

Over-the-scope clip system is effective for the closure of post-endoscopic submucosal dissection ulcer, especially at the greater curvature

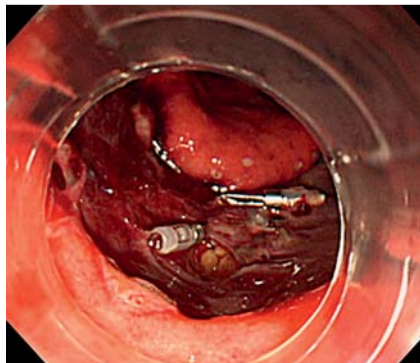


Fig. 1 Case 1. Separation and perforation of the muscle layer during endoscopic submucosal dissection with retroflexed endoscope. We tried to close the perforation site using conventional clips, but this induced further separation of the muscle layer.

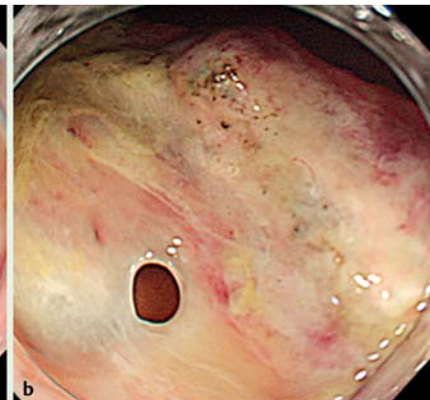
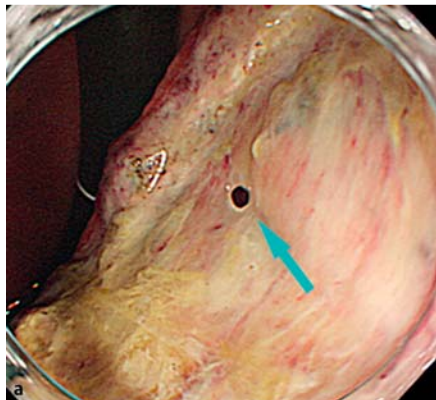


Fig. 2 Case 2. **a** Separated muscle layer after endoscopic submucosal dissection with retroflexed endoscope. **b** Perforation site at close range.



Fig. 3 Case 2. Successful closure of post-endoscopic submucosal dissection ulcer using over-the-scope clips.

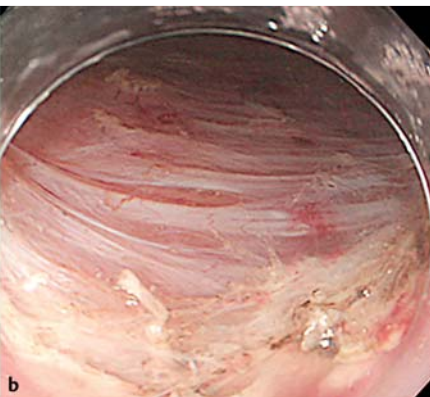
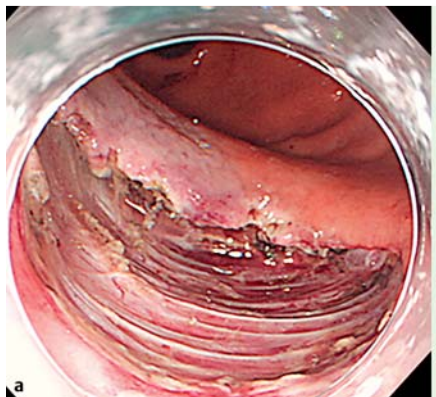


Fig. 4 Case 3. **a** Ulcer after endoscopic submucosal dissection. **b** Thin muscle layer which can easily be perforated.

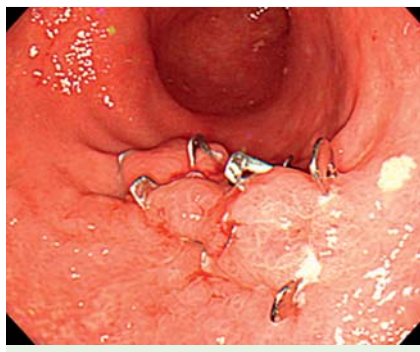


Fig. 5 Case 3. To avoid perforation we used over-the-scope clips to close the ulcer site after endoscopic submucosal dissection.

The technique of endoscopic submucosal dissection (ESD) has been coming into widespread use and gradually becoming a standard treatment for early gastric cancers. However, perforation is a serious complication with peritonitis and the need for emergency surgery [1]. Performing ESD on lesions at the greater curvature is especially difficult, and perforation tends to occur easily [2]. We report our experience of three cases of mucosal gastric cancer at the greater curvature which were treated by ESD.

In the first case, in a 71-year-old man, perforation occurred during the ESD procedure. We tried to close the perforation site using conventional clips but were unable to do so, and in the end the patient underwent surgery (Fig. 1). The second

case, in a 74-year-old man, involved iatrogenic perforation after ESD (Fig. 2); in this case, the ulcer perforation was successfully closed using over-the-scope clips (OTSC Clips; Ovesco Endoscopy GmbH, Tübingen, Germany) (Fig. 3). In the third case (Fig. 4), in an 82-year-old woman, successful closure was achieved without any complication by using over-the-scope clips to prevent perforation due to the thin muscle layer remaining after ESD (Fig. 5). After 2 months, esophagogastroduodenoscopy in both cases revealed the clips remaining in place with complete closure of the post-ESD ulcer, without any complication.

There are several reasons for the vulnerability to perforation at the greater curvature during and after an ESD procedure.

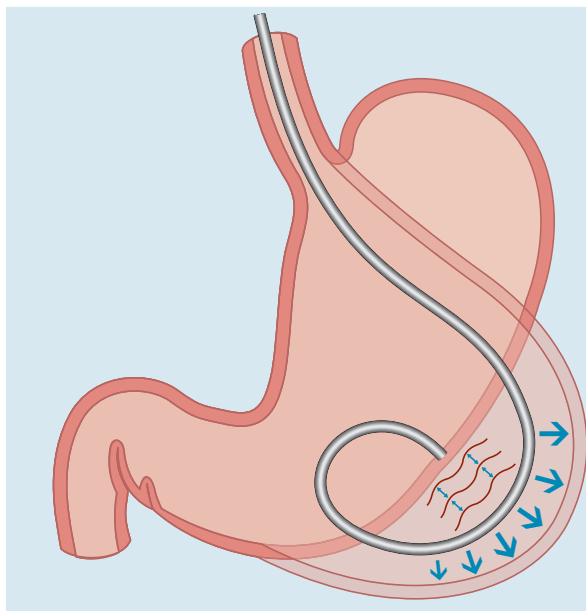


Fig. 6 Retroflexed endoscope during endoscopic submucosal dissection (ESD) at the greater curvature. ESD at the greater curvature typically requires retroflexion of the endoscope because of the location of the lesion. This applies firm pressure to the stomach wall, which may cause elongation and separation of muscle layers in the greater curvature.

One reason is its typical anatomy [3–5]. The muscularis mucosae is thin at the greater curvature compared to other parts of the stomach, and the submucosal vascular networks are larger than in the other parts. To perform ESD at the greater curvature, typically we need to retroflex the endoscope because of the location of the lesion, thus applying firm pressure to the stomach wall, which may cause elongation and separation of muscle layers in the greater curvature (● Fig. 6). These technical difficulties also increase the risk of perforation.

To the best of our knowledge, our two cases are the first in which complete closure of post-ESD gastric ulcer using over-the-scope clips is reported. Comparing our three reported cases, we consider

that complete closure of post-ESD ulcers at the greater curvature using over-the-scope clips is an effective measure to prevent perforation, especially of the thin muscle layer remaining after ESD.

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Competing interests: None

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