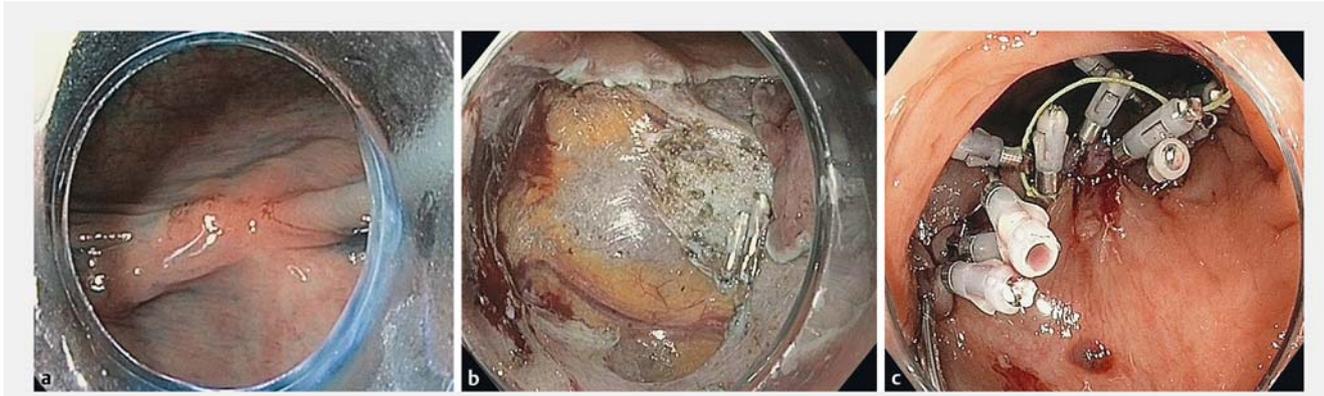
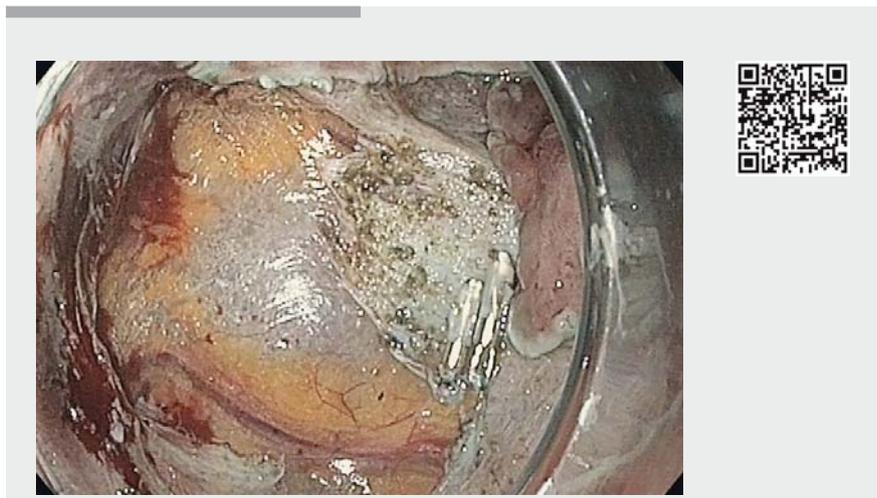


Line-assisted endoscopic complete closure of a large perforation during colonic endoscopic submucosal dissection



► **Fig. 1** Endoscopic views showing: **a** a large flat lesion adjacent to a previous colorectal anastomotic suture line; **b** a large perforation that developed immediately after pushing the colonoscope in a retroflexed position to approach the cephalic end of the lesion; **c** the large perforation following successful closure using the line-assisted complete closure technique.

A 71-year-old woman was found to have a laterally spreading tumor (non-granular type) adjacent to a previous surgical anastomosis (► **Fig. 1 a**). Endoscopic submucosal dissection (ESD) with carbon dioxide insufflation was attempted using an esophagogastroduodenoscope (GIF-H180J; Olympus Co., Tokyo, Japan) and a FlushKnife BT (DK2618JB15; Fujifilm Medical, Tokyo, Japan) during the fourth edition of International ESD Live Madrid 2016, endorsed by the European Society of Gastrointestinal Endoscopy. Severe fibrosis was found during the procedure and it was very difficult to approach the appropriate submucosal plane. While a switch to snare removal was being considered, a large perforation occurred as a result of the colonoscope being pushed in a retroflexed position (► **Fig. 1 b**). As a result, the lesion was removed en bloc using an electrosurgical snare (so-called “hybrid ESD”), because it was essential to complete the procedure immediately. As the perforation was large, we used the line-assisted complete closure (LACC) technique [1–3]. The closure was successfully completed using 30 endoclips (HX-610-090 and HX-202UR; Olympus



► **Video 1** Endoscopic complete closure of a large perforation that occurred during colonic endoscopic submucosal dissection using the line-assisted technique.

Co.) without decompressing the pneumoperitoneum (► **Fig. 1 c**; ► **Video 1**). A contrast-enhanced computed tomography (CT) scan immediately after the procedure showed the presence of the pneumoperitoneum but the absence of leaking contrast agent (► **Fig. 2**). The patient was kept fasted and treated with in-

travenous antibiotics for 24 hours, before being given oral antibiotics for an additional 8 days. She was hospitalized for 4 days without further complications. Histological examination showed low grade dysplasia, with clear lateral and vertical margins. The patient was followed up 5 months later, at which time she was



► **Fig. 2** Computed tomography (CT) images immediately after the procedure showing the presence of a pneumoperitoneum, the absence of leaking contrast at the perforation site, and the endoclips that were placed during the procedure in: **a** coronal view; **b** sagittal view.

asymptomatic. A surveillance colonoscopy will be performed after 1 year. Several suturing methods for colonic perforation have been previously reported [4,5]; however, these methods require special devices, whereas LACC needs no special devices. Furthermore, aborting the procedure or cautious maneuvering when in retroflexion should be considered to avoid perforation during ESD for lesions with fibrosis.

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Competing interests

None

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