Techniques in Gastrointestinal Endoscopy (2010) 12, 231-236

ELSEVIER

Techniques in
GASTROINTESTINAL
ENDOSCOPY

www.techgiendoscopy.com

Stents for benign esophageal strictures

Frank P. Vleggaar, MD, PhD, Peter D. Siersema, MD, PhD, FASGE

Department of Gastroenterology and Hepatology, University Medical Center Utrecht, The Netherlands.

KEYWORDS:
Stent;
Refractory;
Benign esophageal stricture;
Dilation therapy;
Dysphagia;
Self-expanding metal stent;
Self-expanding plastic stent;
Biodegradable stent

Approximately 10% of benign esophageal strictures appear to be refractory to standard dilation therapy. Temporary stent placement is an alternative therapeutic option for these cases. However, only one-third of patients with refractory benign esophageal strictures remain dysphagia free after self-expanding stent placement. Stent migration and hyperplastic tissue reaction limit the efficacy of this type of treatment. Novel stents should be designed to overcome these problems.

Dysphagia caused by benign esophageal strictures can often be treated effectively with endoscopic dilation therapy using bougies or balloons with or without concurrent intralesional corticosteroid injection. Incisional therapy can alternatively be applied in case of simple strictures, such as Schatzki rings or short anastomotic strictures.[1] However, approximately 10% of strictures, which are often complex and caused by radiation therapy, severe peptic injury, ischemia, or ingestion of a corrosive agent, remain refractory to the standard treatment options.[2-4]

A refractory stricture is defined by Kochman et al as the inability to introduce a 14-mm dilator over the course of 5 sessions at 2-week intervals.[2] This condition seems to be related to extensive fibrosis of the submucosa up to the muscular layer. Refractory benign esophageal strictures (RBES; Figure 1) can be treated with temporary self-expanding stents. Prolonged dilation for a period of several weeks to months instead of seconds or minutes, which is the case with bougie or balloon dilation, is the rationale behind this treatment. Remission of the underlying inflammatory process and remodeling of scar tissue may occur during the period that the stent is in place, leading to persistent luminal patency.

If prolonged dilation therapy with a single stent is still not effective, sequential stent placement or surgery in patients fit for esophageal resection should be considered. Currently, a wide variety of different types of self-expanding stents (SEPS), such as partially covered and fully covered self-expanding metal stents, fully covered self-expanding plastic stents, and biodegradable stents, are available for treating RBES. Each stent type has specific features, which are advantageous or disadvantageous for stenting RBES (Table 1).

Technique of endoscopic stent placement in RBES

Stent placement should preferably be performed in an endoscopy room with fluoroscopy equipment. First, upper endoscopy may be performed with a regular diagnostic endoscope or with a small-diameter, ultrathin endoscope to measure the length of the stricture and to assess the distance between the upper margin of the stricture and the upper esophageal sphincter. The minimum distance between the upper part of the stricture and the upper esophageal sphincter should preferably be at least 2 cm, but some patients will tolerate more proximal placement. If the stricture cannot be passed with an ultrathin endoscope, gentle wire-guided dilation up to 7-9 mm over a wire that is placed under fluoroscopic control could first be performed to allow passage of the endoscope. Passage of a stiff (metal) guidewire through the working channel of an ultrathin endoscope and

The authors report no direct financial interests that might pose a conflict of interest in connection with the submitted manuscript.

Address reprint requests to Frank P. Vleggaar, MD, PhD, Department of Gastroenterology and Hepatology, University Medical Center Utrecht, PO Box 85500, 3508 GA, Utrecht, Heidelberglaan 100, 3584 CX, Utrecht, The Netherlands. E-mail: f.vleggaar@umcutrecht.nl

1096-2883/10/$-see front matter
doi:10.1016/j.tgie.2011.02.016

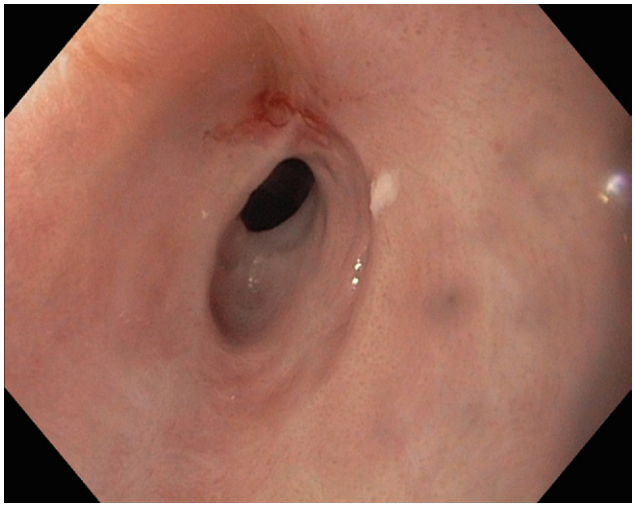

Figure 1 Refractory benign esophageal stricture in the mid-esophagus in a patient with rheumatoid arthritis. (Color version of figure is available online at www.techgiendoscopy.com).

through the stricture into the stomach or jejunum may aid in passing the endoscope downward because it prevents unwanted bending of the endoscope. The upper limit of the stricture is marked under endoscopic and fluoroscopic control with submucosal or intramuscular injection of radio-opaque contrast (preferably Lipiodol), a metal marker applied to the skin, or an endoscopic clip. In our opinion, it is not necessary or helpful to also mark the distal end of the stricture. The following step is to place a guidewire distal to the stricture in the gastric antrum or duodenum. Under fluoroscopic control, the stent is placed over the wire with the constrained proximal stent end beyond the radio-opaque marker. The stent is then pulled back with the upper margin at least 2 cm proximal to the marker. In RBES, we tend to place a stent even more proximal compared with esophageal cancer stent placement because of a higher risk of distal stent migration. Then the stent is fully deployed under fluoroscopic control and the guidewire is removed. The position of the stent can be checked endoscopically and, if necessary, its position can be adjusted using an alligator or rat-tooth forceps. The stent will fully deploy over the next 24-48 hours. The day of stent placement the patient is kept on a liquid diet. Over the following days, patients are advised to take a normal diet, to chew thoroughly, and to drink during and after a meal, preferably sparkling drinks, which may clean the stent to some degree to prevent food obstruction. Stent dwelling time in RBES varies from 1 to 6 months, dependent upon the type of stent and stent-induced hyperplasia.

Partially covered self-expanding metal stents (PCSEMS)

In general, PCSEMS should not be chosen to treat RBES. Very limited data on this type of stent design for treating RBES are available. In total, 2 studies have reported on 14 patients who underwent PCSEMS placement (Ultraflex or Nitinol stent) for benign esophageal strictures.[5,6] Indications for stent placement include caustic (n = 3), postradiation (n = 5), and anastomotic strictures after esophagectomy or gastrectomy (n = 6). Dysphagia scores improved from 3 (ability to drink) to 1 (ability to eat some solids) during a relatively short duration of stenting of 3-7 days. Long-term effects after scheduled stent removal, however, have not been reported in these studies. Bleeding caused by stent removal was observed in 14% of patients and nearly half of the patients reported pain during stenting.

The main problem associated with PCSEMS placement in benign esophageal disorders is endoscopic removal of the stent, which is nearly always necessary. The radial force of the stent causes stent embedding of the uncovered parts of the stent in the esophageal wall and, in combination with its Nitinol material, causes reactive tissue in- and overgrowth, which ensures firm stent anchoring. These 2 mechanisms, which may occur within a period of 2 weeks, often prevent safe stent removal. Mucosal tears or even transmural perforations have been observed during stent removal of embedded PCSEMS.[7,8] Several techniques are available to prevent these severe complications and facilitate easy stent removal. Argon plasma coagulation of the overlying tissue or even stent mesh and subsequent stent removal has been reported to be safe.[9,10] However, this technique of stent removal is time consuming and easily leads to difficulties in removing the entire stent because small Nitinol fragments of the stent remain embedded in the esophageal wall.

An elegant alternative solution for removal of embedded stents is to place a second, fully covered stent, either fully

Table 1 Advantages and disadvantages of different stent types used for treating refractory benign esophageal strictures

Stent type	Advantage	Disadvantage
Partially covered SEMS Ultraflex Evolution Wallflex	Low migration risk	Stent embedding Tissue overgrowth Removal unsafe
Fully covered SEMS Alimaxx-E Wallflex SX-Ella Niti-S	Safe and easy removal	High migration risk Tissue hyperplasia at stent ends
Fully covered plastic stent Polyflex	Safe and easy removal No hyperplastic overgrowth	High migration risk Complex and stiff/large-diameter introducer system
Biodegradable stent Ella BD	No stent removal needed	Complex introducer system Limited data available