



Are the clinical risk scores of survival after colorectal liver metastases still valuable in the era of laparoscopic liver surgery?

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Comment on: Barkhatov L, Fretland ÅA, Kazaryan AM, *et al.* Validation of clinical risk scores for laparoscopic liver resections of colorectal liver metastases: A 10-year observed follow-up study. *J Surg Oncol* 2016;114:757-63.

Received: 10 January 2017; Accepted: 07 February 2017; Published: 17 March 2017.

doi: 10.21037/ales.2017.03.12

View this article at: <http://dx.doi.org/10.21037/ales.2017.03.12>

We read with interest the article by Barkhatov *et al.* reporting on laparoscopic liver resection for colorectal liver metastases with the aim to validate different clinical risk scores (1). This elegant study shows that excellent long-term results (e.g., up to 32% 10-year survival) can be achieved with adequate surgical resection in selected patients with laparoscopic approach. Interestingly, the Fong score, pre- and postoperative BPI and the Nordlinger score systems can be used to predict survival for laparoscopically operated patients in the era of multimodal-treatment.

A prediction of the risk of recurrence after resection that is as precise as possible is essential for maximizing the benefit from such an invasive strategy. A lot of clinical scores have been proposed by different surgical institutions over the years and all were based on easily available parameters associated with the extent of the primary tumor and colorectal liver metastases or grossly defining the aggressiveness of the disease course. Probably one of the most relevant attempt to define prognosis after surgery on colorectal liver metastases was conducted by Fong *et al.* at the Memorial Sloan-Kettering Cancer Center (MSKCC); the authors analyzed a large database of all patients admitted to their institution for liver surgery from 1985 to 1998. Among the 1,001 patients identified resected for colorectal liver metastases, the authors investigated characteristics of the primary tumor and related colorectal liver metastases or extrahepatic disease, identifying seven parameters that independently predicted outcome after resection: (I) positive surgical margin; (II) presence of extrahepatic disease; (III) number of lesions; (IV) preoperative carcinoembryonic antigen level >200 ng/mL; (V) size of the largest lesion; (VI)

nodal status of the primary tumor; (VI) disease-free interval from the primary to diagnosis of colorectal liver metastases and (VII) bilateral tumors as variables.

Limiting to the five factors that can be accessible before resection and not considering the variables that represented absolute contraindication to resection at the time (i.e., positive margin and the presence of metastases outside the liver, which are both associated with a 1.7-times higher risk of death), a clinical risk score was developed assigning each criterion one point; the MSKCC score proved to be highly predictive of long-term outcome after surgery for colorectal liver metastases, with the risk of death increasing when the number of concomitant risk factors increased. In fact, prognosis varied from patients with no risk factors, who achieved a 5-year actuarial survival rate of 60%, to patients with all the five points, who had a 5-year actuarial survival rate of 14%. The clinical risk score proposed by Fong *et al.* has been subsequently validated by independent data sets and should therefore guide patient selection and treatment allocation but should not be interpreted as absolute contraindication to surgery.

These results are in line with the study from our group published last year in *Annals of Surgery* concerning long-term outcomes following second and third laparoscopic hepatectomies for patients with recurrent CRLM (2). While tumor recurrence is frequent after either a first or second resection, the benefit provided by second and third LLRs was suggested by the excellent 5-year survival rates, which were both better than those obtained after a first LLR and comparable to those observed by open approach. Likewise, Allard *et al.* showed that laparoscopy yields better operative

outcomes without impairing long-term survival in a cohort including more than 2,500 patients (3).

Potential benefits of laparoscopic approach compared with open in liver resection have been largely investigated. The different results suggest the superiority of the laparoscopy in terms of length of hospital stay, transfusion rate, and morbidity. Indeed, the role of the pneumoperitoneum and the magnification achieved by 2D or 3D cameras enable excellent control of small intrahepatic vascular structures and this contributes to limit bleeding during the parenchymal transection. Of course, the laparoscopic approach may be impaired by tumor location, adequate resection margins, and complete intraoperative exploration of the liver. This may lead to worse oncological results in patients operated by laparoscopy for CLM and prefer open hepatectomy.

Overall, these data strongly suggest that in both laparoscopic and open approaches bring equivalent long-term outcomes. In their study the Norwegian teams show that the actual survival exceeded the predicted value by the scoring systems. The reason is more probably due to the multimodal treatments than the mini invasive approach itself. In this setting, the Fong score, even with an underestimation of 16.8% for 5 years survival and 20 months for median survival is the closest of the current results and can be used to predict survival in all patients with CRLM.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the editorial office, *Annals of Laparoscopic and Endoscopic*

Surgery. The article did not undergo external peer review.

Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/ales.2017.03.12>). The authors have no conflicts of interest to declare.

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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doi: 10.21037/ales.2017.03.12

Cite this article as: Gayet B, Fuks D. Are the clinical risk scores of survival after colorectal liver metastases still valuable in the era of laparoscopic liver surgery? *Ann Laparosc Endosc Surg* 2017;2:40.