Segmental anatomy of liver in ultrasonography and CT scan

PRESENTED BY

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NORMAL ANATOMY

- The liver lies in the right upper quadrant of the abdomen.
- The liver is best examined with sonography in both supine and right anterior oblique positions. Sagittal , transverse, coronal, and subcostal oblique views are suggested using both a standard abdominal transducer and a higher frequency transducer.

- It can be divided into three lobes: right, left, and caudate.
- The right lobe of the liver is separated from the left by the main lobar fissure, which passes through the gallbladder fossa to the inferior vena cava (IVC).
- The right lobe of the liver can be further divided into anterior and posterior segments by the right intersegmental fissure.
- The left intersegmental fissure divides the left lobe into medial and lateral segments.

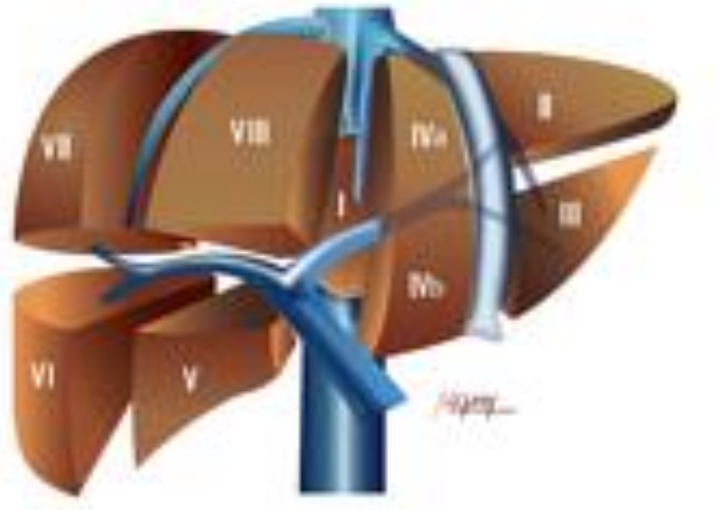
STRUCTURES USEFUL FOR IDENTIFYING THE HEPATIC SEGMENTS

Structure	Location	Usefulness
Right hepatic vein	Right intersegmental fissure	Divides cephalic aspect of anterior and posterior segments of right lobe
Middle hepatic vein	Main lobar fissure	Separates right and left lobes
Left hepatic vein	Left intersegmental fissure	Divides cephalic aspect of medial and lateral segments of left lobe
Right portal vein (RPV) (anterior branch)	Intrasegmental in anterior segment of right lobe	Courses centrally in anterior segment of right lobe
RPV (posterior branch)	Intrasegmental in posterior segment of right lobe	Courses centrally in posterior segment of right lobe
Left portal vein (LPV) (horizontal segment)	Anterior to caudate lobe	Separates caudate lobe posteriorly from medial segment of left lobe anteriorly
LPV (ascending segment)	Left intersegmental fissure	Divides medial from lateral segment of left lobe

Couinaud Anatomy

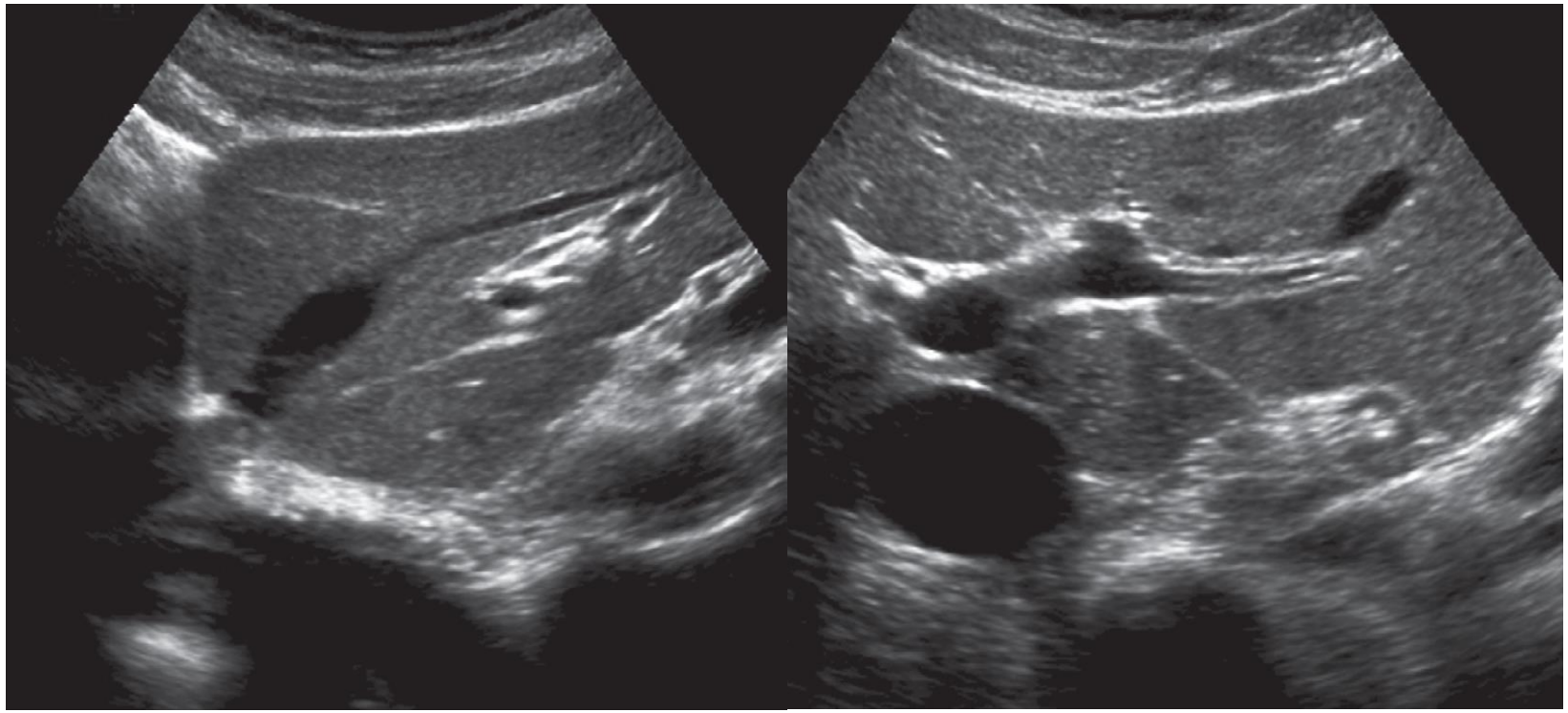
- **Couinaud anatomy** is now the universal nomenclature for hepatic lesion localization .This description is based on **portal Segments** and is of both **functional** and **pathologic** importance.
- Each segment has its own blood supply (arterial, portal venous , and hepatic venous), lymphatics, and biliary drainage.
- Thus the surgeon may resect a segment of a hepatic lobe, providing the vascular supply to the remaining lobe is left intact.Each segment has a branch or branches of the portal vein at its center, bounded by a hepatic vein.
- There are **eight segments.** The right, middle and left hepatic veins divide the liver longitudinally into four sections. Each of these sections is further divided transversely by an imaginary plane through the right main and left main portal pedicles.

- **Segment I** is the caudate lobe, **segments II and III** are the left superior and inferior lateral segments, respectively, and **segment IV,** which is further divided into IVa and IVb is the medial segment of the left lobe. The right lobe consists of **segments V and VI** located inferior to the transverse plane and **segments VII & VIII located superior to transverse plane.**

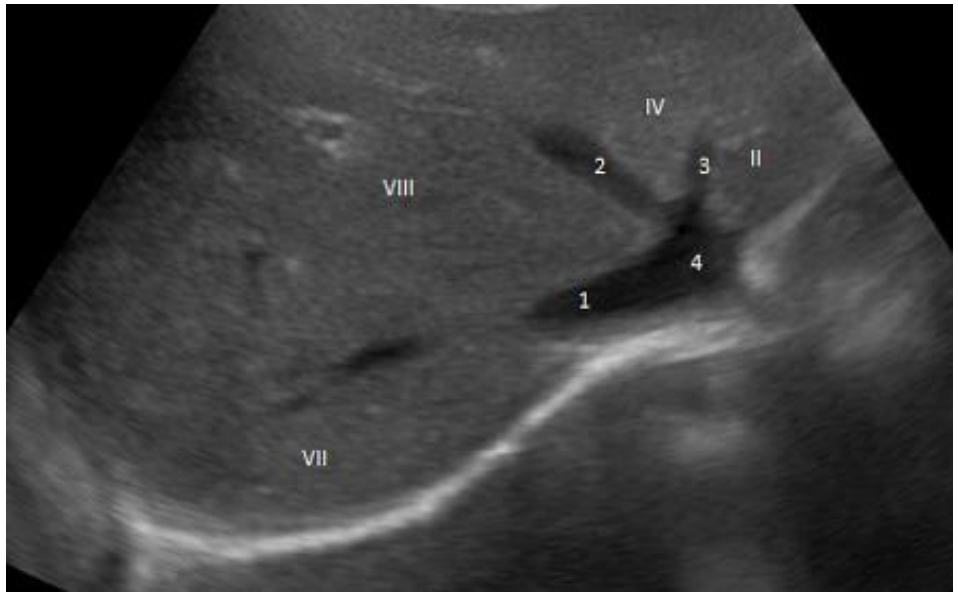


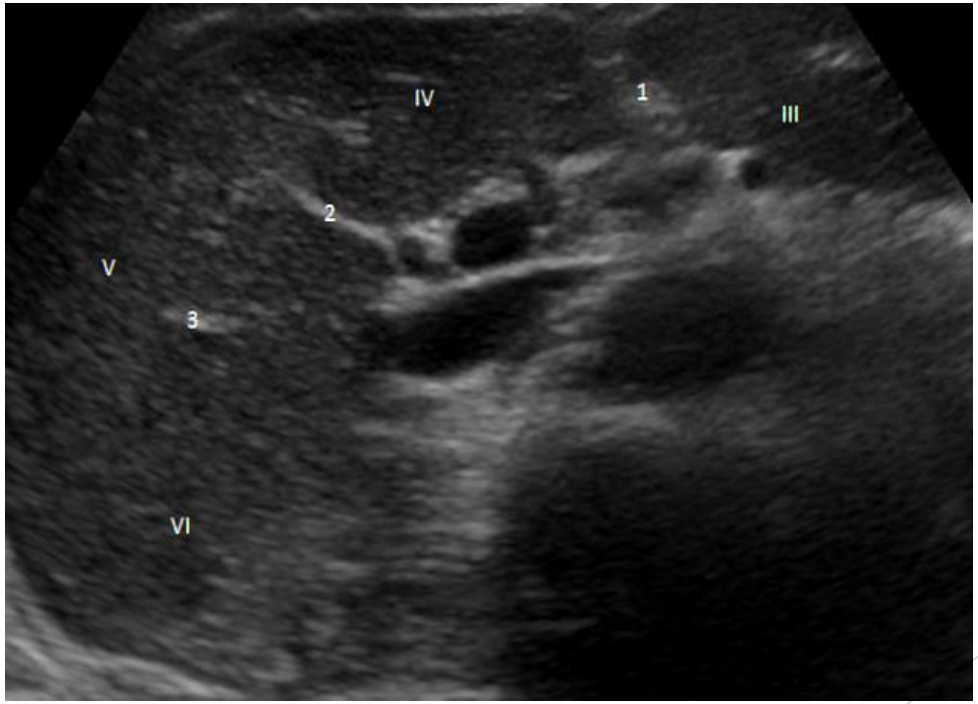
Couinaud Segments and Traditional Hepatic Anatomy

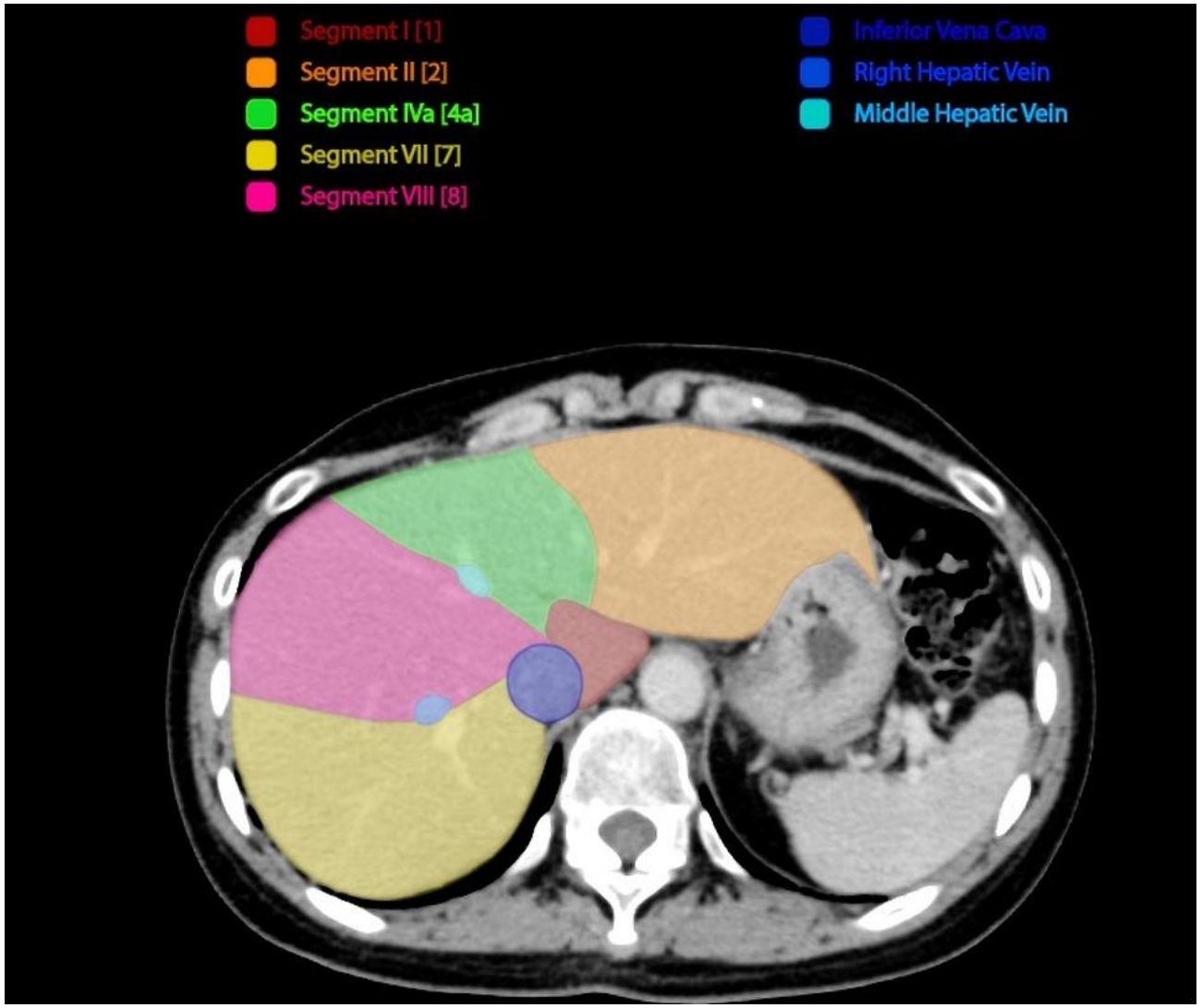
Couinaud	Traditional
Segment I	Caudate lobe
Segment II	Lateral segment left lobe (superior)
Segment III	Lateral segment left lobe (inferior)
Segment IV	Medial segment left lobe
Segment V	Anterior segment right lobe (inferior)
Segment VI	Posterior segment right lobe (inferior)
Segment VII	Posterior segment right lobe (superior)
Segment VIII	Anterior segment right lobe (superior)

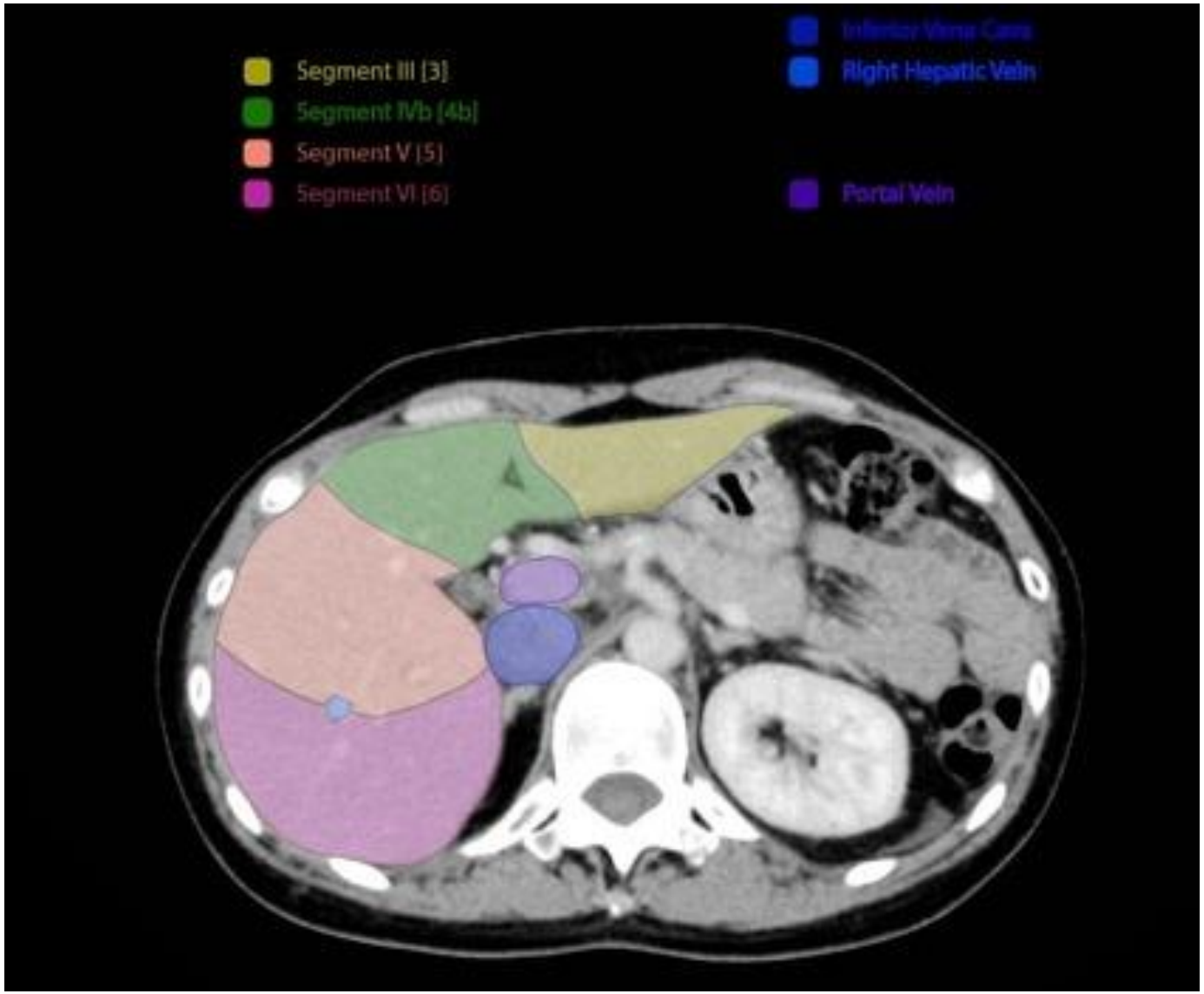


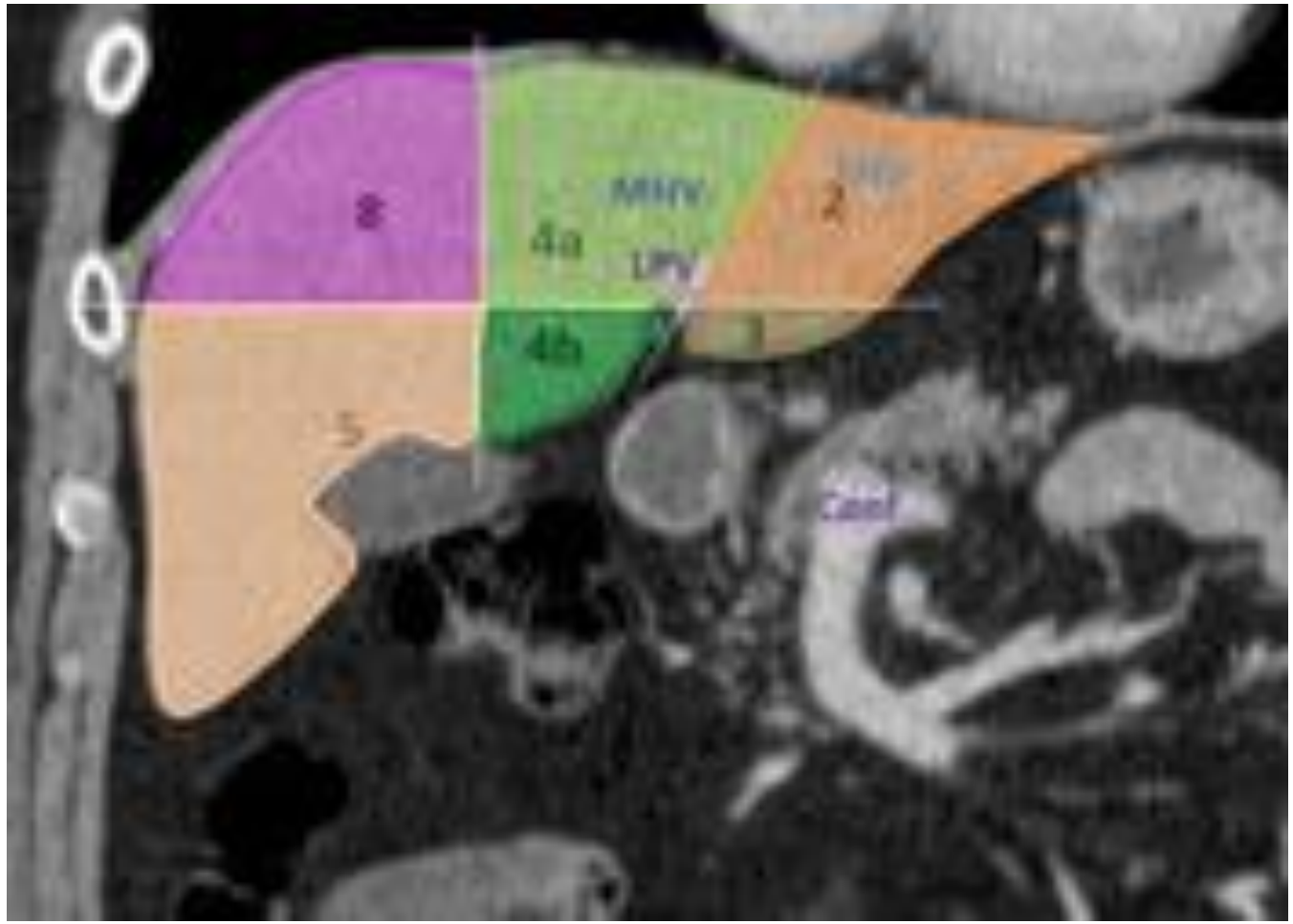
Caudate Lobe. (A) Sagittal view and **(B)** transverse view show the caudate lobe *(CL)* separated from the left lobe by the fissure for the ligamentum venosum *(arrows)* anteriorly. Posterior is the inferior vena cava.


IV
2
3
II
VIII
4
1
VII


IV
1
III
2
V
3
VI


Segment I [1]
Segment II [2]
Segment IVa [4a]
Segment VII [7]
Segment VIII [8]
Inferior Vena Cava
Right Hepatic Vein
Middle Hepatic Vein


Segment III [3]
Segment IVb [4b]
Segment V [5]
Segment VI [6]
Right Hepatic Vein
Portal Vein


8
MHV
4a
LPV
2
4b
5
Cava

Thank You