Editorial

Robotic resection for posterosuperior liver lesions: is it really superior to laparoscopic resection?

Andrew K. Y. Fung, Kit-Fai Lee

Department of Surgery, Prince of Wales Hospital, The Chinese University of Hong Kong, Hong Kong, China

Correspondence to: Kit-Fai Lee. Department of Surgery, Prince of Wales Hospital, The Chinese University of Hong Kong, 30–32 Ngan Shing Street, Shatin, N.T., Hong Kong, China. Email: leekf@surgery.cuhk.edu.hk.

Comment on: Melstrom LG, Warner SG, Woo Y, *et al.* Selecting incision-dominant cases for robotic liver resection: towards outpatient hepatectomy with rapid recovery. Hepatobiliary Surg Nutr 2018;7:77-84.

Submitted Dec 16, 2018. Accepted for publication Dec 24, 2018.
doi: 10.21037/hbsn.2018.12.12
View this article at: http://dx.doi.org/10.21037/hbsn.2018.12.12

Recovery after traditional open liver resection is greatly hindered by a big upper abdominal incision. This is especially true when the scale of parenchymal liver resection is relatively small, such as wedge resection or left lateral sectionectomy. In such scenarios, the access trauma outweighs the surgical trauma. On the other hand, when the surgical trauma is large, such as major hepatectomy or extended liver resection, the surgical trauma rather than the access trauma determines the postoperative recovery. Thus, minimal access surgery or minimally invasive surgery has come up as a fantastic way to minimize the access trauma and help to speed up recovery and shorten hospital stay (1).

In the manuscript by Melstrom *et al.* (2), the authors correctly pointed out that liver resection could be segregated into three categories: (I) major hepatectomy, (II) minor hepatectomy for segments 3, 4b, 5, 6, and (III) minor hepatectomy for segments 1, 2, 4a, 7 and 8. It was for category II and III that the access trauma outweighs the surgical trauma in open hepatectomy and that minimally invasive approach can hasten postoperative recovery. The authors further pointed out that it was for category III that robotic approach might offer benefit over laparoscopic approach due to higher instrument dexterity. In the paper, since there was no breakdown of different liver segments in category III liver resection, it was reasonable to assume that most of the lesions were in posterosuperior segments of liver as isolated segment 1 or 2 liver resection was rare. In other words, robotic liver resection was most beneficial for small scale resection in posterosuperior segments of liver.

The drawback of this paper is that the authors did not adopt an intention-to-treat analysis. The final analysis only included patients who have successful robotic liver resection performed. On the other hand, the actual conversion rate was not low, which was (5/13) 38.5%, (1/51) 2.0% and (4/33) 12.1% for category I, II and III liver resection respectively. Of note, though both belonged to minor hepatectomy, the conversion rate for category III liver resection was much higher than that of category II (12.1% *vs.* 2.0%). High conversion rate can dilute the claimed benefits in the quoted result. Besides, the authors only mentioned that conversions were mostly due to more extensive disease found. It is crucial to list out the reasons for conversion. Conversion rate can be lowered by better case selection if the problem lies on inadequate pre-operative disease assessment rather than hemorrhage. Another important piece of information missing is the size of tumor resected and the resection margin obtained. From our experience, laparoscopic wedge resection was more prone to have narrower resection margin than laparoscopic anatomical resection such as left lateral sectionectomy (3). Even with robot assistance, an adequate resection margin may be difficult to obtain with wedge resection in posterosuperior segments of liver, especially when the tumor is large and deep seated, due to poor exposure and restricted movement of dissecting instruments in the narrow space between the diaphragm and the liver. If there is high rate of involved resection margin, the robotic approach cannot be regarded as desirable even if it can accelerate recovery.

For laparoscopic or robotic liver resection in posterosuperior segments of liver, a left decubitus or even a

© HepatoBiliary Surgery and Nutrition. All rights reserved.

left lateral position with reverse Trendelenburg position is usually necessary. With such posture the space for robotic port placement is diminished and intercostal placement of port may be necessary. Pringle maneuver is also difficult to apply in such patient position. The authors should elaborate how they can overcome such hurdle in robotic hepatectomy and what is the difficulty encountered if conversion to open is needed.

It is well known that laparoscopic resection of posterosuperior lesions is difficult. Study had shown that compared with resection of anterolateral liver lesions, it was associated with longer operation time, increased blood loss and longer hospital stay, but there was no increased conversion, no increased postoperative complication and similar long-term survival (4). A systemic review of laparoscopic liver resection (including one robot assisted) for difficult lesions just published earlier this year collected 11 articles on resection of posterosuperior lesions, with all together 206 patients (5). There was no mortality. Morbidity ranged from 0% to 8.3%. The mean operation time ranged from 105 to 272 min. The mean blood loss ranged from 60 to 400 mL. It seems that despite the technical difficulty, laparoscopic approach is safe and feasible in experienced centers.

Robotic resection of posterosuperior lesions was also reported in literature (6). It included 12 patients. One patient needed conversion. The mean operative time was 260.4 min. Mean blood loss was 252.7 mL. There was no mortality and complications occurred in 4 patients (33.3%).

A propensity score-matched comparison between robot and laparoscopic resections of posterosuperior lesions was published 2 years ago (7). There were 36 robotic and 72 matched laparoscopic liver resections. There were no significant differences in blood loss, hospital stay, R0 resection margin rate, morbidity and mortality. The only difference found was a longer inflow occlusion time (77 *vs.* 25 min, P=0.001) required in the robotic group. Hence, the claimed superiority of robotics over conventional laparoscopic approach for the category III liver resection was not seen in this study.

Finally, one should not forget alternate treatment option when a difficult located liver tumor is encountered. For small (<3 cm) hepatocellular carcinoma, radiofrequency ablation can be as effective as hepatectomy with comparable overall survival (8). This is especially true for small deep-seated tumors in the posterosuperior segment of liver in which a laparoscopic or even a percutaneous ablation seems to be much simpler than a robotic resection. Certainly, it would be better answered by a randomized controlled trial.

Nevertheless, the paper by Melstrom *et al.* has highlighted the value of minimally invasive liver resection in incision-dominant cases: small tumors in difficult locations which would otherwise require a large incision for removal. As the surgical trauma is small, it is the access trauma rather than the physiology of liver regeneration that dominates the postoperative recovery. Short stay or even outpatient hepatectomy is not impossible in well selected patients. A well-designed enhanced recovery after surgery (ERAS) program seems to be a crucial part to make it come true. Whether robot offers advantage over conventional laparoscopy for these difficult location lesions remains to be answered.

Acknowledgments

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

References

1. Cuschieri A. Minimal access surgery and the future of interventional laparoscopy. Am J Surg 1991;161:404-7.
2. Melstrom LG, Warner SG, Woo Y, et al. Selecting incision-dominant cases for robotic liver resection: towards outpatient hepatectomy with rapid recovery. Hepatobiliary Surg Nutr 2018;7:77-84.
3. Lee KF, Wong J, Cheung YS, et al. Resection margin in laparoscopic hepatectomy; a comparative study between wedge resection and anatomical left lateral sectionectomy. HPB (Oxford) 2010;12:649-53.
4. Lee W, Han HS, Yoon YS, et al. Comparison of laparoscopic liver resection for hepatocellular carcinoma located in the posterosuperior segments or anterolateral segments: a case-matched analysis. Surgery 2016;160:1219-26.
5. Araki K, Kubo N, Watanabe A, et al. Systemic review of the feasibility and future of laparoscopic liver resection for difficult lesions. Surg Today 2018;48:659-66.
6. Boggi U, Caniglia F, Vistoli F, et al. Laparoscopic robot-assisted resection of tumors located in posterosuperior liver segments. Updates Surg 2015;67:177-83.
7. Montalti R, Scuderi V, Patriti A, et al. Robotic versus

© HepatoBiliary Surgery and Nutrition. All rights reserved.

laparoscopic resections of posterosuperior segments of the liver: a propensity score-matched comparison. Surg Endosc 2016;30:1004-13.

8. Kim GA, Shim JH, Kim MJ, et al. Radiofrequency ablation as an alternative to hepatic resection for single small hepatocellular carcinomas. Br J Surg 2016;103:126-35.

Cite this article as: Fung AK, Lee KF. Robotic resection for posterosuperior liver lesions: is it really superior to laparoscopic resection? HepatoBiliary Surg Nutr 2019;8(3):264-266. doi: 10.21037/hbsn.2018.12.12

© HepatoBiliary Surgery and Nutrition. All rights reserved.