

Case Report

Left Hemihepatectomy for Hepatocellular Carcinoma Following Esophagectomy with Retrosternal Gastric Tube Reconstruction for Esophageal Cancer

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Approximately 4% of patients with esophageal cancer develop a second primary malignancy in the upper gastrointestinal trunk. However, hepatectomy following esophagectomy for esophageal cancer has rarely been reported. We report the case of a 70-year-old man who underwent an esophagectomy for esophageal cancer with retrosternal gastric tube reconstruction. Nine years later, he developed hepatocellular carcinoma with tumor thrombus involving the left portal vein, and was successfully treated with left hemihepatectomy. Special attention should be paid to avoiding incidental injury of the gastric tube as well as the right gastroepiploic artery during the hepatectomy.

Key words: liver resection, esophagectomy, retrosternal gastric tube reconstruction

Although the prognosis following esophagectomy for esophageal cancer has improved due to recent advances in multidisciplinary treatment and perioperative care [1], it has been reported that approximately 4% of patients with esophageal cancer develop a second primary malignancy in the upper gastrointestinal trunk [2, 3]. Surgical interventions including gastrectomy and pancreatoduodenectomy for second primary malignancies in the upper gastrointestinal trunk have been reported in patients following esophagectomy [3, 4]. However, to date few studies have reported on cases of esophageal cancer in which hepatectomy was performed following esophagectomy. A gastric tube has often been used as an esophageal substitute in alimentary tract reconstruction in patients undergoing esophagectomy for esophageal cancer [4, 5]. Therefore

special attention to the gastric tube is necessary when abdominal surgery is performed following esophagectomy. Herein, we present the case of a patient who underwent left hemihepatectomy for hepatocellular carcinoma (HCC) nine years after esophagectomy with retrosternal gastric tube reconstruction for esophageal cancer.

Case Report

A 70-year-old man underwent neoadjuvant chemoradiotherapy and esophagectomy for esophageal cancer with retrosternal gastric tube reconstruction at our institute. The details of the surgical procedure were described previously [6]. Nine years later, at his annual follow-up, positron emission tomography/computed tomography (PET/CT) revealed a large liver tumor with

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no symptoms. Abdominal CT images revealed a 9 cm tumor at the left lateral segment. The tumor compressed the umbilical portion, as the tumor thrombus protruded into the left portal vein, and also compressed the middle hepatic vein. The enhancement pattern on the CT image showed early arterial enhancement with rapid washout, suggesting the presence of HCC rather than liver cancer that had metastasized from esophageal cancer. Therefore, we diagnosed the tumor as HCC accompanied by a portal vein tumor thrombus, and not as an extrahepatic metastasis. The CT also confirmed the gastric tube running through the retrosternal pathway as well as the right gastroepiploic artery. The CT images are shown in Fig. 1.

The laboratory values were as follows: total bilirubin, 0.99 mg/dL; alanine transaminase, 20 IU/L; albumin, 4.2 g/dL; and prothrombin time, 104%. The tumor markers were elevated: alpha-fetoprotein, 27,462 ng/mL; prothrombin induced by vitamin K absence or antagonist-II, 4,699 mAU/mL. The serological markers for hepatitis B virus (HBV) showed a hepatitis B virus surface antigen (HBsAg) seroconversion pattern: HBsAg negative, hepatitis B e antigen negative, antihepatitis B e antibody positive (77%), antibodies to hepatitis B core antigen positive (17.6 s/co), antihepatitis B surface antigen antibody positive (344 mIU/mL), and undetectable HBV-DNA. Hepatitis C virus antibody was negative. The patient had undergone no treatment for HBV infection, and his family history of HBV infection was unknown. In addition, the patient had a history of alcohol abuse prior to undergoing esophagectomy for esophageal cancer.

With respect to the liver functional reserve, the indocyanine green retention rate at 15 min was 15.8%, and the Child-Pugh classification was grade A (score 5). The technetium-99 m-galactosyl human serum albumin showed the following results: the clearance index (HH15) was 0.518, and the receptor index (LHL5) was 0.867. Accordingly, a left hemihepatectomy was scheduled.

Following the dissection of the adhesions around the liver, the gastric tube was encircled (Fig. 2A). The left lobe of the liver was stuck under the gastric tube, and thus we were unable to mobilize the left lobe and perform the extrahepatic Glissonean approach. Therefore, the liver parenchyma was initially dissected along Rex-Cantlie's line using a Cavitron Ultrasonic Surgical Aspirator and vessel sealing system (LigaSure). Subsequently, the left hepatic artery and the left portal

vein were identified and transected, and the left hepatic duct was then divided. Finally, the middle hepatic vein and left hepatic vein were transected to achieve complete dissection of the liver parenchyma. During surgery, it was necessary to pay additional attention to the gastric tube as well as the right gastroepiploic artery in order to prevent incidental injury (Fig. 2B). The total operative time was 239 minutes, and the estimated blood loss was 350 mL.

The patient was discharged on postoperative day eight with an uneventful course. The pathological findings confirmed moderately differentiated HCC with microvascular invasions into the secondary branch of the portal vein (vp2) and peripheral hepatic vein (vv1).

Discussion

To the best of our knowledge, this report is the first to highlight the technical aspects of hepatectomy following esophagectomy with retrosternal gastric tube reconstruction. We found that hepatectomy following esophagectomy was feasible. Furthermore, special attention should be paid to avoid incidental injury of the gastric tube as well as the right gastroepiploic artery during hepatectomy following esophagectomy with gastric tube reconstruction.

The treatment strategy for complicated cases with HCC should be determined depending on availability and experience of facilities. According to the clinical practice guidelines, hepatectomy, embolization, hepatic arterial infusion chemotherapy, and molecular-targeted therapy are recommended for patients with HCC accompanied by vascular invasion without extrahepatic metastasis [7]. However, hepatectomy has been shown to have a survival benefit for patients with HCC with portal vein invasion [8]. Therefore, surgical intervention was performed in this patient. Although hepato-biliary-pancreatic surgery following prior abdominal surgery has been shown to be feasible, several concerns regarding this course of treatment should be noted, including the higher risks of intraoperative organ injury and postoperative complications, as well as the prolonged operative time and greater blood loss [9].

In esophagectomy followed by alimentary tract reconstruction using a gastric tube, reconstruction can be achieved by either the retrosternal route or the prevertebral route through the mediastinum [5]. Although there is an ongoing discussion as to which approach has

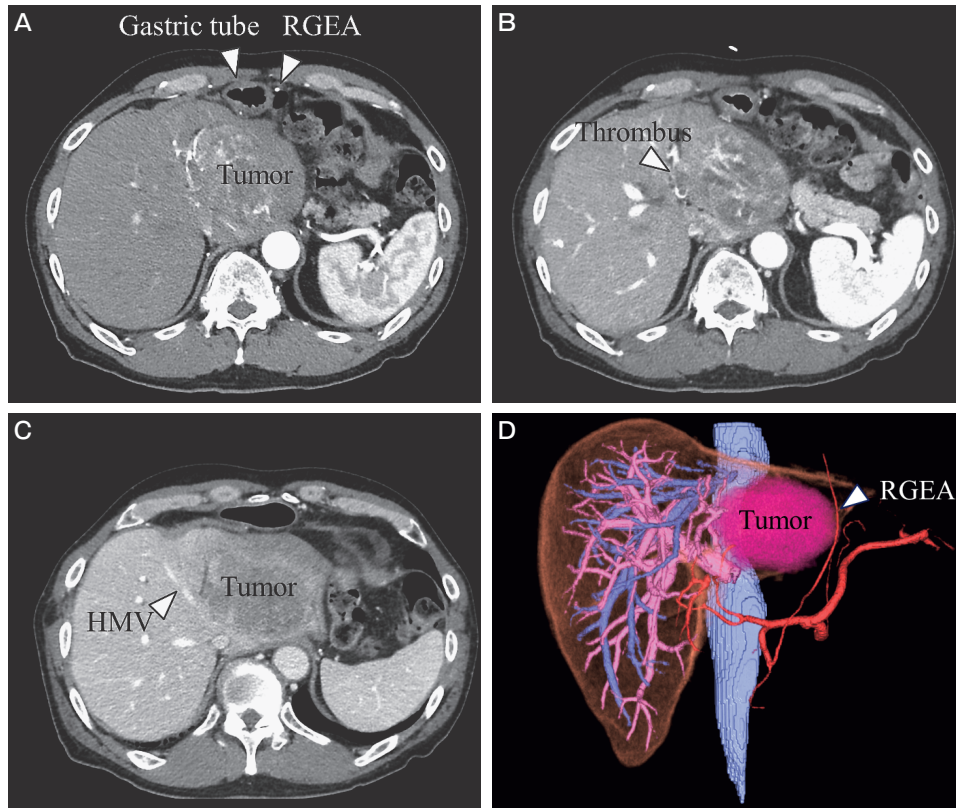


Fig. 1 Contrast-enhanced computed tomography images. (A), The well-enhanced tumor in the arterial phase. The gastric tube running through the retrosternal pathway and the right gastroepiploic artery (RGEA) are confirmed; (B), The enhancement pattern of the portal phase revealing the tumor thrombus protruding into the left portal vein; (C), The enhancement pattern of the venous phase showing rapid washout. The middle hepatic vein is compressed by the tumor; (D), The relationship between the tumor and the RGEA based on three-dimensional imaging.

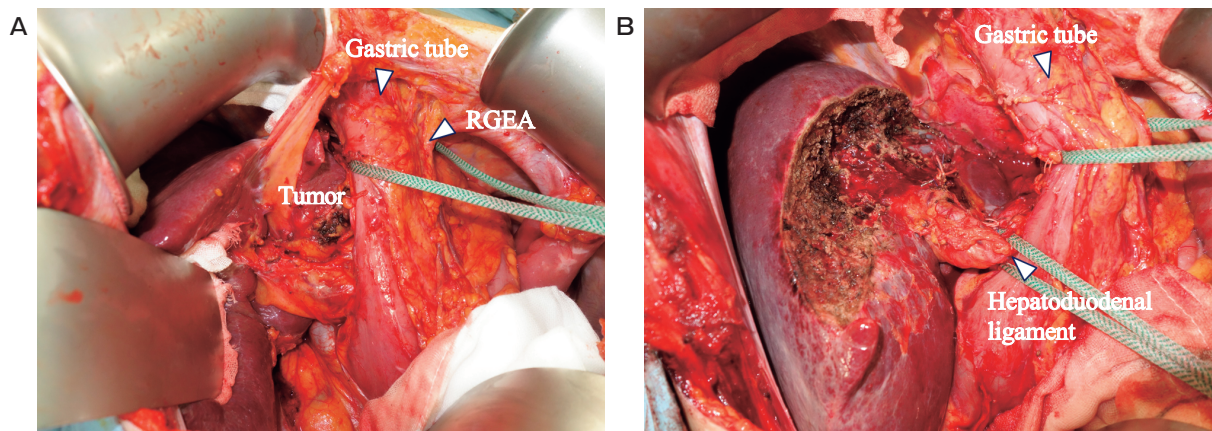


Fig. 2 Intraoperative findings. (A), The gastric tube and the right gastroepiploic artery (RGEA) were carefully dissected and encircled after the dissection of adhesions around the liver; (B), Following left hemihepatectomy, the gastric tube and the RGEA were preserved without incidental injury.

more advantages, the prevertebral route might add less technical difficulty when performing hepatectomy following esophagectomy. In our case, the retrosternal route using the gastric tube interfered with the surgical field due to adhesion between the liver and the gastric tube. Furthermore, the right gastroepiploic artery, which runs along the gastric tube, should be carefully dissected.

With respect to the etiology of the HCC in this case, it is speculated that it developed due to previous alcohol abuse and/or HBV infection. Chronic liver disease due to HBV and alcoholic liver disease are well known as major risk factors for HCC [10]. Although the patient consumed less alcohol after undergoing the esophagectomy, his previous alcohol abuse might have been related to the development of HCC. In contrast, nine years ago the serological markers for HBV demonstrated an HBsAg seroconversion pattern, which meant that this case developed HCC more than nine years after HBsAg seroclearance. A recent study has reported that patients with HBsAg seroclearance had a significantly lower incidence of HCC than those who were HBsAg positive; however, the pooled incidence of HCC after HBsAg seroclearance was 1.88% [11]. Therefore, a surveillance program for HCC should also be applied in patients who have shown HBsAg seroclearance.

In conclusion, we report the case of patient who underwent left hemihepatectomy for HCC following esophagectomy with retrosternal gastric tube reconstruction for esophageal cancer. Special attention should be paid to avoid incidental injuries during the hepatectomy, such as injuries to the gastric tube and the right gastroepiploic artery.

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