

Received: 2021.02.18

Accepted: 2021.04.08

Available online: 2021.04.20

Published: 2021.05.26

Iatrogenic Esophageal Perforation After Laparoscopic Heller's Myotomy Treated Successfully with Endoscopic Stent: Case Report and Literature Review

Authors' Contribution:

Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABEF 1 **Ghadeer M. AlHajjaj**
BE 1 **Fatimah Yasser AlTaweel**
BE 1 **Roaya Ahmed AlQunais**
B 2 **Zahra H. Alshammasi**
AEG 1 **Saeed J. Alshomimi**

1 Department of Surgery, College of Medicine, King Fahad Hospital of the University, Imam Abdulrahman bin Faisal University, Khobar, Saudi Arabia
2 Department of Surgery, King Fahad Specialist Hospital, Dammam, Saudi Arabia

Corresponding Author: Saeed Alshomimi, e-mail: sshomimi@iau.edu.sa

Conflict of interest: None declared

Patient: Male, 37-year-old
Final Diagnosis: Achalasia
Symptoms: Dysphagia
Medication: —
Clinical Procedure: Laparoscopic surgery
Specialty: Surgery

Objective: Unusual or unexpected effect of treatment

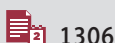
Background: Achalasia cardia is a neuro-degenerative motility disorder, which results in the loss of esophageal peristalsis along with failure of the lower sphincter to relax in response to swallowing. It is relatively rare, with a prevalence of 10 cases per 100 000 individuals. The criterion standard in the management of achalasia is laparoscopic Heller's myotomy with partial fundoplication. Esophageal perforation is one of the earliest major complications that could be managed by primary repair. However, it has been reported that esophageal perforations in achalasia cases can be managed with esophageal stenting after primary repair failure.

Case Report: We are reporting a case of achalasia after Heller's myotomy in a 37-year-old man, which was complicated by iatrogenic esophageal perforation and was successfully managed by esophageal stenting after failed primary repair.

Conclusions: Esophageal stenting is a safe and effective management in cases of esophageal perforation after Heller's myotomy procedure.

Keywords: Esophageal Achalasia • Esophageal Perforation • Heller Myotomy • Stents

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/931677>



1306



—



5



12



Background

Traditionally, operative repair was the best treatment for acute esophageal perforation. Currently, however, there has been a shift toward the use of esophageal stenting, which is considered safer and less invasive than primary repair, which has been well documented to have a significant failure rate. Multiple cases of esophageal leak have been reported to be managed with esophageal stent placement after failed primary repair [1].

Case Report

A 37-year-old man who had no history of chronic illnesses and was a smoker presented to our general surgery clinic as a referral from the gastroenterology clinic with symptoms of progressive dysphagia and regurgitation for the past 2 years. The dysphagia was first noticed to be associated with the consumption of solid food and had slowly progressed to occur with liquid consumption. It was not associated with chest pain or any other gastrointestinal symptoms. The patient experienced significant unintentional weight loss of around 10 kg in the previous months.

The gastroenterology team conducted several investigations prior to referral, including a Gastrografin swallow, esophago-gastroduodenoscopy (EGD), and esophageal motility study. The Gastrografin swallow demonstrated esophageal dilation with significant smooth narrowing at the gastroesophageal sphincter, representing a bird's beak sign (Figure 1). The EGD showed a tight lower esophageal sphincter (LES) and esophageal peristalsis. A high-resolution esophageal manometry study showed type II achalasia, a lower esophageal sphincter pressure of 55 mmHg, and peristaltic movement of only 10%. The treatment options that were available (medical, endoscopic, and surgical management) were discussed with the patient, who decided to undergo operative management.

In March 2020, the patient underwent an elective laparoscopic Heller's myotomy with Dor fundoplication. An iatrogenic



Figure 1. Pre-operation Gastrografin swallow study showed tapering of the contrast at the distal part of esophagus (bird's beak appearance) suggestive of achalasia.

esophageal perforation was discovered intraoperatively and repaired primarily using an absorbable suture (3-0 Vicryl) in an interrupted fashion (Figure 2). An intraoperative endoscopy confirmed an adequate myotomy with no evidence of an open perforation or resistance and the adequacy of the primary repair of the discovered perforation on insertion of the endoscope. Owing to the iatrogenic esophageal perforation,

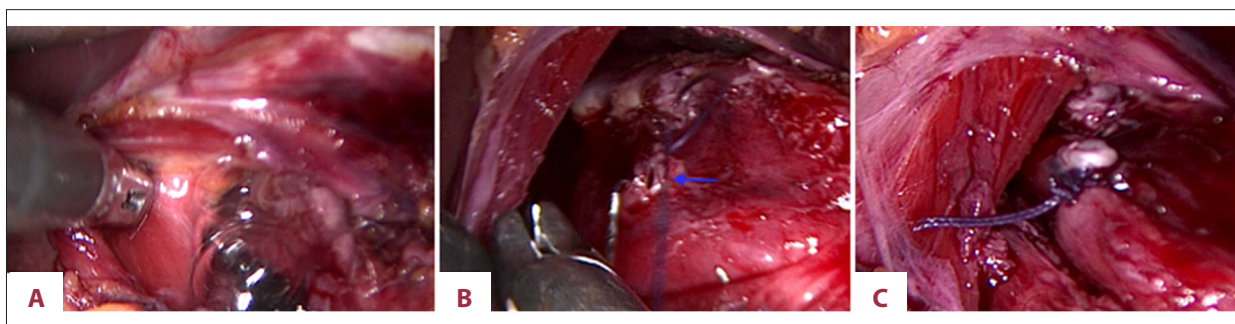


Figure 2. Intraoperative pictures: (A) leak test, which is showing bubbles from the perforation site, (B) small perforation of the esophagus, and (C) primary repair of the perforation.

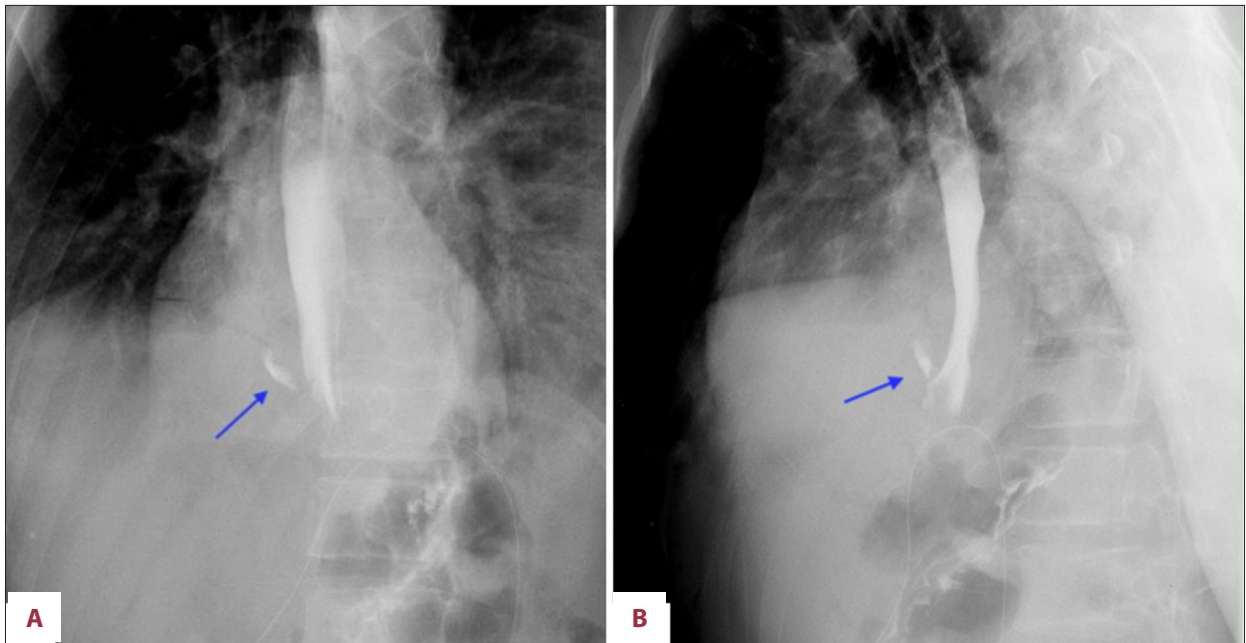


Figure 3. Postoperative (A) anteroposterior and (B) lateral views of Gastrografin swallow study showing leak on the right side before stenting.

an intra-abdominal drain was inserted into the upper abdominal area.

On postoperative day 1, the patient developed severe intermittent chest and abdominal pain with no associated symptoms. Laboratory studies revealed leukocytosis, with a leukocyte count of 20.8 k/uL, and elevated C-reactive protein of 18.7 mg/dL. Additional laboratory tests were performed, including aerobic and anaerobic blood cultures, which yielded no growth after 5 days. A computed tomography scan of the chest with oral contrast was obtained, which demonstrated postoperative changes with associated small pneumomediastinum and small bilateral pleural effusion, with no evidence of oral contrast leakage. The patient was kept fasting on intravenous (i.v.) fluids, and the infectious disease team was consulted to determine the appropriate antimicrobial agents for this case. They elected to start the patient on antibiotic treatment with i.v. Tazocin. The thoracic surgery team was consulted regarding the small bilateral pleural effusion and opted to observe the patient. Because the patient's symptoms were persistent and not improving, we elected to do a Gastrografin swallow on postoperative day 2 to confirm or exclude an esophageal leak. The fluoroscopy study displayed a leak in the lower end of the esophagus (Figure 3). An EGD was performed, and a fully covered metallic esophageal stent (ELLA Stent Esophageal HV), 11 cm in length, was inserted and deployed, covering the site of the leak. Three days after the esophageal stenting, the patient started to have right lower abdominal pain and coffee-ground vomitus. An abdominal X-ray revealed there was stent migration inferiorly (Figure 4). The following day, the EGD was

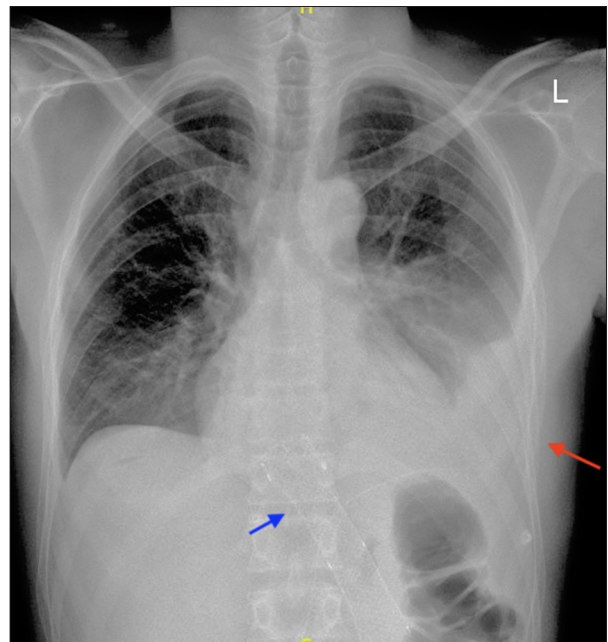


Figure 4. X-ray showing stent migration (blue arrow) with left-side pleural effusion (red arrow).

repeated for stent adjustment. An additional Gastrografin study after the procedure showed satisfactory placement of the stent. An oral diet was started on postoperative day 8, starting with sips of water and progressing, as tolerated, to a liquid diet. On postoperative day 9, a follow-up chest X-ray showed an increase of pleural effusion in the left hemithorax. The thoracic surgery team recommended an ultrasound-guided left-sided



Figure 5. Gastrografin swallow after removal of the stent, showing no leak.

pleural pigtail insertion connected to an underwater seal system. Four days after the pigtail insertion, the thoracic surgery team removed the pigtail after resolution of the left pleural effusion. The intra-abdominal drain was removed on the same day as the pigtail removal. Follow-up of the patient over the last few days of hospitalization showed improvement in his clinical condition and laboratory studies. Therefore, the patient was discharged on postoperative day 14. He was prescribed pantoprazole 40 mg p.o. twice daily, ciprofloxacin 500 mg p.o. twice daily, and paracetamol 1 g every 6 h as needed. He had

a follow-up appointment 3 days after discharge. After 1 month, the stent was endoscopically removed and contrast was injected during endoscopy, which did not demonstrate any evidence of an esophageal leak (Figure 5). The patient was followed up 9 months after surgery (because of COVID-19 pandemic restrictions). Clinically, the patient did not complain of dysphagia, tolerated a regular diet with no regurgitation, and returned to his usual weight. A follow-up barium swallow showed a smooth passage of contrast with no evidence of leak.

Discussion

Achalasia cardia is a neuro-degenerative motility disorder that results in the loss of esophageal peristalsis along with failure of the lower sphincter to relax in response to swallowing [2]. Achalasia is relatively rare, with a reported incidence of 1.6 cases per 100 000 in the population annually. The prevalence of achalasia is 10.8 cases per 100 000 individuals. Recent reports suggest an increase in the incidence in some populations, which may be explained by the expanding use of high-resolution manometry for diagnosing achalasia cardia in western countries. Achalasia can be approached either surgically or nonsurgically [3,4]. The criterion standard in the surgical management of achalasia is Heller's myotomy, which was performed for the first time by the young surgeon Ernts Heller on April 14, 1913. Today, the transabdominal laparoscopic approach of Heller's myotomy is the modality of choice, with excellent long-term results and an 91.8% success rate. On the other hand, nonsurgical options for the management of achalasia include pneumatic dilation of the lower esophageal sphincter, botulinum injections, or smooth muscle relaxants such as calcium channel blockers and nitrates, and recently, peroral endoscopic myotomy (POEM). Serial pneumatic dilation is a feasible option for achalasia type I and type II. The procedure is done under fluoroscopy guidance whereby a balloon is placed at the LES and inflated to disrupt the LES muscles. Pneumatic dilation has been associated with esophageal perforation and symptomatic gastroesophageal reflux disease. Botulinum injection works by inhibiting acetylcholine release, which leads to a decrease in LES pressure. POEM is an endoscopic procedure involving a submucosal tunnel creation and myotomy of esophageal circular muscles. The advantage of POEM over the laparoscopic Heller's myotomy is the length of the myotomy, which is mostly valuable in achalasia type III [5-7].

Esophageal perforation is an early major complication of laparoscopic Heller's myotomy, occurring in up to 7% of patients. Perforations that are recognized and repaired intraoperatively require minimal intervention, which results in a good outcome. Another method of management for esophageal perforation is esophageal stenting. There are 2 types of stents that are commonly used in this regard: a plastic stent and a covered metallic stent (which appears to be more successful) [8,9].

Many cases of iatrogenic esophageal perforation in patients with achalasia that were successfully managed with esophageal stenting have been described in the literature. However, most of these perforations were a complication of pneumatic dilation [10,11]. To the best of our knowledge, there is only 1 published case that displayed the use of esophageal stenting as management for iatrogenic esophageal injury after Heller's myotomy with failed primary repair, in an achalasia patient in Mexico [12].

References:

1. Ong GKB, Freeman RK. Endoscopic management of esophageal leaks. *J Thorac Dis.* 2017;9(Suppl 2):S135-45
2. O'Neill OM, Johnston BT, Coleman HG. Achalasia: A review of clinical diagnosis, epidemiology, treatment and outcomes. *World J Gastroenterol.* 2013;19(35):5806-12
3. Kim E, Lee H, Jung HK, Lee KJ. Achalasia in Korea: An epidemiologic study using a national healthcare database. *J Korean Med Sci.* 2014;29(4):576-80
4. Arora Z, Thota PN, Sanaka MR. Achalasia: Current therapeutic options. *Ther Adv Chronic Dis.* 2017;8(6-7):101-8
5. Khashab MA, Vela MF, Thosani N, et al. ASGE guideline on the management of achalasia. *Gastrointest Endosc.* 2020;91(2):213-27.e6
6. Jung HK, Hong SJ, Lee OY, et al. 2019 Seoul consensus on esophageal achalasia guidelines. *J Neurogastroenterol Motil.* 2020;26(2):180-203
7. Kahrilas PJ, Bredenoord AJ, Fox M, et al. Expert consensus document: Advances in the management of oesophageal motility disorders in the era of high-resolution manometry: A focus on achalasia syndromes. *Nat Rev Gastroenterol Hepatol.* 2017;14(11):677-88
8. Rosemurgy AS, Morton CA, Rosas M, et al. A single institution's experience with more than 500 laparoscopic Heller myotomies for achalasia. *J Am Coll Surg.* 2010;210(5):637-45, 645-47
9. Kamarajah SK, Bundred J, Spence G, et al. Critical appraisal of the impact of oesophageal stents in the management of oesophageal anastomotic leaks and benign oesophageal perforations: An updated systematic review. *World J Surg.* 2020;44(4):1173-89
10. Elhanafi S, Othman M, Sunny J, et al. Esophageal perforation post pneumatic dilatation for achalasia managed by esophageal stenting. *Am J Med Case Rep.* 2013;14:532-35
11. Verma A, Mohindra S, Saraswat VA, Ghoshal UC. Successful management of esophageal perforation with self-expandable metal stent following pneumatic dilation for achalasia cardia. *J Dig Endosc.* 2019;10(3):183-85
12. Villarreal-Galvan JJ, Gonzalez-Gonzalez JA, Maldonado Garza HJ. Total loss of the covering of a metallic stent during esophageal leak treatment. *Rev Gastroenterol Mex.* 2013;78(1):49-51

Conclusions

Esophageal perforation is an early major complication of Heller's myotomy. The use of esophageal stenting in cases of esophageal leak after failed primary repair has shown to be an effective and safe course of management with a good clinical outcome.