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Pharyngeal perforation and tracheopharyngeal fistula caused by foreign body impaction: A case report

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Abstract

Though pharyngeal perforations are a well-documented occurrence, tracheopharyngeal fistulae are rare and published guidance for management is limited. We describe the workup and management of a traumatic tracheopharyngeal fistula caused by foreign body impaction. A conservative, endoscopic treatment strategy with broad spectrum antibiotics, transnasal drainage, and covered tracheal stent placement was used. The stent was removed after 4 weeks and complete closure of the fistula tract was confirmed by endoscopy and contrast esophagram. Although tracheopharyngeal fistulae are rare and operative treatment can be complex, this case demonstrates that in select cases conservative management with antibiotics, drainage, and endoscopic stenting can be successful.

Introduction

Traumatic tracheopharyngeal fistula are rare and there is little available guidance for management. While necessary, the principles of wide drainage, broad spectrum intravenous antibiotics, nothing per os, and nutritional supplementation, are not sufficient for management of traumatic tracheopharyngeal fistula because the fistula allows ongoing airway contamination. In these cases, the additional need for exclusion of the fistula tract to prevent ongoing airway soilage is of paramount importance; options include primary repair of the airway and esophageal defects, primary repair of the esophageal defect and segmental tracheal resection, soft tissue coverage of the defects, combined surgical/endoscopic strategies, esophageal diversion with primary airway repair, and endoluminal stents. Fistula etiology, chronicity of the fistula, location, fistula size and contour, patient nutritional status and comorbidities, previous surgical history, previous attempts at repair, and surgeon

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experience all play a role in selection of the operative strategy. It is important to note that, while the use of self-expanding covered metal stents is gaining acceptance in a variety of settings, their role in the management of upper aerodigestive tract perforations and fistulae continues to be debated and explored.

Case Report

A 47 year-old male with a history of mental retardation initially presented with acute respiratory failure after oral intake. A water-soluble contrast esophagram revealed an irregular cavity extending from the anterior aspect of the pharynx at the level of C5-6, communicating directly with the airway, consistent with a tracheopharyngeal fistula. (Figure 1) A CT was then performed to determine the extent of the perforation and to evaluate for mediastinal involvement. (Figure 2) Upper endoscopy revealed a plastic foreign body impacted in the right pyriform sinus, which was easily removed with biopsy forceps. (Figure 3) The site of pharyngeal perforation was intubated endoscopically and the fistulous tract, measuring 3 cm in depth and 2 cm wide, was identified with extension into the trachea at the distal end of the cavity. (Figure 4) Bronchoscopy identified the fistulous opening just proximal to the first tracheal ring. (Figure 5A)

Given the absence of soft tissue infection or sepsis, the decision was made to manage the injury endoscopically. The endotracheal tube was pulled back to the level of the vocal cords and a covered 18×40 mm tracheal stent was deployed using fluoroscopy just distal to the cords to prevent further soiling of the airway. (Figure 5B) Following advancement of the endotracheal tube through the stent, a transnasal Jackson Pratt drain was placed through the site of perforation into the fistula tract for drainage. A percutaneous endoscopic gastrostomy tube was also placed for nutritional support. Postoperative contrast esophagram demonstrated effective exclusion of the fistula. (Figure 6)

The patient's subsequent recovery was uneventful. He was given IV antibiotic and antifungal therapy for empiric treatment of his perforation and never developed signs of soft tissue infection. Serial endoscopies at roughly 1 week intervals were performed for stent debridement and dilation to minimize the risk of stricture formation. The transnasal drain was removed at the time of the first repeat upper endoscopy. On postoperative day 28 the tracheal stent was removed and repeat esophagram showed that the fistula was completely healed. (Figure 7)

Comment

Pharyngeal perforations most commonly occur as a result of iatrogenic trauma, such as complications from endotracheal intubation, nasogastric tube placement, and endoscopic instrumentation. Less common causes include blunt or penetrating trauma and foreign body ingestion. Most commonly seen in the pediatric population, pharyngeal perforation caused by foreign body ingestion is uncommon in adults. In a large retrospective review of patients treated for impacted upper aerodigestive tract foreign bodies reported by Singh and colleagues, retropharyngeal abscess was reported as the most common complication occurring in patients over the age of 10. [1] Presentation after 24 hours, pharyngeal location, radiolucency, and age of over 10 years were found to be risk factors for complications

caused by foreign body impaction. Interestingly in this large series of 323 patients, no fistulae were reported. Tracheopharyngeal fistulae are most commonly reported as a late complication following laryngectomy for head and neck cancers, typically representing recurrent disease. Nonmalignant fistulae are less common and may occur as a result of trauma, infection, caustic ingestion, immunodeficiency, or prolonged intubation. [2,3]

Given the rarity of nonmalignant tracheopharyngeal fistulae, guidance for management is lacking. Management of the more common retropharyngeal abscess is well-established, typically consisting of wide drainage, broad spectrum intravenous antibiotics, nothing per os, and nutritional supplementation. However, this approach is not applicable to tracheopharyngeal fistulae given the potential for ongoing airway contamination and low likelihood of spontaneous fistula closure. [3] Management of post-laryngectomy and malignant tracheopharyngeal fistulae also does not seem applicable, as these patients tend to have significant scar tissue caused by previous surgery and irradiation with resulting poor wound healing. Complex reoperation is typically required in these patients with the use of pedicled muscle flaps to buttress the fistula repair. [2,6]

Some general principles may be taken from the management of tracheoesophageal fistulae. In addition to the principles described for the management of upper digestive tract perforations (drainage, antibiotics, NPO, nutrition), the additional need for exclusion of the fistula tract to prevent ongoing airway soiling is of paramount importance. A variety of management strategies have been proposed for the surgical treatment of tracheoesophageal fistulae, including primary repair of the airway and esophageal defects, primary repair of the esophageal defect and segmental tracheal resection, soft tissue coverage of the defects, combined surgical/endoscopic strategies, and esophageal diversion with primary airway repair. [3-6] Experience with stents for the management of tracheoesophageal fistulae is limited, but appears to be more successful for the treatment of perforations rather than fistulae. [7,8] Choice of approach remains controversial given the heterogeneity of this patient population. Etiology, chronicity of the fistula, location, fistula size and contour, patient nutritional status and comorbidities, previous surgical history, previous attempts at repair, and surgeon experience all play a role in selection of the operative strategy. Given that the presented patient had healthy surrounding soft tissues with minimal contamination, no previous neck operations, and a non-irradiated field, a conservative approach with endoscopic management was deemed an appropriate initial treatment strategy. Failure would have prompted a more aggressive surgical approach to divide the fistula and repair both the pharyngeal and tracheal defects.

In conclusion, we present a case of a rare, nonmalignant tracheopharyngeal fistula caused by foreign body ingestion and impaction successfully managed endoscopically with transnasal drainage and tracheal stenting. Although the use of self-expanding covered metal stents is gaining acceptance in a variety of settings, their role in the management of upper aerodigestive tract perforations and fistulae continues to be debated and explored. This report demonstrates the potential of stents to provide significant therapeutic benefit in appropriately selected patients, avoiding larger scale, more morbid operations for some patients with the use of less invasive endoscopic techniques. An individualized approach,

considering conservative, endoscopic, and surgical management strategies on a case by case basis is recommended.

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Figure 1.
Esophagram demonstrating an irregular cavity near the esophagus at C5-6 with tracheopharyngeal fistula

Figure 2.

CT showing fistula from the anterior pharynx to the trachea inferior to the cricoid cartilage; A. Air in soft tissues of the pharynx (small arrow) just below the cricoid cartilage (large arrow); B. Moving cephalad, air tracking in the soft tissues (small arrow) and between the cricoid cartilage and trachea (large arrow); C. and D. Serial images moving cephalad with air in the soft tissues (small arrows) and tracking along the trachea (large arrows); E. Air in cavity (small arrow) near the esophagus (large arrow); F. Site of perforation into the trachea (small arrow) with no obvious esophageal perforation (large arrow).

Figure 3.
Foreign body (A. Front and B. Back of object) found emanating from the site of pharyngeal perforation

Figure 4. Endoscopic view of fistula traversing the pharyngeal perforation through the right pyriform sinus and into the trachea (white arrow indicates endotracheal tube seen through defect)

Figure 5.

A. Bronchoscopic view of tracheopharyngeal fistula just proximal to the first tracheal ring

B. View of tracheal stent excluding fistula

Figure 6.
Esophagram showing exclusion of fistula with tracheal stent

Figure 7.
Contrast esophagram showing complete healing of fistula after stent removal