



The efforts are worth the benefits for laparoscopic liver resection

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Last year, *Hepatobiliary Surgery and Nutrition* published an interesting analysis performed by Ratti and colleagues (1). This study aimed to understand if the efforts associated with the laparoscopic approach in liver surgery are always worthwhile, specifically in high-complexity cases. Primary endpoint was to analyse the degree of benefit of laparoscopy over open liver surgery (OLS) in different levels of technical difficulty. Secondary endpoint was to confirm that advantages of minimally invasive techniques over open are detectable within all levels of complexity.

The benefits of laparoscopic liver surgery (LLS) have been extensively documented over the past decade (2,3), leaving no real doubt that its implementation is justified. As correctly stated by the authors, there is no real evidence of these benefits in all levels of complexity. Two recent studies, performed by the authors, suggest that advantages of LLS are more detectable in technically more demanding procedures (4,5). As the efforts of LLS are high (higher costs, need for specific training, longer operative times), it is important to investigate whether these are worthwhile in every case.

This analysis is of great value and might be the first of many investigating this topic. To our knowledge, this is indeed the first article comparing the benefits of LLS over OLS in different complexity cohorts. It is also the first article reporting the differential benefit stratified per complexity. Another strength of this study is the large amount of patients in this high volume centre, resulting in large cohorts of patients in the three pairs.

Despite the limitation of the retrospective nature of this study, the methodology is strong. As a matter of fact,

a retrospective study is arguably the only possible way to investigate the issue. Furthermore, the methodology of this study is robust. The process of propensity score matching and bootstrap analysis should suffice to overcome any selection bias.

The concept of differential benefit is new but is a very important finding. It compares the benefits of laparoscopy over open surgery in cohorts with different levels of complexity. In this analysis, laparoscopy was associated with clinical benefits in all levels of difficulty, yet the advantages were wider in more complex procedures. This clearly supports the statement that the efforts of LLS are justified. Another argument in favour of these efforts is the finding that outcomes of converted procedures are similar to those in open procedures.

An important item in many studies analysing LLS, including this study, is the difficulty score. Several authors have proposed a scoring system, based either on technical difficulty or on the risk of intraoperative complications (6-8). The scoring system used in this analysis was proposed by Ban and is probably the most widely used difficulty scoring system. It has been validated for LLS (9). However, there is a wide range of scoring systems used in literature, and most of these are only validated for LLS. Also, little is known about their applicability in OLS.

The authors take a different standpoint on the concept of the difficulty score: it is usually viewed as a “bottom-up” stairway to progressively take on more complex cases. In this view, it aids in going through the learning curve of LLS. However, they propose to use the score to identify the areas with the highest possible clinical benefits. Although these

findings are theoretically correct, this should, in our view, not lead to stopping implementing LLS in less complex procedures. Also, in this cohort, the most difficult resections were presumably performed by the most experienced surgeons. Therefore, these results should be extrapolated with caution to other, less experienced surgeons.

To conclude, this study is the first to introduce the concept of differential benefit in laparoscopic compared to OLS. The important finding that the clinical advantages are wider in more complex procedures, clearly justifies the efforts of laparoscopic liver resections.

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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