The Story Behind the Cover Picture

The key role of the hepatic veins collaterals in the modern liver surgery

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Currently, the terminology for liver anatomy and resection was based on the updates of the Brisbane 2000 system (1). In this setting, Couinaud's anatomical description serves as the backbone for the classification of resection (2). Based on this classification, an anatomic liver resection was defined as the complete removal of the liver parenchyma confined within the responsible portal territory. Anatomical subsegmentectomy is defined as the removal of the liver parenchyma within the portal territory of less than a Couinaud's segment. These are also defined as cone units, and their areas can be intraoperatively assessed by using ischemic demarcation, indocyanine green (ICG) staining, or both.

However, in Brisbane terminology, was considered only the guidance by the Glissonian pedicles (arteries, portal and bile ducts). In fact, in approximately half of the patients, the hepatic veins did not run normally and have collaterals (3). During the last decade, a new concept of parenchyma-sparing surgery was introduced ensuring the liver preservation without the venous reconstruction. Torzilli *et al.*, identified by intra-operative ultrasound (IOUS) these hepatic venous collaterals called "communicating veins" in almost 80% of the patients (4). The detection of "communicating veins" may open for new perspectives, otherwise unfeasible, liver resections, event when hepatic vein resection is required. Furthermore, their occlusion represents the key-technical point, of the emerging liver venous deprivation procedure to optimize the future remnant liver (5). In normal livers, without venous obstruction the preoperative detection of communicating veins is not possible due to thin diameter even with the new-generation computed tomography (CT) or magnetic resonance (MR) imaging.

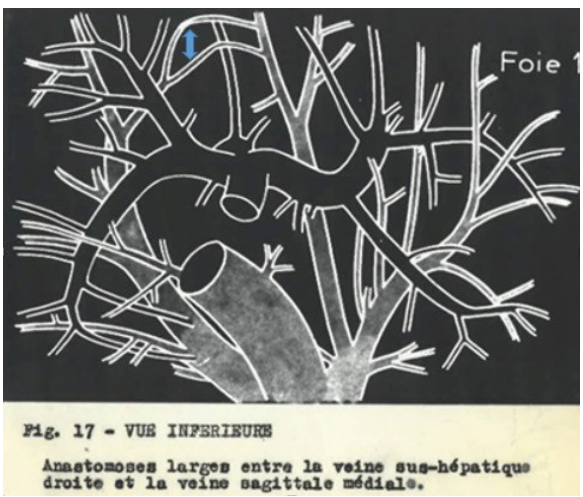

Figure 1 Manuscript (8) dated on June 24, 1953; entitled: *Venous system of the liver* (*Fig. 17*; p150), by Dr. Paul E. Rapp, MD (Museum and Conservatory of Anatomy, University of Montpellier, France). Black vessels: portal vein system; grey vessels: hepatic vein system. Arrow: communicating veins between the rHV and the mHV. rHV, right hepatic vein; mHV, middle hepatic vein.

Historically, Tôn Thât Tùng in Hanoi [1939], described the role of the venous drainage, while Hardy [1972] studied the distribution of inter-hepatic vessels, all aiming to reduce the risks associated with hepatic resection (6,7). In France, at quite the same period (1951–1954), two surgeons Rapp in Montpellier with 134 livers (*Figure 1*) corrosions and Couinaud in Paris with 144 livers corrosions

(the most important collection on the corrosion livers in the world) studied the variations and the intrinsic vascular segmentations of this complex organ (2,8). In particular, Rapp studied the frequency and the multiplicity of anastomoses, existing between the hepatic veins. From a practical point of view, he constated that a traumatic, surgical, or thrombosis of a large hepatic trunk, does not seem to alter the return circulation in its territory of origin.

These anatomical "forgotten" details today, play a key role in the modern surgery of the liver.

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References

1. Wakabayashi G, Cherqui D, Geller DA, et al. The Tokyo 2020 terminology of liver anatomy and resections: Updates of the Brisbane 2000 system. J Hepatobiliary Pancreat Sci 2022;2:6-15.
2. Couinaud C, Nogueira C. Les veines sus-hépatiques chez l'homme. Acta Anat 1958;34:84-110.
3. Sato F, Igami T,Ebata T, et al. A study of the right intersectional plane of the liver based on virtual left hepatic trisectionectomy. World J Surg 2014;38:3181-5.
4. Torzilli G, Garancini M, Donadon M, et al. Intraoperative ultrasonographic detection of communicating veins between adjacent hepatic veins during hepatectomy for tumours at the hepatocaval confluence. Br J Surg 2010;97:1867-73.
5. Panaro F, Giannone F, Riviere B, et al. Perioperative impact of liver venous deprivation compared with portal venous embolization in patients undergoing right hepatectomy: preliminary results from the pioneer center. Hepatobiliary Surg Nutr 2019;8:329-37.
6. Tùng TT. La vascularisation veineuse du foie et ses applications aux résections hépatiques. 1939.
7. Hardy KJ. The hepatic veins. Aust N Z J Surg 1972;42:11-4.
8. Rapp PE. Le réseau veineux du foie: systématisation générale. 1953.

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