CASE REPORT

Deep colonic endoscopic submucosal dissection using a modified clip and snare method incorporating a pre-looping technique

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SUMMARY

Endoscopic submucosal dissection (ESD) is more difficult to perform for colorectal cancer than for early gastric cancer. The use of traction to facilitate direct submucosal layer visualisation is promising in reducing the procedure's time and complication rate. We report a case in which deep colonic ESD was performed with a modified clip and snare method. A 57-year-old man was admitted for ESD of a laterally spreading caecal lesion 25 mm in size (classified as LST-GM) that had been found on colonoscopy. The clip and snare method was previously developed for ESD of gastric cancer; we improved on this method and applied our pre-looping technique in the deep colon. The procedure lasted 40 min and was without complications. Our pre-looping technique represents a modification of the clip and snare method, enabling its performance in the deep colon. We expect that our technique will be applicable to colorectal tumours.

BACKGROUND

Endoscopic resection is a widely accepted treatment for digestive tract neoplasia and is used throughout the world. Advances in endoscopic techniques, such as Endoscopic submucosal dissection (ESD), have enabled the en bloc resection of sizeable lesions. As a result, ESD has become the standard treatment for early gastric cancer.^{1–3}

However, ESD is more difficult to perform for colorectal cancer compared with early gastric cancer because of the following factors. First, the anatomy of the colorectum is twisted and complicated, and its wall is thin.^{4–7} Second, ESD takes longer to perform for colorectal cancer than for gastric lesions. Finally, because of the high risk of complications, such as perforation and bleeding, it requires considerable technical skill to perform ESD for colorectal lesions.⁶ Accordingly, new devices and advanced techniques are necessary to reduce the procedure's time and complication rate.

The use of traction to facilitate direct submucosal layer visualisation is promising in reducing the length of the procedure and associated complications. Several traction methods have been devised for use in the ESD of colorectal cancer lesions.^{8–10}

However, these methods are not simple, and they are difficult to apply in the deep colon. Recently, Yasuda *et al*¹¹ and Baldaque-Silva *et al*¹² reported a novel clip and snare method (CSM), and described its use in early gastric cancer. Although this CSM is still difficult to apply in the deep colon, we were

able to improve on it.¹³ We describe the safe and effective use of our modified CSM for the ESD of a superficial caecal cancer lesion.

CASE PRESENTATION

A 57-year-old man underwent colonoscopy as part of a routine medical check-up. He had been healthy without any specific symptoms and had no significant family or medical history.

INVESTIGATIONS

Physical examination showed no abnormalities, and laboratory findings were within normal limits. Colonoscopy revealed a laterally spreading caecal tumour 25 mm in size (classified as LST-GM; [figure 1](#)). An endoscopic biopsy taken from the lesion revealed suspected adenocarcinoma, so we performed ESD to remove the lesion.

TREATMENT

We used a colonoscope (PCF-Q260JI; Olympus Medical Systems Co, Tokyo, Japan) with an attachment (D-201-11804; Olympus Medical Systems Co) and a balloon over tube (ST-CB1; Olympus Medical Systems Co). To reduce intraluminal gas, a CO₂ insufflation pump (UCR; Olympus Medical Systems Co) was used during the procedure. After the scope reached the lesion, the distal end of the balloon over tube was fixed in the ascending colon with the balloon. A combination of 0.4% sodium hyaluronate (MucoUp; Seikagaku, Tokyo, Japan) and indigo carmine was injected into the

Figure 1 Colonoscopy revealed a laterally spreading caecal tumour 25 mm in size (classified as LST-GM).

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Figure 2 Snare pre-looped over the scope.

submucosal layer to lift the surrounding mucosa. Next, we initiated circumferential cutting with a needle knife (KD-1L-1; Olympus Medical Systems Co). After circumferential cutting, we began dissecting the lesion with an IT knife nano (KD-612Q; Olympus Medical Systems Co) to make it easier to obtain traction.

After cutting, the scope was withdrawn once to pre-loop a snare (SD-221U-25; Olympus Medical Systems Co) over it (figure 2). The scope and snare were re-inserted up to the lesion through the balloon over tube. A hemoclip (HX-610-090; Olympus Medical Systems Co) was inserted through the working channel of the endoscope and used to grasp the mucosal flap on the anal side of the lesion. At this time, we were careful not to release the hemoclip from the forceps and

to continue grasping the lesion. We loosened the pre-looped snare and moved it along the forceps up to the hemoclip; we then tightened the snare to grasp the hemoclip. The snare was affixed to the hemoclip with Velcro tape. We were then able to release the hemoclip from the forceps; traction was maintained by the snare and the hemoclip independent of the scope (figures 3 and 4). Because the snare passed inside the balloon over tube, the hemoclip and corresponding edge of the lesion could be manipulated (gently pulled or pushed) during ESD independent of scope movement, which enabled good visualisation of the submucosal layer, cutting plane and edges of the lesion. Dissection was completed with the IT knife nano after re-injection of the previously described solution in the submucosa. Finally, the en bloc resection was completed.

OUTCOME AND FOLLOW-UP

The procedure lasted for 40 min. The submucosal dissection time was approximately 28 min; less than 1 min elapsed from the pre-looping of the snare over the scope to the release of the hemoclip. No immediate complications were identified during the procedure. The pathological diagnosis was tubular adenoma of the caecum with low-grade dysplasia. The lateral and vertical margins of the resected specimen were negative for neoplasia. The patient was discharged 6 days after ESD without any complications.

DISCUSSION

We have described a new modification of the traction method for use in the ESD of colonic cancer. The use of traction is important in facilitating direct visualisation of the submucosal layer, which reduces the procedure's time and complication rate.

Figure 3 Schematic of our clip and snare method incorporating a pre-looping technique. (A) The hemoclip was inserted through the working channel of the endoscope and used to grasp the mucosal flap on one side of the lesion. (B) The snare, which had been pre-looped over the scope, was loosened and moved along the forceps up to the hemoclip. We tightened the snare to grasp the hemoclip. (C) We were then able to release the hemoclip from the forceps.

Figure 4 (A) Traction was achieved by the snare and the hemoclip independent of the scope. (B) We achieved good visualisation of the submucosal layer, cutting plane and edges of the lesion.

Several traction methods have been previously applied in colorectal cancer treatment, but all of these methods were difficult to apply in the deep colon and none of them enabled adjustment of the traction.^{8–10} Recently, traction device-assisted ESD of a colorectal tumour was reported using an S-O clip. This method could be applicable in the deep colon, but it is not well suited for multiple uses within a given lesion. Additionally, the S-O clip is not yet applicable to clinical situations.^{14 15}

We decided to focus on the CSM, one of the traction methods used for early gastric cancer.^{11 12} The snare used in this technique is characterised by softness as well as strength, attributes that are required for use in the colon because of its complicated anatomy.

This traction method is simple, and it can be rapidly adopted because the hemoclip and snare used in the technique are standard pieces of equipment already available in most hospitals. Additionally, this method is flexible; it enables widespread access to the submucosa through the placement of multiple hemoclips on different edges of a large lesion. Moreover, previously placed clips do not inhibit the next step of the procedure. This flexibility is important when ESD is performed for colorectal cancer lesions because the clinical situation can change from moment to moment in this setting. Despite these ideal properties of the CSM, it is still difficult to apply in the deep colon. Our improvements to the technique were aimed at solving this problem; the two key aspects of our modification are given below.

First, the snare was pre-looped over the scope for delivery to the deep colon. This pre-looping technique¹³ is simple but crucially important because it enables the snare to be used to provide traction in the deep colon. Moreover, this modification would theoretically allow the snare to be delivered anywhere. Second, we used a balloon over tube¹⁶ designed to provide safe access to the deep colon; this enabled pushing and pulling movements of the snare independent of scope movement. Interestingly, we were able to perform colorectal ESD with this improved technique even in retroflexion.

There are three limitations of this method. First, traction is limited to only two directions: pushing and pulling. Second, a balloon over tube is needed to use this procedure for deep colonic ESD. Third, this report included only one case. We think that the utility of this novel technique should be assessed with a case series or comparative study in the future.

Contributors RO drafted the article. HD and KT contributed to the conception, design of the study and the critical revision of the article for important intellectual content. SY collected the data. All authors analysed and interpreted the data.

Competing interests None.

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Learning points

- We successfully performed colonic endoscopic submucosal dissection using a modified clip and snare method incorporating a pre-looping technique.
- Our modified method is simple and can be rapidly adopted.
- The two key aspects of our modification are pre-looping of the snare and the use of a balloon over tube.

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