

Underwater reopenable clip closure of mucosal defects after duodenal endoscopic submucosal dissection



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Closing mucosal defects after duodenal endoscopic submucosal dissection (ESD) decreases the risk of postoperative adverse events.¹ Although various methods for closure have been proposed,^{2,3} a single reliable and safe method has not yet been established. Herein, we propose the

underwater reopenable clip closure (U-REC), a novel technique for closing mucosal defects after duodenal ESD.

The U-REC is a reliable technique that uses reopenable clips (SureClip; Micro-Tech Co Ltd, NanJing, China) to enable safe closure of duodenal mucosal defects

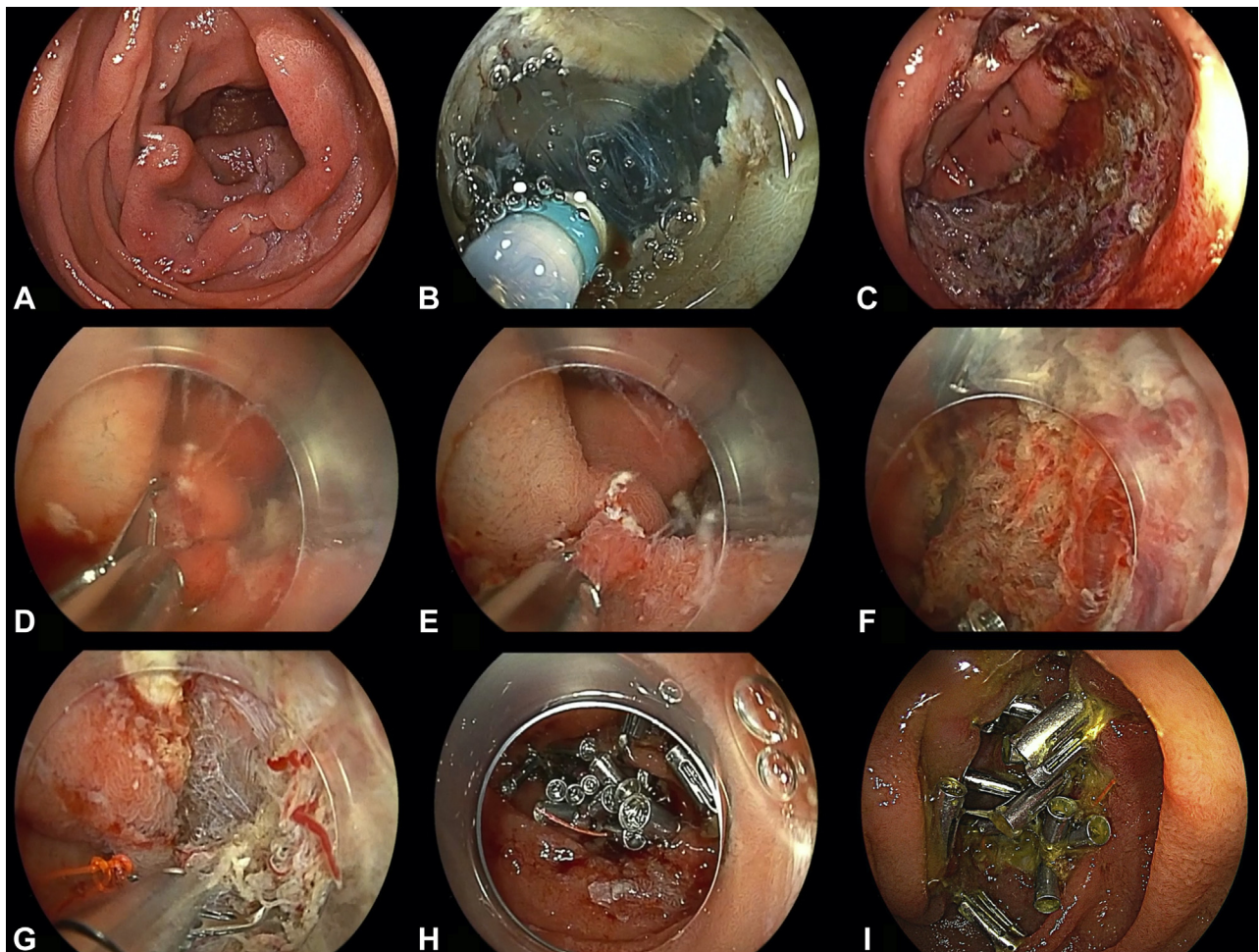


Figure 1. **A**, A superficial 50-mm mass located in the second portion of the duodenum. **B**, The mass is dissected by endoscopic submucosal dissection (ESD) using the pocket-creation method. **C**, Mucosal defect after ESD, measuring approximately 60 mm. **D**, The margins of the mucosal defect are firmly grasped underwater with reopenable clips. Where the edges of both submucosal defects were invisible, the clips were reopened and used to grasp the edges. **E**, After confirmation that the edge of the submucosa was completely grasped using the reopenable clips, clips were deployed. **F**, A large mucosal defect remained in the center of the resection site after the edges of the mucosal defect were approximated with a reopenable clip. **G**, The thread-assisted mucosal defect closure technique was used; the edges of the mucosal defect are gradually approximated and closed securely using a reopenable clip. **H**, The mucosal defect is completely closed using underwater reopenable clip closure (U-REC). **I**, Four days after the duodenal ESD with complete closure of the mucosal defect using U-REC, all clips remained in place.

underwater. To fix the margins of a large mucosal defect with a single clip, it is necessary to remove the air in the intestinal tract, which makes the intestinal wall flexible and softens the muscularis. However, removing the air makes it difficult to identify the margins of the mucosal defect. The U-REC technique is performed by filling the intestinal tract with water to maintain visibility of the defect. In addition, the duodenal mucosa is delicate, and unless the normal mucosa around the mucosal defect margins on both sides is securely grasped by the clip, the defect in the duodenum may easily separate after the clip is closed. Therefore, U-REC uses a clip that can be securely grasped between mucosal defects under direct endoscopic observation and deployed after confirmation under endoscopic observation. The reopenable clips are used to securely fix the margins of the mucosal defect.

A 76-year-old woman presented with a superficial 50-mm tumor in the second portion of the duodenum (Fig. 1; and Video 1, available online at www.VideoGIE.org). We performed an en bloc resection of the tumor using the pocket-creation method,⁴ which resulted in a mucosal defect of approximately 60 mm, representing approximately three-fourths of the duodenal circumference. The U-REC technique was then used to gradually close the mucosal defect starting at the periphery. The air in the duodenum was completely removed, and the duodenum was filled with water to make the intestinal wall flexible. Next, both edges of the mucosal defect were grasped with a reopenable clip. If the margins of the mucosal defect are not firmly fixed under the endoscopic view, the clips are opened to grasp the margins of the mucosal defect. The clip applicator is pulled slightly, and endoscopic image recognition is used to confirm that the edges are completely grasped. If the mucosal defect cannot be grasped using U-REC starting at the edge of the defect, a thread-assisted mucosal defect closure technique can be used to gradually approximate the margins of the defect.⁵ Once the edges are approximated, the U-REC is used to ensure that the mucosal defect is fixed with reopenable clips, and thus, the clips can be deployed. An additional clip was added using U-REC, and the defect was completely closed. Four days after the ESD, all clips remained in place and the patient was discharged without adverse events (Fig. 1; and Video 1, available online at www.VideoGIE.org).

U-REC was used to securely grasp the edges of the mucosal defects with a reopenable clip underwater using

image recognition. U-REC is reliable for the complete and safe closure of duodenal mucosal defects.

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DISCLOSURE

Dr Yamamoto has a patent for the ST hood produced by the Fujifilm Corporation. The hood was used for ESD and has been shown in this video. He also has a consultant relationship with Fujifilm Corporation and has received honoraria, grants, and royalties from the company. All other authors disclosed no financial relationships.

Abbreviations: ESD, endoscopic submucosal dissection; U-REC, underwater reopenable clip closure.

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