CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 9 (2015) 39–43

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Creation of gastric conduit free-graft with intraoperative perfusion imaging during pancreaticoduodenectomy in a patient post esophagectomy

Spyridon Pagkratis [a,*], Dimitrios Virvilis [a], Brett T. Phillips [a], Philip Q. Bao [b], Sami U. Khan [c], Jason C. Ganz [c], Kevin T. Watkins [b]

[a] Division of General Surgery, Stony Brook, New York, USA
[b] Division of Upper Gastrointestinal and Surgical Oncology, Stony Brook, New York, USA
[c] Division of Plastic and Reconstructive Surgery, Stony Brook, New York, USA

ARTICLE INFO

Article history:
Received 20 January 2015
Received in revised form 15 February 2015
Accepted 16 February 2015
Available online 19 February 2015

Keywords:
Gastric conduit
Intraoperative fluorescence imaging
Gastrointestinal surgery
Pancreaticoduodenectomy
Esophagectomy

ABSTRACT

As surgery becomes more successful for complicated malignancies, patients survive longer and can unfortunately develop subsequent malignancies. Surgical resection in these settings can be treacherous and manipulations of the patient's anatomy need to be closely considered before embarking on major operations. We report a case of a patient who survived esophageal resection for locally advanced esophageal cancer only to develop a new pancreatic head malignancy. Careful upfront planning allowed for a successful resection with an uncomplicated recovery.

She underwent open pancreaticoduodenectomy, and to maintain perfusion to the gastric conduit a microvascular anastomosis of the gastroepiploic pedicle was performed to the middle colic vessels. Intraoperative fluorescent imaging was used to evaluate the anastomosis as well as gastric and duodenal perfusion during the case.

1. Introduction

Recent advances in gastrointestinal cancer diagnosis and treatment have resulted in improved survival. On top of other individual risk factors, long term effects of chemo-radiation increases the risk of developing a second malignancy [1]. Increased number of reports of patients who survived long enough to develop a second malignancy can be found in the literature. Awareness of this increased risk and close follow up is recommended.

Previous surgery as an integral part of the treatment for the initial malignancy can significantly alter the surgical anatomy. Surgical resection of a second malignancy can become complicated and treacherous if these alterations are not considered. Meticulous pre-operative planning is fundamental and the use of new modalities and techniques can be very beneficial in order to achieve an optimal oncologic result.

The incidence of a second malignancy after esophageal cancer is unknown and more specific the development of a subsequent pancreatic cancer is a rare event [2]. We present the unique case of a patient with resectable pancreatic adenocarcinoma who had previously undergone transthoracic esophagectomy for esophageal cancer. She underwent pylorus-preserving pancreaticoduodenectomy with microvascular anastomosis of the gastroepiploic pedicle to the middle colic vessels. Intraoperative assessment of the vascular reconstruction was performed using an intraoperative fluorescent imaging platform (SPY system; Novadaq Technologies, Inc., Mississauga, Ontario, Canada). There are less than 20 case reports outlining the resection of pancreatic tumors in patients with previous esophagectomy [3]. To our knowledge this is the first report describing this specific technique as well as the use of intraoperative perfusion imaging.

2. Presentation of case

A 68 year old woman was referred to surgical oncology clinic with symptoms of vague abdominal pain for several months. The patient's history was significant for esophageal cancer that was treated with neoadjuvant chemo-radiation followed by Ivor–Lewis esophagectomy in 2001. She was currently in surveillance with no evidence of disease. During diagnostic work-up, multi-detector contrast computed tomography identified a pancreatic head mass associated with a dilated pancreatic duct (Fig. 4). Anatomically, the patient had a replaced right hepatic artery (Fig. 3) and evidence of the gastric conduit into the chest with a patent right gastroepiploic artery (Figs. 1 and 2). No concerning adenopathy or metastatic lesions were otherwise noted. An ERCP was performed which

* Corresponding author. Tel.: +1 2158021377.
E-mail address: spyros.md@gmail.com (S. Pagkratis).

http://dx.doi.org/10.1016/j.ijscr.2015.02.028

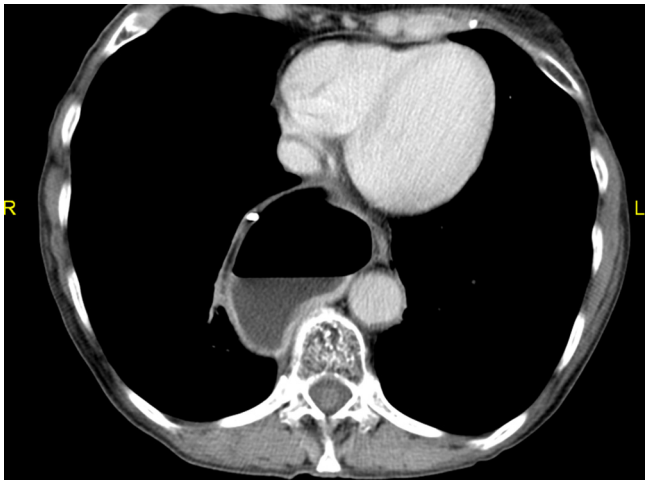

Fig. 1. Gastric conduit in the lower chest.

Fig. 2. Patent right gastroepiploic artery (arrow).

identified a pancreatic stricture and subsequent endoscopic ultrasound with biopsy was positive for pancreatic adenocarcinoma. This new primary cancer was considered resectable and she was offered surgical exploration for staging and potential curative resection.

With known history of esophagectomy with gastric pullthrough and the likelihood of dividing the only blood supply to the gastric conduit the patient was seen preoperatively by the microvascular plastic surgery service. Additionally, CT angiography was obtained to better detail the patient's anatomy and possibilities for reconstruction.

2.1. Operative technique

At exploration the patient showed no sign of disseminated disease. The duodenum was mobilized from the retroperitoneum with an extended Kocher maneuver well to the left of the aorta and up to the base of the superior mesenteric artery. Due to the previous esophagectomy, the proximal duodenum was rotated over medially, making the identification of the common hepatic artery difficult. The gastric antrum was also not visualized and the pylorus was near the level of the esophageal hiatus. After cholecystectomy, the common hepatic bile duct was isolated above the level of obstruction. At this point the replaced right hepatic artery was dissected free from the pancreatic head and mobilized back to the

Fig. 3. Replaced right hepatic artery (arrow).

superior mesenteric artery. The right gastroepiploic pedicle was visualized and, as expected, was felt to be the only significant inflow and outflow of the gastric conduit. The gastroepiploic pedicle was divided as close to the pancreas as possible, and the vessels were tagged for later revascularization. The duodenum was then divided beyond the pylorus using a 3.5 mm load GIA stapler. As expected, the duodenal stump at this point appeared congested and ischemic (Fig. 5).

The pancreaticoduodenectomy was completed and the reconstruction planned. A double Roux limb reconstruction was used with separate biliary and pancreatic limbs. One limb of jejunum was passed under the root of the mesentery for a standard two-layer duct-to-mucosa pancreaticojejunostomy. The second limb was mobilized up to the bile duct where an end-to-side hepaticojejunostomy was performed in a retrocolic fashion. Distal on this jejunal limb was the area where the duodenojejunostomy was to be performed after revascularization. The plastic surgery service then re-established vascular supply to the gastric conduit by performing a microscopic vascular anastomosis between the gastroepiploic pedicle and the middle colic artery and vein. The middle colic vessels were clumped prior to getting divided and the transverse colon was evaluated for its perfusion. An easily palpable marginal artery was identified throughout the length of the transverse colon and adequate flow was confirmed both clinically and with the Doppler devise. The plastic surgery team subsequently divided the middle colic vessels, swinged them up and performed an end-to-end anastomoses using 8-0 Nylon sutures to the previously divided gastroepiploic vein and artery (Figs. 6 and 7).

Fig. 4. Dilated pancreatic duct with stent (arrow).