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Editorial

Diagnostic Performance of a Comprehensive Risk Model for Posthepatectomy Liver Failure

Yong Eun Chung

Department of Radiology, Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

Corresponding Author
Yong Eun Chung
ORCID https://orcid.org/0000-0003-0811-9578
E-mail yelv@yuhs.ac

See "Risk Prediction Model Based on Magnetic Resonance Elastography-Assessed Liver Stiffness for Predicting Posthepatectomy Liver Failure in Patients with Hepatocellular Carcinoma" by Hyo Jung Cho, et al. on page 277, Vol. 16, No. 2, 2022

Although the primary purpose of hepatectomy in patients with hepatic neoplasm is complete tumor removal, this goal should only be considered accomplished with the postoperative recovery of patients. Hence, posthepatectomy liver failure (PHLF) is a major concern after hepatic surgery. In particular, it is necessary to accurately evaluate the risk of hepatectomy and choose the best treatment approach for hepatocellular carcinoma (HCC) patients because other treatment options are available.

To prevent PHLF, sufficient liver function should remain after hepatectomy. As the liver is responsible for several functions including metabolism, biliary excretion, protein synthesis and immune mechanisms, various methods are used collectively to assess overall liver function.[1,2] Traditionally, future remnant liver volume is used to predict PHLF: at least 20% for patients with a normal liver, 30% for patients with liver fibrosis but without cirrhosis and 40% for patients with liver cirrhosis is needed to prevent PHLF after hepatectomy.[3] However, liver volume does not solely represent liver function which is why several methods have been proposed for function assessment such as the Child-Push score, the model for end-stage liver disease score, indocyanine green clearance test, and protein synthesis assessment, and various combinations of these methods.[1] Liver fibrosis is another indicator of liver function, with the aspartate aminotransferase-to-platelet ratio index (APRI) and transient elastography (TE) being used for its evaluation.[1] Initially, TE was mainly used for liver fibrosis, but recent studies have suggested that liver stiffness (LS) measured by TE can be used as a biomarker to predict PHLF.[4-6] In addition to TE, magnetic resonance elastography (MRE) can be used to evaluate liver fibrosis and LS measured by MRE (MRE-LS) can be used as a biomarker for PHLF with a sensitivity of 69.8% and specificity of 72.3% (when the cutoff value was 3.3 kPa).[7] But no study has shown how combinations of MRE-LS and other parameters can attribute to predicting PHLF. In a study by Cho *et al.*,[8] a risk prediction model was developed that included both MRE-LS and other clinical and laboratory parameters. The authors first showed that MRE-LS had better diagnostic accuracy for liver fibrosis compared to conventional serum fibrosis makers including the APRI and fibrosis-4 index and reported poorer liver disease-specific survival (LSS) in patients with PHLF than those without. In a multivariate analysis, high MRE-LS (kPa; hazard ratio [HR], 1.33; p=0.018), high serum alpha-fetoprotein (AFP) (>100 ng/mL; HR, 2.96; p=0.047), and major hepatic resection (HR, 3.01; p=0.031) were independent risk factors for poor LSS in HCC patients who underwent hepatic resection. They also identified high MRE-LS (kPa; odds ratio [OR], 1.49; p=0.006), low serum albumin (≤3.8 g/dL; OR, 15.89; p=0.004), major hepatic resection (OR, 4.16; p=0.010), high albumin-bilirubin score (>−0.55; OR, 3.72; p=0.028), and high serum AFP (>100 ng/mL; OR, 3.53; 95% confidence interval, p=0.022) as independent risk factors for PHLF through the multivariate analysis. Based on these results, the "Comprehensive Risk Model for PHLF (CRMP) index" was developed. The CRMP index showed the highest diagnostic performance for all-grade PHLF and grade B/C PHLF compared to other single biomarkers. In a subgroup analysis, CRMP showed similar diagnostic performance to MRE-LS for predicting all-grade PHLF in

patients who underwent both minor and major hepatic resection and better diagnostic performance compared to MRE-LS for predicting grade B/C PHLF in patients who underwent minor hepatic resection. These are meaningful findings because CRMP can be used as a predictive biomarker for PHLF regardless of the extent of hepatic resection.

In summary, the authors showed that MRE-LS could be a biomarker for predicting PHLF and when added to the CRMP index, diagnostic performance was better than that of MRE-LS alone or other serum fibrosis markers. Although MRE is less accessible than both TE and serum fibrosis tests, considering that most HCC patients planned for surgical resection also need to undergo liver MRI, accessibility is not thought a significant obstacle to using CRMP to predict PHLF. With CRMP as a biomarker, the prognosis of HCC patients can be improved by choosing alternative treatment methods such as transarterial chemoembolization or radiofrequency ablation in patients at high risk for PHLF. One point of concern is, as the authors mentioned, TE-LS which has already been widely used to evaluate liver fibrosis and predict PHLF was not included as a parameter in the predicting model. Hence, a more comprehensive model that incorporates TE, MRE and other clinical parameters needs to be developed and evaluated in a future study.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

ORCID

Yong Eun Chung https://orcid.org/0000-0003-0811-9578

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