Hybrid endoscopic approach for submucosal tunneling septum division for Zenker's diverticulum

A 71-year-old man was referred for a symptomatic Zenker's diverticulum. The patient had undergone a stapled diverticulotomy 7 years ago. A barium esophagram revealed a 3-cm Zenker's diverticulum with evidence of staples (► **Fig. 1 a**). The decision was made to perform a peroral endoscopic myotomy of Zenker's diverticulum (Z-POEM).

A submucosal injection was performed with the intention of creating a bleb above the septum using a combination of normal saline and methylene blue. However, the bleb could not be created because of submucosal scarring and fibrosis (► **Fig. 1 b**, ► **Video 1**). A mucosal incision was made with a triangle-tip knife (KD 640 L; Olympus, Center Valley, Pennsylvania, USA) using EndoCut Q current, effect 3, and staples were seen

through the incision. A clear submucosal layer could not be exposed because of extensive scarring and fibrosis, and thus tunneling was not possible. The decision was made to perform a standard septotomy (myotomy), which was started with a triangle-tip knife and then continued with a scissor-type endoscopic submucosal dissection (ESD) knife (SB knife, Olympus). A standard septotomy of 1.5 cm was performed using EndoCut Q current, effect 3, after which a clear submucosal layer was observed (► **Fig. 1 c, d**).

The procedure was continued using the Z-POEM technique to ensure complete exposure and dissection of the septum. Tunneling was performed along the esophageal and diverticular sides of the septum using a triangle-tip knife and spray coagulation mode, effect 2. Once

the cricopharyngeal muscle septum was completely exposed, it was dissected for 2 cm down to the bottom of the diverticulum with a scissor-type ESD knife and EndoCut Q current (► **Fig. 1 e**). The mucosal incision was closed using through-the-scope clips (MicroTech, Ann Arbor, Michigan, USA) (► **Fig. 1 f**). The patient was admitted overnight. An esophagram performed the next day showed no leakage, and the patient was discharged on a soft diet. At follow-up 3 months post-procedure, the patient had complete resolution of the symptoms with no residual symptoms while taking a full diet.

The standard approach to Z-POEM starts with a mucosal incision, submucosal tunneling, septum division (septal myotomy), and mucosal closure [1]. On the other hand, in patients with prior such

► **Fig. 1** Hybrid peroral endoscopic myotomy technique for Zenker's diverticulum (Z-POEM) in a symptomatic 71-year-old man. **a** A Zenker's diverticulum is identified with visible staples. **b** After mucosal incision, submucosal scarring was clearly visible. **c** A standard septotomy was done by using a scissor-type endoscopic submucosal dissection (ESD) knife. **d** After septotomy, the submucosal layer was visualized. **e** The septum was exposed after submucosal tunneling on both sides of the septum, followed by complete septotomy using the scissor-type knife. **f** The mucosal incision was closed using through-the-scope clips.

▶ Video 1 A symptomatic 71-year-old man with post-surgical fibrosis underwent peroral endoscopic myotomy for Zenker's diverticulum (Z-POEM) using a hybrid approach. Conversion to a hybrid Z-POEM technique when the standard method is found to be not initially possible is a reasonable and effective approach.

▶ Table 1 Peroral endoscopic myotomy for Zenker's diverticulum (Z-POEM): features and advantages of a hybrid approach.

- The standard Z-POEM technique may not be possible in patients who have had prior interventions
- Starting the procedure with a standard septotomy when Z-POEM is not initially possible and then switching to the Z-POEM technique is a reasonable and effective approach
- Once the submucosal layer can be delineated, this allows for further exposure and dissection of the septum
- The Z-POEM technique with the hybrid approach allows for a complete septotomy, which may reduce the risk of recurrence

interventions, a hybrid approach may be necessary. This hybrid approach consists of five steps: (i) mucosal incision, (ii) standard septotomy until a clear submucosal layer is visualized, (iii) submucosal tunneling, (iv) septum division, and (v) mucosal closure) (▶ **Table 1**).

In conclusion, the hybrid Z-POEM technique is safe and feasible in patients with symptomatic recurrent/residual Zenker's diverticulum and submucosal fibrosis from prior interventions. This is the first case to report the use of the Z-POEM technique with the hybrid approach in the case of post-surgical fibrosis.

Endoscopy_UCTN_Code_TTT_1AO_2AD

Competing interests

Mouen A. Khashab is a consultant for Boston Scientific, Medtronic, and Olympus. None of the other authors have any conflict of interest to declare.

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Endoscopy 2020; 52: E457–E458
DOI 10.1055/a-1164-7569
ISSN 0013-726X
published online 12.5.2020
© 2020. Thieme. All rights reserved.
Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

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