

Laparoscopic Liver Surgery: A Marriage of Technology and Surgical Technique

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Introduction

Laparoscopic liver surgery originally started as an example of surgical prowess and an attempt to extend the benefits of minimally invasive surgery into the realm of more demanding procedures. This led to an enthusiastic increase in laparoscopic liver procedures, with the goal of pushing to see how far we could go. Eventually, it became clear that there would need to be a better coordinated effort, resulting in the organization of two significant consensus conferences with the participation of the more experienced surgeons in the field. The first consensus conference in Louisville in 2008 established the feasibility and safety of the procedure and examined the question of appropriate indications [1]. The second consensus conference, held in Morioka in 2014, included a panel of laparoscopic and “open” hepatic surgeons, who after a very detailed process came to the conclusion that there was a lack of solid and convincing evidence, and that although laparoscopic liver surgery had a role for minor hepatic resections, in the case of major resections its applicability was still being evaluated [2].

The paper “Current Concepts in Laparoscopic Liver Surgery” in this edition of the Hellenic Surgery journal [3] provides us with an excellent review of the history of the evolution of laparoscopic liver surgery, and of the major challenges and obstacles involved. The authors very astutely raise the issues of lack of experience, quality of the available instrumentation, concern about adverse intraoperative events and oncological outcomes, as some of the key factors that have delayed the widespread acceptance of laparoscopic liver surgery. In addition, they provide us with an overview of how these concerns have been (and still are being) addressed, generating continuing interest in pushing the limits.

Present Challenges and Future Prospects

The continued success of laparoscopic liver surgery is predicated on the need to address the following points:

a. Indications: The indications for laparoscopic liver resection have evolved significantly over the last 30 years,

with the majority of resections still being performed for benign disease (approximately 60%). Accumulated experience has led to the use of laparoscopic surgery for major hepatectomies in large liver centers, even in the case of cirrhosis, with the advantages of smaller abdominal incisions, reduced fluid requirements, preservation of collaterals and allowing for more manageable repeat resection or liver transplantation, should the need arise. Even so, there are still limitations, including its application for living donors, as discussed at the Morioka conference, given the fact that the safety of the living donor is paramount and should be ensured at all costs.

b. Instrumentation: Technological progress in providing improved instrumentation for parenchymal transection and hemostasis has been a key factor in allowing the careful expansion of indications. This includes the use of intraoperative ultrasound (U/S) and improved 3D imaging, which have facilitated a more accurate targeted approach with more limited, yet oncologically sound, resection.

c. Results: Although there is an overall paucity of randomized controlled trials (RCTs), the majority of reported results document the oncological soundness and efficacy of the laparoscopic approach, in the hands of experienced surgeons, and with the use of the intraoperative U/S. These findings remain to be verified by the currently ongoing RCTs that the authors very astutely discuss in their paper.

e. Training and the Learning Curve: As in the application of any new surgical technique or technology, the learning curve has been essential in fostering acceptance of the procedure and adoption by an increasing number of surgeons and liver centers. This is probably the most relevant point for the future progress of laparoscopic hepatic surgery, as we need to remember that the surgeon performing these procedures needs to possess expertise in BOTH hepatic and minimally invasive surgery. At the second consensus conference in Morioka the need for a formal education curriculum was stressed, which will include a progression from simpler, limited resections to gradually being able to perform major hepatectomies. This is easier said than done, given the fact that once the attending surgeons have mastered the technique, it will be vital to teach it to the fellows and, subsequently, the surgical residents. Fortunately, there are significant “allies” in this effort, such as the use of surgical simula-

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tion, aimed at achieving excellent training with minimal risk to the patients.

Conclusion

The authors of the paper “Current Concepts in Laparoscopic Liver Surgery” have presented the current status of laparoscopic liver resection and have accurately discussed the key points made above. We need to remember the two key guiding principles in the current surgical era, namely: a) the importance of precision medicine and surgery, with a patient-targeted approach, and b) the necessity of adopting the emerging technologies in an effort to achieve a minimally invasive approach towards surgical treatment of our patients, so that we can achieve cures with the least possible disruption of their physiology. Laparoscopic liver surgery represents a perfect example of a field where these

two principles can and should be carefully applied. As such, we should not “fear” it, but rather identify the safest manner to conquer the technique.

References

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