Use of a novel dual-action clip for closure of complex endoscopic resection defects

Mike Tzuhen Wei, MD,1,2 Shai Friedland, MD1,2

While there continues to be debate surrounding indications for closure, use of clips following endoscopic mucosal resection of large nonpedunculated polyps has been found to reduce risk of postprocedural bleeding,1,3 and clinically has also been performed to reduce risk of perforation because of muscularis propria injuries. While standard clips are effective for closure of 2- to 3-cm endoscopic mucosal resection sites in the colon, closure of endoscopic submucosal dissection (ESD) wounds is more technically challenging as the deeper dissection plane in ESD tends to result in a larger separation between the wound edges. Limitations of currently available clips include the ability to adequately grasp the opposing edges and prevent the clip from slipping off the edges while grabbing sufficient tissue. There is therefore a need for improved through-the-scope closure devices for ESD.

In this article, we discuss 2 new closure devices: a dual-action clip (Micro-Tech Endoscopy USA, Ann Arbor, Mich, USA), which can grasp each wound edge in sequence (Fig. 1), and a clip with added atraumatic teeth (Micro-Tech Endoscopy USA) (Fig. 2) for more secure attachment to tissue. The dual-action clip has 2 independent color-coded clip components that are activated by 2 color-coded handles. One side of the wound is grasped by closing one of the clips. The second clip is opened and used to pull the opposing edge of the wound. Once the clip is in

---

**Figure 1.** Dual-action clip. Top: the clips are controlled independently by 2 handles. The gold clip is controlled by the yellow handle and the silver clip is controlled by the blue handle. Bottom left: opened gold clip. Bottom right: both clips opened.
satisfactory position, both handles are deployed simultaneously. The clip with atraumatic teeth is a rotatable clip with 2 sets of teeth designed for improved grip. Similar to other clips in use, the clip with atraumatic teeth is opened and closed by pulling and pushing the thumb ring. We hereby present 3 cases of colorectal ESD requiring use of the novel clips (Video 1, available online at www.giejournal.org).

CASE 1

A 70-year-old man with a 3-cm mixed traditional serrated adenoma and tubulovillous adenoma of the ascending colon was referred for colonoscopy. ESD was selected over EMR or cold snare to increase the likelihood of en bloc resection and decrease risk of recurrence in this dysplastic lesion. ESD was performed, and a 35-×27-mm specimen was removed en bloc. Given the size of the resection site, the dual-action clip was placed to grasp the edges of the middle of the wound, which brought the remainder of the resection edges closer together. The closure was completed with a series of 6 single clips with atraumatic teeth.

CASE 2

A 60-year-old woman was referred for resection of a 2-cm serrated ascending colon polyp. Prior biopsies demonstrated low-grade dysplasia. During the prior procedure, a tattoo was placed at the lesion margin. Given the presence of dysplasia and expected fibrosis because of the tattoo, we opted to remove the lesion via ESD rather than piecemeal cold snare. The ESD was performed with R0 resection. To close the wound, a dual-action clip was placed to bring together the 2 farthest points of the wound. The closure was completed by placing 2 clips with atraumatic teeth on either side of the dual clip (Fig. 3, left).

CASE 3

A 68-year-old woman with a 10-mm fibrotic residual adenoma after incomplete resection and prior injection of a poloxamer 188 based gel (Eleview; Cosmo Pharmaceuticals NV, Dublin, Ireland). The lesion was removed by ESD. The edges of the wound were relatively far apart, so standard clip closure was thought to be technically challenging. After placing 1 dual-action clip, the wound edges were close enough together to place one 16-mm clip with atraumatic teeth followed by 1 smaller 11-mm clip on each side of the dual clip (Fig. 3, right).

DISCUSSION

In 2020, Liu et al performed a meta-analysis and found that prophylactic endoscopic closure following colorectal ESD may help decrease risk of delayed bleeding compared to nonclosure. The meta-analysis did not identify any difference with respect to delayed perforation, but studies remain limited, and more work is needed to evaluate this. While guidelines continue to evolve surrounding necessity and technique of closure of post-polypectomy sites, there has been continual evolution of available devices to achieve closure. Current devices for closure include clips, X-Tack (Apollo Endosurgery, Austin, Tex, USA), OverStitch (Apollo Endosurgery), and over-the-scope clips (Ovesco Endoscopy GmbH, Tübingen, Germany). However, there are different limitations to these tools, including learning curve (X-Tack/OverStitch), requirement of 2-channel endoscope (OverStitch), as well as limitation to size of the defect (over-the-scope clip). As such, it is important to identify other devices to the available armamentarium.

Our experience with the dual-action clip and clip with atraumatic teeth has demonstrated straightforward and
easy-to-use devices for closure of ESD defects. Closure of large wounds with standard clips can be challenging: when the wound edges are far apart, clips may slip off the mucosa because of excessive tension or inadequate purchase. We find that by using even 1 dual-action tissue clip, we are able to significantly reduce the size of the wound and tension on the edges. In doing so, subsequent closure with clips becomes significantly easier, decreasing time and reducing the number of clips needed. During our use of the 2 devices, we found the dual-action clip device needs to be positioned sufficiently far from the endoscope and cap to allow room for the device to open. In addition, there is a small color-matched metallic piece on the opposite side from the clip that slides away from the catheter when the clip is open. This is helpful to note when the open clip is at an angle that makes it difficult to visualize. Finally, the device is not rotatable. If needed, the catheter can be removed from the endoscope and reinserted to obtain a more favorable orientation.

In conclusion, the 2 new clips facilitate closure of ESD defects. The dual-action clip is ideally suited to bring distant edges of the wound together. Once the wound is partially closed, single clips with atraumatic teeth can be used to finish the closure. ESD has been found to dramatically decrease risk of recurrence,9,10 and as such is an attractive option for managing dysplasia. By providing the ability to close challenging ESD defects, these devices may reduce risks related to the procedure and facilitate adoption of the technique.

DISCLOSURE

Dr Wei is a consultant for Neptune Medical and AgilTx. Dr Friedland is a consultant for Caps ovision and Intuitive Surgical.

Abbreviation: ESD, endoscopic submucosal dissection.

REFERENCES

1. Pohl H, Grimm IS, Moyer MT, et al. Clip closure prevents bleeding after endoscopic resection of large colon polyps in a randomized trial. Gastroenterology 2019;157:977-84.e3.
2. Albéniz E, Álvarez MA, Espinós JC, et al. Clip closure after resection of large colorectal lesions with substantial risk of bleeding. Gastroenterology 2019;157:3213-21.e4.
3. Gupta S, Sidhu M, Shahidi N, et al. Effect of prophylactic endoscopic clip placement on clinically significant post-endoscopic mucosal resection bleeding in the right colon: a single-centre, randomised controlled trial. Lancet Gastroenterol Hepatol 2022;7:152-60.
4. Girotra M, Triadafilopoulos G, Friedland S. Utility and performance characteristics of a novel submucosal injection agent (Eleview™) for endoscopic mucosal resection and endoscopic submucosal dissection. Transl Gastroenterol Hepatol 2018;3:32.
5. Liu M, Zhang Y, Wang Y, et al. Effect of prophylactic closure on adverse events after colorectal endoscopic submucosal dissection: a meta-analysis. J Gastroenterol Hepatol 2020;35:1869-77.
6. Draganov PV, Wang AY, Othman MO, et al. AGA Institute clinical practice update: endoscopic submucosal dissection in the United States. Clin Gastroenterol Hepatol 2019;17:16-25.e1.
7. Zhang LY, Bejjani M, Ghandour B, et al. Endoscopic through-the-scope suturing. VideoGIE 2021;7:46-51.
8. Wei MT, Ahn JY, Friedland S. Over-the-scope clip in the treatment of gastrointestinal leaks and perforations. Clin Endosc 2021;54:798-804.
9. van Hattem WA, Shahidi N, Nkoso S, et al. Piecemeal cold snare polypectomy versus conventional endoscopic mucosal resection for large sessile serrated lesions: a retrospective comparison across two successive periods. Gut 2021;70:1691-7.
10. Kobayashi N, Yoshitake N, Hirahara Y, et al. Matched case-control study comparing endoscopic submucosal dissection and endoscopic mucosal resection for colorectal tumors. J Gastroenterol Hepatol 2012;27:728-33.

Copyright © 2022 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.2022.08.005