

Is really full right full left split liver transplantation a valuable tool to increase organ availability?

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The gap between available liver grafts and the number of patients in need for liver transplantation represents an unsolved issue worldwide. To overcome this persistent disparity, which is of particular relevance for adult recipients, split liver transplantation (SLT) is one of the main resources utilized by liver transplant centers.

While this strategy is commonly accepted when one pediatric and one adult patient are transplanted by a conventional splitting technique, adult-to-adult split liver transplantation (AASLT) has not yet gained the same consensus within the transplant community due to variable results (1-3). In fact, more than one experienced Center and even multicenter series have shown inferior outcomes when compared to those achieved with whole liver grafts transplanted into adults (3,4).

With the spread of a Model for End stage Liver Disease (MELD)-based organ allocation system also outside the U.S.A. in Europe and Asia, the application of SLT has become more difficult, because at least one of the two generated partial grafts should be transplanted into a (very) sick patient (5,6).

Since AASLT is a demanding technique, it should be performed by Centers with great experience in both liver transplantation and resection, but, unless the procedure is performed by a single team for its own pair of recipients, there is another crucial requisite, that is, the perfect coordination by two Institutions involved. For this purpose, the best way to systematically apply a policy of splitting shared at a multicenter level is to establish *a priori* donor, recipient and logistic criteria able to minimize the risk of failure of SLT.

The paper by Aseni *et al.* (7) reports on the 12-year

activity of AASLT of the North Italy Transplant (NIT) organization, which includes most of the liver transplant Centers in the North of Italy. Surgeons and physicians working within this organization greatly contributed to expand and innovate SLT (8-11) and, importantly, they designed a model of cooperation able to detect, once a donor with adequate characteristics for splitting had been identified, the best pair of recipients among those listed at every participating Center.

This well-constructed program represents the ideal platform to share partial grafts under strict criteria of allocation, respecting the choice of the assigned Center to perform or not SLT, and favoring the interaction between different teams, with the consequent possibility of less experienced ones of improving results. A similar commitment among Centers has never been replicated elsewhere, and its principal value resides in the attempt to systematize a practice commonly considered extemporaneous.

Considering this background, one would expect that outcomes generated by this policy are optimal and/or progressively improving over time. In fact, although the NIT criteria for splitting seemed to be eventually fulfilled, with very favorable donor characteristics, median graft-to-recipient weight (GRWR) ratio far above 1, and largely acceptable ischemia time (6 hours), the Authors report 64% grade III and IV complications, and 5-year patient and graft survival rates significantly lower than that of whole liver transplants (WLTs) performed in the same period (63% *vs.* 83%, and 58% *vs.* 80%, respectively). These data are very similar to those shown by preliminary reports of the activity of Centers acting within the same organization (3,4),

meaning that there was no real improvement of results over time. The Authors conclude that AASLT should be considered a surgical option only in experimental clinical studies in experienced centers.

This latter statement sounds a little contradictory, because NIT itself is composed of Institutions performing SLT since late nineties, thus with one of the most relevant expertise in Europe. Nevertheless, the Authors could mean that not all Centers had the same skills, and this is probably related to the unequal “attitude” to perform SLT within the same cooperative group.

On the other hand, the Authors of another previous study from the same NIT experience of full-right/full-left SLT commented these results as not dismal, since they were better than those of living-donor liver transplants (LDLTs) reported in the European Liver Transplant Registry (11). We would prefer to support this latter and more optimistic point of view, considering the unfavorable logistic conditions inherent to SLT and virtually absent in LDLT. Given that, we do not believe that 63% 5-year survival is an unsatisfactory figure.

More importantly, the results reported by Aseni and Colleagues prove that, even in front of the best available policy design, AASLT remains a practice subjected to a multitude of drawbacks, most of which are uncontrollable or unpredictable. If LDLT is still considered a challenging procedure, requiring a thorough investigation of donor and recipient, then AASLT should be considered a sort half-blinded LDLT, where the average graft quality is inferior, graft anatomic and volumetric features become understandable only during or after the procedure, and the ischemia time is longer. The disarming effect is that probably even experienced Centers will continue to produce worse results as compared with WLT or LDLT, unless the workup of deceased donors chosen for splitting could approach that of LDLT. Despite the impossibility of obtaining a radiological volumetric assessment for logistic reasons, it has been shown that by the routine use of intraoperative cholangiography and ultrasound, together with surgeons skills and correct criteria of donor selection, the results could be similar to those of LDLT, even in recipients with high MELD score (6).

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