ORIGINAL ARTICLE

Functional luminal imaging probe assessment of eosinophilic esophagitis stricture followed by optical-haptic dilation with a dilating cap

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INTRODUCTION

Eosinophilic esophagitis (EoE) is a chronic immune-mediated disease of the esophagus that can cause esophageal dysfunction resulting in dysphagia, food impaction, and esophageal stricture.[1,2]

The standard treatment for symptomatic EoE strictures is esophageal dilation combined with medical therapy.[3] Common dilation devices used for esophageal dilation are through-the-scope dilating balloons and wire-guided bougienage.[3]

The BougieCap (Ovesco, Cary, NC, USA) is an endoscopic dilator available in 6 different sizes with 2 dilation diameters per cap (7/8 mm, 9/10 mm, 11/12 mm, 13/14 mm, 15/16 mm, and 17/18 mm), which enables the dilation of strictures and stenoses under direct visualization. The dilation is achieved by applying endoscopic pressure that can allow the dilating cap to pass through the stricture. Use of the dilating cap has been reported to be effective for dilation in cases of EoE.[4]

Currently, there is no endoscopic technique available that can objectively characterize lengths of an esophageal stricture. The endoluminal functional lumen imaging probe (EndoFlip; Medtronic, Minneapolis, Minn, USA) has been approved by the U.S. Food and Drug Administration to measure pressure and dimensions in the esophagus. Research has shown that reduced esophageal distensibility can predict the requirement for esophageal dilation in patients with EoE.[5]

CASE PRESENTATION

A 44-year-old man who carried the diagnosis of EoE for over 20 years presented with chronic dysphagia to solid food. In addition to medical therapy with omeprazole and fluticasone, he had previously undergone multiple dilations, with the most recent one performed in 2019 using balloon dilation up to 10 mm. The patient's last upper endoscopy was 6 months prior, which revealed EoE with significant luminal narrowing. A therapeutic gastroscope (10.8 mm) could not pass through, but a regular gastroscope (9.8 mm) managed to traverse it with gentle resistance, resulting in mucosal disruption. Consequently, dilation was not performed. However, the patient did not experience significant improvement after the procedure and was subsequently referred to our center for further management.

Abbreviations: EoE, eosinophilic esophagitis; FLIP, functional luminal imaging probe.

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EQUIPMENT

The procedure was done with a standard gastroscope (GIF-H180, 9.8 mm; Olympus, Tokyo, Japan), an EndoFlip 325 8-cm balloon, and BougieCaps (11/12 mm, 13/14 mm, and 15/16 mm).

PROCEDURE

During upper endoscopy, the esophageal findings were graded by the Endoscopic Reference Score System as follows: edema (grade 1), rings (grade 2), exudates (grade 0), furrows (grade 1), and stricture (grade 1), with a complex stricture measuring 6 cm in length (22-28 cm from the incisors) (Video 1, available online at www.videogie.org).

To gather more information about the stricture, including its distensibility, diameter, and a more accurate estimate of its length, we proceeded with the functional luminal imaging probe (FLIP) to assess the esophageal stricture. This part of the procedure was investigational. An 8-cm-long FLIP with a volume-based barostat bag was placed across the stricture using endoscopic visualization. Saline was infused into the bag to a volume of 30, 35, and 40 mL. At a volume of 40 mL, the diameter was measured to be about 12 mm. The distensibility index was 0.77 mm^2/mm Hg, indicating a low value that might suggest a fibrostenotic stricture based on our experience. The stricture length was estimated to be about 3 cm using the FLIP.

The dilating cap has been shown to be effective in dilation for EoE and has the advantage of providing dilation under

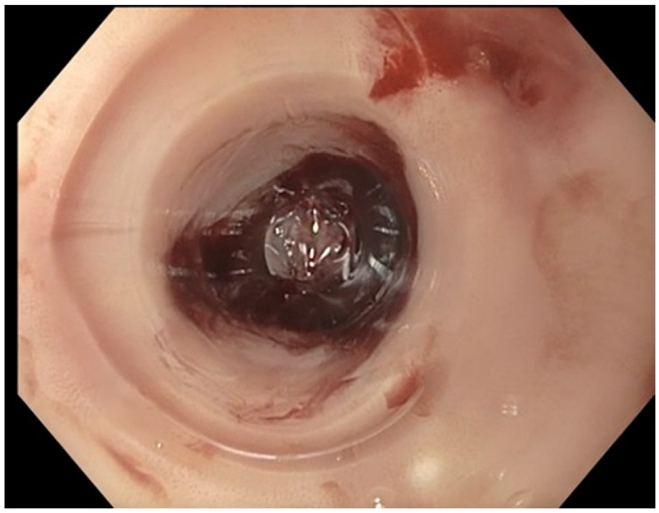

Figure 1. Optic-haptic dilation of the eosinophilic esophagitis stricture using the dilating cap.

direct visualization as well as "haptic feedback" of the amount of resistance to dilator passage. Dilation was performed first with a dilating cap with no resistance at 12 mm. Mild resistance was encountered with a 14-mm dilating cap, and there was significant resistance at 16 mm (Fig. 1). After dilation, there were 2 jagged and deep mucosal tears without evidence of perforation. Overall, there was improvement in luminal narrowing after the procedure.

A repeat dilation was performed 2 weeks later starting with a 16-mm dilating cap. Only a small area of mucosa disruption was noted at 26 cm from the incisors after passage of the 16-mm dilator. Due to the unavailability of an 18-mm dilating cap at our facility, serial dilation was performed with 17-mm and 18-mm wire-guided Savary dilators. After this, the stricture showed a similar jagged mucosal tear, no perforation, and complete resolution of the luminal narrowing.

Both procedures were performed with the patient under propofol sedation. The patient tolerated them well without experiencing postdilation chest discomfort. He continues without dysphagia symptoms 6 months after the second dilation. He remains on a proton pump inhibitor and fluticasone.

DISCUSSION

A FLIP can provide measurements of length and diameter of an EoE-associated esophageal stricture. This has the potential to aid in determining the appropriate dilation strategy in terms of the starting diameter of dilators to be used. The role of distensibility in EoE stricture also remains to be explored. A pilot study of FLIP assessment of strictures is being planned at our institution.

There are potential advantages of using the dilating cap. Optical-haptic dilation with a dilating cap can provide direct visualization and offers real-time feedback of resistance to dilator passage during the dilation process. The cap can also allow more accurate assessment of stricture diameter and length. The dilating cap is for single use and does not require reprocessing. A potential disadvantage is the risk of losing the cap during endoscopy; however, this issue has been addressed by the manufacturer by changing the tape that is used to attach the device to the endoscope. Our case adds to the literature demonstrating the safety and effectiveness of the dilating cap in patients with EoE.[4]

DISCLOSURE

Dr Diehl receives financial compensation from Boston Scientific, Cook Medical, Pentax, Olympus, GI Supply, Steris Endoscopy, Lumendi , Castle BioSciences, Merit Medical, Actuated Medical, MicroTech, OnePass Medical, and Kite Endoscopic Innovations. Dr Chen disclosed no financial relationships relevant to this publication.

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