Surgical Anatomy of the liver

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## Disclosures

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<td>Potential conflict of interest</td>
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<td>Potentially relevant company relationships in connection with event</td>
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WHY DO I HAVE TO GO FIRST?

THERE'S NO I IN TEAM, EH

Marc
The cell lineage steps during hepatic development (red) from uncommitted endoderm to functional adult hepatocytes and biliary epithelium.
Time line mouse liver development

- e7: endoderm formation
- e8: hepatic specification
- e9: liver diverticulum
- e10: liver bud growth
- e15: hepatic maturation
- postnatal: hepatocyte / biliary differentiation

fg: foregut, mg: midgut, hg: hindgut
ld: left duct, lb: left bile duct
Adult liver
Galen (circa 130–200 BC) was one of the first who described the liver. He thought that the liver was five-lobed. Such opinion dominated until the 15th century.
Vesalius founder modern anatomy (1514-1564)
1st book on human anatomy Vesalius
In 1654, F. Glisson (1597–1677) studied the liver. He discussed topography of the intrahepatic vessels and surrounding connective tissue. Even today this is referred to as Glisson’s capsule and the triad (portal vein, biliary duct and hepatic artery) is called portal pedicle or Glisson’s pedicle.
Francois Glisson

1597-1677
N. A. Goldsmith and R. T. Woodburne supported division of the liver into four segments, each having two subsegments with second order of portal vein branches (1957)
C. Couinaud suggested that the liver should be divided into eight segments, based on third order portal vein distribution (1957)
Claude Couinaud
A good knowledge of the anatomy is a prerequisite for modern surgery of the liver.”

H. Bismuth
Henri Bismuth
Bismuth’s classification. H. Bismuth brought together the Couinaud’s cadaveric system in situ and the system of Goldsmith and Woodburn in vivo
He distinguished three planes (scissurae), hosting the hepatic veins and a transverse plane passing through the right and left portal branches. Additionally, H. Bismuth described the caudate lobe as a separate segment I.
Anatomy according to Bismuth
Anatomy 1
Anatomy 2

Cantlie’s line
Falciform ligament

VIII IVa II
IVb
V

Maastricht UMC+ ➔ ESCAM ➔ Uniklinik RWTH Aachen
Anatomy 3
Anatomy 4
Anatomy 7
VIDEO???
Cirrhosis
No comment

I HOPE YOU HAVE FUN WHILE SOME OF US HAVE TO WORK OVERTIME!

theAwkwardYeti.com
Arterial anatomy
Portal Anatomy
Right hepatic duct
Cystic duct
Neck of gallbladder
Common hepatic duct
Mucosa with folds
Body
Common bile duct
Pancreatic duct
Left hepatic duct
Biliary Anatomy

Diagram showing the anatomy of the biliary system, including the right duct, confluence, and left duct with percentage distributions.
Anatomy 12

- **Right Posterior Sectionectomy**
- **Left Medial Sectionectomy**
- **Right Anterior Sectionectomy**
- **Left Lateral Sectionectomy**
Anatomy 13
Key Points

- The anatomy of each liver can be represented at three levels of complexity, according to the uses that the description has to serve.

- The first - conventional - level corresponds to Couinaud's 8-segments scheme and is a very useful referential framework for the localization of focal lesions. It allows a common language between clinicians of different specialties and it is based in fact on the three hepatic veins and on the level of the portal bifurcation rather than on the portal anatomy.

- The second - surgical - level corresponds to the actual (and not the theoretical or schematic) branching of the hepatic vessels. Imaging and surgical techniques are now available to identify and follow this real anatomy during modern liver surgery, allowing anatomically tailored territorial liver resections, but this requires independence from the Couinaud representation.

- The third - academic - level is for the anatomist: a 1-2-20 concept for the number of zero-, first-, and second-order branches respectively, can take into account Couinaud's as well as other segmentations, and does justice to the beautiful complexity of the hepatic vascular tree.
You're getting tired of this? I'm the one who's had to eat liver 735,239 days in a row, and I can't even find a decent wine to go with it!