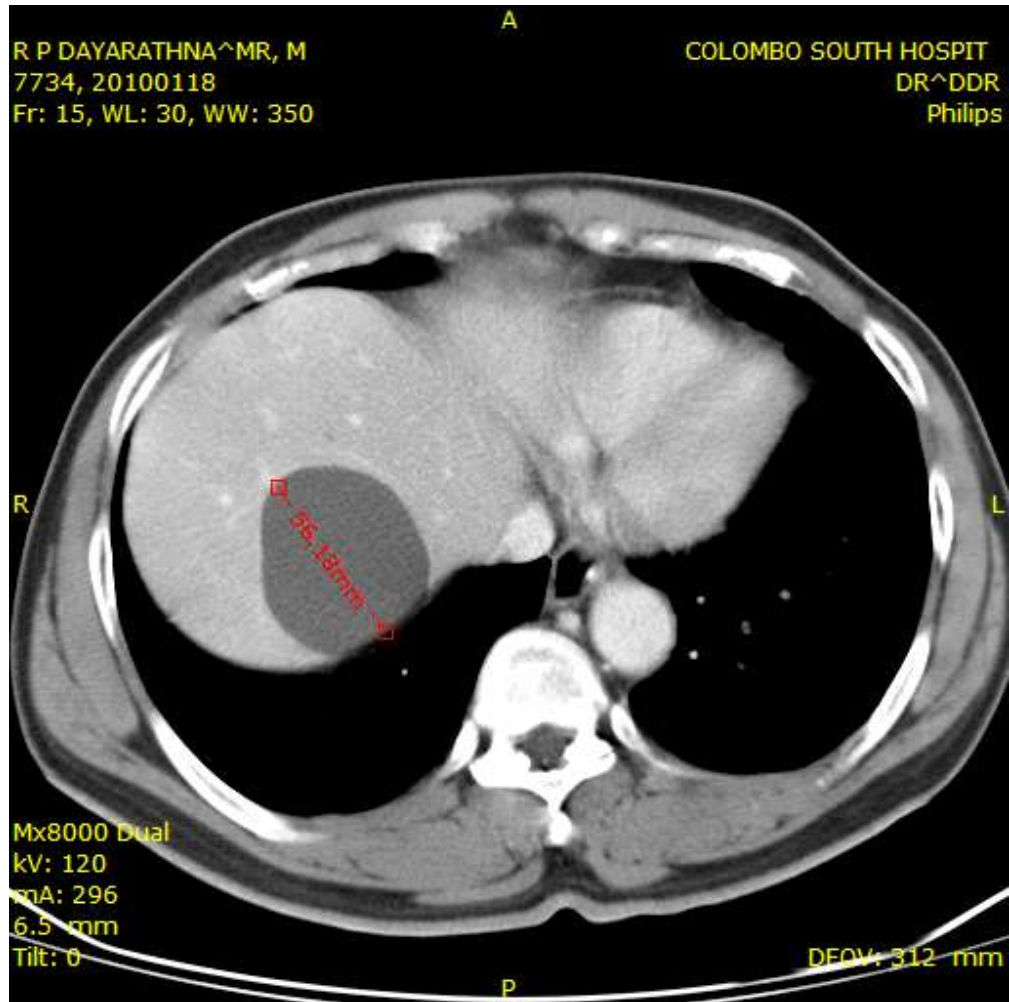


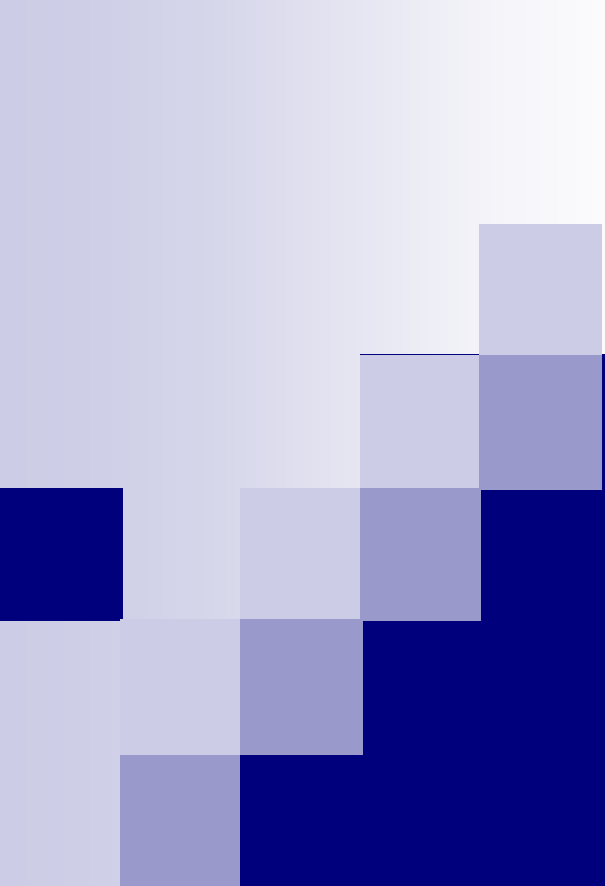
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Benign cyst





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