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Right gastro-omental artery reconstruction after pancreaticoduodenectomy for subtotal esophagectomy and gastric pull-up

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ABSTRACT

INTRODUCTION: There are no reports on vessel reconstruction of right gastro-omental artery deficits due to pancreatic tumor resection. Here, we describe successful arterial reconstruction using the middle colic artery in a patient who had undergone esophageal reconstruction with a gastric tube and whose right gastro-omental artery had been resected.

PRESENTATION OF CASE: A 70-year-old man underwent subtotal esophagectomy and reconstructive surgery with a retrosternal gastric tube for esophageal cancer. A follow-up computed tomography (CT) scan revealed a tumor on the pancreatic head that was adjacent to the right gastro-omental artery. Pancreaticoduodenectomy (PD) was subsequently performed. The gastro-omental artery was resected along with the tumor, creating a 7-cm deficit. The anastomosis was performed between the right branch of the middle colic artery and the distal end of the right gastro-omental artery. No complications that involved blood flow to the reconstructed esophagus were postoperatively observed. Four months after surgery, the blood flow to the gastric tube was confirmed by a contrast CT scan.

DISCUSSION: We reconstructed the right gastro-omental artery using the middle colic artery, and not a vein graft, as that would have required vessel anastomosis at two locations. The middle colic artery branches on the posterior surface of the pancreas, which is located close to the right gastro-omental artery.

CONCLUSION: The middle colic artery provides sufficient blood supply to the pulled-up gastric tube. PD can be performed even in patients who have undergone esophageal reconstruction.

1. Introduction

Pancreaticoduodenectomy (PD) for a pancreatic head tumor is an extremely difficult and challenging operation [1,2], and the gastric tube is frequently used for reconstruction after subtotal esophagectomy for esophageal cancers. The right gastro-omental artery, which is located close to the pancreas, is extremely important for supplying blood flow to the gastric tube. Surgeries for pancreatic head tumors become incredibly difficult in patients that have undergone esophageal reconstruction with a gastric tube.

2. Case report

The patient was a 70-year-old man who, in April 2009, underwent subtotal esophagectomy for esophageal cancer as well as reconstructive surgery with a retrosternal gastric tube. A follow-up computed tomography (CT) scan revealed a contrast-enhanced tumor (3 cm in diameter) on the pancreatic head, adjacent to the right gastro-omental artery (Figs. 1 and 2) and PD was performed in April 2014.

Based on the intraoperative findings, the gastro-omental artery was resected along with the tumor, creating a 7-cm deficit (Fig. 3A). Direct anastomosis was not possible, so the right branch of the middle colic artery was used as the recipient vessel. The middle colic artery was separated from the intestinal membrane after confirming its path. Blood flow to the colon was confirmed and conserved using a micro-clamp. End-to-end suturing was performed with an 8-0 PRONOVA suture (Ethicon Inc., Edinburgh, UK) under an operating microscope (Fig. 3B). The patency of the right gastro-omental artery was checked using color Doppler ultrasonography. We did not use antithrombotic therapy due to risk of postoperative bleeding. Endoscopy was postoperatively performed at ten days and one month, and the findings showed good blood flow to the reconstructed esophagus, without complication (Fig. 4). Ten days after surgery, oral intake was started. Patient discharged our hospital two months after surgery. A contrast CT scan four months postoper-

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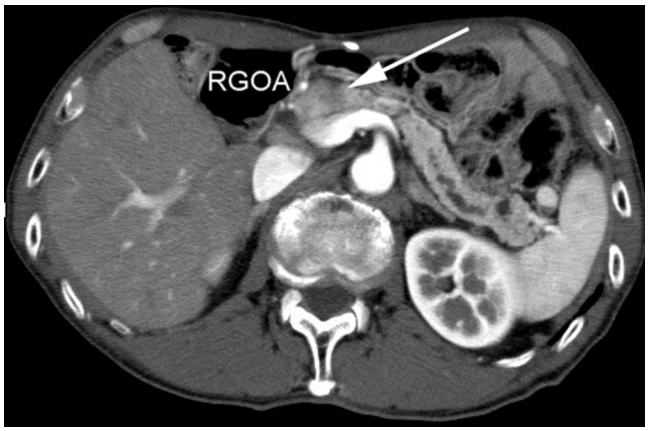

Fig. 1. Preoperative view of enhanced CT scan. The pancreatic head tumor is shown by the arrow. Tumor was adjacent to the right gastro-omental artery (RGOA).

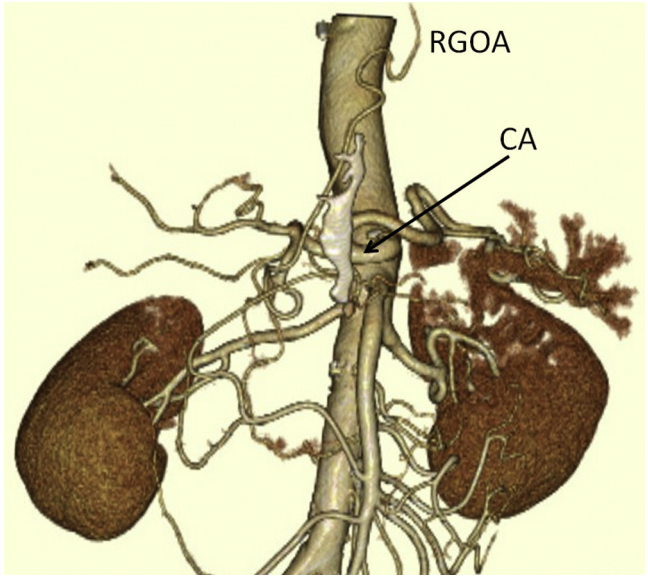

Fig. 2. 3D angiography of a CT scan. The right gastro-omental artery arose from the celiac artery. CA: celiac artery. RGOA: right gastro-omental artery.

atively confirmed blood flow to the gastric tube (Fig. 5). Histological examination revealed adenocarcinoma. At eight months, no blood flow disorders were observed in the reconstructed esophagus.

Our work has been reported in line with the CARE criteria (http://www.care-statement.org/).

3. Discussion

In this report, we describe successful arterial reconstruction of the right gastro-omental artery using the middle colic artery in a patient who had undergone esophageal reconstruction with a gastric tube prior to the resection of pancreatic tumor and right gastro-omental artery. When performing PD for advanced tumors, the hepatic artery [3,4], superior mesenteric artery [4,5], and celiac artery [6] can sometimes be resected. Revascularization is required when there are blood vessel deficits due to PD [7,8]. Direct anastomosis can be performed when the deficit is small. However, for larger deficits, reconstruction by vein grafting or with an artificial vessel is necessary [5]. Methods of using other vessels such as the splenic [5,9] or gastro-omental arteries [3] have also been reported.

Esophageal reconstruction using a gastric tube is carried out for esophageal cancer [10]. All arteries that supply the stomach, aside from the right gastro-omental artery, are ligated when creating a gastric tube. Thus, the right gastro-omental artery is important for supplying blood flow to the gastric tube. Performing PD in patients who have undergone reconstructive surgery using a gastric tube for esophageal cancer is considered more difficult than in patients who have not. This is because the right gastro-omental

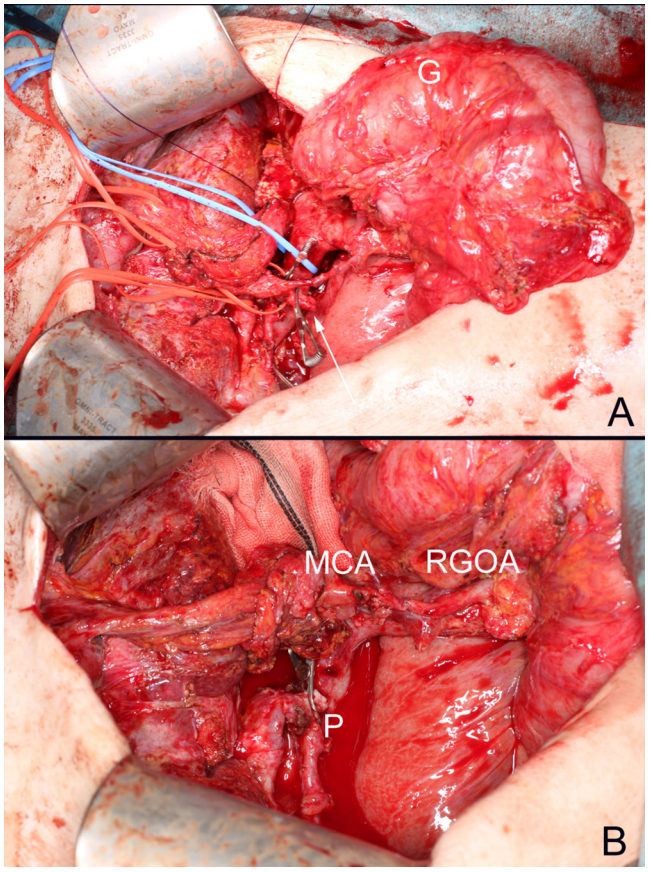

Fig. 3. (A) Pancreaticoduodenectomy was performed. Proximal stump of middle colic artery is shown by the arrow. G: gastric tube. (B) Immediately after the anastomosis. MCA: middle colic artery. RGOA: right gastro-omental artery. P: proximal stump of right gastro-omental artery.

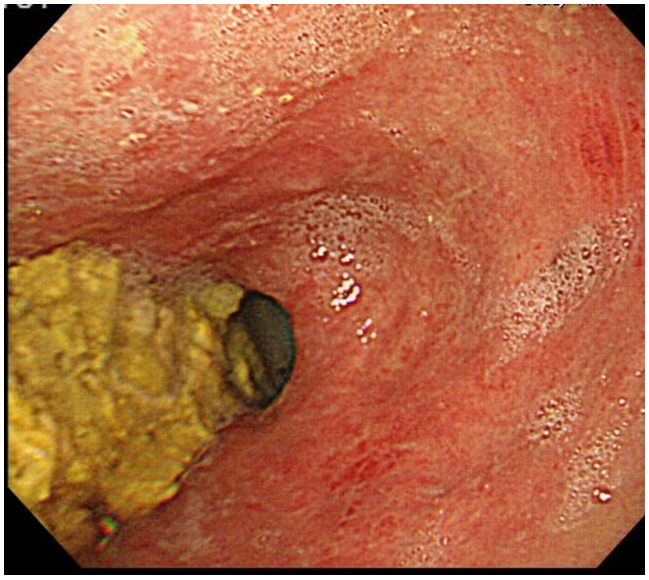

Fig. 4. One-month postoperative endoscopic view. There was no erosion.