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Navigating the Oesophagus: Case Series on Tackling Complications Post-Esophagectomy in Achalasia Patients

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ABSTRACT

Achalasia, a primary esophageal motility disorder, manifests as impaired peristalsis and dysfunctional relaxation of the lower esophageal sphincter. Treatment aims to alleviate the functional obstruction at the gastroesophageal junction, facilitating esophageal emptying. For end-stage cases, esophagectomy is often recommended as the primary intervention, despite the considerable postoperative complications it entails. In this case series, we present instances of various complications post-McKeown's esophagectomy in achalasia patients with sigmoid oesophagus. These complications encompass anastomotic strictures, leaks, hydrothorax, tracheal injury, and laryngeal nerve damage.

Keywords: Achalasia, McKeown's Esophagectomy, Tracheal injury, Recurrent laryngeal nerve injury, Anastomotic leak.

INTRODUCTION

Esophagectomy is a complex surgery which is considered in cases of severe achalasia refractory to other treatments. However, postoperative complications can significantly impact patient outcomes and quality of life. With reported complication rates as high as 59% and a 90-day mortality rate of 4.5%, the management of complications following esophagectomy warrants careful consideration. (1) Among the array of potential postoperative challenges, anastomotic

leakage, anastomotic stricture, tracheobronchial injury, and recurrent laryngeal nerve injury stand out as particularly significant. In this case series, we explore the management of such complications, aiming to guide clinicians facing similar scenarios.

CASE PRESENTATION

Case 1 - Iatrogenic Tracheal Injury and Bilateral Vocal Cord Paralysis

A 42-year-old previously healthy male presented with a one-year history of dysphagia, heartburn, and regurgitation. Imaging revealed a widened mediastinum on chest x-ray and significant contrast hold-up at the distal oesophagus during a barium swallow. Esophagogastroduodenoscopy showed a dilated distal oesophagus with retained fluid. An attempted Peroral endoscopic myotomy was unsuccessful due to a distended lumen with a sigmoid-type morphology, hindering scope passage through the gastroesophageal junction. Prior to surgery, bronchoscopy lavage was performed, and a guidewire-assisted nasogastrojejunal tube was placed.

Subsequent laparoscopic-assisted McKeown's esophagectomy, revealed a tortuous oesophagus with dense adhesions to the pleura and membranous trachea, resulting in iatrogenic injury to the trachea during the dissection. The perforation was repaired primarily with Polydioxanone suture, via minimally invasive approach and a pleural patch was applied. Additionally, a chest tube was placed in the left lung base. Postoperatively, the patient was ventilated in ICU for the first few days, before he was extubated and transferred out to the general ward. An upper contrast study on the 6th postoperative day confirmed no anastomotic leak.

He developed grade 3 dysphonia due to unilateral vocal cord paralysis secondary to recurrent laryngeal nerve injury. Despite initial conservative management, his symptoms persisted beyond 8 weeks necessitating further intervention with injection laryngoplasty using Hyaluronic acid. Post-discharge, the patient exhibited satisfactory progress on a soft diet, with notable improvement in phonation.

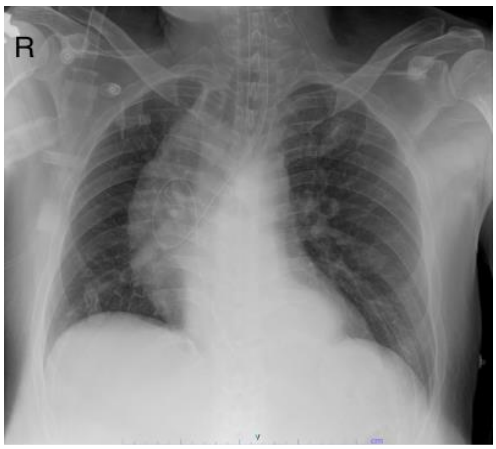

Fig 1: Chest Xray before Esophagectomy.

Fig 2: Chest Xray after Esophagectomy

Case 2 - Anastomotic Failure, Anastomotic Leak and Vocal Cord Paralysis

This is a case of a 66-year-old woman with a background of Dyslipidemia, Paroxysmal Atrial Fibrillation following ablation, who underwent total thyroidectomy for multinodular goitre a decade ago, and open cholecystectomy 30 years ago. She presented with a six-month history of

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solid dysphagia accompanied by retrosternal discomfort and weight loss. An esophagogastroduodenoscopy revealed a dilated and tortuous oesophagus indicative of a sigmoid oesophagus with residual food contents. High-resolution impedance manometry demonstrated 100% ineffective swallows consistent with type 1 achalasia. Imaging with contrast-enhanced computed tomography of the thorax and abdomen showed a dilated, tortuous oesophagus with thickened walls.

The patient underwent laparoscopic-assisted McKeown's esophagectomy. Subsequent examination with oral gastroscopy performed the following day, failed to visualize the anastomosis lumen. This lead to emergency neck exploration and on-table enteroscopy, which revealed a narrow anastomotic connection. A decision was made against revising the anastomosis, opting instead for a new hand-sewn, side-to-side esophagogastric anastomosis, with a drain placed below and a nasogastric-jejunostomy tube inserted beyond the anastomosis. A post-anastomosis gastroscopy confirmed the patency of the newly created connection. After surgery the patient was managed in the ICU.

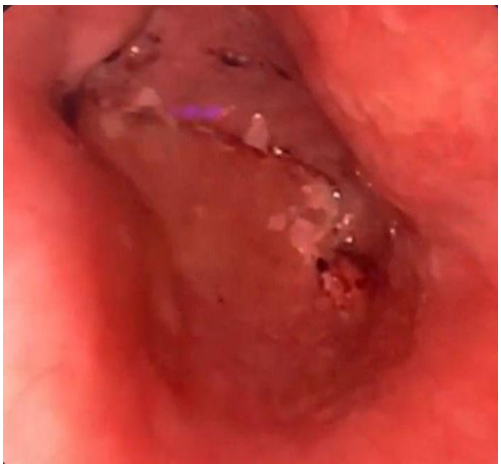
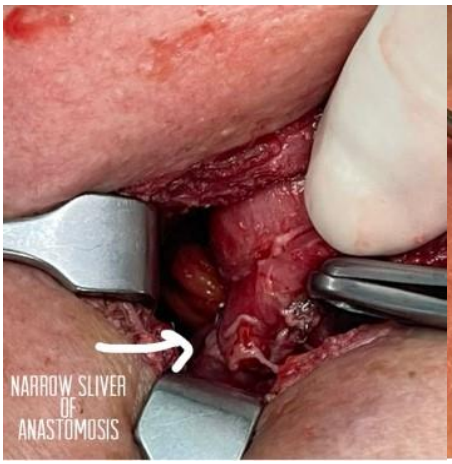


Fig 3: Endoscopic image after esophagectomy showing

Fig 4: Endoscopic image after new esophago-gastric anastamosis no anastamotic lumen



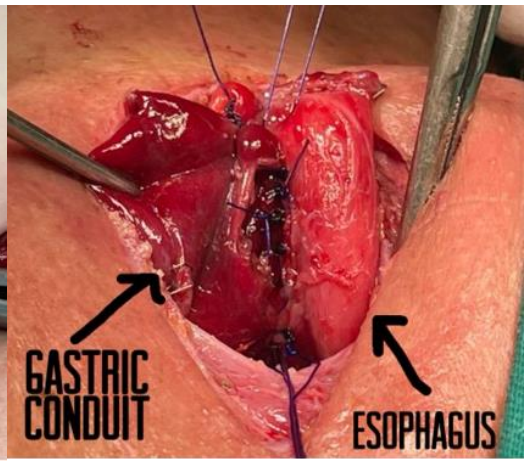


Fig 5. Intraoperative image showing narrow sliver of Fig 6. Intraoperative image of new esophago-gastric anastomosis being made anastomosis of previous esophagectomy

Postoperatively, the patient developed surgical site infection and unilateral vocal cord palsy which was managed conservatively. On the sixth day, air leakage from the neck wound prompted an upper gastrointestinal contrast study, diagnosing an anastomotic leak. It was successfully treated with vacuum dressings, facilitating the patient's recovery.

The initial anastomotic failure was attributed to the use of a smaller 45mm linear stapler during the anastomosis, resulting in a drastically narrowed lumen, upon the firing of a second stapler to seal off the anastomosis which necessitated the revision surgery.

Case 3 - Hydrothorax

This is a case of a 29-year-old female with no prior medical history, who presented with dysphagia. Following comprehensive evaluation, she was diagnosed with achalasia type 1.

Despite undergoing Peroral Endoscopic Myotomy (POEM) in 2019, the procedure failed to alleviate her symptoms. Next, the patient underwent Laparoscopic-assisted McKeown's esophagectomy. Intraoperatively, a redundant sigmoid oesophagus with dense adhesions at the lower oesophagus, cardio-oesophageal junction, and crural pillars was noted, necessitating thoracoscopic, laparoscopic, and mini-laparotomy isolation of the oesophagus.

On postoperative day 3, she was diagnosed with a small right pneumothorax and left hydropneumothorax. The left hydrothorax was managed with pigtail insertion under image guidance, while the pneumothorax resolved with conservative measures. Post-surgical endoscopy revealed an intact anastomosis with a healthy conduit and a small hematoma at the anastomotic region. Repeat contrast-enhanced computer tomographic scan of the thorax confirmed the absence of an anastomotic leak. The patient resumed a soft diet and was discharged on postoperative day 9. At the 6-week follow-up, the patient exhibited expected recovery with no new issues.

Fig 7: Esophagectomy specimen.

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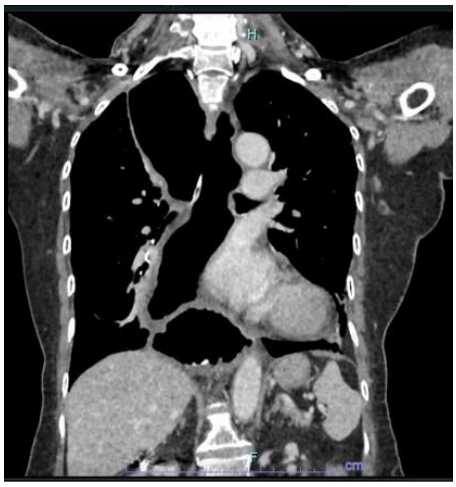

Fig 8: Chest CT image (coronal) showing a severely dilated, sigmoid esophagus

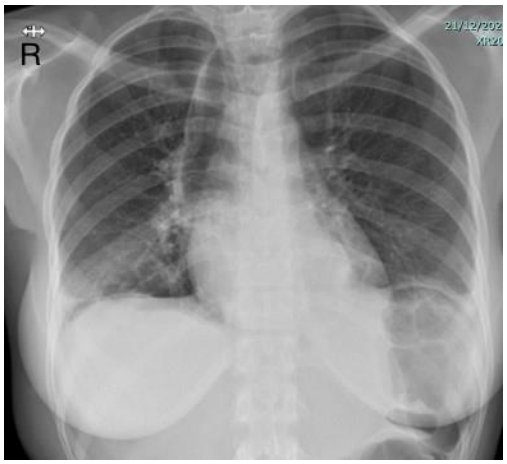

Fig 9: Chest Xray postoperatively showing hydrothorax

DISCUSSION

Achalasia, an esophageal motility disorder, is characterized by abnormal peristalsis and inadequate relaxation of the lower esophageal sphincter. Its annual incidence is estimated between 1.07 and 2.2 cases per 100,000 individuals, with prevalence rates ranging from 10 to 15.7 per 100,000 individuals. (2) Typical symptoms include dysphagia to solids and liquids, regurgitation, and occasional chest pain, often accompanied by weight loss. High-resolution manometry has classified achalasia into three subtypes based on pressurization and contraction patterns. (2,3) Diagnostic clues include endoscopic findings of retained saliva with puckering of the gastroesophageal junction or esophagram findings of a dilated oesophagus with bird beaking. (4)

Sigmoid oesophagus refers to the dilation of the distal oesophagus exceeding 10 cm in diameter and/or taking a tortuous course through the chest towards the gastroesophageal junction. (4) For individuals with a massively dilated or sigmoid oesophagus and significantly impaired quality of life, upfront esophagectomy should be considered to alleviate symptoms and enhance quality of life. (5)

Iatrogenic tracheal injury during esophagectomy, as seen in the first case, is an exceedingly rare yet potentially fatal complication associated with severe morbidity and mortality, with an incidence ranging from 1% to 10%. (6) Both anatomical and mechanical risk factors contribute to the heightened risk of this complication. Previous thoracic surgeries or esophageal malignancies with local invasion are notable risk factors. However, even benign conditions like achalasia, as observed in this case, can lead to dense adhesions, increasing susceptibility to tracheal injuries.

Prompt recognition and closure of such injuries are paramount to prevent life-threatening consequences. There are controversy regarding the optimal management approach, balancing the increased complications of primary repair against conservative management. It is recommended that injuries extending over 2 cm, those detected intraoperatively, full-layer tracheal injuries involving the posterior membranous portion, and injuries resulting from emergency intubation should undergo primary repair. Surgical repair options include utilizing

tissue flaps from intercostal or pectoral muscles, or from pericardial or pleural sources, as well as employing a gastric tube with its omentum. (7)

The second case encountered anastomotic failure stemming from technical issues. It was an unexpected complication necessitating immediate intervention upon identification. Given the challenges in repairing the small anastomosis and limited access from a small neck incision, the decision was made to create a new anastomosis. Moreover, there was a concern regarding the risk of subsequent stricture formation. Unfortunately, this led to another complication of anastomotic leak. According to a study conducted by Annelijn et al, rate of anastomotic leak after McKeown's esophagectomy is 32%. (8)

Various approaches exist for managing anastomotic leaks. While self-expanding metallic stents (SEMS) are an option, emerging techniques such as vacuum dressing show promise. In cases where these methods fail, surgical repair remains the final option.

In hindsight, an intraoperative gastroscopy following the first surgery could have identified and corrected the anastomotic failure, potentially preventing the second surgery and subsequent complications. This measure could have avoided additional morbidity, extended intensive care unit and hospital stays, and improved the patient's early postoperative recovery quality.

Two out of the mentioned three cases developed unilateral vocal cord paralysis, due to recurrent laryngeal nerve injury during esophagectomy. This is a common complication with an incidence reaching 4.2%. (9) While 55 percent of patients should recover spontaneously, full recovery can take a long time. Bilateral vocal cord paralysis has a far worse prognosis for complete spontaneous recovery. (10) One surgical procedure, called medialization laryngoplasty, inserts a structural implant into the larynx to return voice quality.

Two of the three cases described experienced unilateral vocal cord paralysis resulting from recurrent laryngeal nerve injury during esophagectomy. This complication is relatively common, with an incidence reaching 4.2%. (9) While spontaneous recovery occurs in 55% of patients, complete restoration of function may take a considerable amount of time. However, bilateral vocal cord paralysis carries a bleaker prognosis for full spontaneous recovery. (10)Medialization laryngoplasty, a surgical procedure involving the insertion of a structural implant into the larynx, offers a solution to restore voice quality.

Pulmonary complications contribute to 20% of postoperative outcomes following esophagectomy. (11) Remarkably, the third case, being young and devoid of comorbidities, experienced relatively few complications, aside from a minor pleural effusion successfully managed through drainage under radiological guidance. Fortunately, more severe complications such as chylothorax or anastomotic leak were ruled out.

It's worth mentioning that all three cases underwent Esophagogastroduodenoscopy, and nasogastric decompression was performed prior to surgery as a precaution against aspiration, which could lead to dire consequences.

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Additionally, early admission to the ward and nutritional optimization before surgery were standard procedures for all cases. This proactive approach aimed to minimize surgical complications and facilitate easier management.

CONCLUSION

The management of complications post-esophagectomy in achalasia patients, requires a multidisciplinary approach tailored to individual patient factors and specific complications encountered. Strategies may include conservative measures, endoscopic interventions, revision surgeries, and optimization of medical therapy. Careful consideration of the risks and benefits of each approach is essential to achieve favourable outcomes while minimizing morbidity and mortality. By sharing our experiences and lessons learned, we aim to facilitate better care and outcomes for this challenging patient population.

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