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ABOUT COVER

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Combined treatment of refractory benign stricture after esophageal endoscopic mucosal dissection: A case report

Wen-Feng Pu, Tao Zhang, Zong-Han Du

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Abstract

BACKGROUND

Endoscopic submucosal dissection (ESD) post-procedure stricture is a relatively common long-term complication following ESD treatment. A range of approaches has been implemented for the treatment of post-procedural stricture using endoscopic techniques such as endoscopic dilation, self-expandable metallic stent insertion, local steroid injection in the esophagus, oral steroid administration, radial incision and cutting (RIC). The actual efficacy of these different therapeutic options is highly variable, and uniform international standards for the prevention or treatment of stricture.

CASE SUMMARY

In this report, we describe the case of a 51-year-old male diagnosed with early esophageal cancer. To protect against esophageal stricture, the patient was administered oral steroids and underwent self-expandable metallic stent insertion for 45 d. Despite these interventions, stricture was detected at the lower edge of the stent following its removal. The patient remained refractory to multiple rounds of endoscopic bougie dilation treatment, and thus suffered from complex refractory benign esophageal stricture. As such, RIC combined with bougie dilation and steroid injection was employed to treat this patient more effectively, ultimately achieving satisfactory therapeutic efficacy.

CONCLUSION

Combination of RIC, dilation, and steroid injection can be safely and effectively implemented to treat cases of post-ESD refractory esophageal stricture.

Key Words: Endoscopic submucosal dissection; Radial incision and cutting; Benign stricture; Early esophageal cancer; Stent insertion; Case report

Core Tip: Endoscopic submucosal dissection post-procedure stricture is one of the most common long-term complications of the procedure. At present, there is no uniform international standard on how to effectively prevent and treat stricture after resection of large esophageal lesions. We selected to attempt to treat complex refractory esophageal stricture through a combination of radial incision and cutting, dilation, and steroid injection. Satisfactory results were achieved.

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INTRODUCTION

Advances in the endoscopic submucosal dissection (ESD) procedure have led to its canonization as the primary treatment for individuals diagnosed with superficial esophageal cancer[1,2]. However, ESD treatment can result in esophageal stricture, limiting the ability of patients to swallow while increasing their healthcare costs and lowering their overall quality of life. Independent risk factors known to be associated with the onset of post-ESD esophageal strictures include tumors that bypass the esophageal lamina propria mucosal layer or esophageal mucosal defects that cover over 75% of the esophageal circumference and are at least 30 mm in length[3-5]. For ESD procedures covering over 75% of the esophageal circumference, stricture rates are as high as 83.3%-94.1%[6]. A number of treatments for post-ESD esophageal stricture have been developed, with some levels of varying efficacy. However, no reports have yet described the treatment of a case of refractory stricture *via* radial incision and cutting (RIC) in combination with dilation and steroid injection.

CASE PRESENTATION

Chief complaints

Recurrent dysphagia.

History of present illness

Examination of the patient revealed esophageal mucosal congestion and erosion 28-35 cm from his incisors. Pathological examination revealed severe squamous cell dysplasia of the esophageal mucosa. To mitigate the risk of esophageal stricture development following the ESD procedure, the patient was administered oral 30 mg prednisone acetate tablets for 3 d after surgery with a gradual reduction over 8 wk. Five days after the procedure, the patient underwent self-expandable metallic stent insertion which remained in place for 45 d. However, following stent removal, gastroscopy showed the presence of stricture at the lower edge of the stent. The patient underwent repeated endoscopic bougie dilation procedures in our hospital without any significant effect. Given this repeated treatment failure, we decided to attempt to treat this patient through a combination of RIC, dilation, and steroid injection.

Personal and family history

The patient did not have any history of esophageal cancer or any relevant family or genetic history.

Physical examination

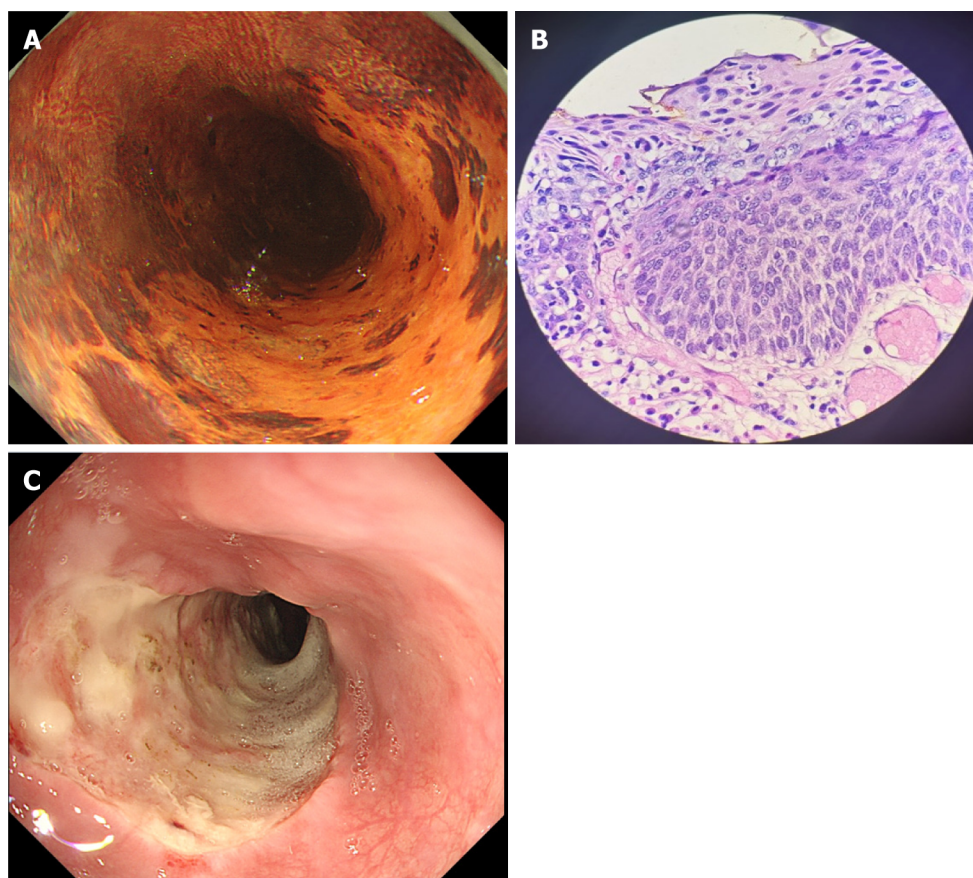
Physical examination revealed no abnormalities.

Laboratory examinations

The levels of squamous cell carcinoma antigen and Elccsys CYFRA21-1 were normal.

Imaging examinations

Iodine staining showed that the lesion, located 28-35 cm from the incisors, extended to almost two-thirds of the esophageal circumference with a longitudinal length before treatment of about 7 cm (Figure 1A). Pathological examination revealed severe squamous cell dysplasia of the esophageal mucosa (Figure 1B). The longitudinal length of the mucosal defect after ESD was about 8 cm. After



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Figure 1 Histology of the esophageal mucosa before endoscopic submucosal dissection and the wound surface after treatment. A: Iodine staining showing extension of the target lesion to almost two-thirds of the esophageal circumference, including a small non-stained area; B: Pathological examination of biopsy specimen showing severe squamous cell dysplasia; C: En-bloc lesion resection was performed five days after endoscopic submucosal dissection; the formation of ulcers can be seen on the wound.

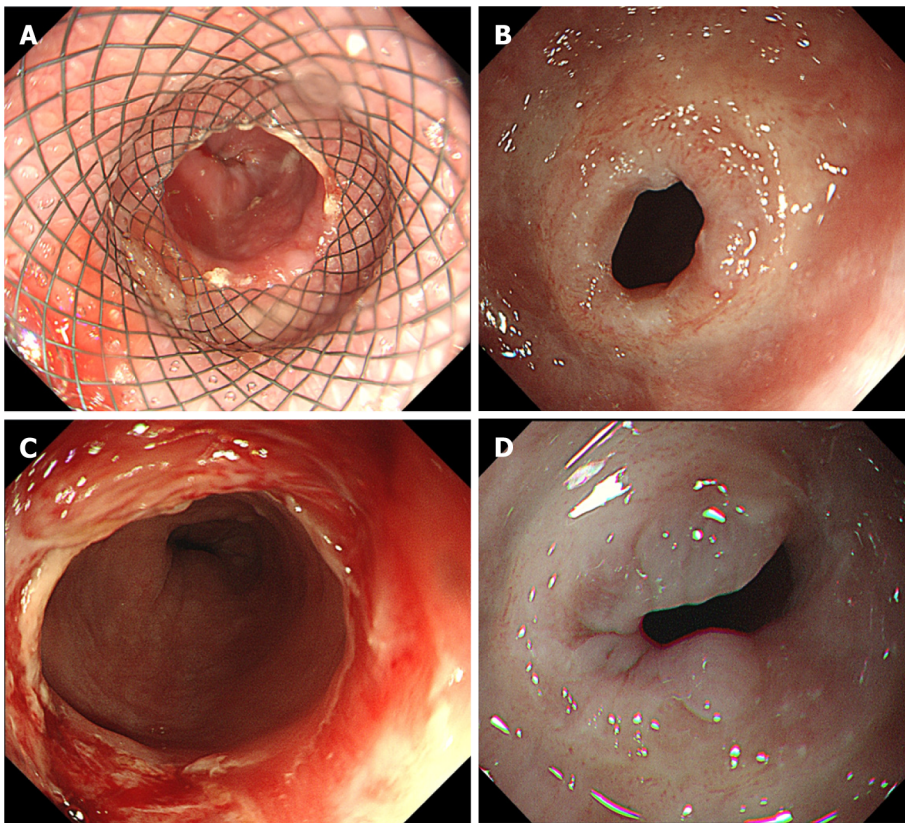
discussion of the methods for preventing postoperative stricture, family members and patients requested stent implantation ESD was conducted and en bloc lesion resection was performed (Figure 1C). Five days after ESD, a silicone-coated esophageal stent system (Micro-Tech [Nanjing] Co., Ltd) was implanted; the stent length was 120 mm with a diameter of 20 mm (Figure 2A). After removal of the stent, Gastroscopy revealed an esophageal stricture 37 cm from the incisors. The site of the stricture was covered by the stent preventing the passage of the gastroscopy through the esophagus (Figure 2B). The patient underwent three bougie dilations using an esophagocardiac stricture dilator at intervals of approximately 10 d. Although each time this resulted in a 13 mm expansion (Figure 2C), the procedure was not effective (Figure 2D).

FINAL DIAGNOSIS

Benign stricture of the esophagus.

TREATMENT

As the patient suffered from severe dysphagia, we ultimately decided after approximately two and a half months to perform an RIC. This was done using an Olympus IT Knife 2, KD-611L, and an ERBE VIO 200 S high-frequency selectric cutting device. This was done to remove the scar tissue together with expansion treatment to fully open the stricture ring, after which an 80 mg (2 mL) Triamcinolone Acetonide steroid injection was administered at the stricture surface and surrounding mucosa to prevent scar formation (Figure 3A-C).



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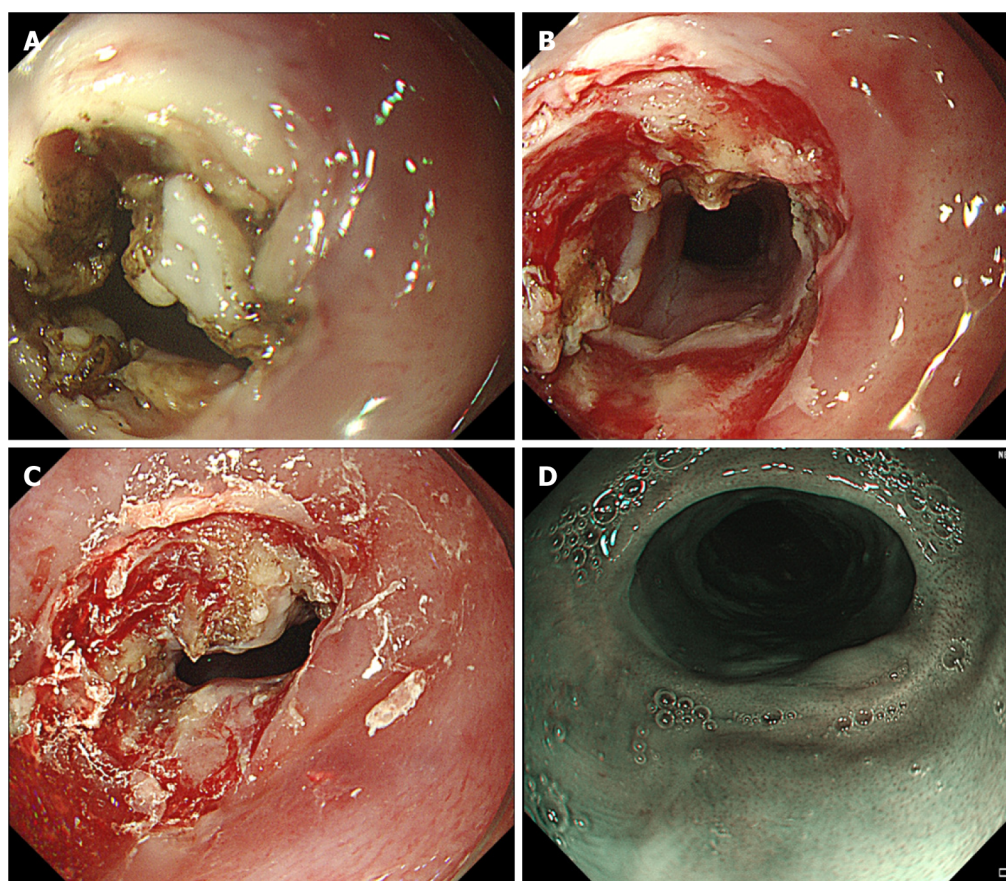
Figure 2 Stent removal and stricture formation; Stricture occurred after the removal of the stent and endoscopic dilatation was performed but proved ineffective. A: An esophageal stent was implanted five days after endoscopic submucosal dissection; B: Esophageal stricture 37 cm from the incisors; C: Bougie dilation was performed at the stenosis site; D: The stricture was still apparent even after three expansion treatments.

OUTCOME AND FOLLOW-UP

After this combined treatment procedure, the patient was able to eat normally. At three months post-treatment, white scar formation was observed in the esophagus, but the gastroscope was able to pass without any resistance (Figure 3D). During the one-year follow-up, the patient did not experience any dysphagia or related symptoms.

DISCUSSION

Endoscopic resection has emerged as an increasingly common treatment for precancerous lesions and early esophageal cancer cases, conferring the same benefits as more invasive surgical treatment[7-9]. However, high esophageal stricture rates in patients who undergo such treatment remain a pressing clinical challenge[10]. In an effort to prevent post-ESD stricture development, Ezoe *et al*[11] implemented an endoscopic balloon dilatation (EBD) strategy but found that 59% of patients still developed stricture even if they had undergone six rounds of prophylactic EBD. Endoscopic dilatation is a relatively straightforward procedure that can effectively prevent or treat post-ESD esophageal stricture in many cases. However, this procedure does carry some risk of perforation, and repeated treatment is often required. Stent placement can also reduce the incidence of post-ESD esophageal stricture and lower the need for EBD procedures, but can result in adverse events including stent displacement, chest pain, esophageal perforation, and bleeding[9,10,12]. Several recent reports have described RIC as a novel means of treating refractory cases of rectal or esophageal stricture, allowing for the excision of fibrotic tissue in the target site[13-17]. Yano *et al*[18] successfully employed a radial resection approach to treat esophageal stricture cases in 8 patients, markedly alleviating their postoperative dysphagia[18]. Moreover, Hashimoto *et al*[19] first employed steroid injection as a strategy aimed at preventing esophageal stricture development following ESD, reporting a decrease in stricture rates from 75% in control patients to 19% in those that underwent multiple local triamcinolone acetonide injections[19]. Hanaoka *et al*[20] additionally found that a single round of local triamcinolone acetonide injection was associated with a 10% stricture rate[20]. Delayed perforation is the most significant potential safety concern associated with this local injection approach. Combining oral



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Figure 3 Combination of radial incision and cutting, dilation, and steroid injection treatment. A: Radial incision and cutting of the mucosa and submucosal fibrous scar in four places; B: Expansion treatment to fully open the stricture ring; C: The steroid triamcinolone acetonide was injected into the surface of the stricture and surrounding mucosa; D: Three months post-treatment, the gastroscopical view was able to pass without any resistance.

steroids and localized injections can aid in the prevention of refractory stricture, as demonstrated in a study showing a refractory stricture rate of 30.6% in control patients (11/36) but none in the steroid treatment group ($P < 0.001$)[21]. Steroids are capable of inhibiting the regeneration of fibroblasts within scar tissue regions, facilitating the degradation of collagen while suppressing collagen synthesis and slowing scar growth. Regenerative medicine strategies are also being increasingly studied to prevent and treat post-ESD esophageal stricture cases[22-24].

CONCLUSION

Combination of RIC, dilation, and steroid injection can be safely and effectively implemented to treat cases of post-ESD refractory esophageal stricture.

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FOOTNOTES

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