



# Novel Use of AXIOS Stent for Concurrent Management of Achalasia and Esophageal Varices in a Cirrhotic Patient

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## ABSTRACT

AXIOS stents create an anastomotic connection between 2 lumens, facilitating bypass of blockages and strictures as well as drainage of large fluid collections. Historically, AXIOS stents have primarily been used for draining pancreatic fluid collections, with no documented cases of their use within the esophagus until now. In this article, we present a case of a 65-year-old man with cirrhosis admitted for dysphagia. On evaluation, he was diagnosed with type 1 achalasia and concurrent esophageal varices. A novel approach was used, utilizing an AXIOS stent, to provide both symptomatic relief and targeted treatment for his varices.

**KEYWORDS:** AXIOS stent; achalasia; esophageal varices; cirrhosis; esophagus

## INTRODUCTION

Achalasia is a rare condition characterized by the failure of the lower esophageal sphincter (LES) to relax.<sup>1</sup> It stems from a degeneration of inhibitory neurons in the Auerbach plexus, resulting in impaired esophageal peristalsis and dilation above the LES. Patients can present with dysphagia to solids and liquids, chest pain, weight loss, and regurgitation.<sup>2</sup> There are multiple treatment modalities available, ranging from botulinum toxin injections, pneumatic dilation (PD), peroral endoscopic myotomy (POEM), to esophagectomy for certain cases.<sup>3</sup>

AXIOS stents create an anastomotic conduit between 2 lumens, allowing the bypass of blockages and strictures while facilitating the drainage of large fluid collections. They are conventionally used to drain pancreatic fluid collections through endoscopic ultrasound guidance.<sup>4</sup> In this article, we highlight a unique case where we introduce the use of an AXIOS stent in a cirrhotic patient with esophageal varices who presented with symptomatic achalasia.

## CASE REPORT

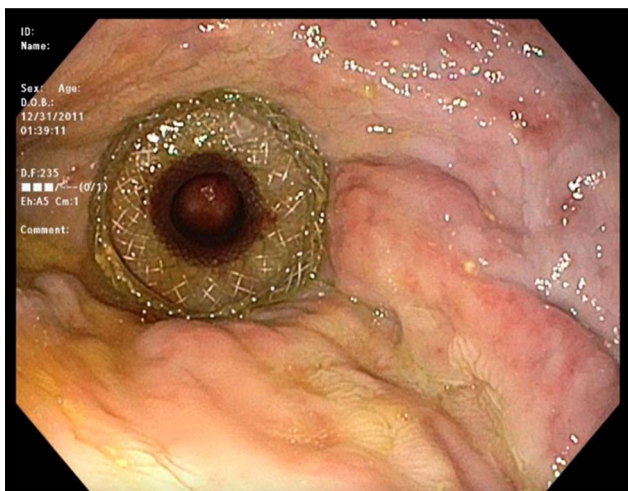
A 65-year-old man with a history of decompensated cirrhosis from hepatitis C presented to the hospital with a 3-week history of progressive dysphagia to solid foods and an unintentional weight loss of 30 lbs over 6 months. Laboratory test results on admission were notable for an international normalized ratio of 1.46 (normal: 0.65–1.30 ratio) and a platelet count of 110 K/ $\mu$ L (normal: 130–400 K/ $\mu$ L). An esophagogastroduodenoscopy (EGD) revealed a massively dilated esophagus containing a large amount of debris and an unremarkable stomach. Subsequent barium esophagogram indicated marked esophageal dilation with gastroesophageal junction (GEJ) narrowing and irregularity, suggesting achalasia. An esophageal motility study confirmed type 1 achalasia.

A multidisciplinary meeting deemed the patient a poor candidate for gastric/jejunal tube placement because of anticipated leakage and placement difficulty, attributed to his significant ascites. PD was rejected because of perforation risks. Because of his high operative risk from cirrhosis, esophagectomy and surgical myotomy were also considered infeasible.

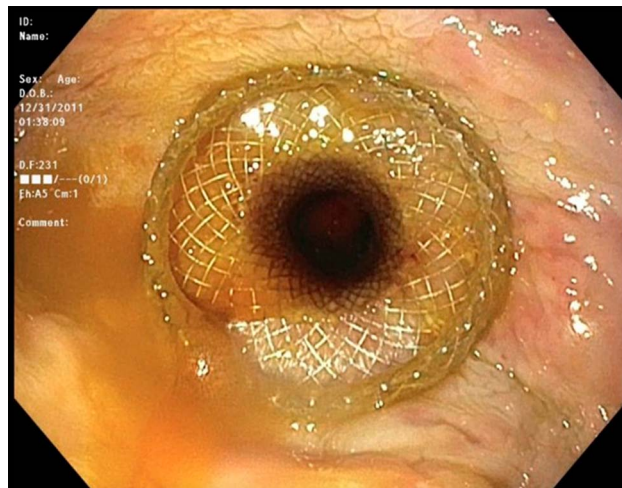
Ultimately, the decision was made to place an esophageal stent, specifically an AXIOS stent, at the GEJ to alleviate symptoms (Figures 1 and 2). During stent placement, large esophageal varices with red wale signs not previously visible on EGD because of debris were observed in the lower third of the esophagus and subsequently ligated. No gastric varices were noted. After stent placement, the patient experienced immediate relief. His diet was advanced to regular, and he was discharged soon after. Subsequent follow-up revealed sustained symptomatic improvement with no recurrence.

## DISCUSSION

Achalasia is characterized by the failure of LES relaxation, leading to impaired esophageal function and consequent symptoms such as dysphagia to solids and liquids, chest pain, weight loss, and regurgitation.<sup>2,5</sup> Patients suspected to have achalasia should first undergo an EGD and/or esophageal barium swallow; regardless of initial imaging findings, esophageal manometry has been the standard for diagnosis and classification. Current management options are aimed toward alleviating symptoms, enhancing esophageal emptying, and preventing further esophageal dilation as there is no intervention that can significantly improve esophageal peristalsis; repeat interventions are often required as LES hypertonicity seen in achalasia rebounds over time.<sup>2</sup> Management is determined based on the degree of the patient's surgical risk. For those with low risk, PD is often attempted before performing LES myotomy because it is less invasive and has a faster recovery



**Figure 1.** AXIOS stent at the gastroesophageal junction with esophageal varices in view.



**Figure 2.** AXIOS stent at the gastroesophageal junction.

period.<sup>2</sup> PD consists of tearing muscle fibers surrounding the LES with the use of a balloon under endoscopic guidance.<sup>2</sup>

Myotomy is also used as an option for treating achalasia in low-risk patients when PD is unsuccessful or infeasible. LES myotomy, also known as Heller myotomy, involves incising the circular muscle layers of the LES without damaging the mucosa. However, gastroesophageal reflux disease (GERD) is a frequent postoperative complication of myotomy. Funduplications are, therefore, strongly recommended for patients who undergo myotomy to prevent GERD development.<sup>2</sup>

If the myotomy incision may involve the esophageal body, POEM is considered as an alternative. POEM is a newer technique similar to Heller myotomy in that it divides the inner circular muscular layer of the LES under endoscopic guidance but also involves submucosal incision and allows for further projection into the esophageal body if necessary.<sup>6</sup> Incidence of GERD as a postoperative complication is more frequent in POEM than in Heller myotomy because of the lack of endoscopic antireflux therapy (eg, fundoplication) used along with POEM.<sup>6</sup> In more severe cases where achalasia may lead to megaesophagus or significant esophageal dilation, esophagectomy, which is the partial or complete surgical esophageal resection, may be considered but is associated with higher rates of morbidity and mortality than myotomy and is, therefore, only used for cases with failed previous surgical interventions (eg, PD and myotomy).<sup>2</sup>

Management of our patient proved challenging, given his comorbidities and subsequent status as a poor surgical candidate. Nonsurgical treatment options, including botulinum toxin injections, nitrates, and calcium channel blockers, were deemed unsuitable from the associated risk of hypotension. Gastric/jejunal tube placement was rejected because of anticipated placement difficulties and leakage from his ascites. Although PD carries a low perforation risk, it was avoided because of the life-threatening consequences of perforation in our

patient. Alternative options, such as esophagectomy and POEM, were considered, but his history of cirrhosis deemed him as too high of a risk of these procedures.

In patients with cirrhosis, increased resistance within hepatic sinusoids because of fibrosis precipitates portal hypertension, a condition that subsequently triggers the development of gastroesophageal varices. These varices, representing the most significant clinical manifestation, are present in approximately 50% of cirrhotic patients.<sup>7</sup> The primary method used to assess hepatic venous pressure gradient is hepatic venous catheterization, with varices typically correlated with a hepatic venous pressure gradient exceeding 12 mm Hg.<sup>8</sup> In a meta-analysis conducted by Shao et al regarding esophageal stent placement for refractory variceal bleeding, esophageal stents were successfully deployed in 96.7% of patients with refractory variceal bleeding. Furthermore, the hemostasis rate was 93.9%, and the rate of rebleeding after stent placement was 13.2%.<sup>9</sup> Complications associated with esophageal stents fall into 2 categories: early or delayed. Early complications include, but are not limited to, chest pain, bleeding, reflux, and stent migration. Late complications include, but are not limited to, stent migration, occlusion, and the development of esophageal fistulas.<sup>10</sup> Therefore, complications of stent placement could mitigate the worsening of variceal bleeds.

Given the complexity of this case, the decision was made to place an esophageal stent, specifically an AXIOS stent, at the GEJ. Although AXIOS stent usage in achalasia management is novel, it provided significant symptomatic relief in our patient. During stent insertion, the discovery of varices in the lower third of his esophagus raised concerns for variceal bleed. Typically, pharmacological treatment and prophylaxis with beta-blockers are considered for esophageal varices; however, in this patient with decompensated cirrhosis, beta-blockers posed a risk of significant hypotension. Consequently, variceal ligation of the varices was performed, with the AXIOS stent serving as a means of tamponade as well. After stent placement, the patient's symptoms significantly improved, and discharge followed once a regular diet was tolerated. Unfortunately, the patient was later readmitted about a month later because of a bleed secondary to a gastric ulcer. Endoscopy at the time confirmed stent patency with no symptomatic recurrence, demonstrating successful AXIOS stent implementation for symptomatic achalasia palliation and esophageal variceal management. The gastric ulcer was then treated, and the patient responded well initially. However, the patient later decompensated in the intensive care unit with multiorgan failure and eventually died.

AXIOS stent utilization showed promising results for expanding the management options available to patients with

achalasia. Despite the favorable outcomes observed, it is crucial to acknowledge the limited literature on AXIOS stent utilization in achalasia management. Further research and longer follow-up periods are warranted to comprehensively evaluate the efficacy, safety, and long-term outcomes associated with this intervention.

## DISCLOSURES

Author contributions: M. Tawfik: writing the manuscript, literature review, and is the article guarantor. S. Chain: writing the manuscript and literature review. A. Elfiky, M. Abureesh, and D. Gurala: writing the manuscript, review, and revision of the manuscript. S. Andrawes and Y. El Douaihy: review and revision of the manuscript.

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