

CASE REPORT

The laparoscopic transabdominal approach for resection of the large epiphrenic esophageal diverticulum

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ABSTRACT

Background: Epiphrenic (supradiaphragmatic) esophageal diverticula are epithelial-lined mucosal pouches that protrude through the esophageal wall. Almost all of these pulsion diverticula are acquired and appear within the last 10 centimeters of the distal esophagus. Among others, the main cause of the occurrence of these gigantic diverticula is achalasia. We present a 54-year-old male patient with symptoms of large epiphrenic diverticulum, and achalasia Eckardt score 7.

Presentation of case: The results of the gastrografin swallow test, computed tomography, and esophageal manometry showed a large epiphrenic diverticulum, and therefore surgical treatment was indicated. We performed laparoscopic transhiatal diverticulectomy, Heller myotomy, hiatoplasty, and Dor fundoplication. The overall operation time was 180 minutes. While performing Heller myotomy, an iatrogenic lesion of esophageal mucosa appeared within 2 centimeters of the lower esophageal sphincter. The perforation was immediately closed with a single suture. After this, a Dor fundoplication was created. On the fifth postoperative day, a gastrografin swallow test was performed with no evidence of a suture-line leakage. On the sixth postoperative day, the patient was discharged home in good general condition.

Discussion and conclusion: Resection of esophageal diverticula by a transabdominal laparoscopic approach is a feasible method that, in the case of intraoperative incidents such as lesions of the esophageal wall, enables prompt and excellent visualisation of the lesion site. Furthermore, primary suturing of iatrogenic perforation of the distal esophagus is a feasible technique for resolving these kinds of surgical complications, also taking into account the fact that a Dor fundoplication is then created over the lesion site.

Keywords: Epiphrenic esophageal diverticulum; Iatrogenic lesion; Laparoscopic transhiatal surgery; Laparoscopic Heller myotomy; Dor fundoplication

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Introduction

An esophageal diverticulum is a rare condition with a reported prevalence of 0.06%-3.6%, mainly occurring in patients older than 65 years of age¹⁻⁴. However, the real prevalence is unknown since they are mostly diagnosed incidentally during endoscopic or radiographic examinations⁵.

According to their location, they are classified as proximal, midesophageal, or epiphrenic diverticula^{6,7}. In the literature, conditions such as achalasia, diffuse esophageal spasm, and hypertensive lower esophageal sphincter (LES) are motility abnormalities associated with epiphrenic diverticulum⁸. The most commonly noted symptoms are dysphagia and regurgitation⁵.

Presently, there are no guidelines for standard treatment⁵. Indications for surgical treatment include patients whose quality of life is impaired and patients with life-threatening conditions, such as recurrent aspiration pneumonia⁵. The most commonly used technique in surgery for esophageal diverticula is the transabdominal laparoscopic approach⁹.

We report a case of the large epiphrenic esophageal diverticulum that was treated surgically via the transabdominal laparoscopic approach. During the procedure, while performing Heller myotomy, iatrogenic perforation of the distal esophagus occurred. The site of the lesion was successfully closed by primarily suturing.

Case Presentation

A 54-year old male patient was admitted to our department with a history of progressively worsening dysphagia, accompanied by food regurgitation, and hoarseness. The patient underwent a gastrografin swallow test, a computed tomography (CT) scan, a manometry test, and upper gastroesophageal endoscopy, which revealed a large diverticulum located on the right side of the distal end of the esophagus. The location of the diverticulum was estimated to

be about 35 centimeters (cm) from the incisors. The diverticulum was measured and found to be 6x3cm (Figure 1). In addition, achalasia, Eckard score 7 was diagnosed. Surgery was indicated by the size of the diverticulum and the severity of the patient's symptoms.

We performed transabdominal laparoscopic transhiatal diverticulectomy and consecutive Heller myotomy, hiato-plasty, and a Dor fundoplication. A laparoscopic surgical approach was applied using a camera port, three working trocar ports, and a Nathanson retractor. First, the abdominal and lower mediastinal parts of the esophagus were mobilized using a LigaSure® device. A large epiphrenic diverticulum was identified intraoperatively, measuring in diameter approximately 4 cm (Figure 2). The diverticulum was dissected and removed with a two Endo GIA® 45 millimeter (mm) three line stapler (Figure 3).

While performing Heller myotomy, a small iatrogenic lesion of esophageal mucosa appeared within 2 cm of the LES (Figure 4). The perforation was closed with a single Vicryl® 2-0 suture (Figure 5). After this, an anterior partial fundoplication of Dor was created. The Dor fundoplication covered the sutured myotomy area and stapled line (Figure 6).

The abdominal cavity was drained with a single silicone drain, in the subhepatic space. The resected diverticulum has been sent for pathohistological analysis. The overall operative time was 180 minutes. On the fifth postoperative day a gastrografin swallow test was performed (Figure 7). There was no evidence of a suture-line leakage, therefore on the sixth postoperative day the patient was discharged in good general condition.

The result of the pathohistological analysis revealed a 4x3.5 cm esophageal diverticulum. Histologically, the lumen contained the remains of undigested material (food). The squamous epithelium was partially desquamated and inflamed. All the layers of the diverticular wall contained abundant mixed inflammatory infiltrates.



Figure 1: Gastrografin swallow test showing a large epiphrenic diverticulum.

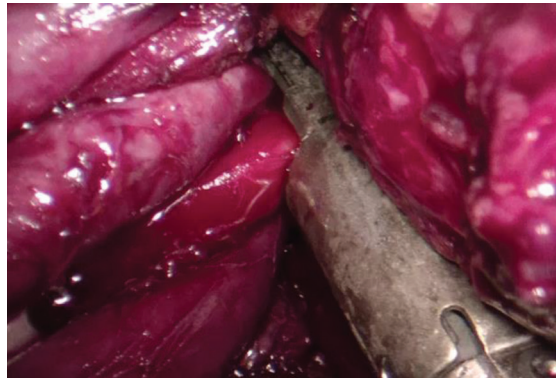


Figure 3. Endo GIA stapler resection of the epiphrenic diverticulum.



Figure 4. Location of the esophageal perforation.

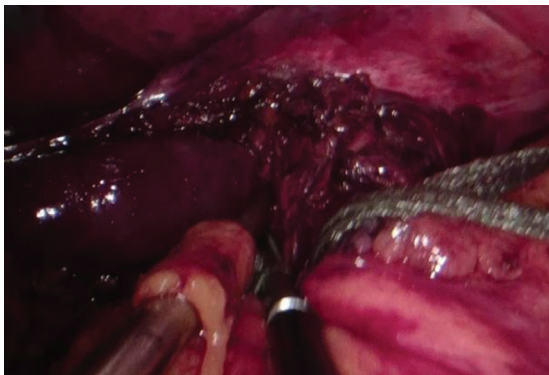


Figure 2. Intraoperative finding of an epiphrenic diverticulum.

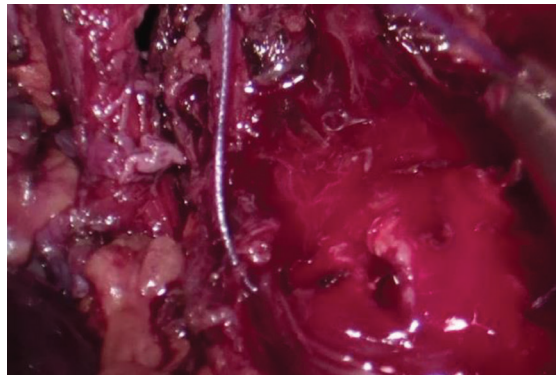


Figure 5. Perforation closure with Vicryl stitches.

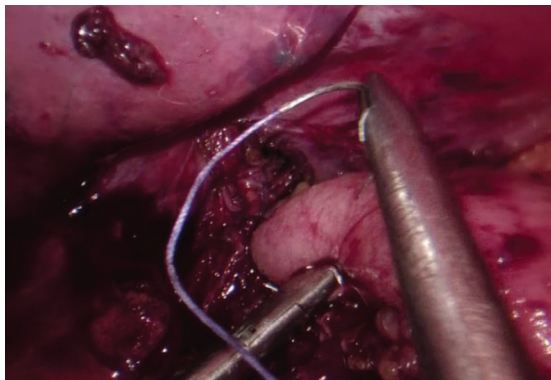


Figure 6. Dor fundoplication.

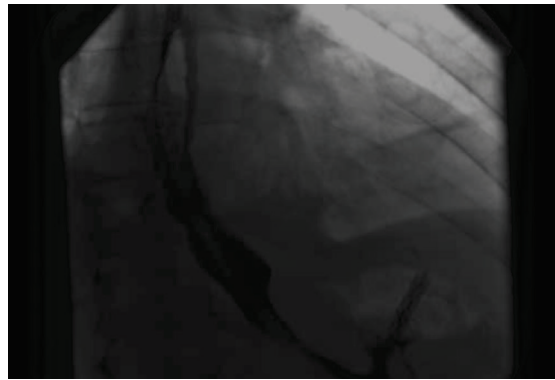


Figure 7. Postoperative control gastrografen swallow test.

Discussion

An epiphrenic diverticulum is a pulsion diverticulum, defined by the herniation of mucosa and submucosa through the muscle layers of the esophagus¹⁰. In the present case, the histopathological findings revealed an inflammatory infiltrate in the diverticular wall. The protrusion was on the right side, within 10 cm of the esophagus, as is reported most often^{8,10}. The diverticulum in the present case was considered to be associated with achalasia which had caused severe motility abnormalities and symptoms of dysphagia and regurgitation.

Since the patient presented with non-specific clinical manifestations, the differential diagnosis was comprehensive. It included other esophageal diverticula, such as Zenker or traction diverticula, acid reflux, hiatal hernia, benign tumors, and esophageal cancer¹¹.

Preoperatively, our diagnostic algorithm included medical history, a gastrografen swallow test, a CT, upper gastroesophageal endoscopy, and esophageal manometry. We performed a contrast swallow test, which is able to determine the exact size, location, and the distance from the gastroesophageal junction of the diverticulum¹². An endoscopy examination was performed, to exclude multiple diverticula and cancer^{8,12}.

The indications for surgery have still not been defined, mainly for patients with mild or absent symptoms¹². Most authors suggest that asymptomatic patients and patients diagnosed with small diverticula should not be treated surgically due to the small risk of cancer, adverse complications, and aspiration¹³⁻¹⁵. In our case, surgery was indicated due to the large size of the diverticulum and the progression of the patient's symptoms.

In 1998, Rosati et al. first reported the results of laparoscopic transhiatal diverticulectomy, esophageal myotomy, and partial fundoplication in four patients with a symptomatic epiphrenic diverticulum¹⁶. The postoperative period was uneventful, with adequate clinical controls¹⁶.

Currently, laparoscopic transhiatal diverticulectomy is considered to be a safe and effective procedure with satisfactory long-term outcomes¹⁷. One of the main advantages of the laparoscopic approach is the better exposure of the gastroesophageal junction, which allows the performance of myotomy and fundoplication¹².

We also performed laparoscopic transhiatal diverticulectomy, Heller myotomy, hiatoplasty, and a Dor fundoplication. However, while performing the Heller myotomy, a small iatrogenic esophageal perforation was noted within 2 cm of the LES.

Esophageal perforation, a major complication of laparoscopic Heller myotomy, occurs in 7% of patients¹⁸. At this time, there are still no guidelines, only management options: conservative, surgical, or an endoscopic approach with clipping, suturing, or stenting¹⁹. Since we recognized the perforation intraoperatively, we decided to suture the lesion laparoscopically with a single suture. We want to emphasize that cervicostomy or gastrostomy is not necessary when a primarily esophageal perforation occurs. Primary suturing of the esophageal perforation site is the method of choice when a lesion is noted intraoperatively. Therefore, in order to recognize intraoperative complications early, adequate visualization of the lesion is essential. Subsequently, primary suturing of an iatrogenic esophageal perforation is advised.

Transabdominal laparoscopic resection of esophageal diverticula is a widely used surgical technique. It allows prompt and excellent visualisation of possible lesions and also enables necessary surgical interventions. Primary suturing is a feasible technique for resolving such iatrogenic esophagus perforations, also taking into account that a Dor fundoplication is then created over the lesion site. Postoperatively, a significant improvement is expected in terms of quality of life.

Conflicts of interest

The authors have no relevant financial or non-financial interests to disclose.

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