



Liver resection for hepatocellular carcinoma associated with portal vein tumor thrombus

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We would like to thank to Cheng *et al.* for their comments on our recently published article, which demonstrated the survival benefit of hepatic resection for hepatocellular carcinoma (HCC) associated with portal vein tumor thrombus (PVTT) through an analysis of the Japanese nationwide survey (1). The authors supported our findings that PVTT is not a contraindication to liver resection. In addition, they summarized the recent advances in the treatment of HCC with PVTT.

PVTT is considered to be a contraindication to liver resection in Western guidelines and the only proposed treatment option is palliative sorafenib therapy (2). For decades, Eastern centers have repeatedly reported a survival benefit of liver resection in patients with PVTT (3-5). In addition, several recent Western reports have also demonstrated a preferable prognosis after liver resection for HCC patients with PVTT (6,7). Taken together with our study, the literature shows that PVTT should not be considered a contraindication to curative resection especially for PVTT limited to the first-order branch.

However, whether there is a survival benefit of surgical resection for PVTT invading the main trunk or contralateral branch is controversial (1,4). Even after curative resection, patient outcomes for this extremely advanced disease remain dismal, and additional treatment is

necessary. According to our data, perioperative transcatheter arterial chemoembolization did not show better survival (1). As mentioned by Cheng *et al.*, perioperative radiotherapy may be a possible treatment modality to improve outcome for PVTT invading the main trunk or contralateral branch. Further prospective study is needed with special consideration of radiological liver damage.

Surgical procedure is another important issue to consider. The superiority of en bloc resection to thrombectomy is still controversial (8,9). If an en bloc resection is technically feasible without additional procedures or damage to non-cancerous parenchyma, it should certainly be considered first. However, in patients with impaired liver function or PVTT invading the main trunk or contralateral branch, an en bloc resection may be difficult due to the risk of postoperative liver failure and additional procedures, such as segmental resection of the portal vein, may be necessary. In these cases, thrombectomy may be an appropriate procedure to avoid fatal postoperative complications, without impairing the oncological outcomes (8).

Although the survival benefit of surgical resection is evident in patients with PVTT, the prognosis is not satisfactory with high rates of recurrence. Future study focusing on adjuvant treatments and surgical techniques is essential to improve the outcome of this advanced disease.

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