The "Asclepius tube": a slim drainage tube wrapped around the distal part of the endoscope for cecal endoscopic submucosal dissection

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In order to manage colorectal lesions, especially those with severe submucosal fibrosis, we have developed the pocket-creation method (PCM).[1] The PCM is now recommended for colorectal endoscopic submucosal dissection (ESD) by the 2023 technical review of the European Society of Gastrointestinal Endoscopy.[2] When performing ESD with PCM, gas and fluid are endoscopically aspirated to collapse the bowel lumen and reduce distension.[3] Alternatively, the use of an accessory drainage tube allows gas and fluid drainage, obviating the need for endoscopic aspiration. Although we have recently applied this method to rectal ESD, using a trans-anal tube[4] or Foley catheter,[5] and to gastric ESD, using a nasogastric tube,[6] we had not yet developed a method of drainage for proximal-colonic ESD. We, therefore, hypothesized that a fenestrated slim tube wrapped around the distal part of the colonoscope would allow effective drainage for facilitation of proximal colonic ESD. Given its similarity to the medical symbol of the snake wrapped around the rod of Aclepius,[7] we chose to name this "the Asclepius tube."

A 62-year-old man was referred for ESD of a laterally spreading tumor (LST) of the cecum (Video 1, available online at www.videogie.org; Fig. 1). We performed ESD using our Asclepius tube, an 11.1-mm-diameter colonoscope (EC-L600MP7; Fujifilm, Tokyo, Japan), equipped with a conical distal attachment (DH-33GR; Fujifilm) (its slit covered with transparent tape), a carbon dioxide (CO_2) insufflator (CW-200; Fujifilm), and the Flushknife BT-S (DK2620J-B15S; Fujifilm). The Asclepius tube was made out of a 14F, 125-cm nasogastric tube (SF-GX1420, Terumo, Tokyo, Japan), which only costs 88 Japanese yen (0.60 U.S. dollars). The tip of the tube was cut diagonally, and it was wrapped around the distal end of the colonoscope, so as not to interfere with the endoscopic bending section; it was secured to the colonoscope shaft with pieces of medical adhesive vinyl tape placed at 12- to 20-cm intervals (Figs. 2 and 3). The draining end of the tube was placed inside a collecting plastic bag for free gravity drainage without extra suction. The patient's bowel preparation was adequate, and cecal PCM-ESD was performed (Fig. 4) with the patient in a supine position. Luminal gas and fluid, including blood and irrigated saline solution, were drained through the tube without the need for endoscopic aspiration. Endoscopic maneuverability was not hindered by the Asclepius tube. Closure of the distal attachment's side-slit with transparent tape provided enough gas and saline solution pressure for adequate stretching and visualization of the submucosa (Fig. 5). Any cloudy fluid or blood was easily washed away from the operating field and freely drained through the tube.

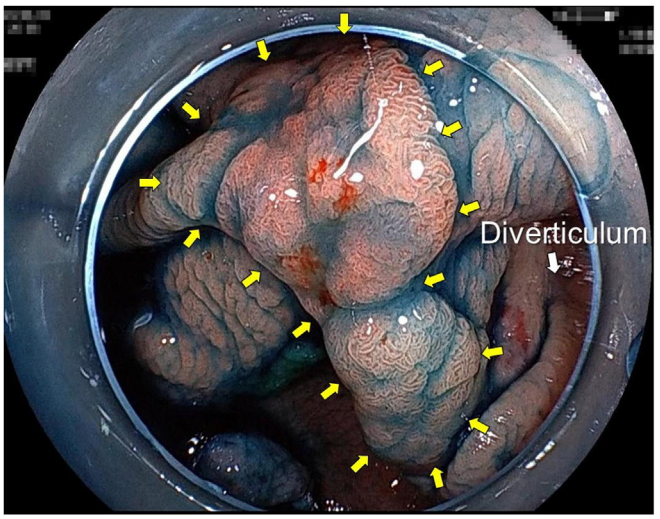

Figure 1. A laterally spreading tumor (LST) in the cecum, dyed with indigo carmine, as indicated by the *yellow arrows*. A diverticulum, indicated by the *white arrow*, is seen in the distal side of the LST.

Abbreviations: CO_2, carbon dioxide; ESD, endoscopic submucosal dissection; LST, laterally spreading tumor; PCM, pocket-creation method.

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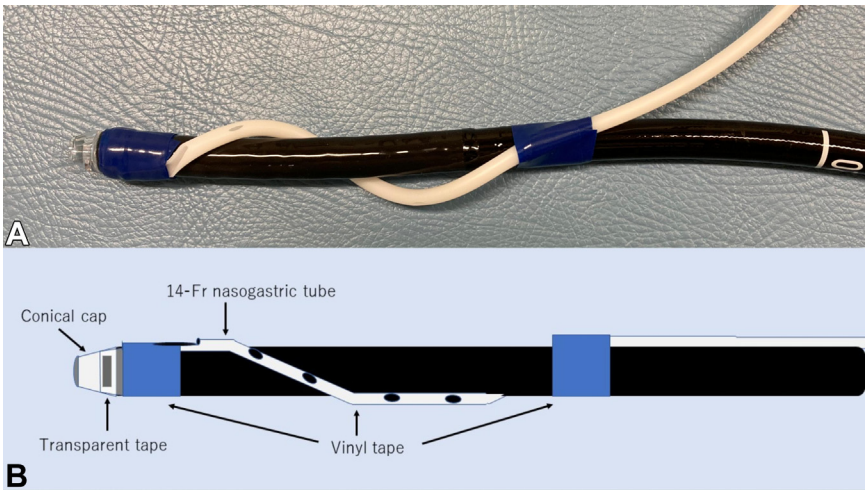

Figure 2. A, Graphic representation and **(B)** photograph of the drainage tube wrapped around the distal part of the endoscope. Additional side holes (fenestrations) were cut on the distal part of a 14F 125-cm nasogastric tube. The tip of the tube was cut diagonally, wrapped to the colonoscope tip, and fixed with vinyl tape. A conical distal attachment (DH-33GR; Fujifilm) with the side slit covered with a piece of transparent tape is attached to the colonoscope tip.

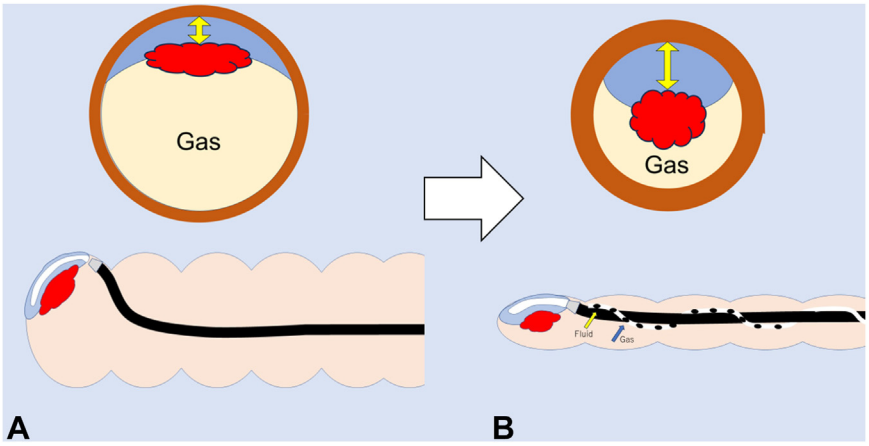

Figure 3. A, Insufflation distends the cecal lumen; the submucosa is consequently thinner (*yellow arrow*), and endoscopic maneuvering becomes unstable. **B,** Continuous gas and fluid drainage through the tube during the endoscopic submucosal dissection (ESD) results in collapse of the cecal cavity, stabilizing endoscopic maneuverability and thickening the submucosa (*yellow arrow*). The insufflated gas or irrigated saline solution pressure through the distal attachment stretches the submucosal tissue in front of the opening and subsequently drains through the tube, which facilitates ESD.

No clots accumulated in the cecum. After creation of a submucosal pocket, a circumferential lateral mucosal incision was made. The mucosal edge of entrance to the submucosal pocket was connected to the distal contralateral mucosa with a traction device (SureClip Traction Band, ETD00006; Micro-Tech Co, Ltd, Nanjing, China) to facilitate opening of the pocket (Fig. 6). The ESD was successfully completed and the LST was removed en bloc with no adverse events (Fig. 7). The histopathology confirmed low-grade adenomatous etiology with negative margins (R0 resection). The total volume of drained fluid was approximately 500 mL (Fig. 8).

Our drainage tube wrapped around the distal end of the colonoscope, akin to the rod of Asclepius, facilitated ESD in the cecum. We also reported that drainage facilitated rectal ESD after a circumferential mucosal incision.[4] This is because the collapsed lumen functions as a limited space similar to a submucosal pocket. Therefore, drainage may be beneficial not only for PCM but also for other ESD methods. We hypothesize that an external, fenestrated

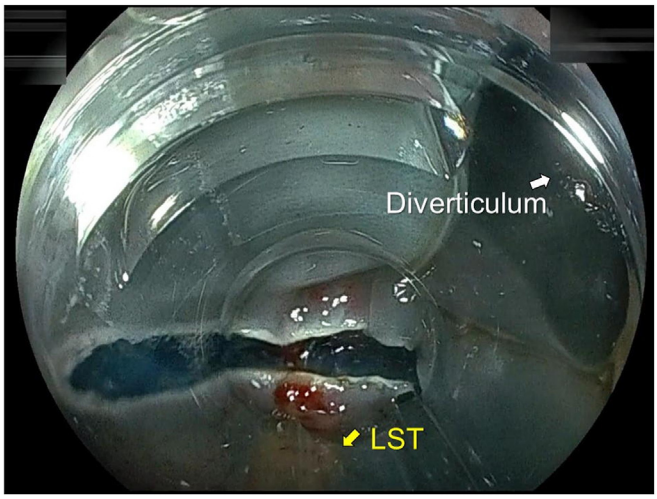

Figure 4. Mucosal incision between the laterally spreading tumor (LST) (*yellow arrow*) and the diverticulum (*white arrow*) to secure its horizontal margin first.

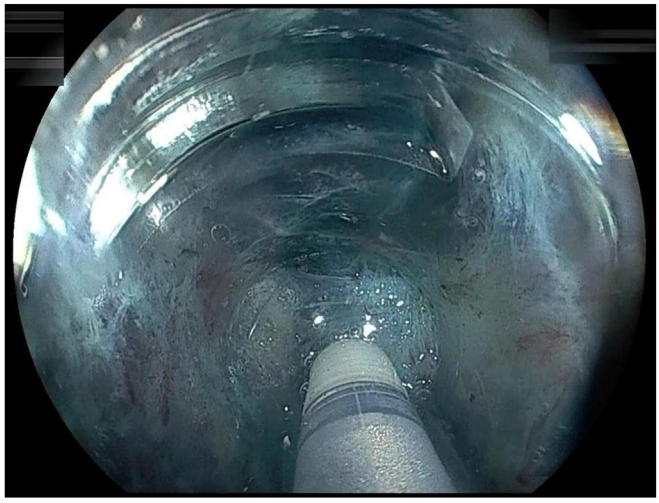

Figure 5. The conical distal attachment apposed to the submucosa in the collapsed lumen maintains the visual field, despite its small tip orifice. The submucosal tissue in front of the distal attachment opening is stretched as a result of its conical nature, even with the collapsed lumen.

drainage tube, such as our Asclepius tube, may also facilitate drainage of intestinal fluid and/or blood during endoscopic polypectomy with a risk of immediate massive bleeding and for free drainage of redundant fluid when using the saline solution immersion therapeutic endoscopy technique[8] or the similar water (saline solution) pressure method.[9] Our preliminary experience suggests that accessory free drainage with our Asclepius tube is safe, cheap, and effective for cecal/proximal colon ESD and warrants further comparison study.

DISCLOSURE

Conflicts of interest: Dr Despott has received educational grants in support of conference organization and honoraria from Fujifilm, Pentax, Olympus, and Ambu. Dr Yamamoto has consultant relationships with Fujifilm Co Ltd and received honoraria, grants, and royalties from the company. The other authors disclosed no financial relationships.

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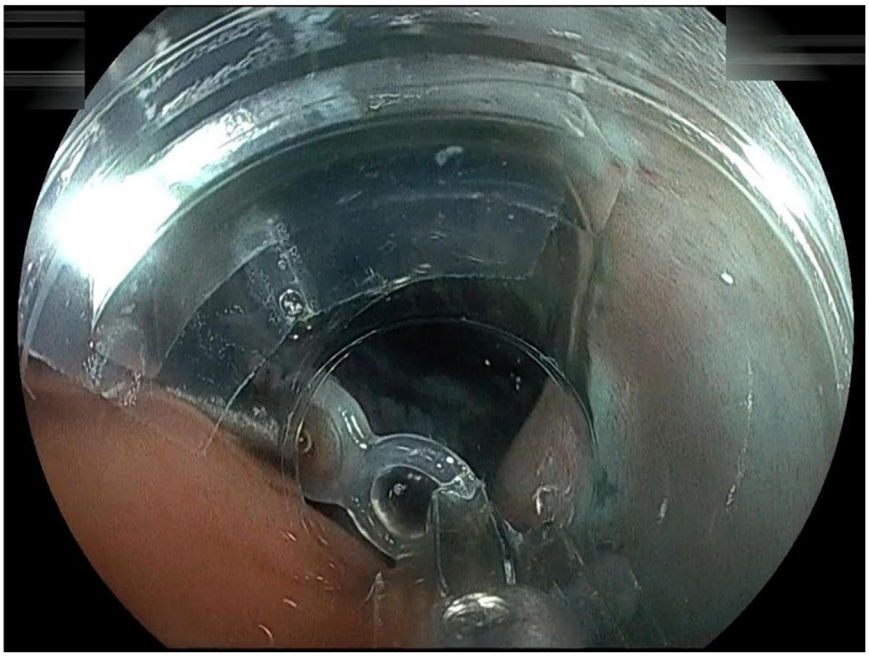

Figure 6. After dissecting most of the area of the laterally spreading tumor and circumferentially incising the surrounding mucosa, a traction device (Sure-Clip Traction Band; Micro-Tech) was used to facilitate opening of the pocket.

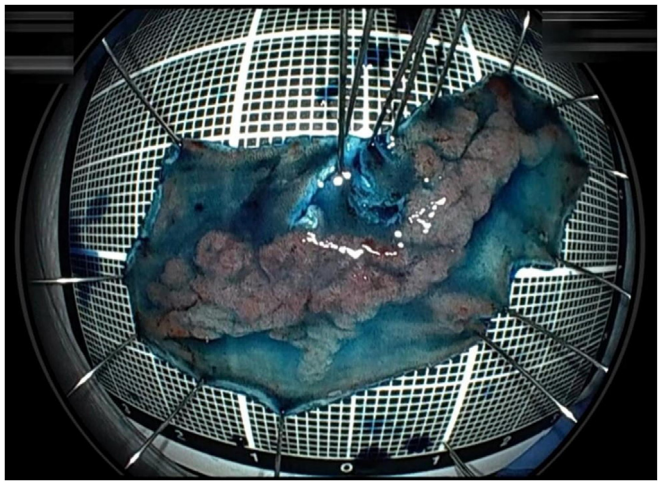

Figure 7. Endoscopic submucosal dissection specimen. The laterally spreading tumor was completely removed without adverse events. Histopathology was that of a low-grade adenoma with negative margins (R0 resection).

Figure 8. The total amount of the drained fluid including irrigated saline solution and blood was approximately 500 mL.

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