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# Feasibility and oncologic efficacy of robotic vs. open liver resection for large and huge hepatocellular carcinoma

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*Dear Editor,*

We wish to congratulate Zhang *et al*.[1] for their interesting work on the use of robotic liver resection (RLR) in patients with large (≥5 cm in size) and huge (≥10 cm) hepatocellular carcinomas (HCCs). In this retrospective, propensity score matched (PSM)-based multicenter study from eight Chinese centers, the authors reported the feasibility and safety of RLR for large and huge HCC compared to open liver resection (OLR). The study population (280 RLRs and 465 OLRs after the PSM) consisted of 65% of cirrhotic patients (varices in 5%), solitary HCCs of BCLC (Barcelona Clinic Liver Cancer) stage A in 88%, and a little less than 20% of tumors were ≥10 cm. The authors demonstrated similar short-term and long-term outcomes (recurrence and survival) between RLR vs. OLR. Interestingly, some advantages in favor of RLR were found in the short-term results of surgery, like a shorter operative time (albeit of only 20 min), half of the blood losses (200 vs. 400 $cm^3$), and a 3 days shorter hospitalization (6 vs. 9 days). The advantages of less bleeding and shorter hospitalization were also confirmed in the subgroup of huge HCCs.

This study indeed provided encouraging results and evidence about a poorly investigated topic[2]. These findings should now be confirmed in the western series and prospectively.

We have some (1) methodological/technical and (2) oncologic comments.

(1) The authors excluded RLR patients requiring intraoperative conversion to laparotomy. When discussing the feasibility of RLR in large/huge HCCs by comparing minimally invasive (MILS) to open liver surgery, it would be useful to include MILS patients converted to laparotomy (intention-to-treat analysis) as well as to detail the reasons for conversion. The inclusion of converted patients could have attenuated (possibly) the advantage of RLR, and conversely, their exclusion could have contributed to the very good results of RLR. Furthermore, conversion could be an important prognostic factor in HCC patients with cirrhosis[3]. We would kindly ask the authors to comment on this. The study lacks some details about resectability or tumor status, eventually increasing the difficulty of MILS and conditioning the selection of one approach over the other (i.e. portal hypertension, tumor proximity to major vessels or bile ducts, contact of tumors with the diaphragm, macrovascular invasion/thrombosis, upper limit of size of HCC). A stratification of the procedures according to their complexity is also lacking (i.e. rate of major hepatectomy, IWATE score)[4]. We believe that those missing data could be responsible for residual selection bias, leading to the inclusion of easier resections in the RLR group and more difficult cases in the open group.

(2) From an oncologic perspective, the presence of macrovascular invasion (not clear if considered an exclusion criteria) or R0 rate were not reported, as well as recurrence and re-treatment details. Most of the patients experienced recurrence as we would expect [median recurrence-free survival (RFS) of 25.7 months in RLR], it would be paramount to understand (a) where recurrences were located (i.e. at the surgical margin or distant within the liver, extra-hepatic) and (b) if the salvageability of RLR was similar to that of open surgery (meaning how recurrences were managed). However, the absence of such data was mitigated by the similar overall survival (OS) and RFS rates reported. Some comments from the authors would be helpful for those who plan to approach these tumors mini-invasively.

We would like to address one last comment regarding the category of huge HCCs. Due to the lack of tactile feedback, the robotic approach could potentially carry a higher risk of tumor rupture compared to open surgery or even to laparoscopy (minimally invasive but with indirect tactile feedback). The latter point was addressed recently in a consensus conference on robotic hepatobiliary surgery (Paris, December 2023), where caution was highly suggested in approaching robotically tumors larger than 10 cm, especially in the posterior–superior liver segments.

We thank once again Zhang *et al*. for their highly focused study, which opens the road to western centers in selecting patients with large HCCs to RLR.

## Ethical approval

No ethical approval is required (correspondence article, no original data included, no patients involved).

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## Author contribution

L.B., E.B., D.G., and A.C.: study concept or design; L.B. and A.C.: writing the paper.

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We (all the authors) have no conflicts of interest to disclose.

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Not applicable.

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