

Consideration for Esophagectomy in Patients with Prior Bariatric Surgery

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Abstract Bariatric surgery is frequently performed for the treatment of severe obesity. Esophageal cancer has been reported to occur in patients who had prior bariatric surgery. Due to the anatomic alterations associated with bariatric surgery, esophageal resection requires an understanding of certain technical considerations. This paper describes the technical considerations in performance of an esophageal resection in patients who had prior sleeve gastrectomy or Roux-en-Y gastric bypass.

Keywords Esophagectomy · Roux-en-Y gastric bypass · Sleeve gastrectomy · Bariatric surgery

Esophagectomy Options

Esophagectomy for cancer is a complex operation that can be associated with significant morbidity and mortality. Options for esophagectomy include either a partial esophagectomy with an intrathoracic anastomosis (Ivor Lewis resection) or a total esophagectomy with a neck anastomosis [1, 2]. The total esophagectomy procedure can be accomplished using the three-field technique as described by McKeown or the blunt transhiatal esophagectomy (popularized by Orringer). The three-hole technique consists of thoracic esophageal mobilization, followed by abdominal construction of the gastric conduit and a cervical esophagogastric anastomosis [1]. In a study

using the Nationwide Inpatient Sample, Jafari et al. reported that approximately three fourths of esophagectomy procedures performed in the USA are partial esophagectomy [3]. Minimally invasive esophagectomy using a combination of laparoscopy and thoracoscopy is an option for both partial and total esophagectomy. There are many variations in the minimally invasive technique, including a hybrid operation and total laparoscopic and thoracoscopic operation [4]. A complete minimally invasive esophagectomy procedure includes laparoscopic transhiatal esophagectomy, combined thoracoscopic and laparoscopic esophagectomy with a cervical anastomosis, and laparoscopic and thoracoscopic Ivor Lewis resection. Currently, selection of a particular minimally invasive procedure depends on the tumor's size and its location, the patient's history of prior thoracic or abdominal surgery, and the surgeon's preference.

Bariatric surgery is a common procedure being performed for the treatment of severe obesity. The most frequently performed bariatric operations are the laparoscopic Roux-en-Y gastric bypass, the laparoscopic adjustable gastric banding, and the laparoscopic sleeve gastrectomy. Recently, sleeve gastrectomy has surpassed Roux-en-Y gastric bypass as the most frequently performed bariatric operation. There is an association between obesity and cancer. Particularly, esophageal carcinoma has been reported in patients who underwent previous bariatric surgery [4, 5]. The most common location for esophageal cancer is in the distal esophagus followed by middle third and cervical location. Planned esophagectomy in patients with a history of bariatric surgery can be complex due to the altered gastrointestinal anatomy. Of the three common bariatric operations, consideration for esophagectomy in a patient with a history of an adjustable gastric banding is the least complex. Removal of the laparoscopic adjustable gastric banding prior to esophagectomy (at the time of laparoscopic staging) will essentially revert the patient to normal

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esophagogastric anatomy. A partial or total esophagectomy can then be performed. The primary author has clinical experience in this operation. The altered anatomy associated with Roux-en-Y gastric bypass and sleeve gastrectomy, however, can have an effect on the proposed esophagectomy procedure. This article discusses the technical considerations in performing an esophageal resection in patients with altered gastrointestinal anatomy from prior surgical history of a Roux-en-Y gastric bypass or sleeve gastrectomy.

Considerations for Esophagectomy in Patients with a History of Roux-en-Y Gastric Bypass

In Roux-en-Y gastric bypass, a vertically oriented gastric pouch is constructed based on the gastric cardia and the lesser curvature of the proximal stomach. The jejunum is transected at 30 cm distal to the ligament of Trietz and a 75–150-cm Roux limb is constructed. The Roux limb is often routed antecolic and a gastrojejunal anastomosis is constructed using a linear stapler. The altered anatomy in patients with a history of Roux-en-Y gastric bypass poses a challenge to patients requiring an esophageal resection. Several case reports have been reported on the technical considerations for esophageal resection in patients with a history of prior Roux-en-Y gastric bypass [5, 6]. In most esophagectomy procedures, the stomach is used as the conduit of choice for replacement of the resected esophagus. In patients with altered anatomy from a Roux-en-Y gastric bypass, the gastric remnant should be used as the gastric conduit. Care should be taken in mobilizing the gastric remnant to preserve the right gastroepiploic vessels which would be the main blood supply for the gastric conduit. Another consideration is the need for resection of the Roux limb. The gastric pouch should be divided above the gastrojejunal anastomosis, and the jejunal Roux limb should be divided from its mesentery using a bipolar vessel sealer all the way down to the level of the jejunojejunostomy. The jejunal Roux limb is then divided adjacent to the jejunojejunostomy and removed. The tip of the gastric remnant is then sutured to the transected gastric pouch in preparation for a gastric pull-up. Mobilization of the esophagus and the gastric cardia is performed in the usual manner with division of the left gastric vessels. The gastric conduit can be pulled up to the right chest for a partial esophagectomy with an intrathoracic anastomosis [5].

Considerations for Esophagectomy in Patients with a History of Sleeve Gastrectomy

In sleeve gastrectomy, the gastrocolic ligament is divided along the greater curvature of the stomach starting at 4 cm proximal to the pylorus and continued toward the angle of

His with division of the short gastric vessels. A 34–36-Fr Bougie is then placed along the lesser curvature of the stomach. A lateral gastrectomy of the greater curvature of the stomach is performed. The remaining stomach is now tubular in shape and the blood supply is based on the left and right gastric vessels. The altered anatomy in patients with a history of sleeve gastrectomy poses a challenge to the esophageal surgeon depending on the location of the esophagus cancer and the extent of planned esophageal resection. There has not been any published case report of a patient with prior sleeve gastrectomy who underwent an esophageal resection. However, the authors speculate that for distal esophageal cancer, a distal esophagectomy with gastric cardia resection can be performed. Since the left gastric vessel has to be divided, the blood supply to the remaining stomach is based primarily on the left gastric vessels with some contribution from the right gastroepiploic vessels. The remaining stomach can be used as a gastric conduit for gastric pull-up, but its length is limited due to the previous resection of the gastric fundus. One common complication associated with a gastric pull-up reconstruction is gastroesophageal reflux. One technical consideration is to perform the gastroesophageal anastomosis high in the chest to minimize reflux. Middle or proximal esophageal cancer poses a difficult scenario as the remaining stomach will likely not be able to be pulled up high enough to achieve a tension-free anastomosis. In this scenario, an option is to perform a colonic interposition whereby a segment of colon can be used to interpose between the esophagus and the remaining stomach [7]. The colonic segment can be taken from the right colon based on the middle colic vessels or the left colon based on the left colic vessels. The proximal aspect of the colon segment is pulled up to the chest for construction of an esophagocolonic anastomosis, and the distal aspect of the colon segment is used for construction of a gastrocolic anastomosis. An ileocolonic or colocolonic anastomosis is also constructed [7].

Conclusions

Bariatric surgery is commonly performed for the treatment of severe obesity. Bariatric patients presenting with esophageal cancer can pose a technical dilemma for surgical treatment options. Understanding the altered gastrointestinal anatomy associated with bariatric surgery and the proposed technical considerations for esophagectomy in this paper may help the bariatric surgeon in dealing with this complex surgical dilemma.

Compliance with Ethical Standards This article does not contain any studies with human participants or animals performed by any of the authors.

Conflict of Interest The authors declare that they have no competing interests.

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