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ASO Author Reflections: Is hepatectomy plus diaphragmatic resection for

hepatocellular carcinoma with diaphragmatic involvement justified?

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PAST

Hepatic resection is the accepted treatment for hepatocellular carcinoma (HCC), but the validity of a hepatectomy combined with diaphragmatic resection for treating HCC with diaphragmatic involvement is still unclear. Although a peripherally located large HCC, particularly located in segment VII or VIII of the liver, is prone to diaphragmatic involvement, it is difficult during an operation to discriminate between the histological invasion of the diaphragm and a strictly fibrous adhesion only [1, 2]. In addition, HCCs with gross diaphragmatic involvement tend to have abundant blood flow from the surrounding mesenteries and diaphragm [3]. Thus, when a HCC tumor is suspected to have infiltrated the diaphragm, a hepatectomy combined with diaphragmatic resection is thought to be important to avoid such intraoperative bleeding risk or tumor rupture, because a forcible dissecting approach to the diaphragm typically triggers bleeding from the surface of the tumor. Infiltration of the diaphragm of HCC is common in advanced cases, such as those harboring very large tumors. However, there has been no prior study that has matched the clinicopathological background of these patients and this has caused a selection bias.

PRESENT

A total of 874 HCC patients who underwent liver resection between 1999 and 2018 were enrolled in our study, and these cases were divided into 46 HCC patients with

diaphragmatic resection (DR group) and 828 HCC patients without diaphragmatic resection (non-DR group). Because the DR group cases were pathologically more advanced than non-DR group, we applied 1:1 propensity score matching (PSM) to these subjects in order to match the clinicopathological features. There was no statistically significant difference between the two groups in terms of perioperative outcomes, overall survival, and relapse-free survival in these matched cohorts. Multivariate analyses of the matched HCC patients revealed that neither diaphragmatic invasion nor diaphragmatic resection was found to be prognostic factors for both overall survival and relapse-free survival. The most frequent site of recurrence in non-DR group was the liver, whereas the most frequent site of recurrence in DR group was the lung before and after PSM [4].

FUTURE

The short- and long-term surgical outcomes of DR and non-DR HCC patients are similar under a matched clinicopathological background. A hepatectomy combined with diaphragmatic resection is therefore an acceptable treatment for HCC with diaphragmatic involvement. However, HCC that requires diaphragmatic resection tends to be pathologically advanced and has a higher rate of extra-hepatic recurrence. Therefore, it will be necessary to establish a therapeutic strategy for preventing extra-hepatic recurrence after hepatectomy for such cases. Current standard treatment for HCC with distant metastases is systemic therapy.

On the other hand, no adjuvant therapy has been established for HCC after surgical resection. However, since the significance of adjuvant therapy for advanced HCC is still unknown, adjuvant therapy including molecularly targeted therapy or immunotherapy has the potential to reduce the recurrence of HCC with diaphragmatic involvement. In the future, a large-scale study should be conducted to establish the adjuvant therapy for HCC with diaphragmatic involvement.

REFERENCES

1. Zheng J, Shen S, Jiang L, et al. Outcomes of anterior approach major hepatectomy with diaphragmatic resection for single huge right lobe HCC with diaphragmatic invasion. *Medicine (Baltimore)*. 2018 ;97:e12194.
2. Yamashita Y, Morita K, Iguchi T, et al. Surgical impacts of an en bloc resection of the diaphragm for hepatocellular carcinoma with gross diaphragmatic involvement. *Surg Today*. 2011;41:101-6.
3. Wakayama K, Kamiyama T, Yokoo H, et al. Our technique of preceding diaphragm resection and partial mobilization of the hepatic right lobe using a vessel sealing device (LigaSure™) for huge hepatic tumors with diaphragm invasion. *Surg Today*. 2016 ;46:1224-9.

4. Orimo T, Kamiyama T, Wakayama K, et al. Hepatectomy combined with diaphragmatic resection for hepatocellular carcinoma with diaphragmatic involvement: A propensity score-matched analysis. *Ann Surg Oncol*. 2020 in press.