



Laparoscopic liver resection for hepatocellular carcinoma is gaining acceptance

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Laparoscopic liver resection (LLR) has evolved dramatically in the last years with an increasing number of centers adopting this surgical approach worldwide (1). Though technically demanding, LLR is becoming extensively used following the evolution of the recommendations from different consensus conferences, from Louisville in 2008 (2) and Morioka in 2014 (3) to Southampton in 2017 (4). When compared with open resection, LLR has repeatedly shown a reduction in complication rates, blood loss, need for transfusion and hospital stay (1).

Surgical treatment of hepatocellular carcinoma (HCC) has specific features due to the fact that most HCC arise in cirrhotic livers mainly in Western countries (5). Liver resection in cirrhosis increases the risk of developing significant complications, such as hepatic failure, ascites and encephalopathy, that may affect survival (6). LLR for the treatment of HCC has shown a reduction in overall morbidity, including the development of ascites, liver failure and respiratory complications, with improved overall survival, but not disease-free survival (7,8). After some initial reluctance, there is currently no doubt that LLR is feasible and result in excellent surgical outcomes when performed by experienced surgeons. According to a recent Asian Pacific consensus conference, minor LLR is a preferred practice for HCC at experienced centers, while major LLR for HCC should be performed in centers of excellence (9). In addition, oncological results after minor LLR for HCC are at least comparable to the open approach, while

evidence in favor of major LLR is not as strong, particularly in cirrhotic patients (10).

Anatomical resection in patients with HCC has been related to an improvement in survival. A recent meta-analysis showed a significant improvement in one-, three- and five-year disease-free survival after anatomical open liver resection when compared to non-anatomical resection (11). In this study, complication rates and early mortality were comparable despite an increase in blood loss after anatomical surgery. The potential benefit in survival of the anatomical approach has also been observed in HCC with microvascular invasion (12). Nevertheless, not all studies have shown homogeneous results. Marubashi *et al.* failed to demonstrate any benefit in survival in a propensity score-matching study comparing 329 open anatomical resections for HCC versus 329 non-anatomical resections (13). Anatomical LLRs for HCC are also gaining widespread acceptance in experienced centers (14). The potential benefit of the anatomical laparoscopic approach has been observed even in large HCC. In this sense, a recent study showed a significant benefit in three-year disease-free survival with significantly less intrahepatic recurrence after anatomical laparoscopic resection, though with increased time of surgery and blood loss (15).

Apart from the potential superiority of anatomical resection, there are still some other important matters to be defined in the use of minimally invasive approach in HCC: the role of indocyanine green fluorescence, the potential

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benefits in the treatment of BCLC stage B (intermediate) and C (advanced) lesions or patients with clinical portal hypertension and the role of the robotic approach.

Oppici *et al.* present a retrospective analysis of the evolution of LLR for HCC in a Western center (16). The authors studied a cohort of 149 HCC patients treated with LLR from 2009–2018. As common in Europe, most of the patients were affected by cirrhosis (94.6%) with a relatively conserved hepatic function: Child-Pugh A in 88.6% and MELD score <10 in more than 70% of the patients. The whole cohort was divided in two five-year periods: 52 patients from 2009–2013 and 97 patients from 2014–2018. This increase in the number of HCC patients treated laparoscopically during the second period seemed to be related to an increase in the total number of HCC cases resected at the authors' unit and the proportion of patients treated with LLR. Of note, 32.4% of the HCC patients were treated with LLR during the first period, increasing to 42.8% during the second period.

The main findings of this study included no significant differences between the two time periods in terms of liver function of the operated patients, according to the Child-Pugh or MELD scores. There were also no differences in the number of nodules being a single HCC in 71.2% *vs.* 78.4% of the cases, respectively. Though nodules >30 mm in size were more common in the second period the proportion of major hepatectomies did not increase significantly, from 1.9% to 4%, respectively. Nevertheless, segmentectomies were more common during the second period (50% *vs.* 34.6%), with a reduction of wedge resections from 46.2% to 22.9%. Unfortunately, if this difference resulted from a modification in the protocol in favor of anatomical resection of HCC instead of non-anatomical approach, it was not commented by the authors. In addition, no differences were shown between the periods in the use of the Pringle maneuver, blood loss, operative time and hospital stay.

The limitations of the study are principally related to its retrospective design and descriptive nature, as the authors did not provide any statistical analysis comparing both periods of time. Of note, there is a lack of significant data relating short- and long-term outcomes. The authors did not provide data regarding complications observed after LLR; therefore, neither the security of LLR can be discussed nor can a learning curve be defined. This would have been of interest when it seems that all procedures were performed by a single experienced surgeon. The use of indocyanine green fluorescence, which has the advantages

of real-time illumination of occult lesions and assessment of the surgical margins and anatomical landmarks of the liver, was also not described. Again, the authors did not provide data regarding surgical margins, type of resection (anatomical or non-anatomical), follow-up or survival. Therefore, no conclusions can be drawn about the adequacy of LLR for the treatment of HCC, compared to an open procedure or other therapeutical approaches.

In conclusion, the authors show the evolution of the LLR of HCC in an experienced Western unit during a 10-year period, demonstrating its feasibility. However, the lack of data prevents the study from demonstrating any benefit of this minimal invasive surgery in security or oncological aspects, such as tumor recurrence or survival.

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References

1. Ciria R, Cherqui D, Geller DA, et al. Comparative short-

- term benefits of laparoscopic liver resection: 9000 cases and climbing. *Ann Surg* 2016;263:761-77.
2. Buell JF, Cherqui D, Geller DA, et al. The international position on laparoscopic liver surgery: The Louisville Statement. *Ann Surg* 2009;250:825-30.
 3. Wahabayashi G, Cherqui D, Geller DA, et al. Recommendations for laparoscopic liver resection: a report from the second international consensus conference held in Morioka. *Ann Surg* 2015;261:619-29.
 4. Abu-Hilal M, Aldrighetti L, Dagher I, et al. The Southampton Consensus Conference Guidelines for Laparoscopic Liver Surgery: From Indication to Implementation. *Ann Surg* 2018;268:11-8.
 5. Bruix J, Sherman M. Management of hepatocellular carcinoma. *Hepatology* 2005;42:1208-36.
 6. Hackl C, Schilth HJ, Renner P, et al. Liver surgery in cirrhosis and portal hypertension. *World J Gastroenterol* 2016;22:2725-35.
 7. Chen K, Pan Y, Zhang B, et al. Laparoscopic versus open surgery for hepatocellular carcinoma: A meta-analysis for high-quality case-matched studies. *Can J Gastroenterol Hepatol* 2018;2018:1746895.
 8. Goh EL, Chidambaram S, Ma S. Laparoscopic versus open hepatectomy for hepatocellular carcinoma in patients with cirrhosis: A meta-analysis of the long-term survival outcomes. *Int J Surg* 2018;50:35-42.
 9. Cheung TT, Han HS, She WH, et al. The Asia Pacific Consensus Statement on Laparoscopic Liver Resection for Hepatocellular Carcinoma: A Report from the 7th Asia-Pacific Primary Liver Cancer Expert Meeting Held in Hong Kong. *Liver Cancer* 2018;7:28-39.
 10. Komatsu S, Brustia R, Goumard C et al. Laparoscopic versus open major hepatectomy for hepatocellular carcinoma: A matched pair analysis. *Surg Endosc* 2016;30:1965-74.
 11. Moris D, Tsilimigras DI, Kostakis ID, et al. Anatomic versus non-anatomic resection for hepatocellular carcinoma: A systematic review and meta-analysis. *Eur J Surg Oncol* 2018;44:927-38.
 12. Zhong XP, Zhang YF, Mei J, et al. Anatomical versus Non-anatomical Resection for Hepatocellular Carcinoma with Microscope Vascular Invasion: A Propensity Score Matching Analysis. *J Cancer* 2019;10:3950-7.
 13. Marubashi S, Gotoh K, Akita H, et al. Anatomical versus non-anatomical resection for hepatocellular carcinoma. *Br J Surg* 2015;102:776-84.
 14. Ryu T, Honda G, Kurata M, et al. Perioperative and oncological outcomes of laparoscopic anatomical hepatectomy for hepatocellular carcinoma introduced gradually in a single center. *Surg Endosc* 2018;32:790-8.
 15. Xu H, Liu F, Hao X, et al. Laparoscopically anatomical versus non-anatomical liver resection for large hepatocellular carcinoma. *HPB (Oxford)* 2020;22:136-43.
 16. Oppici D, Sbuely F, Scotti A, et al. Laparoscopic liver resection for hepatocellular carcinoma: 10 years retrospective study of laparoscopic liver resection in a single reference center. *Dig Med Res* 2020;3:38.

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