Recanalization of Severe Gastric Antral Stricture after Large Endoscopic Submucosal Dissection: Mucosal Incision and Local Steroid Injection

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Abstract

Endoscopic submucosal dissection (ESD) of early gastric cancer is well-established in Japan. Although ESD enables en bloc resection of large lesions, it results in an extensive artificial ulcer that might lead to severe stricture, especially in case of large ESD in the pre-pylorus area. Here, we report two cases suffering from severe antral stenosis. The first case was refractory severe antral stenosis after a large ESD. Though we performed endoscopic balloon dilations, it remained severe stricture. We made a mucosal incision on the opposite side of the ulcer scar and local triamcinolone acetonide (TA) injection into the incision site. In the second case there was considerable improvement of a pinhole stenosis using ESD counter-incision and local TA injection. Local steroid injection into the post-ESD artificial ulcer promotes the formation of granulation tissue of the healing process leading to regeneration of gastric mucosa without gastric deformity. Making a mucosal incision on the opposite side of post ESD ulcer and cutting the submucosal layer eases the mucosal tension, and the local injection of TA into a large artificial ulcer following ESD can prevent re-stenosis.

Key words

Endoscopic submucosal dissection – antral stenosis – triamcinolone injection – balloon dilation.

Introduction

Endoscopic submucosal dissection (ESD) for early gastric cancer was developed to resect en bloc specimens of larger lesions [1-3]. ESD has the advantage over endoscopic mucosal resection (EMR) of enabling en bloc removals [4-11]. However, ESD generates a large artificial ulcer that can lead to considerable gastric deformity. Severe stricture after the large ESD of antrum sometimes occurs, altering the patients’ quality of life. Only conventional balloon dilation does not obtain sufficient dilation of the stricture in the cases of severe fibrotic strictures after large ESD, thus requiring repeated ineffective dilations. We thought that making a mucosal incision on the opposite side of post ESD ulcer and cutting the submucosal layer would ease the mucosal tension. The local injection of triamcinolone acetonide (TA) into a large artificial ulcer following ESD can prevent post ESD stricture. After the mucosal incision, we performed a TA local injection into the artificial ulcer floor to prevent re-stricture of the antrum [12]. Pharmacologically, the administration of TA has local anti-inflammatory effects, and prevents a keloid scar with deformity [13].

Case reports

Case 1

A 68-year-old man was diagnosed with early gastric cancer and we performed ESD over two-thirds of circumference (Fig. 1A). A severe stricture occurred 50 days after ESD (Fig. 1B). Although we performed 10 times endoscopic balloon dilation, the stricture remained severe. Therefore, we made a mucosal incision using the ESD method on the opposite side of the ulcer scar and we injected TA (50 mg/5 mL, Bristol-Myers Co.) into the incision site (Fig. 1C). Eight weeks later, regenerative mucosa was observed in the ulcer floor without stricture (Fig. 1D).

Case 2

A 79-year-old man was diagnosed with two simultaneous early gastric cancers and we performed a large ESD over two-thirds of the circumference (Fig. 2A). Although ESD was performed without any complications, severe stricture occurred in the antrum 40 days after ESD. As the resected
large specimen was extended to about two-thirds of the circumference, the contraction towards the ulcer center was severe and resulted in severe stricture (Fig. 2B). We performed balloon dilatations twice a week (26 in total), but the stenosis did not improve. Therefore, we decided to make a mucosal incision on the opposite side of the post ESD ulcer.

According to the same procedure of the previous ESD,

**Fig 1.** Post-ESD antral stricture and recanalization after mucosal incision with steroid injection. A. To obtain en bloc specimen of extensive early gastric cancer, ESD over two-thirds in circumference was performed. B. Esophagogastroduodenoscopy (EGD): severe antral stricture after large ESD. C. Mucosal incision to ease the mucosal tension by ESD method and local TA injection in aliquots of 0.2 mL (2 mg) into each injection site just after mucosal incision (blue arrows). D. Eight weeks later, the regenerative gastric mucosa was shown without re-stenosis (blue curved arrow).

**Fig 2.** Simultaneous resection by ESD followed by severe antral stricture and recanalization after mucosal incision with steroid injection. A. Two simultaneous early gastric cancers were resected by ESD and resulted in large artificial ulcers two-thirds in the circumference. B. EGD: severe stricture caused by a large artificial ulcer scar of ESD (yellow arrow) in the antrum. C. Mucosal incision and local TA injection in the ulcer floor. D. Four weeks after ESD, marked granulation tissue formation and regeneration of mucosa.
we made a mucosal incision and cut the submucosal layer to ease the mucosal tension (Fig. 2C). Immediately after the mucosal incision, we performed TA local injection into the artificial ulcer floor. A 23-gauge, 4-mm needle was used for injections. A 5-mL syringe was used to inject TA (50 mg/5 mL, Bristol-Myers Co.). Injections were performed about 5 mm apart onto three straight lines which quadrisect the maximum diameter of the ulcer. We injected TA in aliquots of 0.2 mL (2 mg) into each injection site of the artificial ulcer floor. The dose of TA was 40 mg, the standard dose used to prevent esophageal stenosis after complete circular resection by ESD.

Four weeks after ESD, a marked granulation tissue developed and regenerative mucosa was observed in the ulcer floor (Fig. 2D). Two months later, the granulation tissue was completely replaced by the regenerated gastric mucosa, without any mucosal contraction and stricture.

Discussion

To dilate the post-ESD stricture, we performed mucosal incision and local TA injection into the incision ulcer floor resulting in considerable improvement of the pinhole stricture. Several clinical studies have recommended the use of oral prednisolone after ESD [5] and local steroid injection for post-ESD artificial ulcer [6] to prevent severe esophageal stenosis. Pharmacologically, the administration of TA has local anti-inflammatory effects. It was suggested that when TA is injected into the post-ESD ulcer floor locally, it suppresses local production of cytokines and prostaglandins and it leads to anti-inflammatory effects [7-9]. Therefore, local steroid injection into the floor of a post-ESD artificial ulcer promotes the formation of granulation tissue at an early stage of the healing process leading to regeneration of gastric mucosa without gastric deformity [12]. Steroids modulate the process of wound healing of the artificial post-ESD ulcer through their anti-inflammatory effects. It occurs by decreasing prolyl hydroxylase or procollagen proline dioxygenase, enzymes involved in the production of collagen. Decreasing the activity of these enzymes reduces tissue collagen content [13]. That is why local steroid injection into the post-ESD artificial ulcer floor promotes the formation of flat and sufficient granulation tissue without fibrotic contraction.

Conclusion

If performed over two-thirds of circumference, large ESD could cause severe antral stricture. This new treatment strategy for post-ESD severe stricture by making a mucosal incision and a local TA injection is an effective method to solve the problem.

Conflicts of interest

The authors declare no conflict of interest and no financial arrangement with any company.

Acknowledgment

We thank Dr Makoto Oryuu for technical and editorial assistance.

References