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A new approach to manage aberrant hepatic arteries in liver transplantation: is one better than two?

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Abnormal hepatic arterial supply has been documented in 20-50% of people. (1) The presence of aberrant hepatic arteries (AHAs) has relevant implications for liver transplantation (LT). AHAs imply more complex surgery and an increased risk for postoperative complications.

AHAs can be divided into two great categories: accessory and replaced branches.

When a graft with AHAs is transplanted, two approaches may be considered: reconstruct all the aberrant branches systematically or adopt a selective reconstructive approach.

Living donor LT has the advantage of taking profit from a very detailed pre-operative imaging of the donor's vessels and bile ducts. (2-4) This detailed anatomical knowledge allows planning preoperatively for optimal reconstruction.

Makuuchi's Group was the first to address a more selective approach based on the simple test of adequate backflow after allograft arterialization. In the case of adequate backflow, the supplementary artery was ligated. (2) Several Asian groups, such as the Asan Seoul and the Kaohsiung Groups, clearly prefer to reconstruct all the arteries. (3,4) This approach was also adopted as a safety net in case one artery should thrombose.

In the setting of deceased-donor LT, the situation is more complicated, as precise cartography of the arterial tree is typically absent at the time of procurement. (1) The discovery of an aberrant vessel often results in a more complex arterialization procedure.

In this issue, Pravisani R et al. from the Beaujon Hospital of Paris, France, report about a "one liver, one artery" approach, in which a prospectively applied selective reconstruction policy is adopted. (5) The largest vessel is first reconstructed if an AHA is encountered. If an adequate bilobar arterial perfusion is assessed by intra-parenchymal Doppler ultrasounds (IODUS), the remaining vessel is ligated. Conversely, if the intra-parenchymatous flow is judged insufficient, the AHA is also reconstructed. (5)

The rationale for this "one liver, one artery" approach derives from the old evidence that hepatic arteries are not end-arteries and that trans-lobar and subcapsular collaterals allow reconstituting the blood flow in the territory corresponding to the ligated AHA. This datum has already been verified half a century ago by in-vivo selective catheterization. (6)

The potential benefits of not reconstructing an "unnecessary" branch are triple: a) avoidance of hepatic artery thrombosis caused by arterial kinking, b) shortening of the warm ischemia time, and c) shortening of the operation time. (7)

Conversely, the incautious ligation of an AHA harbors the increased risk for biliary strictures or even severe liver dysfunction due to partial graft necrosis. (8)

The study by Pravisani et al. has the merit of proposing a standardized approach to a piece of evidence already reported in previous experiences. A study from Italy (N=395), specifically focused on the left aberrant branch management, identified several parameters to define this artery as an accessory or a replacing vessel. Among them, the absence of a bilobar flow observed in the IODUS suggested the necessity to reconstruct the vessel. (9)

In conclusion, the systematic adoption of the IODUS in the presence of an aberrant branch represents a valuable tool for transplant surgeons. This approach prevents the potential side effects of unnecessary and complex arterial reconstructions or inadequate ligation.

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The standardization of this approach with prospective external validation in other transplant experiences is warranted to validate the "one artery, one liver" approach.

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