

## Double-balloon endolumenal intervention platform with flexible grasper to expedite colonic endoscopic submucosal dissection



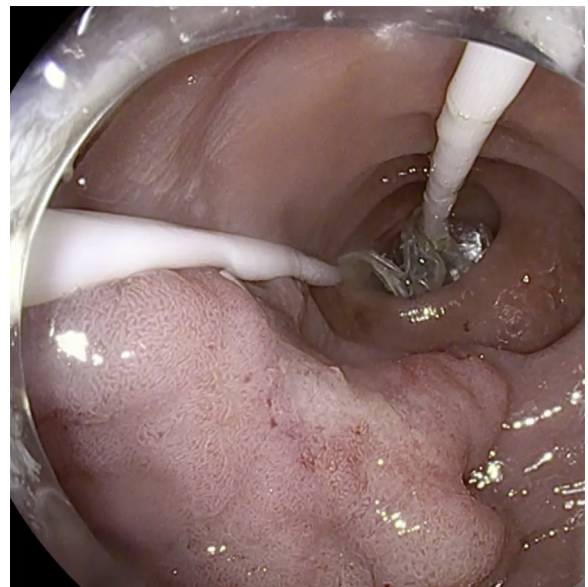
Mohamed O. Othman, MD,<sup>1,2</sup> Salmaan A. Jawaid, MD,<sup>1,2</sup> Manav Rungta, BS,<sup>1</sup> Nilanjana Sur, MD,<sup>3</sup> Sadhna Dhingra, MD<sup>3</sup>

Endoscopic submucosal dissection (ESD) of colonic lesions can be quite challenging owing to the very thin colon wall<sup>1</sup> and limited expandability of the colonic submucosal space, which is in stark contrast to the forgiving esophageal and stomach submucosa.<sup>1</sup> In addition, the colonic muscularis propria can be easily disrupted with inadvertent cauterization by the dissection knife or simply via pressure from the endoscope. Colonic looping and the lesion's location behind folds or around flexures can add to the difficulty of the procedure. Traction devices facilitate ESD by exposing the submucosal space, providing a clear plane for dissection.

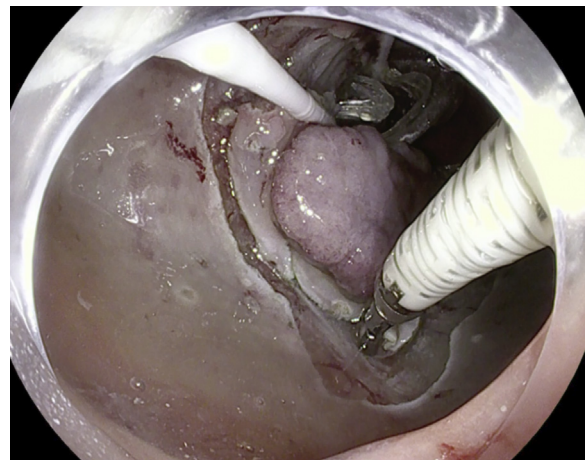
Examples of through-the-scope traction devices include clip-with-line, external grasping forceps/snare alongside the scope, or the use of various equipment through a



**Figure 1.** Double-balloon endolumenal intervention platform with flexible grasper.



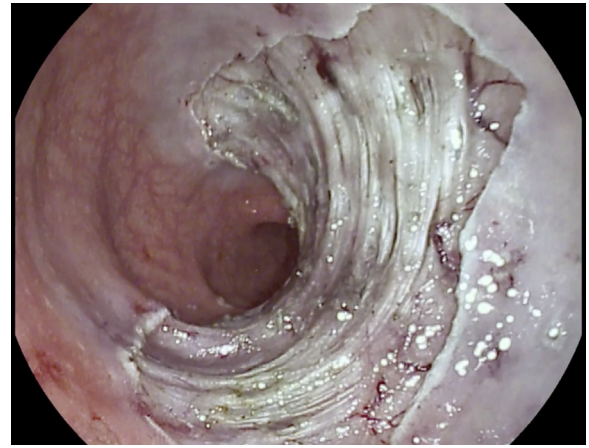
**Figure 2.** Advancement of the fore balloon of the device to the oral side of the lesion to create the therapeutic zone.



**Figure 3.** The edge of the lesion is now grasped with the flexible grasper, creating the initial traction.



**Figure 4.** Adequate tension created by the flexible grasper.



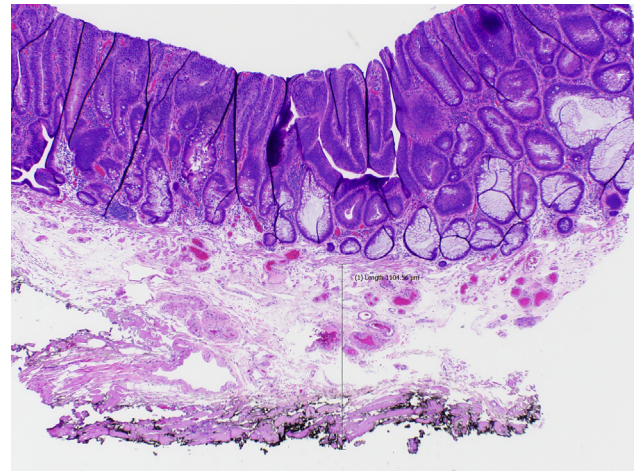
**Figure 5.** Postendoscopic submucosal dissection mucosectomy bed.

double-channel endoscope.<sup>2-4</sup> Although these methods can be helpful, they do not allow dynamic retraction, including the ability to manipulate the lesion in multiple directions to provide adequate tissue tension for dissection. In addition, regrasping the lesion from another edge to change the direction of tension may not be feasible.

In this article, we describe a new platform for colonic ESD, the double-balloon endoluminal intervention platform with flexible grasper (DEIP-FG). The platform allows for faster ESD by (1) stabilizing the colon, (2) creating a therapeutic zone for the performance of ESD, and (3) providing dynamic traction with the use of a flexible grasper alongside the endoscope (Fig. 1). This device is based on a modification of the original double-balloon endoluminal intervention platform currently available for performing colonic ESD. The original DEIP device provided stability and limited traction using the fore-balloon of the device but lacked the flexible grasper capabilities of the novel DEIP-FG.<sup>5,6</sup>

In this video (Video 1, available online at [www.giejournal.org](http://www.giejournal.org)), we demonstrate the usefulness of this novel technique in the removal of a 6-cm polyp in the sigmoid colon, 30 cm from the dentate line. After advancing the colonoscope through the DEIP-FG to the site of the lesion, the fore-balloon of the device was advanced to the oral side of the lesion to create the therapeutic zone (Fig. 2). The polyp was then carefully examined with the help of a transparent plastic cap (disposable distal attachment, Model D-201-15004; Olympus America Inc, Center Valley, Penn, USA) fitted to the distal end of the colonoscope.

After careful examination of the lesion, the lesion's margins were marked using a DualKnife-J (Olympus America Inc) with soft coagulation current (effect 5, 50 W). The lesion margins were then lifted using a submucosal injection of compound solution composed of 500 mL of HES-PAN (6% hetastarch in 0.9% sodium chloride), 1 mL of



**Figure 6.** Pathology showing curative resection of well-differentiated adenocarcinoma.

epinephrine (1:10,000; 0.1 mg/mL), and 3 mL of methylene blue (1:20000 mL). After adequate lifting, a full circumferential incision of the lesion's margin was done with the DualKnife-J. After adequate separation of the anal side of the lesion from the surrounding mucosa, the flexible grasper was introduced under direct visualization and maneuvered to create traction, separating the lesion from the underlying muscle layer (Fig. 3).

The flexible grasper was mounted over a handle, which is attached to the patient's bed, allowing device stability. The endoscopy technician and endoscopist helped manipulate the device on some occasions, but the majority of the time the device was left in position without the need to hold it continuously. Repeated submucosal dissection under traction was performed, and the flexible grasper was constantly maneuvered to provide adequate tissue tension needed to maintain the traction (Fig. 4).

After dissection of 80% of the lesion, the grasper was re-oriented to allow the final dissection. Inspection of the

postmucosectomy bed showed no perforation (Fig. 5). The dissection process starting from injection to complete removal of the lesion lasted 70 minutes. After removal of the DEIP-FG, the OverStitch SX endoscopic suturing device (Apollo, Austin, Tex, USA) was advanced to the resection site. The post-ESD defect was sealed with 2 sutures. Pathology results showed well-differentiated adenocarcinoma with invasion into the superficial submucosa up to 198 mm (Fig. 6).

## DISCLOSURE

*Dr Othman is a consultant for Olympus, Lumendi, Boston Scientific, AbbVie, ConMed, and Apollo Medical and an advisory board member for Lumendi. Baylor College of Medicine, represented by Dr Othman as PI, received a research grant (\$50,000) to establish a colonic ESD registry for patients treated with DEIP. The current manuscript is discussing another device named DEIP-GP, and it is an investigator-initiated manuscript that is not funded by Lumendi. Lumendi did not provide any support for generating this manuscript, nor were Lumendi employees or agents involved in the manuscript preparation. All other authors disclosed no financial relationships.*

*Abbreviations: DEIP-FG, double-balloon endolumenal intervention platform with flexible grasper; ESD, endoscopic submucosal dissection.*

## REFERENCES

1. Yamamoto K, Michida T, Nishida T, et al. Colorectal endoscopic submucosal dissection: recent technical advances for safe and successful procedures. *World J Gastrointest Endosc* 2015;7:1114-28.
2. Tsuji K, Yoshida N, Nakanishi H, et al. Recent traction methods for endoscopic submucosal dissection. *World J Gastroenterol* 2016;22:5917-26.
3. Zhang Q, Xing TY, Wang Z. A snare combined with endoclips to assist in endoscopic submucosal dissection for intraepithelial neoplasia in the entire colon and rectum. *Scand J Gastroenterol* 2019;54:114-21.
4. Aihara H, Kumar N, Ryou M, et al. Facilitating endoscopic submucosal dissection: the suture-pulley method significantly improves procedure time and minimizes technical difficulty compared with conventional technique: an ex vivo study (with video). *Gastrointest Endosc* 2014;80:495-502.
5. Sharma S, Momose K, Hara H, et al. Facilitating endoscopic submucosal dissection: double balloon endolumenal platform significantly improves dissection time compared with conventional technique (with video). *Surg Endosc* 2019;33:315-21.
6. Sharma SK, Hiratsuka T, Hara H, et al. Antigravity ESD - double-balloon-assisted underwater with traction hybrid technique. *Endosc Int Open* 2018;6:E739-44.

Division of Gastroenterology, Baylor College of Medicine, Houston, Texas (1), Baylor St Luke's Medical Center, Houston, Texas (2), Pathology Department, Baylor St. Luke's Medical Center, Houston, Texas (3).

If you would like to chat with an author of this article, you may contact Dr Othman at [mohamed.othman@bcm.edu](mailto:mohamed.othman@bcm.edu).

Copyright © 2021 American Society for Gastrointestinal Endoscopy. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.vgie.2020.11.014>

### VideoGIE Quiz

Think you can outsmart *VideoGIE*? Try your luck with our new Quiz series. Using cases published in *VideoGIE*, we post questions designed to improve the education of our fellows. Go to <http://www.videogie.org> to submit your answer, and keep checking back for more quizzes!