Lumen-apposing covered self-expanding metal stent for management of benign gastrointestinal strictures

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Background and aims: Self-expanding metal stents (SEMS) are safe and effective for endoscopic management of malignant gastrointestinal strictures, but there is limited experience with their use in refractory benign strictures. We assessed the use of a new lumen-apposing covered SEMS for the management of benign gastrointestinal strictures.

Methods: A single-center case-series of five patients who underwent lumen-apposing covered SEMS placement for benign gastrointestinal strictures.

Results: Three patients had a benign gastroduodenal stricture, one had a distal colonic anastomotic stricture, and one with complete gastrojejunostomy underwent endoscopic creation of a new gastrojejunostomy. None of the patients developed any immediate or delayed stent-related adverse events. In two patients, the stents were left in place indefinitely. Stents were removed from the other three patients with successful resolution of their symptoms during follow-up.

Conclusion: Lumen-apposing, fully covered SEMS appear to be safe and effective for management of selected benign gastrointestinal strictures.

Introduction

Endoscopic balloon dilation (EBD) is a common initial treatment for benign gastrointestinal strictures, and is safe and effective in the short-term, but often requires multiple sessions, and strictures frequently recur [1,2]. Fully covered self-expanding metal stents (fcSEMS) relieve the symptoms of refractory benign gastrointestinal strictures [3], but stent migration and intolerance are major limitations [4,5], and strictures frequently recur after stent removal [6].

Lumen-apposing fully covered SEMS (LA-SEMS) consist of a barbell-shaped, flexible nitinol stent designed for deployment through a therapeutic linear echoendoscope (Fig. 1a). In this series, we describe the use of LA-SEMS for the management of selected benign gastrointestinal strictures and discuss the benefits and limitations of this approach.

Case series

Case 1
A 45-year-old woman was referred for treatment of a benign pyloric stricture which had recurred after prior EBD. An upper gastrointestinal series demonstrated a short stricture of the pyloric channel which could not be traversed endoscopically (Fig. 2a, Fig. 2b). Under fluoroscopic guidance, a LA-SEMS was deployed across the pyloric stenosis and dilated to 15 mm (Fig. 2c). Her symptoms resolved, and the stent was removed endoscopically 3 months later (Fig. 2d). The previously strictured area was widely patent and allowed easy passage of the endoscope. Symptoms have not recurred during 3 months of follow-up after stent removal.
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Fig. 2  a Contrast study demonstrating the stricture.  b Endoscopic view of the stricture.  c The proximal flange was opened inside the gastric antrum.  d At 3-month follow-up, the stent was easily removed by grasping the proximal end with a rat-tooth forceps.

Fig. 3  a Contrast study demonstrating the anastomotic stricture.  b Endoscopic view of the stricture.  c The distal flange of the stent was partially opened inside the Roux limb stricture.  d To fully bridge the 4-cm ischemic stricture, a second stent was placed inside the first one, with the distal flange of the stent in the jejunum and the proximal flange inside the lumen of the first stent.  e A follow-up upper gastrointestinal series after 6 weeks showed a widely patent gastrojejunostomy with free flow of contrast to the Roux limb.  f Endoscopic view demonstrating excellent stent position at follow-up endoscopy.
Common adverse events associated with fcSEMS placed for benign strictures include migration and intolerance. A study of 22 patients with benign pyloric channel strictures treated with fcSEMS reported a migration rate of 63% [4]. Partially covered SEMS have a lower migration rate, but are more difficult to remove due to tissue ingrowth [9]. Reported migration rates of SEMS in benign colorectal strictures range from 31% to 60% [11, 12]. A concern with the use of traditional SEMS for benign strictures, especially colonic, is the increased risk of perforation. In a meta-analysis of 4086 patients who underwent colorectal stent placement, the perforation rate was significantly higher for benign compared with malignant strictures (18.4% vs. 7.5%) [13]. LA-SEMS designed for EUS-guided deployment have design features making them suitable for treatment of benign strictures [14,15]. Anti-migratory flanges, short saddle, and moderate radial force may decrease the risk of migration and improve patient tolerance, allowing for a longer duration of therapy. In our series, none of the patients developed any stent-related symptoms and, in two patients, the stents were left in place permanently. Design modifications would enhance the use of LA-SEMS for management of benign gastrointestinal strictures. The current delivery system is optimized for delivery during EUS, and when deployed via a forward-viewing therapeutic channel endoscope, the stent’s deployment handle requires stabilization by a second operator to prevent inadvertent deployment of the entire stent distal to the stricture (Fig. 1b). A range of saddle lengths and larger stent diameters would improve the applicability of these devices.

The limitations of our study include the small number of patients, absence of a control group, subjective interpretation of clinical outcomes, and short duration of follow-up. Despite these limitations, our series adds to the one previous case report [16] describing the use of LA-SEMS in a benign stricture, and demonstrates the feasibility and potential safety and efficacy of LA-SEMS for management of various types of benign gastrointestinal stenoses. Prospective comparative trials of conventional SEMS, LA-SEMS, and balloon dilatation are warranted.
Fig. 5  a Short, tight, benign gastroduodenal stricture. b, c Endoscopic view of lumen-apposing, double-flanged, fully covered SEMS in the pyloric channel. d Stent lumen dilated to an internal diameter of 12 mm using a wire-guided hydrostatic dilation balloon.

Fig. 6  a Endoscopic view of the tight anastomatic stricture. b Fluoroscopic image showing guidewire placement before stent deployment. c Endoscopic view of the proximal stent flange immediately after deployment. d Final stent position after balloon dilation of the SEMS lumen to 12 mm.
Competing interests: None

References