Hybrid endoscopic submucosal dissection with novel helix tacking system for defect closure

Thomas R. McCarty, MD, Hiroyuki Aihara, MD, PhD, FASGE

A 60-year-old man with a history of adenomatous colon polyps presented to our institution for surveillance colonoscopy. Initial colonoscopy revealed a carpet-like, 40-mm, laterally spreading tumor granular type lesion in the sigmoid colon on high-definition white-light endoscopy (Fig. 1A). Further examination of the lesion via image-enhanced endoscopy with blue light imaging and chromoendoscopy with indigo carmine revealed a Japan NBI Expert Team Type 2A lesion and Kudo type IV pit pattern, respectively (Fig. 1B and C).[1-3] Given the size, location, and noninvasive pattern, the decision was made to perform hybrid endoscopic submucosal dissection (ESD) with a novel ESD knife, followed by mucosal defect closure using an innovative endoscopic helix tacking system.

Hybrid ESD is a technique characterized by partial submucosal dissection followed by snare-assisted resection in an effort to overcome many of the complexities associated with a conventional ESD approach. Previous literature has shown that hybrid ESD is associated with decreased procedure time, fewer adverse events, and no difference in recurrence when compared with conventional ESD.[4] However, given the limitation of snare size, en bloc resection may be decreased for lesions greater than 40 to 60 mm.[4,5] Although both hybrid and conventional ESD remain highly effective for the removal of superficial

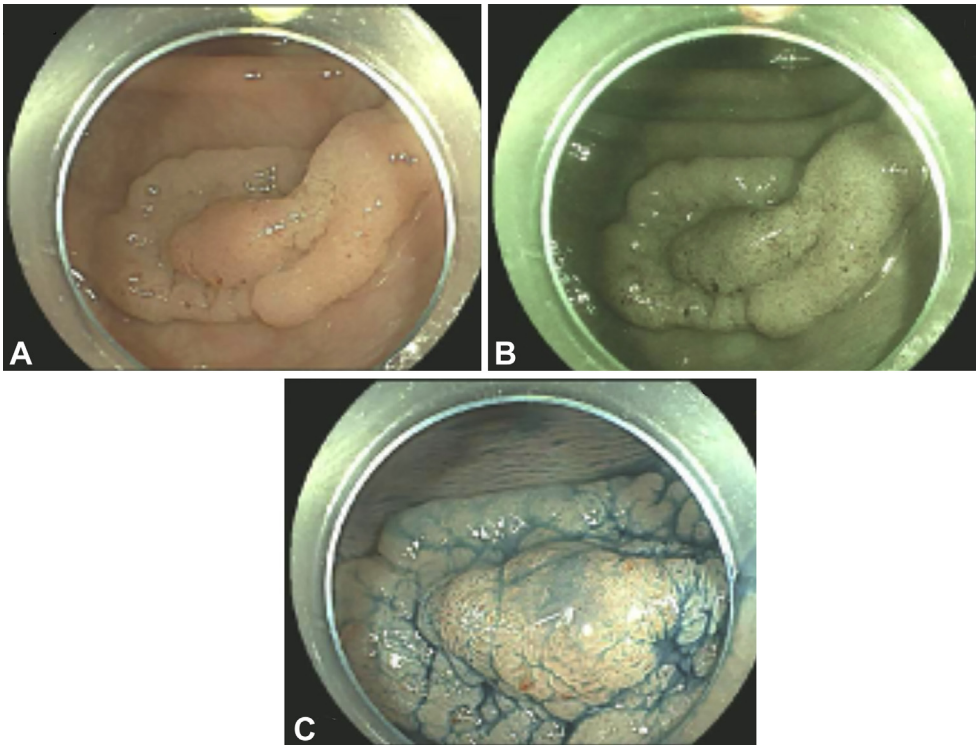

Figure 1. A, A 40-mm laterally spreading tumor granular type sigmoid lesion. **B,** Blue light imaging demonstrating Japan NBI Expert Team Type 2A. **C,** Indigo carmine dye–based chromoendoscopy revealing Kudo type IV pit pattern.

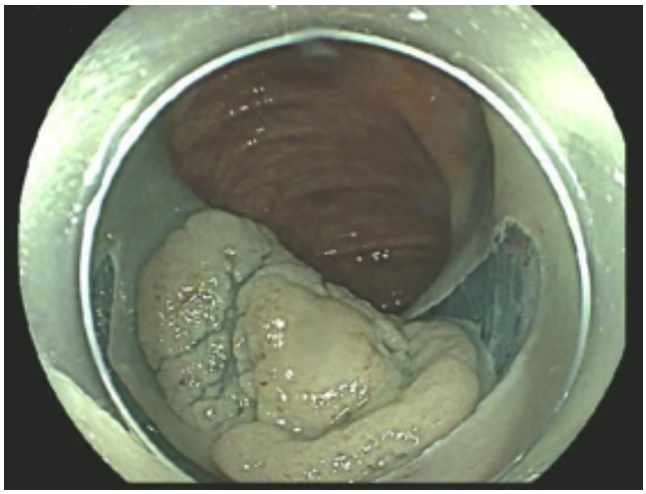

Figure 2. White-light endoscopy image of the lesion after partial circumferential mucosal incision and submucosal dissection.

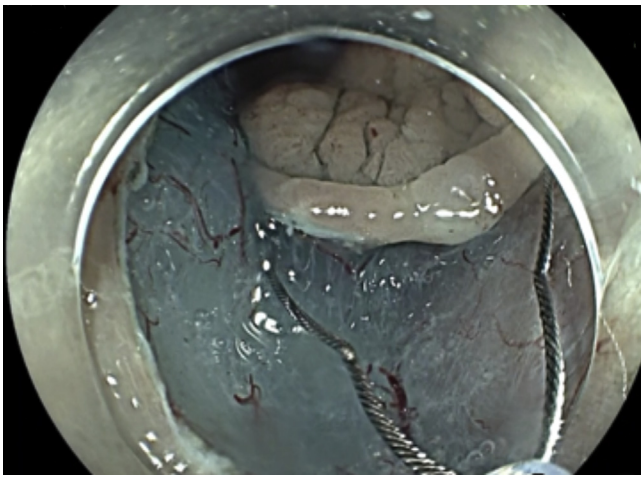

Figure 4. Standard snare-assisted hybrid endoscopic submucosal dissection technique used to perform en bloc resection.

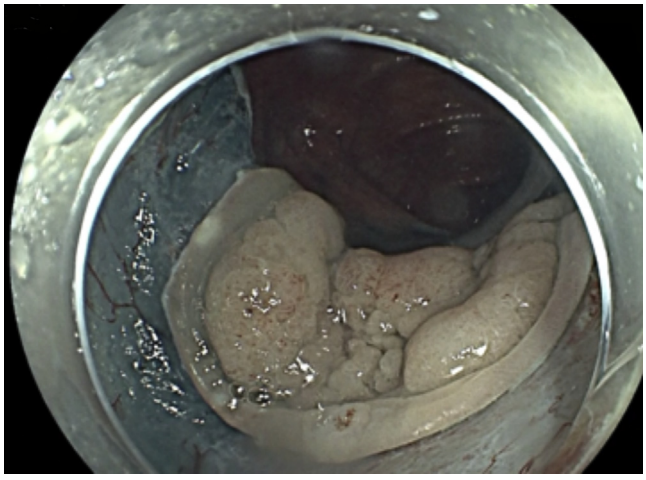

Figure 3. White-light endoscopy image of the lesion after partial submucosal dissection and trimming before snare-assisted resection.

colorectal lesions, ESD-associated mucosal defects may increase the risk of delayed bleeding and perforation.[6,7] Therefore, closure of these mucosal defects is sometimes performed in an effort to minimize adverse events.

In this video (Video 1, available online at www.giejournal.org), we successfully performed en bloc resection of a 40-mm sigmoid lesion using a hybrid ESD technique with the specialized ESD knife (ORISE Proknife; Boston Scientific, Marlborough, Mass, USA) and closure of the mucosal defect using an innovative endoscopic helix tacking system (X-Tack Endoscopic HeliX Tacking System, Apollo Endosurgery, Austin, Tex, USA). Both of these instruments are approved by the U.S. Food and Drug Administration and are commercially available.

First, a novel injectable, T-shaped electrosurgical ESD knife was used to perform a submucosal lift using a solution mixture of 500 mL of 6% hetastarch, 5 mg of epinephrine, and 2 mL of indigo carmine. Next, a partial mucosal incision was made on the anal side of the lesion, followed by an incision on the oral side (Fig. 2). After additional submucosal dissection was performed, submucosal trimming was accomplished to facilitate the hybrid ESD using snare resection (Fig. 3). Once the snare was appropriately placed circumferentially around the lesion, the snare was tightened and successful en bloc resection was achieved (Fig. 4). A step-by-step diagram illustrating the hybrid ESD technique is highlighted in Figure 5.

After snare resection, a novel through-the-scope helix-based suturing system was inserted through the working channel of the colonoscope for defect closure. To achieve appropriate tissue apposition, the first independent barbed Helix Tack was placed at the 9 o'clock position, followed by subsequent helix deployment at 12 o'clock, 6 o'clock, and finally 3 o'clock around the periphery of the defect (Fig. 6). Next, the cinching device was inserted into the working channel of the endoscope, and tension was applied to the suture to approximate all tissue edges of the defect. Once accomplished, the cinch was deployed and suture material was cut to achieve mucosal defect closure. Based on the final appearance, 1 endoscopic hemoclip was placed at the anal side of the defect, adjacent to the endoscopic helix tacking system, to achieve complete mucosal defect closure (Fig. 7). After removal and fixation, the specimen was noted to be 5 cm × 5 cm, with final pathology demonstrating a margin-negative tubulovillous adenoma (Fig. 8). The patient was discharged home the same day postprocedure without issue and was doing well at the 1-month follow-up.

In summary, this case highlights the use of novel tools and techniques to successfully achieve en bloc resection of a 40-mm colorectal lesion. We successfully

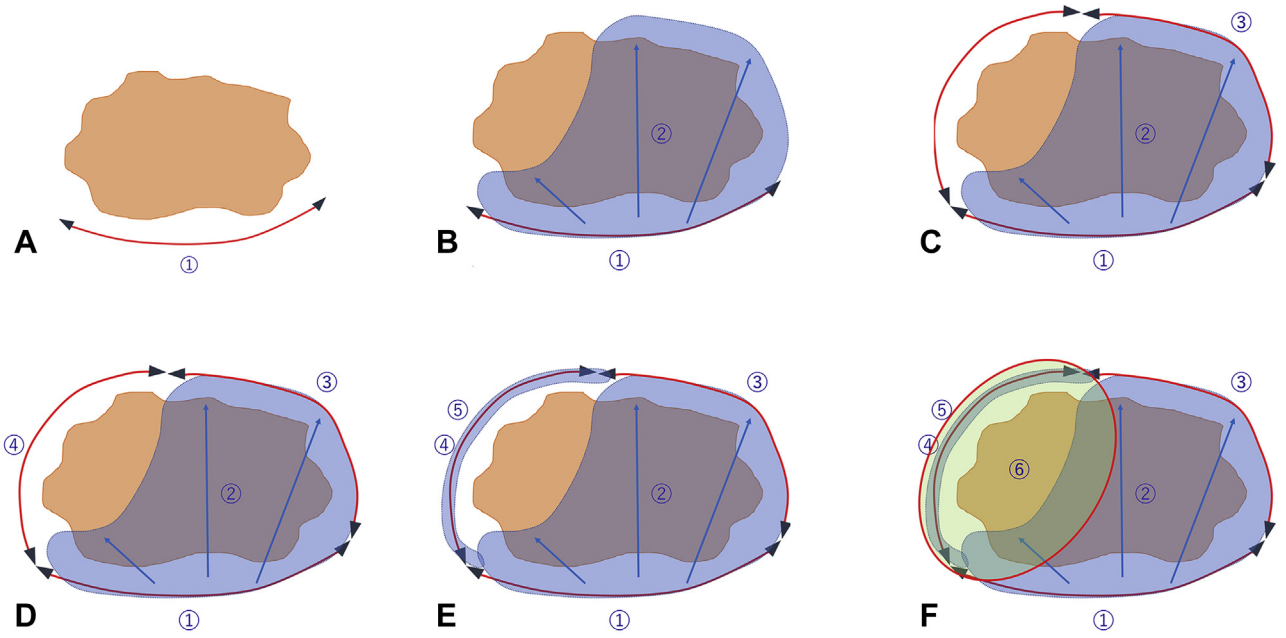

Figure 5. Step-by-step schematic of the hybrid endoscopic submucosal dissection procedure. **A,** Horizontal mucosal incision at the anal side. **B,** Submucosal dissection toward the oral side. **C,** Partial mucosal incision at the oral side (submucosal dissection plane is connected to this incision line and the area is freed). **D,** Completion of the full-circumferential incision (this area was intentionally left intact to apply traction to the right side of the lesion during dissection). **E,** Submucosal trimming. **F,** Snaring of the lesion.

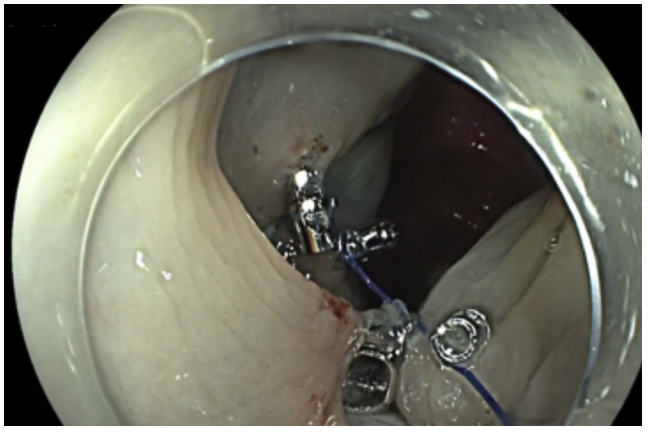

Figure 6. Successful placement of 4 helixes around the periphery of the endoscopic submucosal dissection–associated mucosal defect using the novel endoscopic helix tacking system.

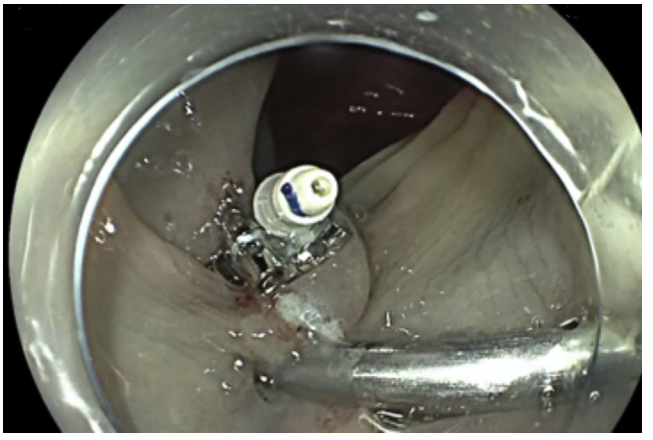

Figure 7. Final appearance and successful mucosal defect closure using the endoscopic helix tacking system and placement of 1 endoscopic hemoclip.

describe the use of a specialized ESD knife and standard endoscopic snare instrument to achieve hybrid ESD, as well as an innovative endoscopic helix tacking system to accomplish mucosal defect closure. Although more literature is needed to study this approach and evaluate the use of these devices in comparison to conventional ESD, these tools and techniques may allow for more widespread adoption of ESD in the United States.

DISCLOSURE

Dr Aihara is a consultant for Olympus America, Boston Scientific, Fujifilm Medical Systems, Medtronic, Auris Health, ConMed, Lumendi, and 3-D Matrix. All other authors disclosed no financial relationships.

Abbreviation: ESD, endoscopic submucosal dissection.

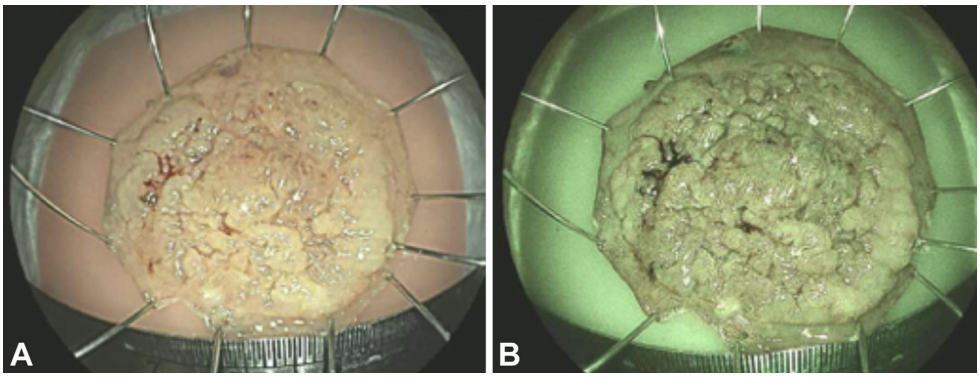

Figure 8. The 50-mm en bloc specimen. **A,** High-definition white light. **B,** Blue light imaging.

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Division of Gastroenterology, Hepatology and Endoscopy, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts.

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