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Laparoscopic transgastric esophageal mucosal resection: a treatment option for patients with high-grade dysplasia in Barrett's esophagus

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Abstract

BACKGROUND: We present long-term follow-up data on patients with esophageal high-grade dysplasia and/or carcinoma in situ who were treated with laparoscopic transgastric esophageal mucosal resection (LTEMR).

METHODS: Patient demographics, operative outcomes, and follow-up results were tabulated.

RESULTS: LTEMR was performed in 11 patients (9 male, 2 female). The median age was 54 (44 to 75) years. The 30-day morbidity or mortality was zero. The median follow-up was 5.2 (2 to 12) years. Upper endoscopy was performed at 3, 6, and 12 month, and yearly thereafter. All patients regenerated squamous epithelium at 6 months. One patient developed a recurrence of Barrett's epithelium 2 years after resection. No recurrences of high-grade dysplasia or carcinoma were observed in any of the patients. Two patients developed an esophageal stricture; both were treated successfully with endoscopic balloon dilation and have suffered no further sequelae.

CONCLUSIONS: LTEMR is safe and effective alternative method to treat patients with Barrett's esophagus with high-grade dysplasia.

The risk of developing adenocarcinoma in a patient with Barrett's esophagus (BE) is estimated to be .3% a year and this risk increases 10-fold with the presence of high-grade dysplasia (HGD).[1–3] Surveillance and several treatment options exist for patients with BE with HGD but optimal management is unclear. None of these techniques have established itself as superior to the others in both efficacy and risk profile. Endoscopic surveillance has the lowest risk of complications but confers no therapeutic benefit to reduce progression to cancer. In contrast, esophagectomy is the definitive surgical management but carries the highest morbidity. Various mucosal ablative treatments have been developed to balance the benefit of risk reduction of cancer progression against the risk of treatment complications. These treatment options include argon plasma coagulation, multipolar electrocoagulation, photodynamic therapy, radiofrequency ablation and endoscopic mucosal resection (EMR). We previously described the technique of laparoscopic transgastric esophageal mucosal resection (LTEMR)

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for the treatment of HGD in BE.[4,5] We report follow-up data on our first 11 patients treated with LTEMR.

Methods

LTEMR consists of circumferential and caudal esophageal mucosal resection. In addition, primary cruroplasty is performed for concurrent hiatal hernias. A 5 -cm gastrotomy is made 4 cm distal to the gastroesophageal junction. A mixture of epinephrine (1:100,000) and normal saline is injected at the Z-line and carried cephalad to the extent of the abnormal mucosa. The abnormal mucosa is removed with a combination of Endo Shears and hook electrocautery in 4 quadrants. A lighted bougie is used for retraction of the esophagus. The anterior quadrant is excised 1st, followed by the 2 lateral quadrants and finally the posterior quadrant. The specimen is then removed and oriented for pathology. The anterior gastrotomy is approximated with interrupted sutures and closed with a linear endostapler. A short floppy Nissen fundoplication is constructed to complete the operation.[4–6] Patient demographics and follow-up data were collected and categorized.

Results

LTEMR was performed in 11 patients (9 males, 2 females) with a median age of 54 years old (range: 44 to 75 years). All patients had HGD on preoperative biopsy. The median length of BE was 4.5 cm (range: .5 to 8.0 cm). Two patients with long-segment BE (6.5 cm and 8.0 cm) required postoperative EMR because the proximal extent of abnormal mucosa was unattainable by laparoscopy. The 30-day morbidity and mortality was zero. All patients had confirmed HGD on postoperative pathologic examination and 2 patients had a focus of carcinoma in situ.

Upper endoscopy was performed at 3, 6, and 12 months, and yearly thereafter. Multiple mucosal biopsies and methylene blue staining was performed at each endoscopy. Surveillance was performed using the common Settle protocol (4 quadrants, every cm). Methylene blue is used to make the edge of Barrett epithelium more distinct and thus easier for eradication; it will also provide a better pattern to identify potential foci of HGD and cancer to biopsy or perform mucosal resection. The median follow-up was 5.2 years (range: 2 to 12 years). All patients had regeneration of squamous epithelium at 6 months. One patient developed a recurrence of intestinal metaplasia 2 years after resection. He is currently being treated with surveillance and a proton-pump inhibitor. No recurrence of HGD or carcinoma was observed in any of the 11 patients. Two patients developed an esophageal stricture; both were successfully treated with endoscopic balloon dilation and have not required further intervention.

Comments

HGD of the esophageal mucosa is a premalignant condition with treatment options ranging from close surveillance to definitive treatment with an esophagectomy. Several mucosal ablative techniques and EMR are also used to treat HGD. The available evidence suggests the incidence of cancer after a mucosal ablative intervention is about one-third in comparison to untreated patients; 2 per 100 patient-years vs 6 per 100 patient-years, respectively.[7] The complete response rate in EMR and radiofrequency ablation for HGD is approximately 95% and 77% respectively with symptomatic stricture rates approaching 38% for EMR.[8,9] Additional complications of EMR include bleeding and perforation.

The rationale for treatment of HGD of the esophageal mucosa with LTEMR has 3 components (1) en block resection of the quadrant of abnormal mucosa, (2) repair of coexisting hiatal hernia, and (3) the ability to perform an antireflux procedure. The last 2 components are unique features of LTEMR and should in theory reduce the future risk of esophageal mucosal injury due to pathologic reflux. A benefit of LTEMR is the ability to orient the specimen for pathology.

Our resection technique is limited to abnormal mucosa extending 5 cm proximal to the Z-line. This approach is more invasive than the previously mentioned modalities, requiring general anesthesia, port insertion, mediastinal dissection, fundal mobilization, and a gastrotomy. Despite these risks, the 30-day morbidity was zero. In addition, this report is limited by a select referral pattern of patients for LTEMR. There is no comparison to other techniques and may not be representative of the population of all patients with HGD on esophageal biopsy.

LTEMR was completed in 11 patients with no recurrences of HGD. Our stricture rate of 18% is comparable to stricture rates of mucosal ablative techniques that have been reported as high as 30%.[7,10] Two patients in our study who would have otherwise undergone esophagectomy for carcinoma in situ were spared this morbid procedure by LTEMR as these patients were treated before the current National Comprehensive Cancer Network guidelines were published.

Conclusions

Given the minimally invasive approach and ability to safely treat both the dysplasia and the underlying cause of the dysplasia, LTEMR seems to be a reasonable treatment for HGD of the lower 5 cm of the esophagus.

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