

Laparoscopy in the treatment of a giant “true” epiphrenic diverticulum with migration of the gastrointestinal anastomosis staples

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ABSTRACT

الحالة التي لدينا هي لرجل يبلغ من العمر 62 عاماً، يعاني من داء السكري مع قلس منذ فترة طويلة، نفس كريبه، التهاب متكرر في الصدر، وآخر المستجدات حدوث نزيف في الجزء العلوي من الجهاز الهضمي GI. تم تشخيص حالته قبل 10 سنوات بأنه يعاني من رنج مريئي فوق الحجاب الحاجز، مع وجود تاريخ عائلي لهذه الحالة. أظهر فحص الباريوم عن وجود رنج فوق الحجاب الحاجز بقياس 10×10 cm مع 4 cm عند العنق، والهامش السفلي للفتحة بقياس 6 cm من اتصال المريء مع المعدة. أكد الفحص بالمنظار الداخلي نتائج فحص الأشعة السينية، والدراسات المتحركة ضمن الحدود الطبيعية. خضع المريض لعملية استئصال للرنج عن طريق البطن بواسطة المنظار. أكدت نتائج الفحص الفسيولوجي أن هذا الرنج من النوع الحقيقي.

Our case is a 62-year-old diabetic man with a long-standing history of regurgitation, halitosis, recurrent chest infection, and most recently upper gastrointestinal bleeding. He was diagnosed 10 years earlier with an epiphrenic esophageal diverticulum, and also has a family history of this condition. Barium study revealed a 10×10 cm epiphrenic diverticula with a 4 cm neck, the lower margin of the opening lying 6 cm from the gastro-esophageal junction. Endoscopy confirmed the x-ray findings, and motility studies were within normal limits. The patient underwent laparoscopic excision of the diverticulum via the trans-abdominal approach. Histopathological examination revealed this diverticulum to be of the “true” type.

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Esophageal diverticulum can be described anatomically as arising in the upper third, middle third, or lower third of the esophagus. Lower third diverticula are also called epiphrenic, and are mostly of the acquired “pulsion type”, inflammatory “traction type”, or both “pulsion and traction” type.¹ However, there are also congenital diverticula that occur as an incomplete attrition of esophageal duplication, and these are described as “true” diverticula. Laparoscopy, as well as, thoracoscopy was described in some case reports as a suitable alternative to the classic open approach. We present this case of a large epiphrenic diverticulum that was treated laparoscopically through an abdominal approach highlighting the transmigration of the clips within the esophageal wall with a review of the literature.

Case Report. A 62-year-old man complaining of a long-standing history of dysphagia of solid foods, and stoppage of food at the level of the xiphisternum presented to our department. The symptoms were progressive, and had been associated with a significant loss of weight. Most recently, he had been noticing regurgitation of food after meals, foul breath, recurrent chest infections, and most notably 3 recent attacks of hematemesis. He was diagnosed 10 years ago with a lower third esophageal diverticulum, but he had been very reluctant to undergo surgical intervention at that time. His medical history is notable for having diabetes for the last 20 years, and is on regular insulin treatment. He also has a sister who suffers from a cervical esophageal diverticulum. There was no history of tuberculosis infection in this patient. His clinical examination was unremarkable, and his laboratory values were unremarkable.

His barium swallow study showed a large 10×10 cm filling defect with a 4 cm neck (Figure 1). Endoscopy (Figure 2) confirmed the presence of the diverticulum with a 4 cm wide opening, the lower margin of this opening was lying 6 cm above the gastro-esophageal

junction. Esophageal motility and trans-luminal pressure studies showed normal resting lower esophageal sphincter pressures, as well as, normal swallowing pressure waveforms. The operative procedure was performed under general anesthesia with the patient lying in a semi-lithotomy position using the Lloyd-Davis leg supports, and placing the patient with his legs in partial extension, and with 30-degree elevation of the torso. Five ports were initially placed, a 10 mm

umbilical/camera port, a 5 mm epigastric port, a 15 mm port in the right side of the abdomen, and 2 ports 5 mm in the left side of the abdomen. Due to the large size of the diverticulum, a sixth port 5 mm in size was placed at the right side of the abdomen, to help in the mobilization of the diverticulum. No dilatation of the esophageal lumen was performed. Intra-operative findings showed no obvious hiatal hernia, mobilization of the intra abdominal esophagus was carried out by dissecting the

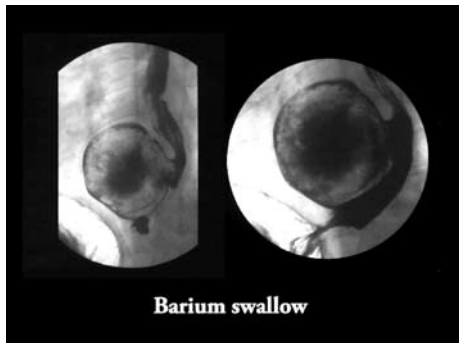


Figure 1 - Barium swallow study showed a large 10x10 cm filling defect with a 4 cm neck.



Figure 2 - The right lumen (white arrow) represents the gastro-esophageal opening while the left lumen (blue arrow) is the opening of the diverticulum.

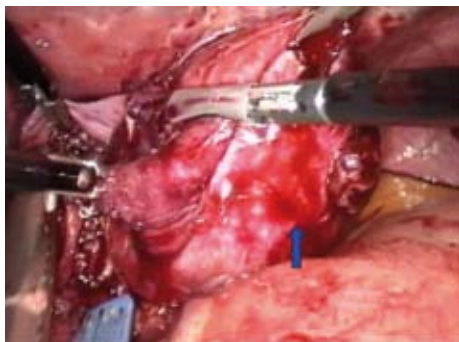


Figure 3 - The diverticular wall (blue arrow) could be identified inside the chest.

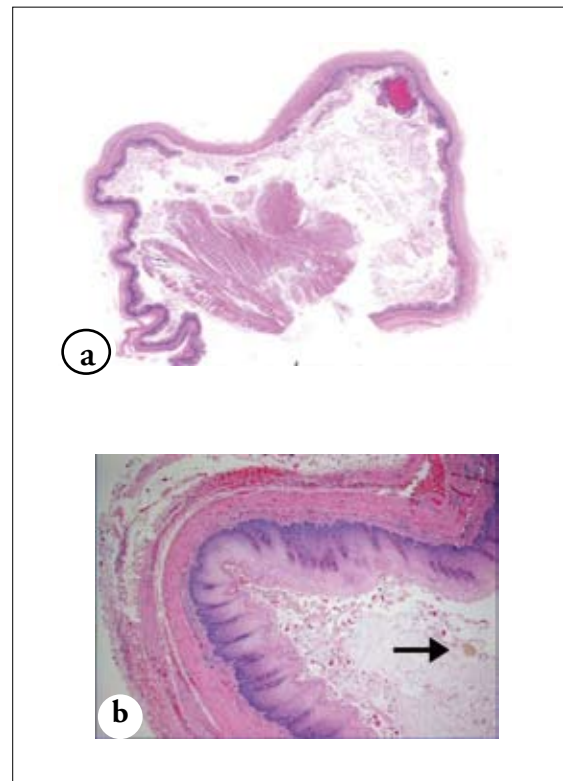


Figure 4 - Histopathology slides revealed the diverticulum to be of true type with all the layers of the esophagus present, a) no inflammatory reaction was noted, and b) large food particles were also found within the diverticulum



Figure 5 - Upper gastro intestinal (GI) endoscopy that showed trans-luminal migration of his endo-GI anastomosis staples (blue arrow), and no evidence of reflux.

phreno-esophageal ligament, and the diaphragmatic hiatus was incised 1 cm vertically at the hiatus, while the diverticular wall could be identified inside the chest and dissected from the pleura using blunt dissection sparing the vagus nerve (Figure 3). (The diverticulum was easily dissected from the trans-abdominal approach, and resection of the diverticulum was carried out using 45 mm endothelial-gastrointestinal anastomosis (GIA) with 3.5 mm staples, 2 cartridges were used, and no overlay stitch was required. The diaphragmatic incision was approximated with 2 stitches of 1/0 silk using the endo-stitch device (Tyco). The diverticulum was extracted using a large endo-bag (Tyco) through the 15 mm port. The site of excision was tested intra-operatively for leakage by using methylene blue dye, as well as, for air leak. No leakage was detected, fundoplication, and myotomy were not performed in this case. In the recovery room, the patient underwent a chest x-ray that showed no pneumothorax, the nasogastric tube was left in place for 24 hours, and fluid diet was started after 72 hours. The patient's recovery was uneventful, and he was discharged home one week after the procedure. Histopathology slides revealed the diverticulum to be of the true type with all the layers of the esophagus present, no inflammatory reaction was noted, and large food particles were also found within the diverticulum. (Figures 4 a & b). The patient was reviewed 2 months after the procedure. He underwent a follow up upper GI endoscopy that showed trans-luminal migration of his endo-GIA staples, and no evidence of reflux (Figure 5). He remained completely asymptomatic with excellent results, and follow up was continued for one year after the procedure.

Discussion. Esophageal diverticula are described anatomically as either being in the upper, middle, or lower third of the esophagus. Lower esophageal diverticula, also called epiphrenic diverticula, are largely of the pulsion, “acquired” type. These diverticula occur due to abnormally high resting lower esophageal sphincter pressure, as well as, uncoordinated esophageal contractions, usually leading to herniation of the mucosa, and are described as being “false” as not all the layers are present on histopathology, although in small diverticula of the pulsion type, all the layers can sometimes be found.¹ Congenital “true” epiphrenic diverticula however, are incredibly rare, and are thought to be due to a communication with a duplication of the esophagus, which is in contrast to congenital mid-esophageal diverticula which are more common, and is usually due to incomplete attrition of an esophago-bronchial fistula. These diverticula are characterized by the presence of a complete esophageal wall with intact muscular layer, and can sometimes present with other

GI histological tissue such as intestinal, gastric, colonic, or even pancreatic tissue.¹

Surgery is usually indicated in symptomatic cases,^{2,3} whether the symptoms are due to the diverticulum, or due to an underlying motor disorder is sometimes difficult to ascertain. It is worthy to note that not all diverticula are symptomatic, however, the larger ones are more likely to cause symptoms. Another school of thought advocates surgery for all patients, even if they are asymptomatic, particularly since malignancy arising in these diverticula is well-documented,⁴ and the possibility of complications arising from the diverticulum, for example, perforation goes unanswered.⁵

Investigations for esophageal diverticula can be described as being either anatomical, or functional. Anatomical investigations of choice are mainly a contrast x-ray and upper GI endoscopy, these investigations can usually ascertain the site, size, and define the opening of the diverticulum. Physiological studies however, are paramount in asserting the cause, as well as, the type of procedure required for the diverticulum. Most esophageal diverticula are associated with some form of abnormality in motility or pressure. As one recent study has shown, as many as 81% of the cases are associated with some form of motility disorder, the most common being non-specific forms of esophageal motility disorder (24%), while findings suggestive of achalasia were uncommon (9%). Nutcracker esophagus and diffuse esophageal spasm were also of a high incidence (24% each in this study).⁶

Surgery is performed either through the abdominal or the thoracic approach, with minimal invasive modalities recently being described for both. The approach is dictated by several factors including the size and position of the diverticular opening, the presence of/or a history of inflammation in the area that might lead to adhesions, as well as, the preference of the attending surgeon. We believe that pre-operative measurement of the distance between the lower diverticular opening and the gastro-esophageal junction is a good indication of the feasibility of an abdominal approach. The trans-abdominal laparoscopic approach can be performed for a diverticulum lying within 6-10 cm from the gastro-esophageal junction. The most common procedure performed is excision of the diverticulum with a myotomy and fundoplication such as an anterior (Dor), or a posterior (Toupet). It is important that the fundoplication not result in a very high lower esophageal sphincter tone, and thus a Nissen fundoplication is not recommended.³

The length of the myotomy described in the literature is variable. There is no general consensus on how long it should be, but generally the affected segment of esophagus involved in dysmotility needs to be included, and is usually placed on the opposite side

to the diverticulum, and extends 1.5 cm onto the gastric cardia. The addition of a myotomy to the procedure is thought to decrease the incidence of leakage from the suture line,^{3,7,8} however, there are also reported cases of iatrogenic diverticula occurring at the myotomy site.⁷ Other procedures have also been described, such as myotomy alone without excision in small diverticula, or excision alone without myotomy, in cases with normal esophageal manometry.¹

Transmigration of the GIA clips has been well described and documented in many GI sites, particularly in cases of vertical banding gastroplasty, and can present as either intra or extra-luminal migration. We are not aware of any similar reported cases in the esophagus following excision of a diverticulum, or whether the presence of a motility disorder would dictate the site of future migration, and the symptomology that might arise from such a phenomena.

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