



Closure in antireflux mucoplasty using anchor prong clips: dead space–eliminating technique

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PURPOSE

Antireflux mucosectomy and antireflux mucosal ablation are effective for patients with proton pump inhibitor refractory–dependent GERD,¹⁻⁴ as confirmed by meta-analyses.⁵⁻⁷ However, these procedures have limitations, including a 3- to 4-week healing period for artificial ulcers and about a 13.0% incidence of transient strictures. Postoperative bleeding, occurring in 5% of cases, may persist despite acid-suppressing medication.^{4,8} To address concerns, we implemented antireflux mucoplasty (ARM-P)⁹ and demonstrated its effectiveness.¹⁰ Additionally, we have successfully completed over 40 cases with no postprocedure bleeding or stenosis. However, our study used manually crafted closure methods like Loop-9¹¹ and Loop-11,⁹ which may pose challenges for those less familiar with their application. The MANTIS clip (Boston Scientific, Marlborough, Mass, USA) ensures secure defect closure with superior tissue-grasping capabilities. Its anchor prongs facilitate effective tissue apposition using the drag technique (Fig. 1). However, in cases of significant mucosal defects, using clips to close the contralateral mucosa may unintentionally create a dead space (Fig. 2), potentially causing delayed wound healing.¹² Recently, the concept of using anchor prong clips to prevent dead space has emerged for ESD defect closure.^{13,14} We have developed a technique called the dead space–eliminating technique (DET), which uses anchor pronged clips (Fig. 3). Here, we present a case applying anchor pronged clips for DET during ARM-P.

This study was approved by the institutional review board of Showa University (approval number: 1205-6, 20 23-089-B).

Abbreviations: ARM-P, antireflux mucoplasty; DET, dead space–eliminating technique.

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CASE

A 59-year-old woman who had been experiencing acid reflux despite treatment with potassium-competitive acid blocker underwent a comprehensive diagnostic evaluation, including upper endoscopy, high-resolution esophageal manometry, and 24-hour pH-impedance monitoring. The upper endoscopy revealed a Hill grade II hiatal hernia (Fig. 4). Pathological acid reflux was confirmed through MII-pH. Pretreatment symptomatic scores were as follows: GERD-HRQL¹⁵ 25/50 and F-scale¹⁶ 28/48.

PROCEDURE

Mucosectomy

The mucosectomy procedure was performed using EMR with a cap-fitted panendoscope. A therapeutic endoscope (H290T; Olympus, Tokyo, Japan), equipped with a distal attachment (MH-463; Olympus) and an electrosurgical snare (SD-210L-25; Olympus) was used. This approach successfully removed approximately one-third of the mucosal circumference along the lesser curvature (Fig. 5).

Defect closure

To replace the distal attachment for clipping, a super-soft hood (Space Adjuster; TOP, Tokyo, Japan)¹⁷ was used. Closure of the mucosal defect was performed using the DET with anchor pronged clips. This involved securing a firm grasp on the edges of the mucosa and submucosa using an anchor prong, followed by gently moving the clip to the contralateral side through a drag technique. Once the clip reached the edge, it was opened, closed over the defect, and deployed. The initial clip, deployed on the defect, significantly reduced the size of the large defect. Subsequently, a second clip was deployed from the opposite side of the first clip, near the edge of the other side. A third clip, anchored from the side of the first clip, grasped the defect. (Video 1, available online at www.videogie.org). This DET technique was continued in a zigzag pattern, ensuring complete defect closure without any dead space (Figs. 6 and 7). The operation, from submucosal injection to deployment of the last anchor pronged clip, lasted 36 minutes, with a total of 8 clips used.

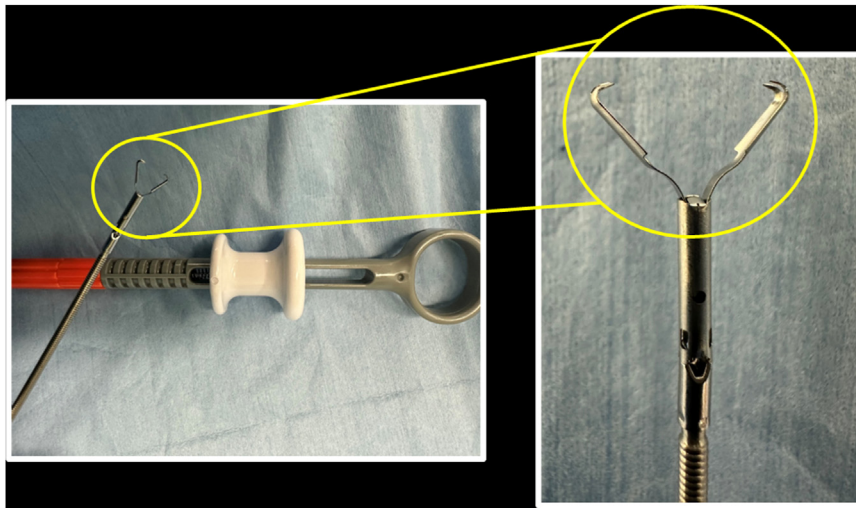


Figure 1. The anchor pronged clip excels in tissue grasping, ensuring secure defect closure.

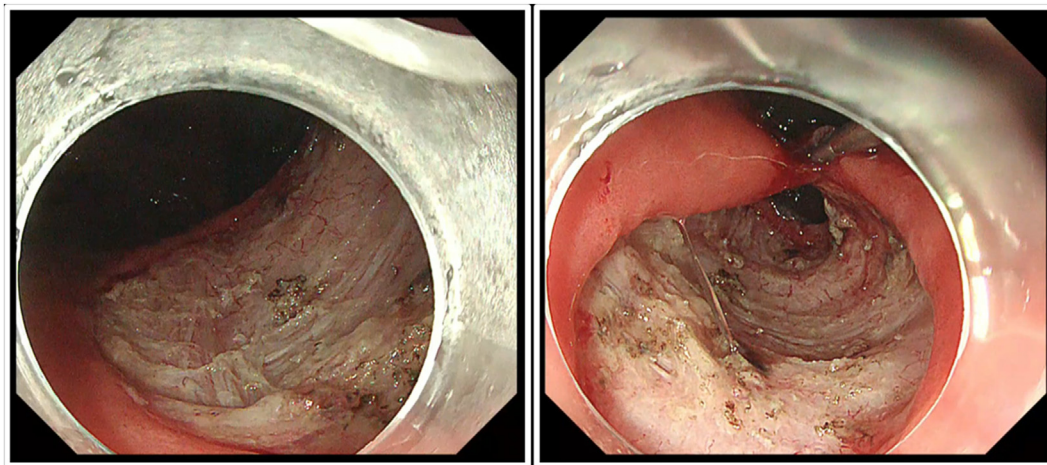


Figure 2. Closing large mucosal defects with clips on the contralateral mucosa may inadvertently result in the formation of a dead space.

Outcome

No adverse events were observed. A follow-up endoscopy 2 months later revealed narrowing of the hiatal esophageal hernia due to wound scarring (Fig. 8). Following the procedure, significant improvements were noted in all scores: The GERD-HRQL score improved to 17/50, and the F-scale showed improvement to 17/48.

CONCLUSION

The successful dead space-free closure in ARM-P led to a favorable outcome, suggesting that DET with anchor

pronged clips could be promising for suturing large mucosal defects.

DISCLOSURE

Dr Inoue is an advisor for Olympus Corporation and TOP Corporation. He has also received education grants from Olympus Corporation. All other authors disclosed no financial relationships relevant to this publication.

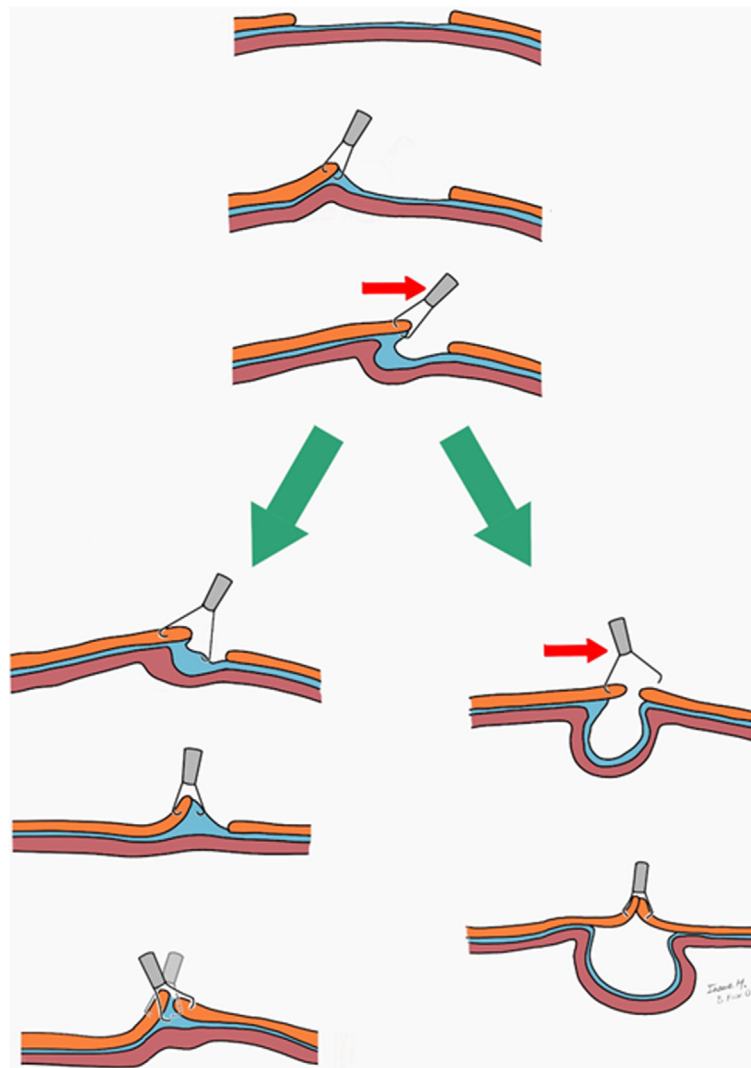


Figure 3. A comparison by illustration of the dead space–eliminating technique and conventional closure techniques.

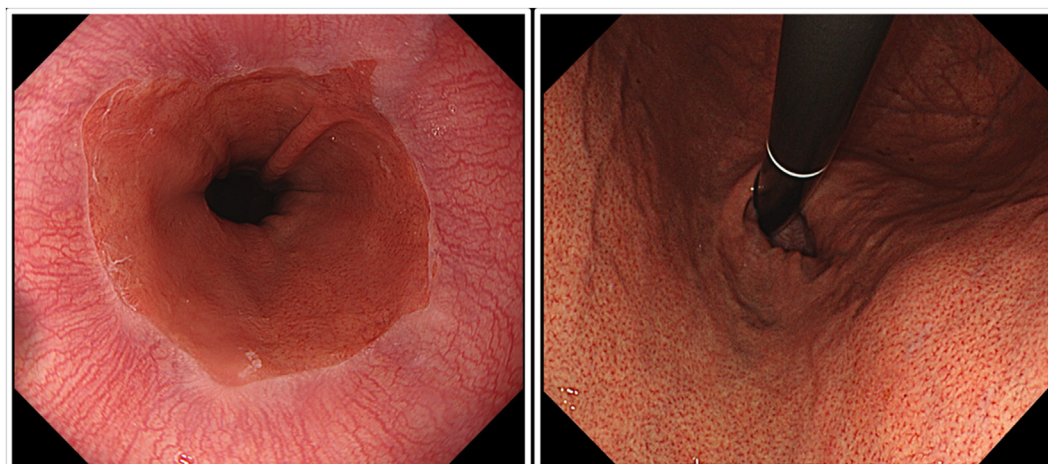


Figure 4. The upper endoscopy revealed a Hill grade II hiatal hernia.

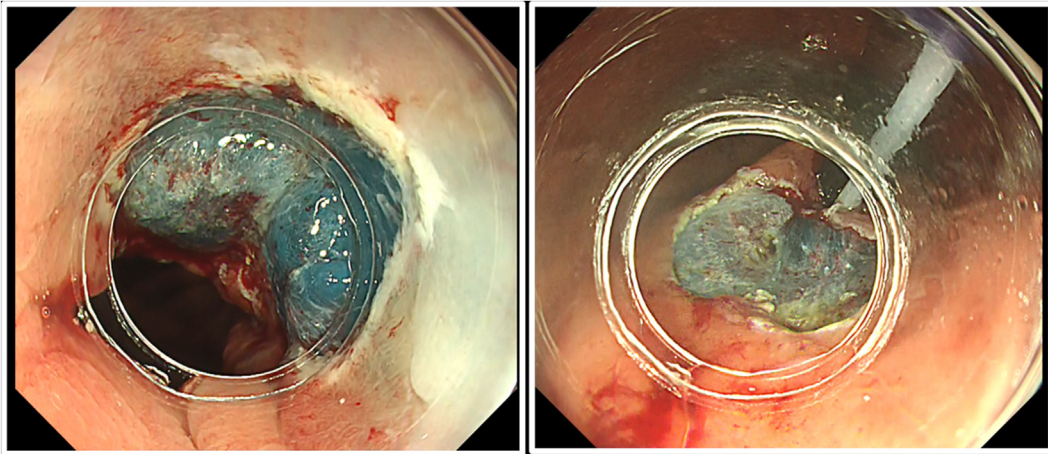


Figure 5. The mucosectomy procedure used the cap-fitted panendoscope technique, removing about one-third of the mucosal circumference along the lesser curvature.

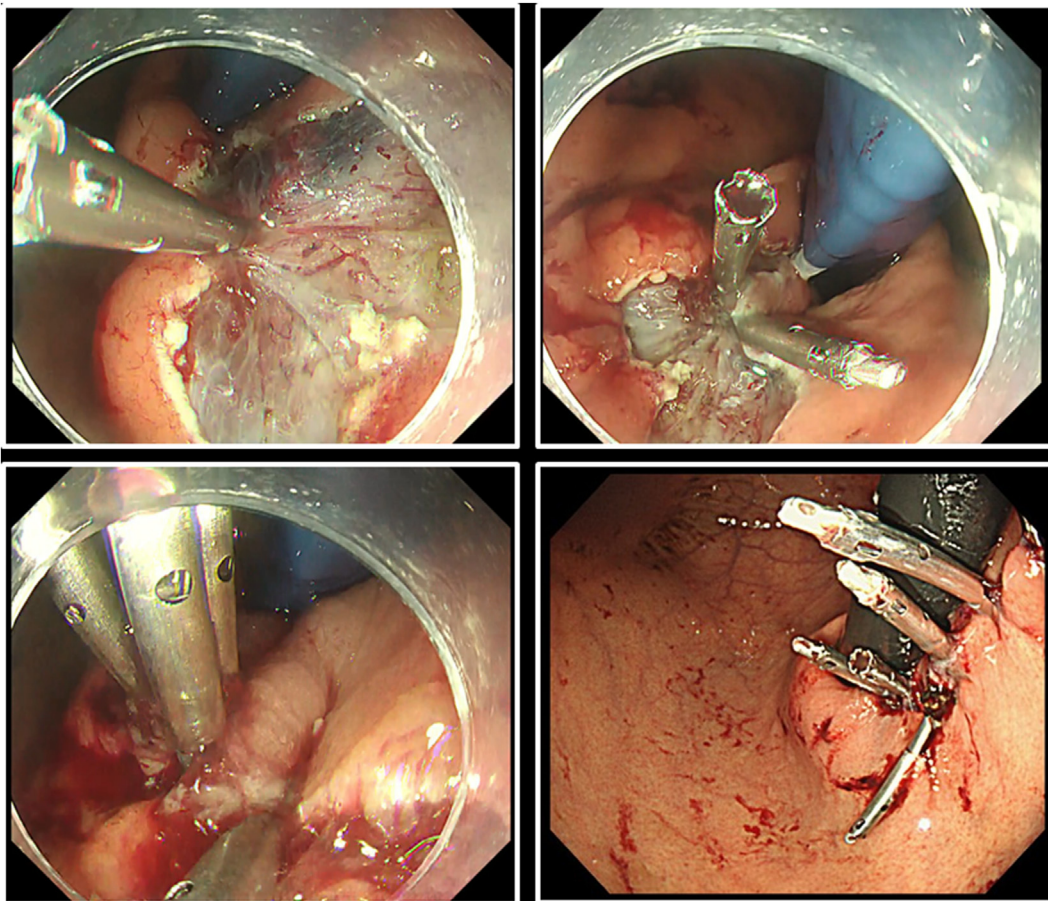


Figure 6. The mucosal defect was closed using the dead space-eliminating technique with anchor pronged clips in a zigzag pattern, ensuring complete closure without any dead space.

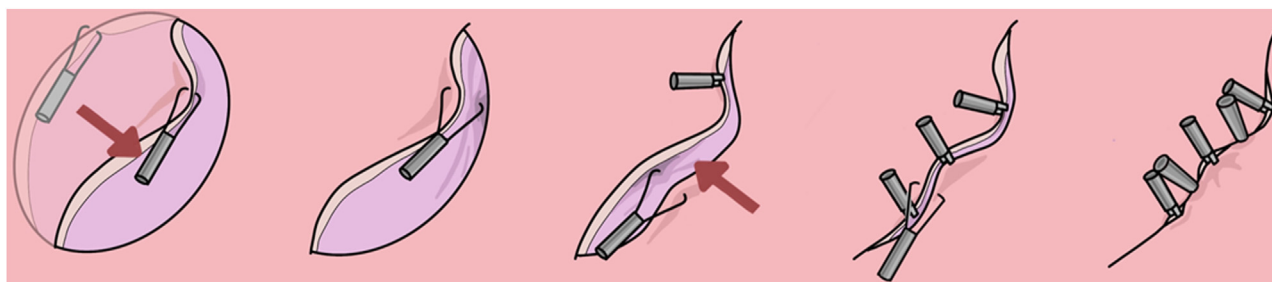


Figure 7. Simplified illustration demonstrating the dead space-eliminating technique.



Figure 8. Endoscopy conducted 2 months after the procedure indicated a tightening of the hernia and reshaping of the mucosal flap valve.

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