



Invited Commentary

“Preoperative prediction of tumor recurrence in HCC - A commentary on: Dynamic liver function is an independent predictor of recurrence-free survival after curative liver resection for HCC - A retrospective cohort study” (Int J Surg 2019; Sep 5. pii: S1743-9191(19)30225-0. doi: 10.1016/j.ijjsu.2019.08.033. [Epub ahead of print]



The incidence of hepatocellular carcinoma (HCC) has shown an alarming increase worldwide. Furthermore, it became obvious that especially in Europe more HCC are arising in non-cirrhotic liver [1]. Considerable advances in surgical technique have led to declined postoperative morbidity and mortality but high rates of tumor recurrence (TR) still remain unsatisfactory. Several parameters have been extensively researched to predict recurrence after liver resection in HCC because commonly available preoperative markers (e.g. standard liver function tests) still lack good sensitivity and specificity. While liver transplantation (OLT) as an alternative treatment for HCC displays lower rates of TR, the current shortage of liver grafts in Europe does lead to the necessity of conducting liver resection for HCC as the primary treatment in a significant proportion of patients. Thus, the development of a sophisticated patient selection tool to reliably predict the risk of early TR after surgery is of utmost interest.

In the current issue of *International Journal of Surgery*, Blüthner et al. have investigated the impact of preoperative liver function assessed by the novel ¹³C- breath test LiMAX on the recurrence-free survival (RFS) after liver resection for HCC in curative intent [2]. Herein, the authors demonstrated that the LiMAX test was superior to pathological parameter and standard laboratory tests in predicting TR. Secondly, they also showed the severity of liver dysfunction does significantly correlate with RFS in a subanalysis.

The novel LiMAX test has been introduced in 2009 by Stockmann et al. who determined the value of early postoperative liver function assessed by LiMAX to predict dismal postoperative outcome after liver

surgery [3]. These results were recently supported by a retrospective analysis of 1170 hepatectomies in a single center, demonstrating a declining rate of postoperative liver failure-related mortality following the implementation of the LiMAX test [4]. Subsequently, the LiMAX test has gained widespread around Germany and is also in use in the hepatobiliary center of the authors.

Similar to the results from Bluethner et al., Sasaki et al. have recently shown that the degree of liver dysfunction is associated with the recurrence rate after liver resection in HCC [5]. Thus, there is evidence that the hepatocarcinogenic potential in the remnant liver might be quantifiable by novel liver function tests.

While this study is certainly progressive, it also generates new questions which warrant further research. For instance, Bluethner et al. did not achieve to define a cut-off value for the preference of transplantation over liver resection in their cohort. Moreover, more multicentric prospective data is needed to validate these findings and potentially propose an algorithm to enhance clinical decision-making in patients with HCC which are eligible for both transplantation and liver resection.

In conclusion, combining pathological characteristics, clinical data and tests to estimate the degree of the underlying liver dysfunction should be in the focus of research on the risk of recurrence after curative-intent surgery for HCC. Of note, Bluethner et al. have shown results of a novel liver function test which might be transferable into clinical practice.

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Conflicts of interest

The authors report no conflict of interest.

Provenance and peer review

Invited Commentary, internally reviewed.

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