

Douglas G. Adler MD, FACP, AGAF, FASGE, Series Editor

## Use of a Lumen Apposing Metal Stent to Treat a Refractory Benign Esophageal Stricture



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### INTRODUCTION

**E**sophageal strictures are a common cause of dysphagia, the abnormal passage of solids or liquids through the esophagus. While gastroesophageal reflux disease (GERD) is the most common cause of benign esophageal strictures, they can be due to a multitude of factors, including external beam radiation, post-surgical injury, caustic ingestions or eosinophilic esophagitis. For some patients with benign esophageal strictures, fully covered metal stents can be used to dilate the stricture, alleviate dysphagia and allow for the passage of liquid and solid food. In this case report, we describe a novel, “off label” use of an existing fully covered self-expanding metal stent (AXIOS, Boston Scientific, Natick MA) for the treatment of a patient who presented with a refractory benign esophageal stricture.

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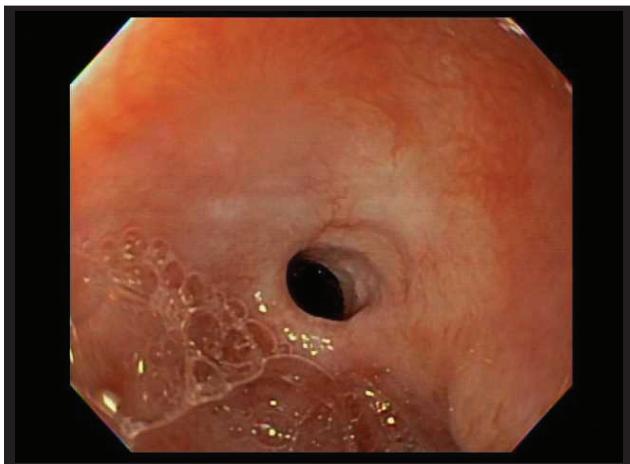
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### Case Report

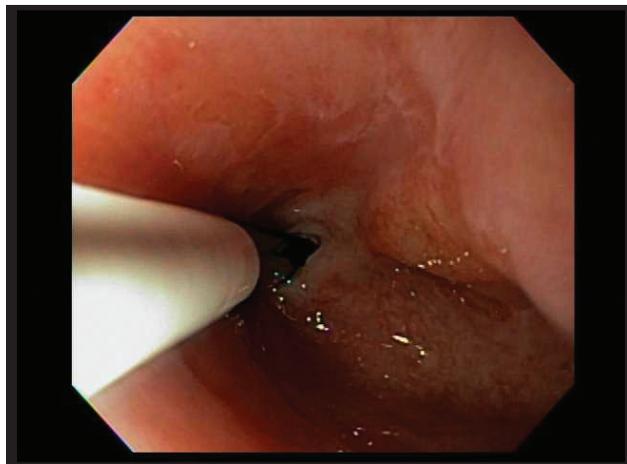
A 57 year-old man with a history of moderately differentiated, metastatic squamous cell carcinoma of the esophagus was seen in follow-up for worsening dysphagia. After the initial cancer diagnosis, the patient was treated with both radiation therapy as well as chemotherapy with paclitaxel and carboplatin. Computed tomography (CT) scans showed complete response to therapy with no evidence of cancer in the esophagus. In December 2015, an esophagogastroduodenoscopy (EGD) was performed which elucidated a severe esophageal stricture with an inner diameter measuring 3 millimeters (mm) in diameter and less than 1 centimeter (cm) in length in the upper third of the esophagus. This was a benign-appearing lesion, and biopsy was negative for malignancy. The etiology of this stricture was felt to be likely due to post-radiation and chemotherapy effects. Dilation was performed with a 10-11-12 mm x 5.5cm CRE balloon dilator. The patient responded well to this procedure, and in one month follow-up, reported improved dysphagia symptoms and had gained 7 pounds.

*(continued on page 44)*

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**Figure 1.** Endoscopic Image of the patient's severe, benign appearing stenosis.



**Figure 2.** LAMS catheter advanced over a guidewire and across the stenosis.

The patient presented again in July 2016 with complaints of progressive dysphagia, weight loss as well as occasional post-prandial, non-cardiac chest pain. On repeat EGD a severe, benign-appearing, intrinsic stenosis was found 20 cm from the incisors. (Figure 1) This again measured 3 mm in diameter and less than one cm in length, and was unable to be traversed by the endoscope. The lesion had a very similar appearance to the prior examination. Prior to the procedure, a discussion was had with the patient regarding the risks and benefits of repeat dilation as well as endoscopic stent placement for relief of symptoms, including off-label placement of an Axios stent. In accordance with this discussion, a 15mm wide x 10mm long AXIOS stent was advanced across the stenosis over a guidewire. (Figure 2) The stent was deployed without difficulty and on the first attempt, and was in excellent position as seen both endoscopically and fluoroscopically. (Figure 3) The patient had no post-procedural complications and was able to tolerate a full liquid and solid mechanical diet afterwards. Of note, he was not able to perceive the stent in his esophagus and had no post-procedure pain.

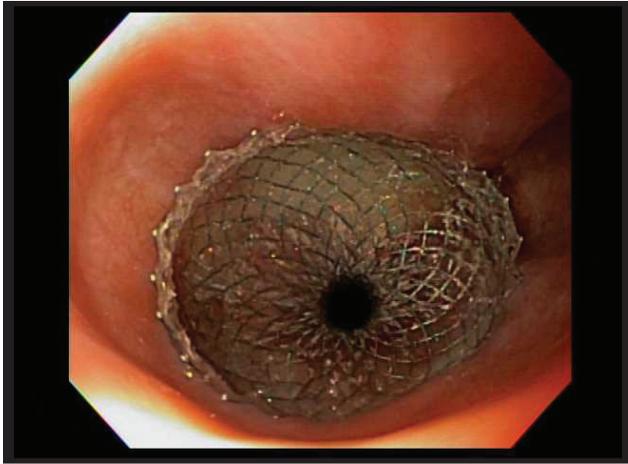
Five weeks after stent deployment, the patient was again seen in follow-up. He had gained 5 pounds, and was tolerating a full diet. A repeat EGD was performed, and the AXIOS stent was removed with raptor forceps without difficulty. (Figure 4) The mucosa was examined after removal of the stent with no obvious complications of stent removal. The esophageal lumen was widely patent. The patient was discharged to home the same day, able to tolerate a regular diet, and has done well thereafter without recurrence of his dysphagia symptoms to date.

## Discussion

Benign esophageal strictures are caused by a variety of etiologies, including after radiotherapy, caustic ingestions, eosinophilic esophagitis and GERD.<sup>1</sup> Post-surgical stenosis is also very common and occurs frequently following esophagectomy. Endoscopic treatment options include dilation, placement of stents, cryotherapy ablation, and bypass of the obstruction via enteral feeding. Although feeding tubes are commonly used for enteric delivery of nutrition, dysphagia scores are not improved by feeding tubes, and mortality has not been shown to be significantly influenced by these interventions.<sup>2</sup>

In some patients with benign esophageal strictures, repeated dilations may fail to provide sustained relief of symptoms. In these situations, some treatment algorithms suggest dilation combined with steroid injections or incisions made via electrocautery.<sup>3</sup> Patients with strictures due to GERD or a history of ablation therapy tend to respond well to steroid injections. Refractory benign esophageal strictures (RBES) have been defined by one author as strictures which do not appropriately respond to at least 5 dilations of at least 14mm, although definitions vary on this point. RBES represent a difficult problem to treat, and are also associated with significant symptoms and decreased quality of life for patients. In these cases, further endoscopic therapy is typically warranted.<sup>3</sup>

Self-expandable metal stents (SEMS) are a cornerstone of treatment for patients with dysphagia due to esophageal strictures. These stents are constrained with a small diameter before placement, thus avoiding aggressive dilation of the esophagus (and associated



**Figure 3.** LAMS after deployment across the esophageal stricture.



**Figure 4.** Removal of LAMS via the use of a rat-tooth forceps.

complications).<sup>4</sup> In addition, they provide persistent dilation of the stenosed esophagus while in place, a significant benefit over intermittent dilation with bougie or balloons.<sup>5</sup> Partially covered or uncovered SEMS are generally avoided in patients with benign esophageal strictures due to the high occurrence of tissue in-growth which leads to recurrent dysphagia and difficult stent removal.<sup>6,7</sup> Newer, biodegradable stents offer promise in that they dissolve in the esophagus and patients do not need repeat EGD for stent removal, but this technology is not currently approved for use in the United States. Fully covered SEMS are removable stents that are most commonly used to treat benign esophageal strictures.<sup>8</sup>

SEMS are composed of nitinol or other similar metals, and differ in their width, length, amount of force they exert as well as their design. Several retrospective and prospective studies have evaluated efficacy of fully covered SEMS for benign esophageal strictures causing dysphagia. Initial success rates have been as high as 56%, with one large meta-analysis finding sustained improvement of dysphagia at the end of follow-up in 46.2% of patients.<sup>9,10</sup> Stent selection is typically determined by endoscopist preference as no studies have definitively shown improved outcomes with a specific SEMS.

One drawback of fully covered SEMS is the high potential of stent migration, found to be as high as 31% in a different meta-analysis.<sup>11</sup> Stents are generally 5cm longer than the stricture, which can lead to post-deployment issues such as abutment with gastric or cricopharyngeal tissue or mucosal damage to normal esophageal tissue. Adverse events related to stent placement include chest pain, GERD, upper gastrointestinal bleeding, perforation, fistula formation,

food impaction, airway compromise and aspiration events.<sup>12</sup>

A novel, fully covered, lumen apposing metal stent (LAMS) called the AXIOS stent has been developed in recent years and is now commercially available. Its primary use has been to drain pancreatic fluid collections including pseudocysts, walled-off pancreatic necrosis and acute peri-pancreatic fluid collections.<sup>13</sup> These stents have dual-anchor flanges in a “dumbbell” shape which helps to maintain position and minimize the risk of migration. Several retrospective studies have reported the clinical success rate of the AXIOS system for drainage of pancreatic fluid collections to be greater than 95%.<sup>14,15</sup> In one large multicenter retrospective study, the LAMS was successfully placed in 97.5% of patients, with only one (1.3%) instance of pancreatic fluid collection recurrence and a very low incidence (2.5%) of spontaneous dislodgement or stent migration.<sup>16</sup> In a review of the literature, only case reports or very small case series have thus far been published about experience with endoluminal placement of the AXIOS stent.<sup>17,18</sup>

In this case report, we describe a novel, “off label” use of an existing fully covered SEMS for the treatment of a refractory benign esophageal stricture. The use of this technology was clinically successful in our patient, and accentuates the need for further evaluation and possibly increased use of this treatment for luminal strictures. At this time, it is unclear if the long term efficacy of the AXIOS stent for treatment of benign esophageal strictures will yield better results than the use of existing esophageal SEMS. The smaller diameter and decreased radial force of the LAMS when compared to standard esophageal stents may allow patients to better

tolerate placement and lead to decreased complaints of chest pain. The AXIOS stent is also much shorter in length than standard esophageal SEMS, and as it is placed only across the stricture, may result in decreased frequency or severity of GERD symptoms as it did in our patient. These stents can be deployed with or without fluoroscopy as they are “through-the scope” devices. In addition, the double-flanged ends may help to decrease the relatively high migration rate that is seen after placement of standard SEMS. Our case report highlights the necessity of more experience with the novel use of this stent technology. ■

### References

- de Wijkerslooth LR, Vleggaar FP, Siersema PD. Endoscopic management of difficult or recurrent esophageal strictures. *Am J Gastroenterol*. 2011 Dec;106(12):2080-91; quiz 2092. doi: 10.1038/ajg.2011.348. Epub 2011 Oct 18. Review.
- Bower MR, Martin RC 2nd. Nutritional management during neoadjuvant therapy for esophageal cancer. *J Surg Oncol*. 2009 Jul 1;100(1):82-7. doi: 10.1002/jso.21289. Review.
- Kochman ML, McClave SA, Boyce HW. The refractory and the recurrent esophageal stricture: a definition. *Gastrointest Endosc*. 2005 Sep;62(3):474-5.
- Knyrim K, Wagner HJ, Bethge N et al. A controlled trial of an expansile metal stent for palliation of esophageal obstruction due to inoperable cancer. *N Engl J Med* 1993;329:1302-1307.
- Kozarek RA, Ball TJ, Brandabur JJ, et al. Expandable versus conventional esophageal prostheses: easier insertion may not preclude subsequent stent-related problems. *Gastrointest Endosc* 1996;43:204-208
- Fiorini A, Fleischer D, Valero J et al. Self-expandable metal coil stents in the treatment of benign esophageal strictures refractory to conventional therapy: a case series. *Gastrointest Endosc* 2000; 52: 259-262.
- Swinnen J, Eisendrath P, Rigaux J et al. Self-expandable metal stents for the treatment of benign upper GI leaks and perforations. *Gastrointest Endosc* 2011; 73: 890-899
- Suzuki T, Siddiqui A, Taylor LJ, Cox K, Hasan RA, Laique SN, Mathew A, Wrobel P, Adler DG. Clinical Outcomes, Efficacy, and Adverse Events in Patients Undergoing Esophageal Stent Placement for Benign Indications: A Large Multicenter Study. *J Clin Gastroenterol*. 2016 May-Jun;50(5):373-8. doi: 10.1097/MCG.0000000000000500.
- Bakken JC, Wong Kee Song LM, de Groen PC, Baron TH. Use of a fully covered self-expandable metal stent for the treatment of benign esophageal diseases. *Gastrointest Endosc*. 2010 Oct;72(4):712-20. doi: 10.1016/j.gie.2010.06.028.
- Thomas T, Abrams KR, Subramanian V, Mannath J, Ragunath K. Esophageal stents for benign refractory strictures: a meta-analysis. *Endoscopy*. 2011 May;43(5):386-93. doi: 10.1055/s-0030-1256331. Epub 2011 Mar 24.
- Fuccio L, Hassan C, Frazzoni L, Miglio R, Repici A. Clinical outcomes following stent placement in refractory benign esophageal stricture: a systematic review and meta-analysis. *Endoscopy*. 2016 Feb;48(2):141-8. doi: 10.1055/s-0034-1393331. Epub 2015 Nov 3.
- Hirdes MM, Siersema PD, Vleggaar FP. A new fully covered metal stent for the treatment of benign and malignant dysphagia: a prospective follow-up study. *Gastrointest Endosc*. 2012 Apr;75(4):712-8. doi: 10.1016/j.gie.2011.11.036. Epub 2012 Jan 28.
- Varadarajulu S, Phadnis MA, Christein JD, Wilcox CM. Multiple transluminal gateway technique for EUS-guided drainage of symptomatic walled-off pancreatic necrosis. *Gastrointest Endosc*. 2011 Jul;74(1):74-80. doi: 10.1016/j.gie.2011.03.1122. Epub 2011 May 25.
- Walter D, Will U, Sanchez-Yague A, et al. A novel lumen-apposing metal stent for endoscopic ultrasound-guided drainage of pancreatic fluid collections: a prospective cohort study. *Endoscopy*. 2015;47:63-67.
- Gornals JB, Loras C, Mast R, Botargues JM, Busquets J, Castellote J. Endoscopic ultrasound-guided transesophageal drainage of a mediastinal pancreatic pseudocyst using a novel lumen-apposing metal stent. *Endoscopy*. 2012;44:211-212.
- Siddiqui AA, Adler DG, Nieto J, Shah JN, Binmoeller KF, Kane S, Yan L, Laique SN, Kowalski T, Loren DE, Taylor LJ, Munigala S, Bhat YM. EUS-guided drainage of peripancreatic fluid collections and necrosis by using a novel lumen-apposing stent: a large retrospective, multicenter U.S. experience (with videos). *Gastrointest Endosc*. 2016 Apr;83(4):699-707. doi: 10.1016/j.gie.2015.10.020. Epub 2015 Oct 26.
- Podgaetz E, Garza-Castillon R, Andrade RS, Vega-Peralta J. Initial experience with a dual-anchor stent for anastomotic strictures after oesophagectomy. *Eur J Cardiothorac Surg*. 2016 Sep 15. pii: ezw283. [Epub ahead of print]
- Martínez Alcalá F, Martínez-Alcalá García FR, Sánchez-Yague A, Martínez-Alcalá García A, Ciria Avila JA, Perez Pozo JM. Treatment of a benign, anastomotic refractory rectal stricture with an AXIOS stent. *Endoscopy*. 2015;47 Suppl 1 UCTN:E413-4. doi: 10.1055/s-0034-1392676. Epub 2015 Sep 23.

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