Endoscopic submucosal dissection with the combination of a scissor-type knife and novel traction method for colonic neoplasm involving a diverticulum

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As various devices and techniques emerge, colorectal endoscopic submucosal dissection (ESD) has become a relatively safe procedure despite the anatomical difficulty. However, ESD for colonic tumors near or involving a diverticulum remains challenging.[1-6] We report a case of colonic neoplasm involving a diverticulum that was treated using ESD via a combination of a scissor-type knife and a novel traction method.

A 74-year-old woman had a 35-mm laterally spreading tumor that partially infiltrated the interior portion of the diverticular orifice in the ascending colon (Fig. 1). She had no abdominal symptoms, and her laboratory findings were normal. Aside from the colonic neoplasm, the patient's medical history was unremarkable. After obtaining informed consent, ESD was selected for treatment.

ESD was performed using a splinting tube with an inflatable balloon (ST-CB1; Olympus Optical Co, Ltd, Tokyo, Japan) for stable endoscopic manipulation (Video 1, available online at www.giejournal.org). A transparent tip hood (DH-28GR; Fujifilm Medical Co, Ltd, Tokyo, Japan) was used to maintain visibility. Glycerol was injected into the submucosa to elevate a mucosa, followed by injection of sodium hyaluronate solution to maintain mucosal elevation. Mucosal incision and submucosal dissection were performed using a DualKnife (KD-655Q; Olympus Optical Co, Ltd) and an insulation-tipped (IT) knife (KD-612Q; Olympus Optical Co, Ltd) from the anal side. Submucosal dissection was performed near the diverticulum until a tunnel was reached on the oral side. Safe dissection was challenging with these knives because of severe fibrosis and blood vessel abundance in the diverticulum (Fig. 2). Therefore, we switched to the stag beetle knife Jr.2 (SB Knife Jr.2; SB-Kawasumi, Inc, Kanagawa, Japan), which is a scissor-type knife.[7] Additionally, to improve visibility of the submucosa, a multiloop traction device (MLTD; Boston Scientific Co, Ltd, Watertown, Mass, USA)[8] was used to facilitate submucosal dissection (Figs. 3 and 4). Finally, en bloc resection was achieved in 117 minutes without adverse events. A part of the diverticular defect after ESD was clipped to prevent delayed perforation (Fig. 5). The lesion size was 35 × 28 mm, with negative margins (Fig. 6A). The pathological diagnosis of the neoplasm was low- and high-grade tubular adenoma (Fig. 6B). She was given cefmetazole sodium by intravenous infusion on the day of treatment and discharged 5 days after.

Endoscopic resection for colorectal neoplasms involving the diverticulum has high perforation risks because the diverticulum lacks a muscle layer.[9] Jimenez-Garcia et al[1] reported that the en bloc resection rate for part or all of the diverticulum using a needle-type or IT knife was

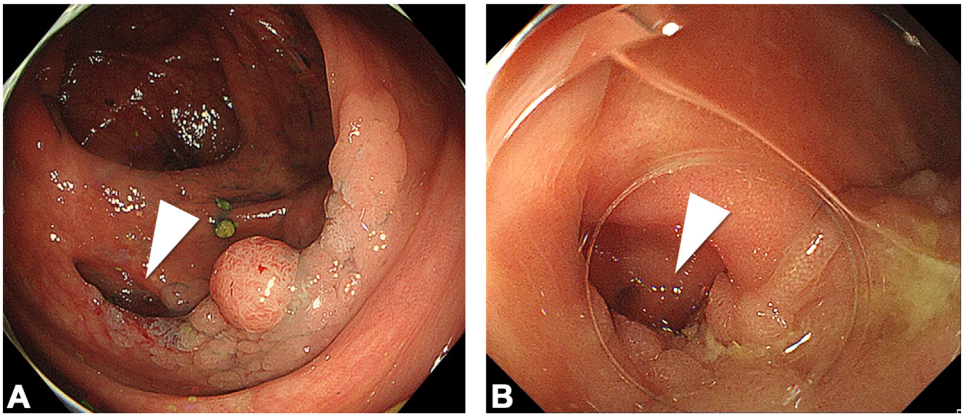

Figure 1. Endoscopic findings of the lesion (*white arrowhead* shows a diverticulum). **A,** A 35-mm laterally spreading tumor located in the ascending colon. **B,** The tumor extended to the diverticular portion (*white arrowhead*).

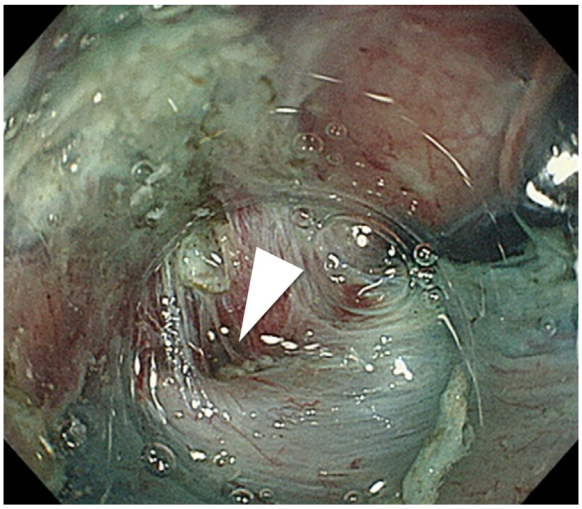

Figure 2. Endoscopic image during the endoscopic submucosal dissection. Severe fibrosis and abundant blood vessels were observed (*white arrowhead* indicates a diverticulum).

33%, and 1 case had a perforation. Direct injection and incision in the diverticulum might lead to perforation, and the working space is limited because of the anatomical characteristics that impair safe movement of a needle-type or IT knife, even for expert endoscopists.[2] To overcome this, a SB Knife Jr.2 was used in this case because it can accurately grasp, coagulate, and incise the target tissue using an electrosurgical current.[7] However, in our case, using only a SB Knife Jr.2 meant that the incision of the neoplasm in the deeper parts of the diverticulum could potentially incise the inside of the neoplasm because it was difficult to identify the incision line. Therefore, in addition to a SB Knife Jr.2, a traction method was used to lift the deeper parts of this neoplasm. The multiloop traction device used in this case was a novel traction device that has 3 rings and enables control of traction force.[8] Thus, the incision can be safely performed by grasping the submucosa with the SB Knife Jr.2 after visualizing the incision line. This procedure offers a safe

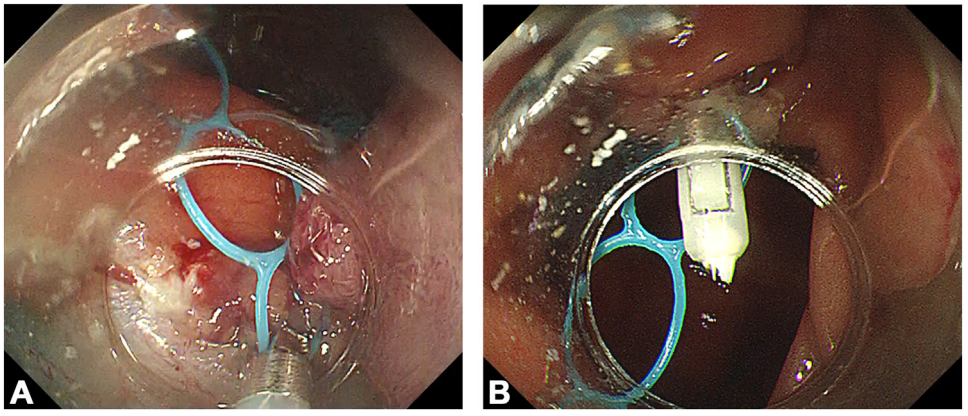

Figure 3. Multiloop traction technique. **A,** The edge of the exfoliated mucosa near the diverticulum was attached to a multiloop traction device. **B,** Traction was applied by attaching another clip to the colonic wall contralateral to the lesion.

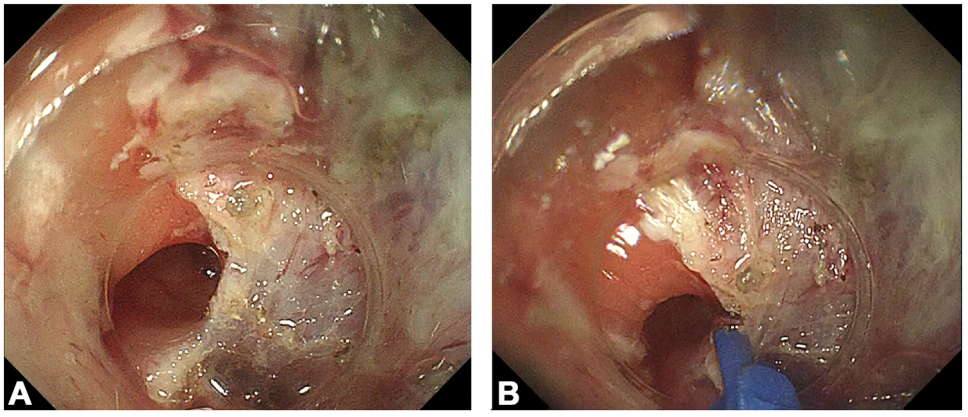

Figure 4. Endoscopic images of the interior of a diverticulum during submucosal dissection. **A,** A good field of view was established with the multiloop traction method. **B,** It was possible to grasp and dissect the submucosa in the deeper parts of the diverticulum using a scissor-type knife.

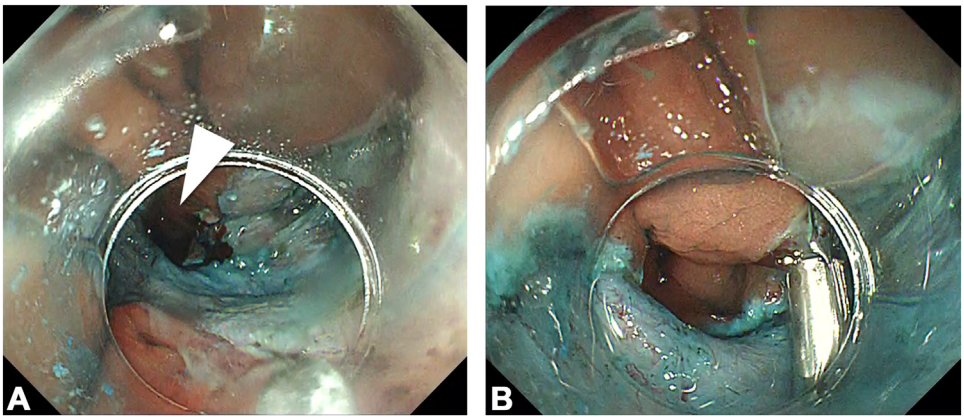

Figure 5. Diverticular area after the ESD. **A,** Mucosal defect was seen after ESD (*white arrowhead* shows a diverticulum). **B,** No perforations were observed within the diverticulum. The edge of the diverticulum was clipped after ESD to prevent delayed perforation. ESD, Endoscopic submucosal dissection.

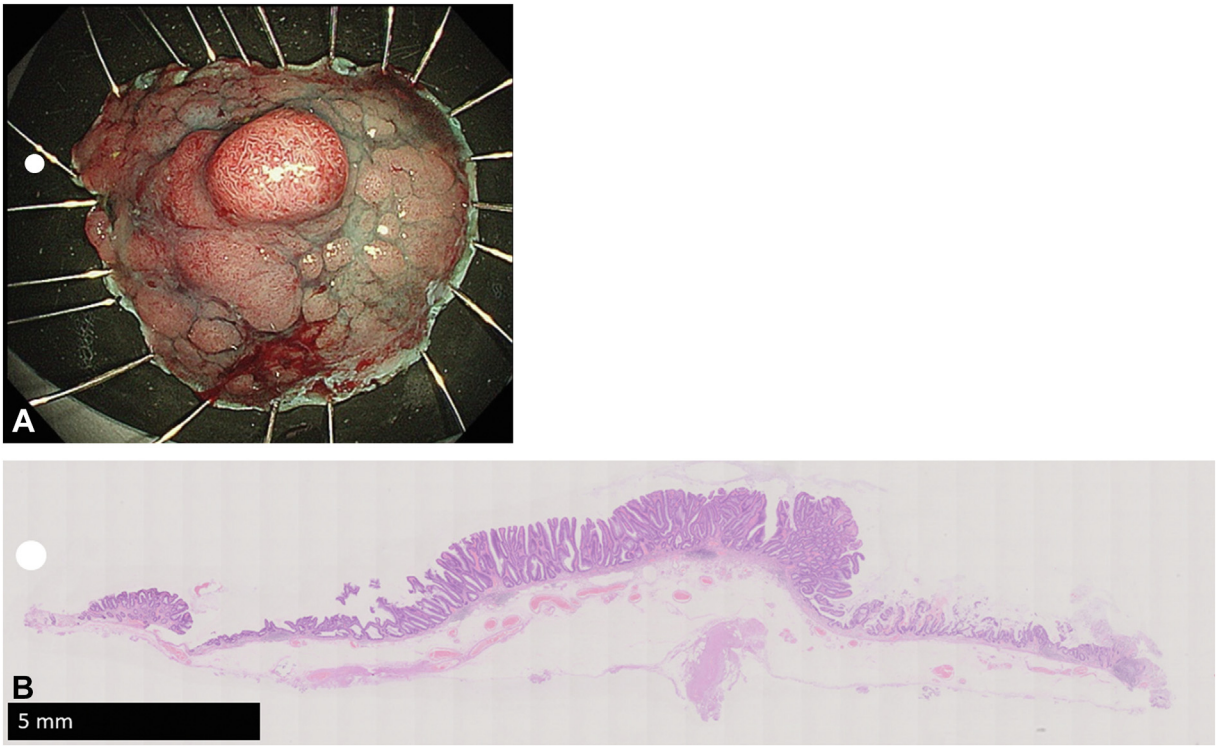

Figure 6. Resected specimen from the endoscopic submucosal dissection (*white circle* shows the direction of the diverticulum). **A,** Endoscopic image of the resected specimen shows a 35- × 28-mm lesion. **B,** Histopathological examination of resected specimen (H&E, orig. mag. x 0.56). The pathological diagnosis of this neoplasm was tubular adenoma (low- and high-grade), with negative margins.

and effective therapeutic option for challenging neoplasms involving the diverticulum.

DISCLOSURE

All authors disclosed no financial relationships.

Abbreviations: ESD, endoscopic submucosal dissection; IT, insulation-tipped.

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