Endoscopic Retrograde Dilation of Completely Occlusive Esophageal Strictures

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Background. Completely occlusive esophageal strictures may develop after head and neck radiotherapy or esophagectomy with gastric or colonic interposition. Major surgical intervention may be required to restore alimentary tract patency when endoscopic lumen reconstitution is not feasible by routine antegrade endoscopy. Retrograde endoscopic lumen identification and dilation is a useful method to reestablish alimentary tract patency, thereby avoiding surgical intervention.

Methods. Patients requiring endoscopic dilation for completely occlusive esophageal strictures were identified by the gastroenterology, thoracic, and head and neck services. Retrograde access was obtained by balloon dilation of either a jejunostomy or gastrostomy tract, and an endoscope was passed to the area of stricture. Antegrade and retrograde endoscopy were performed simultaneously. A guidewire was passed either retrograde or antegrade under direct endoscopic visualization, followed by antegrade Savary dilation under fluoroscopic guidance.

Results. From 2003 to 2006, 9 patients were identified with completely occlusive esophageal strictures requiring retrograde lumen identification and dilation. Stricture developed in 6 patients after radiotherapy for head and neck cancer and in 3 after esophagectomy with either gastric or colonic interposition for esophageal cancer. Endoscopic dilation was successful in all patients, without perforation.

Conclusions. Retrograde endoscopic lumen identification and dilation is an option to reestablish lumen patency of completely occlusive esophageal strictures after esophagectomy with gastric or colonic interposition or after head and neck chemoradiotherapy.

(Ann Thorac Surg 2006;82:1240–4) © 2006 by The Society of Thoracic Surgeons

Esophageal stricture can result from a number of causes, including gastroesophageal reflux, chemoradiotherapy, esophagectomy, and numerous others. The dosages of radiation for head and neck cancers commonly lead to stricture of the esophagus. Strictures are usually partially occlusive, and flexible upper endoscopy is usually sufficient to identify a lumen for subsequent dilation. Perforation of the esophagus is a potentially life-endangering complication of stricture dilation, and lumen identification by fluoroscopic guidance may help minimize this risk [1]. In some cases, rigid esophagoscopy may aid in the identification of a lumen. However, in severe cases of completely occlusive stricture, where flexible or rigid endoscopy fails, complex surgical resection with free flap reconstruction may be required. It is in this subset of patients that we have found retrograde identification of the true lumen useful to reestablish alimentary tract continuity, thereby avoiding surgical intervention.

Patients and Methods

All patients with completely occlusive esophageal strictures unsuccessfully treated by upper endoscopy were identified by the gastroenterology, thoracic, and head and neck services. Patient information was retrospectively gathered from patient records.

Indications for the procedure included inability to eat or drink, failure of antegrade flexible and rigid endoscopy to identify a lumen, and the inability to pass a guidewire distal to the stricture under fluoroscopy. Six patients had barium swallows that failed to demonstrate any lumen; however, the swallow studies were not performed in the last 3 patients because of the concern of aspiration. All patients had previously placed gastrostomy or jejunostomy tubes.

All procedures were performed with the patient under general anesthesia. Dilation of the ostomy tract up to 9 mm by using Savory dilators or balloon was performed to allow the introduction of a flexible endoscope (GF-XP160, Olympus, Melville, NY) in a retrograde fashion. The stricture was identified from the retrograde position (Fig 1).

An upper endoscopy was performed simultaneously by using a rigid or flexible endoscope, under fluoroscopic...
guidance for proper alignment of the two scopes along the normal path of the alimentary tract. Endoscopically, a combination of air insufflation, transillumination, and careful wire probing helped to identify a thinned mucosal area through which a guidewire was forcefully pierced (Fig 2). This may be performed from either the antegrade or retrograde scope, but direct visualization with the opposite scope is essential to minimize the risk of perforation.

Once the guidewire was identified by antegrade endoscopy, it was passed from the retrograde scope and delivered through the patient’s mouth. Then a series of sequentially larger Savary dilators were passed through the oral cavity under fluoroscopic guidance to a maximum diameter of 18 mm (Figs 3 and 4). Endoscopy was performed after dilation to look for evidence of perforation.

**Results**

From 2003 to 2006, 9 patients (6 men, 3 women) with completely occluded esophageal strictures who underwent retrograde endoscopy were identified. Median age was 69.5 years (range, 65 to 81 years). Stricture developed in 6 patients after chemoradiation for head and neck malignancies, in 1 patient with esophageal cancer of the gastroesophageal junction after esophagectomy and gastric interposition, and in 1 patient with esophageal cancer at the cervical anastomosis after esophagectomy and colonic interposition. One patient was referred from another institution after robotic three-field esophagectomy for an esophageal cancer, followed by a leak, prolonged intensive care unit stay, and aborted reexploration for resection of strictured area secondary to dense adhesions (Table 1).

All patients were dilated successfully by the retrograde method without complications and underwent follow-up antegrade endoscopy 1 to 2 weeks later to assess esophageal lumen patency. Of the head and neck patients, 3 could not tolerate oral intake despite a patent alimentary tract because of severe dysfunction of their swallowing mechanism after chemoradiotherapy, 2 required intermittent dilation (every 2 to 3 months) and are taking a soft mechanical diet, and 1 patient is tolerating a regular diet without subsequent problems. Of the 3 surgically resected patients, two continue self-dilation after esophageal resection with gastric interposition but are tolerating regular diets, and 1 is tolerating a regular diet after dilation of a colonic interposition without further problems.
Comment

Strictures of the esophagus may develop after treatment by chemoradiation or esophagectomy, or both. Most routine strictures maintain a true lumen, which can be easily dilated by upper endoscopy alone. Completely occlusive strictures do not have a lumen, however, and dilation therefore carries a greater risk of perforation. Surgical options include jejunal free flap interposition or colonic bypass between the cervical esophagus and stomach or duodenum, treating the damaged esophagus by resection, or leaving it in place [2].

The first successful retrograde approach to complete pharyngoesophageal obstruction was published in 1997 by O’Sullivan and colleagues [3]. A reflux stricture developed in their patient that failed antegrade management. A small open gastrostomy and a flexible gastroscope were used to pass a guidewire retrograde through the stenosis. After four successful antegrade dilations, the patient was able to tolerate a normal diet [3].

Subsequent case series have included primarily head and neck patients after chemoradiation treatment. Lew and colleagues [4] presented a series of 5 patients in whom strictures developed that required a retrograde endoscopic technique after postoperative radiotherapy for pharyngeal and laryngeal cancer. They performed a puncture of the undersurface of the stricture guided by a light source on a laryngoscope passed from the oropharynx [4].

Sullivan and colleagues [5] presented a series of 12 patients in whom strictures developed after head and neck chemoradiation. They reported 5 patients with complications, including hypopharyngeal perforation in 2, and 1 patient each with infection at the gastrostomy site, dehiscence of the gastrostomy site, and chondroradionecrosis of the posterior lamina of the cricoid cartilage [5]. Bueno and colleagues [6] successfully performed a similar procedure in 2 patients after esophagectomy; however, less than a handful of cases have included patients after esophagectomy and none included a patient after colonic interposition.

Our cohort included patients treated by chemoradiation for head and neck malignancy and esophagectomy for esophageal cancer. Although esophageal patency can be reestablished in chemoradiation-treated cancers of the upper aerodigestive tract, return of swallowing function is not guaranteed owing to the radiation fibrosis of the laryngeal and pharyngeal musculature. These patients are better able to manage their secretions, however.

Our series shows that retrograde dilation can be successfully applied to dilate esophageal strictures from various causes. Retrograde endoscopy is a useful tool, and when used with fluoroscopy, guidewire instrumentation, rigid and flexible upper esophagoscopy, and Savary dilators can help dilate strictures safely and thereby avoid major surgical intervention. Although this technique appears safe when performed with surgical and
gastroenterology services, validation in larger studies is warranted.

References


INVITED COMMENTARY

Few clinical problems are more frustrating to deal with and complex to manage than an occluded, or nearly occluded, cervical esophageal stricture. If the lumen remains open, the stricture can be managed with serial dilatations or with an increasing array of luminal stents. Cervical strictures can sometimes renarrow, even close, very quickly. Once this happens, they can no longer be dilated using the antegrade route. Options for management now become limited and invasive: open anastomosis or redo reconstruction.

Garcia and colleagues [1] report a technique that uses retrograde passage of a guidewire to permit antegrade dilatation of the stricture. A flexible endoscope is introduced through dilated gastrostomy or jejunostomy tube tracks to access the cervical stricture from below. Stricture dilatation was successful without perforation in all 8 patients.

As with many good studies, reported solutions lead to new questions. In this study, the authors access the distal gastrointestinal tract through gastrostomy or jejunostomy. Obviously, their technique requires a preexisting enterostomy tube. It is implied that these tracks can be routinely dilated to accept a flexible endoscope. Is this always the case? Other questions raised by this work include: Does the enterostomy tube site need to be initially prepared specifically for this method? Who should perform it? and Can this method be adapted to an open approach if no enterostomy sites are present?

This article underscores the fact that getting the stricture dilated open is only one piece of the swallowing puzzle: posttreatment functional outcome varies according to the etiology of the stricture. Post-chemoradiation head and neck cancer patients fare the worst. Half of these patients (3 of 6) could not tolerate any oral feedings.

Table 1. Summary of Patient Characteristics, Dilation Size, and Prior Treatment

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Diagnosis</th>
<th>Location</th>
<th>Max. Dilation Size (mm)</th>
<th>Oral Diet</th>
<th>Prior Surgery</th>
<th>Treatment History</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>69</td>
<td>M</td>
<td>Squamous cell carcinoma</td>
<td>Base of tongue</td>
<td>18</td>
<td>None</td>
<td>Biopsy alone</td>
<td>Chemoradiation</td>
</tr>
<tr>
<td>2</td>
<td>81</td>
<td>F</td>
<td>Squamous cell carcinoma</td>
<td>Supraglottic larynx</td>
<td>18</td>
<td>None</td>
<td>Biopsy alone</td>
<td>Chemoradiation</td>
</tr>
<tr>
<td>3</td>
<td>73</td>
<td>F</td>
<td>Squamous cell carcinoma</td>
<td>Hypopharynx</td>
<td>18</td>
<td>None</td>
<td>Biopsy alone</td>
<td>Chemoradiation</td>
</tr>
<tr>
<td>4</td>
<td>66</td>
<td>F</td>
<td>Squamous cell carcinoma</td>
<td>Piriiform sinus</td>
<td>18</td>
<td>Soft mechanical</td>
<td>Biopsy alone</td>
<td>Chemoradiation</td>
</tr>
<tr>
<td>5</td>
<td>65</td>
<td>M</td>
<td>Squamous cell carcinoma</td>
<td>Glottic larynx</td>
<td>18</td>
<td>Regular</td>
<td>Biopsy alone</td>
<td>Chemoradiation</td>
</tr>
<tr>
<td>6</td>
<td>70</td>
<td>M</td>
<td>Moderately differentiated invasive adenocarcinoma</td>
<td>Esophagus</td>
<td>18</td>
<td>Regular</td>
<td>Three-field esophagectomy</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>65</td>
<td>M</td>
<td>Squamous cell carcinoma</td>
<td>Glottic larynx</td>
<td>18</td>
<td>Soft mechanical</td>
<td>Biopsy alone</td>
<td>Chemoradiation</td>
</tr>
<tr>
<td>8</td>
<td>72</td>
<td>M</td>
<td>Squamous cell carcinoma</td>
<td>Esophagus</td>
<td>18</td>
<td>Regular</td>
<td>Colonic interposition, esophagectomy x2</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>81</td>
<td>M</td>
<td>Adenocarcinoma</td>
<td>Esophagus</td>
<td>18</td>
<td>Regular</td>
<td>Three-field esophagectomy</td>
<td>None</td>
</tr>
</tbody>
</table>

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doi:10.1016/j.athoracsur.2006.05.090