



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Revascularization for cavernous transformation radical lymphadenectomy in the treatment of gastric cancer: A case report

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ARTICLE INFO

Article history:

Received 5 April 2018

Accepted 20 June 2018

Available online 26 July 2018

Keywords:

Gastric cancer

Cavernous transformation

Portal vein

Revascularisation

ABSTRACT

INTRODUCTION: There are few reported cases of cavernous transformation of the portal vein (CTPV). CTPV is usually found by accident because most patients are asymptomatic at presentation. This paper reports a case of early gastric cancer with CTPV that required gastrectomy and revascularization.

PRESENTATION OF CASE: A 71-year-old man diagnosed with early gastric cancer, which was classified as clinical Stage IA (T1b, N0, M0) according to the TNM classification criteria for gastric cancer, was admitted to our hospital. Preoperative computed tomography (CT) revealed portal vein stenosis, CTPV, and esophageal varix. CT angiography showed that portal flow was maintained by the left gastric vein-right gastric vein (LGV-RGV) shunt. We had to perform lymphadenectomy while maintaining the hepatic blood flow. We performed distal gastrectomy with lymph node dissection including the vessel of the lesser curvature without massive bleeding. Postoperative course was uneventful, and CT examination performed in the 7th postoperative day revealed good blood flow from the reconstructed collateral vessels. The patient had no recurrence of gastric cancer during the postoperative period of 1 year.

CONCLUSION: Diseases that cause intra-abdominal inflammation, such as pancreatitis and choledocholithiasis, might cause CTPV. Thus, patients with this medical history should be carefully assessed for CTPV to avoid intraoperative complications, such as massive bleeding or ischemia. When we perform operation a case with CTPV, we must pay meticulous attention. In our case, we encountered some difficulties in the surgical procedure, especially with respect to the dissection of the regional lymph nodes for gastric cancer.

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1. Introduction

Cavernous transformation of the portal vein (CTPV) usually occurs with long-standing portal vein thrombosis, which developed from the dilatation of multiple small vessels in and around the recanalized main portal vein [1,2]. The discovery rate of CTPV is about one of 2000 using ultrasound (US) imaging screening for the abdomen [3]. Cavernous transformation of the portal vein is usually found by accident because most patients are asymptomatic at presentation. Surgical procedures used to manage CTPV have a high risk of intraoperative bleeding, especially those operative procedures around the liver hilum. We herein report and describe an asymptomatic case of CTPV, which was accompanied with early gastric cancer. We experienced a case of the early gastric cancer that blood flow of portal vein was depend on LGV-RGV shunt and revascularization of LGV-RGV shunt. This case report was prepared in accordance with the SCARE criteria [4].

2. Presentation of case

A 71-year-old man was admitted to our hospital for the treatment of gastric cancer through an operation. Two years ago, he had cholangitis due to choledocholithiasis, which was detected by endoscopic sphincterotomy (EST). Endoscopic findings revealed a tumor located at the anterior wall in the lower third of the stomach (Fig. 1). Moreover, endoscopic ultrasound imaging (EUS) showed that the depth of tumor invasion reached the submucosal layer of the gastric wall. No lymph node or remote metastases were found in the preoperative computed tomography (CT). Cavernous transformation of the portal vein was diagnosed using CT images that revealed portal vein stricture and increased presence of collateral veins around the liver hilum and esophagus. The hepatic portal flow was maintained by the left gastric vein (LGV)-right gastric vein (RGV) from the superior mesenteric vein (SMV). CT angiography showed similar findings with CT that indicate portal blood flow was maintained by the RGV-LGV shunt (Figs. 2 and 3). The patient's gastric cancer was classified as clinical Stage IA (T1b, N0, M0) according to the TNM classification criteria for gastric cancer [5]. The laboratory test findings revealed that the levels of aspartate amino transferase (AST) and alanine amino transferase (ALT)

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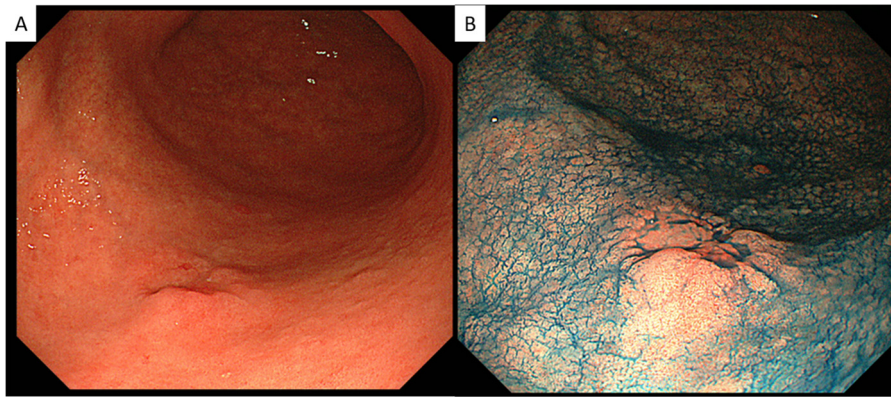


Fig. 1. Upper gastrointestinal endoscopy: A) A flat and elevated lesion with an unclear border (size: 15 mm, 0-IIa+IIc) localized at the anterior wall in the lower third of the stomach. B) Endoscopic view after acetic acid was sprinkled.

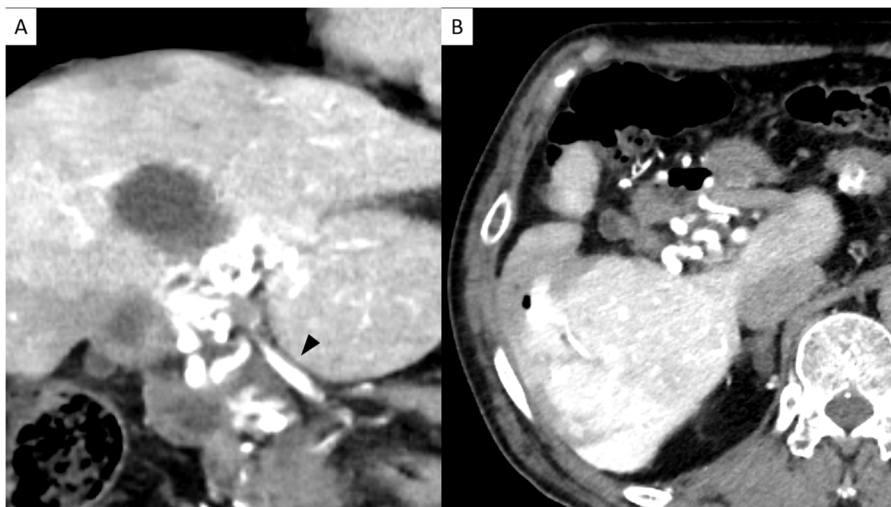


Fig. 2. A) Axial CT angiography images of the abdomen revealed portal vein stricture (arrow) and increased presence of collateral veins around the liver hilum. B) Coronal CT angiography image of the abdomen revealed similar findings.

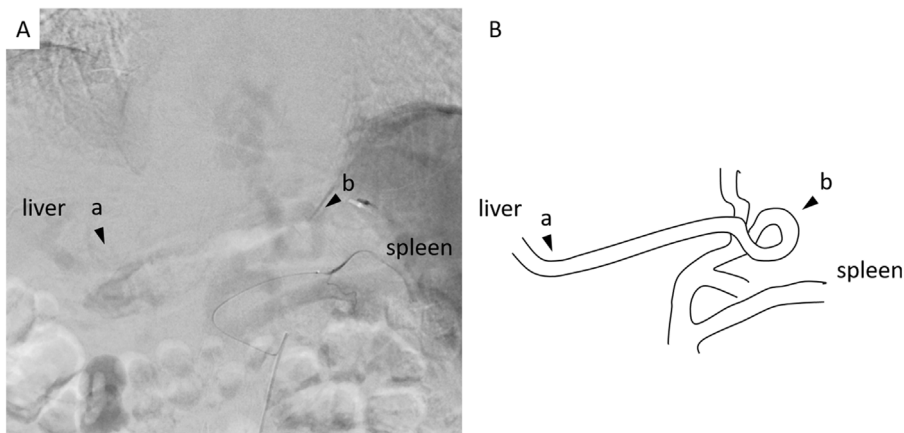


Fig. 3. A) CT angiography of portal phase. B) A schematic diagram of the vessel for CT angiography showed that the blood stream of the liver was maintained by the RGV-LGV shunt. (arrow a: right gastric vein, arrow b: light gastric vein).

were within normal ranges. The patient had normal liver function (Child-Pugh: A). Tumor markers, such as carcinoembryonic antigen (CEA) and CA19-9, were in normal range. The Japanese gastric cancer treatment guidelines requires gastrectomy with D1+ lymphadenectomy for this classification of gastric cancer [5]. However, LGV and RGV ligation might result in liver ischemia in this

case. Thus, we planned to revascularize the LGV and RGV after the lymphadenectomy. During the operation, portal vein pressure of the SMV was measured and liver flow was checked using US. We performed LVG-RVG shunt, vascular anastomosis, lymph node dissection, and distal gastrectomy (Fig. 4). The hepatic portal flow was maintained before and after the lymphadenectomy and revascular-

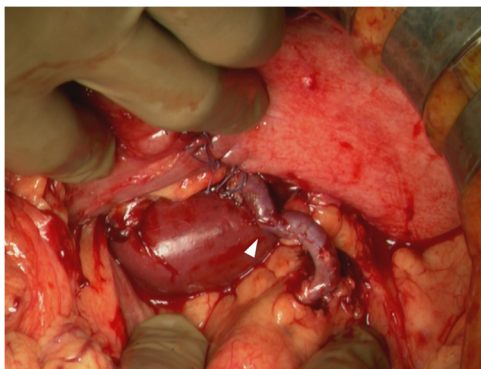


Fig. 4. Operative findings. Revascularization of the LGV and the RGV after gastrectomy and lymphadenectomy (arrow).

ization of the LGV-RGV shunt. Vessels to the esophageal varix were cut to keep the blood flow of the liver. CT revealed that blood flow of the intrahepatic portal vein was good on postoperative day 7. The microscopic examination of the gastric specimen confirmed that the depth of tumor invasion reached the submucosal layer and that the lesion is a gastric carcinoma with lymphoid stroma (described as pT1bN0M0 pStageIA, in accordance with the TNM classification criteria). The postoperative period was uneventful, and the patient was discharged on postoperative day 9. In addition, there is no recurrence of gastric cancer during the postoperative period of 1 year.

3. Discussion

Cavernous transformation of the portal vein is an uncommon case and might have occurred due to a long-standing portal vein thrombosis, which developed from the dilatation of multiple small vessels in and around the obstructive main portal vein [1,2]. Chronic hepatic vein obstruction may be due to congenital, intra-abdominal inflammatory, traumatic, neoplastic, or unknown causes [6]. The diagnosis of CTPV is confirmed using abdominal ultrasonography, color Doppler ultrasonography [7], CT angiography [2], and MRI [8]. Malignant tumor-caused CTPV is due to tumor embolism of the portal vein. In our case, the patient underwent treatment for cholelithiasis and cholangitis, and probably after the procedure, he had intra-abdominal inflammation that may have caused CTPV. Watanabe et al. also reported a similar case of portal vein thrombosis with CTPV accompanied with chronic pancreatitis [9]. During the preoperative examination, CTPV was only found by accident.

The standard treatment of early gastric cancer was gastrectomy with lymphadenectomy [5], because there is an approximately 13.3% chance of lymph node metastases in early gastric cancer (submucosal invasive) [10]. In our case, the patient had Stage IA (T1b, N0, M0) and portal vein stricture; hepatic blood stream was dependent on cavernous transformation and LGV-RGV shunt from SMA. Ligating the LGV and RGV might cause liver ischemia, thus for us to preserve the blood flow to the patient's liver, we planned to proceed with lymphadenectomy with revascularization. We research in PubMed by using key words of "cavernous transformation" and "gastric cancer". Then nine articles were found. Takahashi et al. [11] reported a case of early gastric cancer with CTPV. The cause of CTPV for this case was intra-abdominal inflammation, which was similar to that of our case. Their patient also underwent standard gastrectomy with lymphadenectomy because collateral circulation was just localized around the portal vein. Moreover, Ishikawa et al. [12] also reported a case of advanced gastric cancer with CTPV caused by tumor embolism of the portal vein. Their patient had gastrectomy without regional lymph node resection, because the portal tumor thrombus could not be removed. To the best of our knowledge, this

is the first case report of surgically treated revascularization in gastric cancer with CTPV. There is a case report of liver transplantation with revascularization due to CTPV. Rotellar et al. reported about liver transportation with CTPV [13]. This recipient had complete portal vein thrombosis with cavernous transformation. Given that the portal vein was completely obstructed, a portal vein anastomosis was constructed between the portal vein of the donor and the collateral vein of the recipient. Our case is the first case report with cancer who was treated revascularization.

4. Conclusion

To the best of our knowledge, this is the first case report of CTPV, concurrently treated surgically with gastric cancer. We should take care of the patients with a history of pancreatitis and cholelithiasis in case of CTPV.

Conflicts of interest

The authors declare no conflicts of interest associated with this manuscript.

Funding

None of the authors has any conflicts of interest or any financial ties to disclose.

Ethical approval

We have a consent by the patient. Ethical approval was obtained from the ethical committee of Hiroshima University Hospital.

Consent

Written informed consent was obtained from the patient for the publication of this case report and any accompanying images. A copy of the written informed consent is available for review by the Editor-in-Chief of this journal.

Author contribution

HY and KT wrote the manuscript. KT, RH, YS and HO performed the operation. HY and KT performed the research/study, analyzed the data, designed the study, and interpreted the results. All authors conceived the study, participated in its design and coordination, and helped draft the manuscript. All authors read and approved the final manuscript.

Registration of research studies

We have registered for Research Registry (UIN:researchregistry4274).

Guarantor

Dr Tanabe.

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