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CASE REPORT | ENDOSCOPY

Successful Recanalization of a Long-Segment Complete Esophageal Stricture Using Endoscopic and Fluoroscopic Techniques

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ABSTRACT

Complete esophageal strictures are rare complications in patients who have received head and neck radiation therapy. Although mild strictures are generally amenable to dilation or stenting, management of these debilitating strictures is not well established. Treatment of long-segment obstructions is particularly complicated because documented techniques generally apply for strictures up to 3 cm in length. This report describes a successful recanalization of a long-segment complete esophageal stricture using combined antegrade-retrograde endoscopic therapy with adjunctive fluoroscopic techniques.

INTRODUCTION

Dysphagia is a common complaint in patients with head and neck cancer. Etiologies include luminal obstruction from a tumor, oropharyngeal dysfunction, and mucositis or radiation-induced esophagitis from treatment. It is estimated that within 3 years after radiation therapy, approximately 40% of patients will develop dysphagia and 7% will develop esophageal strictures, with an increase in the odds of sequelae if treatment includes chemotherapy.[1] Theories behind this process include repeated injury to normal cells leading to a chronic inflammatory response resulting in collagen deposition and fibrosis of the affected tissue. This causes luminal narrowing of varying degrees,[2] with approximately 25% of these strictures becoming complete obstructions.[3] These can be devastating to patients as the inability to tolerate oral intake or swallow saliva drastically decreases their quality of life.[4]

CASE REPORT

A 56-year-old man underwent evaluation for persistent sore throat, ear pain, hoarseness, and dysphagia, leading to a diagnosis of stage IVa, poorly differentiated invasive squamous cell carcinoma of the left pyriform fossa. He began concurrent therapy with external beam radiation and cisplatin 1 month after diagnosis. Within 3 weeks of treatment, he developed increasing dysphagia with solids, prompting gastrostomy tube placement for nutritional support. His symptoms ultimately progressed to intolerance of oral secretions with noted dysfunctional oropharyngeal phase of swallowing on videofluoroscopy approximately 6 weeks after starting the therapy.

One year after the completion of chemoradiation, intolerance of secretions persisted despite continued speech therapy and rehabilitation with neuromuscular electrostimulation, prompting gastroenterology evaluation. An esophagogastroduodenoscopy was performed, which demonstrated considerable fibrosis of the pyriform sinus and arytenoids with no identifiable esophageal lumen at 15 cm from the incisors despite endoscopic evaluation using both a standard adult gastroscope (Olympus GIF-HQ 190, Tokyo, Japan) and an ultraslim gastroscope (Olympus GIF-XP 190N) (Figure 1). Given the concern for complete esophageal obstruction, the decision was made to perform a combined antegrade-retrograde endoscopy for recanalization of the esophageal lumen.

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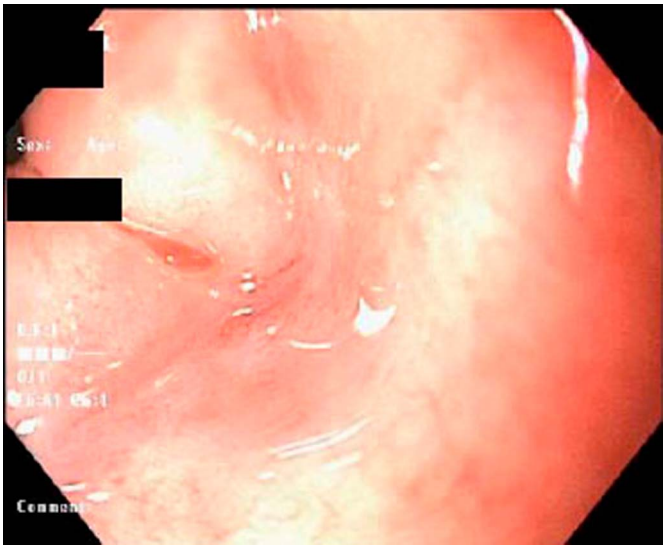

Figure 1. Endoscopic view with no identifiable esophageal lumen and fibrosis of the pyriform sinus and arytenoids.

Basic informed consent was obtained before endoscopy, with the included discussion regarding the risk of bleeding from dilation sites, perforation, possible submucosal tunneling, retropharyngeal perforation, and a need for possible emergent surgery. The patient's gastrostomy tube was removed over a guidewire and dilated under fluoroscopic guidance to 11 mm using serial Savary dilation. A standard gastroscope (Olympus GIF-HQ 190) was passed through the gastrostomy site into the stomach and advanced up the esophagus through the gastroesophageal junction in a retrograde fashion until luminal obstruction was endoscopically encountered.

Retrograde occlusion esophagram was performed through a 9–12 mm extraction balloon under fluoroscopic guidance, revealing a small luminal tract which terminated in the proximal esophagus without contrast noted in the oropharynx, confirming complete luminal obstruction. A guidewire was advanced proximally through this tract. A second standard gastroscope was passed through the patient's oropharynx to the level of the luminal obstruction endoscopically identified just distal to the pyriform sinus. Attempts at transillumination were unsuccessful as luminal obstruction prevented approximation of the endoscopes closer than 5 cm (Figure 2). The guidewire advanced through the retrograde scope terminated 1 cm below the antegrade scope. Fluoroscopy was used in the anterior-posterior and right anterior oblique fields to confirm the alignment of the guidewire at the level of the stricture along with the 2 endoscopes within the same plane, ensuring that a false tract was not created (Figure 3).

The decision was made to attempt wire exposure using biopsy forceps, as this device was readily available and required no additional endoscopes or processors. Biopsy forceps were passed through the antegrade scope, and with endoscope alignment maintained on fluoroscopy, bite-on-bite biopsies were performed to expose the underlying guidewire, which was

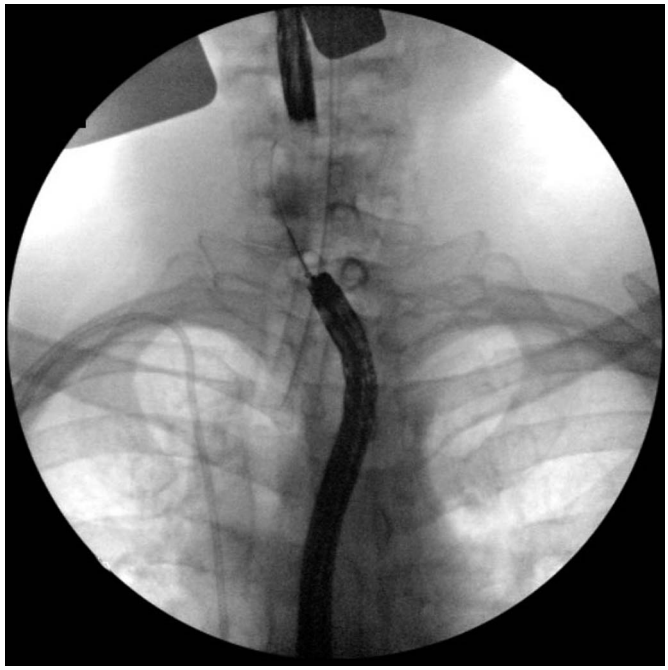

Figure 2. Fluoroscopy with contrast confirming complete obstruction.

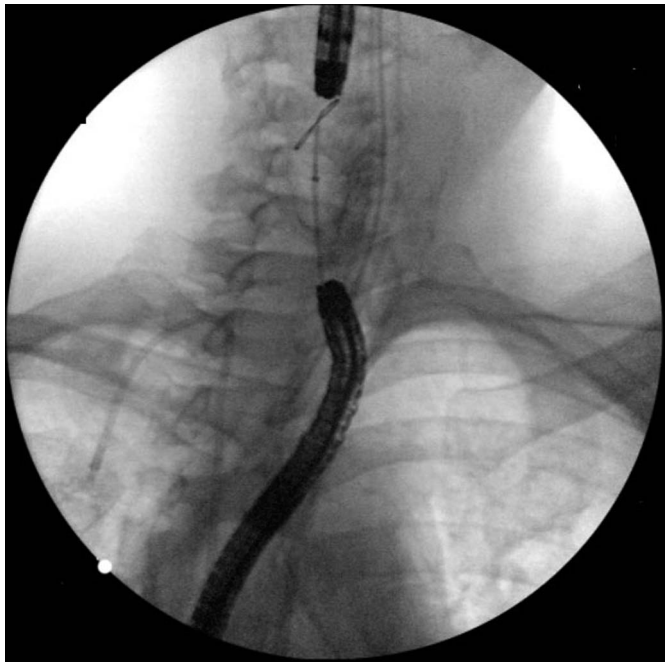

Figure 3. Fluoroscopy in the right anterior oblique view used to confirm endoscope alignment.

grasped and pulled through the patient's mouth. Savary dilation was performed over the guidewire under fluoroscopic guidance starting at 5 mm and upsized in a sequential fashion to 15 mm. After dilation, the antegrade gastroscope successfully traversed the upper esophageal sphincter with visualization of the retrograde endoscope seen endoscopically and was advanced to the duodenum (Figure 4). An 18 Fr nasogastric tube was placed

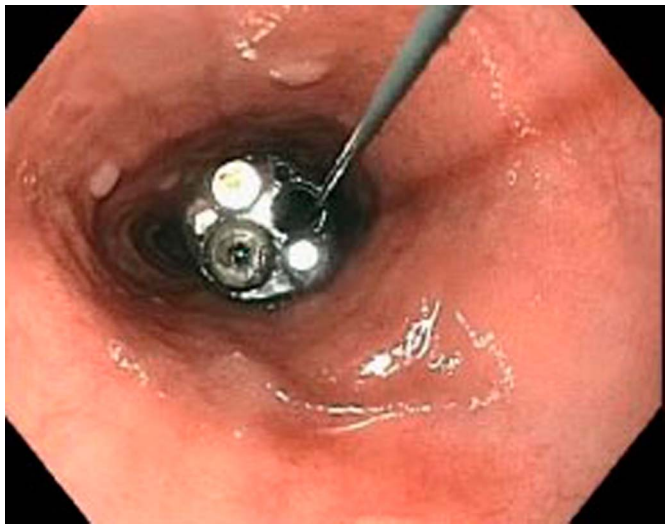

Figure 4. Meeting of retrograde-antegrade endoscopes after recanalization of the esophageal lumen.

to maintain patency, and a gastric tube was replaced through the patient's feeding tube site for assistance with nutritional support. Repeat dilation 1 week later to a diameter of 18 mm was performed, with significant improvement in symptoms and the ability to tolerate oral secretions and sips of liquids. At subsequent follow-up, the esophageal lumen remained patent. Three repeat dilations were performed to a maximum diameter of 20 mm. The patient continued speech therapy and ultimately was able to have his feeding tube removed with the resumption of oral nutrition.

DISCUSSION

The first-line treatment of mild esophageal strictures involves dilation of the esophageal lumen using methods such as serial bougie dilation or balloon dilation.[5–7] Self-expanding stent placement typically is reserved for refractory strictures.[7] This strategy can be challenging depending on the location and extent of fibrosis because proximal esophageal strictures are not generally amenable to stenting due to patient intolerance or possible airway obstruction.[8]

One of the biggest challenges lies in the management of complete esophageal obstructions. Because the occurrence of complete strictures is rare, specific techniques for lumen recanalization are not well established. Combined antegrade-retrograde endoscopy is generally used along with guidewire puncture for safe canalization of strictures less than 3 cm.[2,9] During endoscopic recanalization, transillumination across the stricture is performed to confirm luminal continuity before stricture puncture. However, this method becomes less useful for longer, thicker strictures as transillumination is no longer possible.[10] Endoscopic ultrasound-guided fluoroscopy has been described for luminal access using a 19 G needle and guidewire.[11] Submucosal dissection using the hybrid knife has recently been described for reestablishing luminal patency; however, a reported adverse event included postprocedural pneumonia.[12]

Among the various instruments used for restoring luminal continuity, endoscopic biopsy forceps have been explored as a practical tool for successful recanalization. This was first described by Baumgart et al, who used biopsy forceps to penetrate an area of complete obstruction layer by layer to establish luminal patency.[13] A submucosal tunneling technique was described, which involved taking bites from the obstructed lumen using biopsy forceps to shorten the stricture enough to perform transillumination.[11] Procedures of this nature run the risk of causing mediastinal emphysema as the esophagus lacks a protective serosal layer; however, this is a rare complication.[14] The ubiquity of biopsy forceps in an endoscopic setting, coupled with their relative safety profile, suggests the considerable utility of our outlined dissection method. To improve safety, endoscopic alignment of antegrade and retrograde endoscopes should be confirmed using fluoroscopy as described in the case earlier. This procedure may be a viable option for traversing longer complete esophageal strictures before consideration of more invasive techniques.

DISCLOSURES

Author contributions: S. Lam wrote the manuscript. DE Deivert and JC Obuch edited the manuscript. JC Obuch is the article guarantor.

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Informed consent was obtained for this case report.

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