failure to thrive, aspiration causing recurrent pneumonia, upper respiratory tract infection, and food or foreign-body impaction.[7,8]

Esophagography was the primary diagnostic tool and was performed in all patients (Fig. 5). The esophagography results showed segmental stenosis at the distal third of the esophagus in all patients except 1. Esophagoscopy was performed in most patients and usually showed a nonspecific distal esophageal stenosis without inflammation.

Repeated dilation of the stricture was performed in 33 patients, resulting in only transient or no relief of dysphagia. Three patients had esophageal perforation after dilation, with 1 death after a single dilation. In most of the patients, definitive treatment was performed between 1 and 3 months of age, and surgical resection was required. The diagnosis of TBRs (57 patients) could only be made by histopathological examination of the resected segment, thus underscoring the importance of EUS in the preoperative diagnosis of TBRs.

CONCLUSION

EUS can provide a diagnosis with a good degree of certainty because EUS findings correlate with histopathology findings. To our knowledge, 3D EUS has not been used to diagnose CES. EUS was used only in Japan and in a limited number of patients.[9]

In all of our patients, we obtained a preoperative diagnosis of CES caused by ectopic TBRs with EUS. We strongly suggest that miniprobe EUS should be performed in all patients with CES to safely choose the correct therapeutic strategy (Fig. 5). This miniprobe EUS examination is safe and quick and provides useful information to surgeons about the nature and the length of the stenosis and also examines the relationships with surrounding organs such as the aorta, trachea, and pericardium.

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Fully covered self-expandable metal stents for benign esophageal disease: a multicenter retrospective case series of 31 patients

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Abbreviations: FCSEMS, fully covered self-expandable metal stent; SEPS, self-expandable plastic stent.

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The use of self-expandable stents in the esophagus for the management of benign disease has grown immensely over the past decade. Temporary placement of self-expandable plastic stents (SEPSs) was first used in certain groups of patients with postoperative anastomotic leaks and strictures.[1-3] Some of the drawbacks to silicone-based SEPSs, however, are the relatively high rates of stent migration (up to 63%),[4] as well as a rigid and wide-diameter delivery catheter, often making stent deployment in the proximal esophagus a challenge.

More recently, fully covered self-expandable metal stents (FCSEMSs) have become available.[5-8] FCSEMSs appear to allow easier stent deployment because of a thinner and more flexible delivery catheter as well as the possibility of short-term removability (ie, stent removal or repositioning immediately after deployment). Although FCSEMSs are not currently approved in the United States by the U.S. Food and Drug Administration for long-term removability, limited previous studies have suggested their safety in this regard.[6-8]

Only 2 previous studies examined the use of FCSEMSs exclusively in benign esophageal disease.[7,8] Both series evaluated the safety, feasibility, and complications associated with the Alimaxx-ES esophageal stent (Merit Medical Systems Inc, South Jordan, Utah). The purpose of this article is to report a multicenter experience in benign esophageal conditions with 3 other forms of FCSEMSs commercially available but not previously described. In addition, we report our FCSEMS experience in terms of stent migration as well as the safety and feasibility of long-term removability of these endoprostheses.

PATIENTS AND METHODS

The records of adult patients treated for benign esophageal conditions by means of FCSEMS placement between October 2009 and January 2011 were reviewed by the various physicians at each participating institution. The series was approved by our institutional review board. Patients treated with 1 or more of the following types of FCSEMSs were included: Wallflex esophageal stent (Boston Scientific Inc, Natick, Mass), Bonastent esophageal stent (EndoChoice Inc, Alpharetta, Ga), and Evolution esophageal stent (Cook Medical Inc, Winston-Salem, NC) because these were the available endoprostheses at each institution. The type of FCSEMSs placed was left to the discretion of the endoscopist at the time of the procedure. Patients with stents placed distal to the esophagus or not directly involving the esophagus were excluded (eg, gastrojejunal anastomotic leak with the stent placed completely within the gastric remnant). Remaining cases of FCSEMS placement were divided into the following indications: (1) benign refractory strictures, including peptic strictures and those related to eosinophilic esophagitis, caustic ingestions, or nasogastric tube trauma; (2) surgical anastomotic strictures after esophagectomy or gastrectomy; (3) radiation-induced strictures; and (4) esophageal fistulae or leaks. Patients undergoing stent placement for dysphagia with strictures had not shown sustained improvement in swallowing (>2-4 weeks) with endoscopic dilation in at least 3 previous sessions.

Procedure indications, patient demographics, previous radiographic data, procedure outcomes and complications, and patient follow-up were all documented and reviewed from within the clinical record. Procedure outcomes were defined as resolution of the fistula or leak or improvement in symptoms of dysphagia. Improvement in dysphagia was determined by a decrease of at least 1 point on a standard 5-point (a scale of 0-4) dysphagia scoring system. Resolution of the fistula/leak was defined as clinical improvement plus radiographic resolution on either CT scan with oral contrast or a Gastrografin (diatrizoate sodium) swallow study after stent removal.

Complications included periprocedure and postprocedure complications. Periprocedure complications included the need for positive-pressure ventilation or endotracheal intubation, bleeding requiring endoscopic hemostasis (eg, clip placement, bipolar electrocautery, or other forms of thermal ablation); perforation with the new development of pneumomediastinum, fever, pain, or globus sensation necessitating stent removal; hospital admission; and prolonged hospital stay.

Postprocedure complications included stent migration (early, ≤30 days, or late, >30 days), recurrent dysphagia before scheduled stent removal, stent-induced aspiration or airway compression, and inability to remove the stent endoscopically or complications directly related to stent removal. Basic statistical analysis was performed by using Microsoft Excel 2007 (Microsoft Corp, Redmond, Wash).

RESULTS

A total of 31 patients underwent FCSEMS placement for benign esophageal conditions. The mean age was 56 ± 15.6 years, and just more than half of the patients were women (16/31, 51.6%). The most common indication for stent placement was a fistula or leak (n = 15), followed by benign refractory stricture (n = 9), anastomotic stricture (n = 4), and radiation-induced stricture (n = 3). In the patients with a fistula or leak, 10 of 15 stents (66.7%) were placed in the proximal esophagus within a few centimeters of the upper esophageal sphincter.

Table 1 outlines all 31 patients along with the indications and outcomes of stent placement. Overall, a total of 43 stents were placed: 30 Wallflex stents, 12 Bonastent esophageal stents, and 1 Evolution esophageal stent. One patient (patient 23) had a high-grade benign stricture in which a fully covered biliary Wallflex stent