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The Need to Correct the Indication for Liver Resection in Cirrhotic Patients with Hepatocellular Carcinoma: Reply

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We are grateful to Di Carlo et al. [1] for their interest in and comments concerning the need to correct the indication for liver resection (LR) in cirrhotic patients with hepatocellular carcinoma (HCC), which we described in our recent article [2]. As we know, LR remains without doubt the main curative treatment for patients with HCC [3], and the criteria for LR proposed by Makuuchi et al. [4] have subsequently been widely utilized for assessing the extent of LR. However, we believe that the majority of centers worldwide might have their own modified criteria for LR based on the frequency of liver surgery at the center and the experience of the surgeons, and also on the facilities available at the respective institute [5–8]. Therefore, Makuuchi's algorithm should, in principle, be considered only a guideline and not applicable to every patient. Each individual should be thoroughly assessed as to whether he/she is suitable to undergo LR for HCC. Theoretically, factors, including the size, number, and location of tumors; hepatic functional reserve; and the patient's physical status, should be taken into consideration when evaluating the suitability of LR.

Indeed, in our study, the patients who died from uncontrollable resistant ascites after LR were mostly those who suffered from postoperative liver failure. Of the 45 patients with uncontrollable resistant ascites, nine had Child class B liver cirrhosis, and 24 patients who had Child-Turcotte-Pugh scores $\leq$6 received extensive LR ($\geq$3 segments). One might argue that these patients were not suitable for surgical resection at the initial assessment or that a limited LR would be better for these patients. Nonetheless, numerous patients with similar conditions have recovered very well, and even without postoperative ascites, following LR. Therefore, the contention remains controversial. Recently, Kuroda et al. [9] presented selection criteria for LR in patients with Child class B liver cirrhosis complicated by HCC [9], and the findings of this study are very helpful for dealing with these patients in daily practice. However, our study was conducted on patients who had undergone LR between 2001 and 2005 for which the information of Kuroda et al. has not yet been reported.

We agree with Dr. Di Carlo's comments that the correct indication for LR could prevent the development of postoperative ascites in cirrhotic patients. Indeed, another objective of our study was to risk stratifying patients who may not benefit from LR. Accordingly, patients at high risk of postoperative ascites could be considered for alternative treatment such as local ablation and/or referred for liver transplantation if indicated. Moreover, along with the advancement of treatment modalities and the progress of liver transplantation programs, we have modified our strategy of managing cirrhotic patients with HCC. Currently, HCC patients with Child class B liver cirrhosis are rarely subjected to LR. Instead, locoregional therapies are frequently suggested for those patients at our institute who might be candidates for liver transplantation [10].

With regard to LR, we also agree with the commentator's statement that it is important to determine the exact liver volume that can be removed from a cirrhotic patient. The ICG test proposed by Makuuchi et al. is without doubt a convenient and widely used tool for assessing the extent of LR for cirrhotic patients. Nevertheless, despite the importance of the ICG test and the extent of LR, a successful

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outcome of LR may also depend on perioperative management and meticulous surgical technique. Therefore, we should not totally exclude all patients at high risk of postoperative ascites because LR remains the best potential curative therapy available for treating patients with HCC.

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