Endoscopic cicatrectomy for corrosive esophageal strictures just below the piriform fossa

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Abstract

Corrosive esophageal strictures have been primarily treated using balloon dilatation or endoscopic bougienage. However, many patients experience recurrence after dilatation, and surgical interventions such as esophageal replacement have been attempted. We have performed endoscopic cicatrectomy using a laryngoscope for corrosive esophageal stricture just below the piriform fossa to minimize surgical invasiveness. In this case reported, repeated balloon dilatation therapy failed, and the combination of endoscopic cicatrectomy and intralesional triamcinolone acetonide injections proved most effective even though multiple cicatrectomies were required. If esophageal strictures are close to the piriform fossa, endoscopic cicatrectomy could be one useful surgical option.

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Corrosive substances, whether acid or alkali, can cause significant esophageal strictures. Balloon dilatation or endoscopic bougienage is often chosen as the primary treatment for esophageal strictures. However, many patients with corrosive esophageal strictures develop recurrence of symptoms after dilatation. Surgical intervention has been used in cases requiring repeated dilatation or showing failure of dilatation therapy [1,2]. Esophagectomy or esophageal replacement is often required as surgical intervention [3], but both are invasive, especially in children. A case of corrosive esophageal stricture just below the piriform fossa is reported. Repeated balloon dilatation therapy failed, and endoscopic cicatrectomy was performed using a laryngoscope as a type of minimally invasive surgery.

1. Case report

A 5-month-old girl presented with chemical burns from the angulus oris to the thoracic part of the esophagus due to a bactericide (Phtharal: Disopa®; Johnson & Johnson, Tokyo, Japan). At that time, she was diagnosed with labial burns, epiglottic atrophy, and paralysis of the left vocal fold. Gastrografin swallow did not show dysphagia or esophageal stenosis, and esophagoscopy showed only mucosal erosion from the piriform fossa to the thoracic part of the esophagus (Fig. 1a). At 9 months of age, dysphagia appeared, and esophagoscopy showed an esophageal stricture, approximately 1 mm in diameter; just below the piriform fossa (Fig. 1b). Gastrostomy was therefore performed, and a 5 Fr tube was inserted in the nasal cavity as a stent to the gastric fistula to prevent complete obstruction. From 10 months of age, balloon dilatation and intralesional injection of dexamethasone or triamcinolone acetonide were started. The stricture was membranous and dilated immediately, but it stenosed again within 1–2 weeks. She could be fed orally just after dilatation, but dysphagia appeared again about 2 weeks later. Balloon dilatation was repeated 13 times in 22 weeks, but no amelioration of constriction was obtained (Fig. 1c).

It was felt that surgical intervention might be necessary. However, esophagectomy or esophageal replacement was thought to be overly invasive and difficult, because the stricture was positioned just below the piriform fossa. Endoscopic cicatrectomy and triamcinolone acetonide injection using a laryngoscope were performed. Ethics committee approval was not required at that time and we got informed consent from her parents. At this time, the patient weighed 7.2 kg. The operation was performed by supine position with stretching her neck. After the 5 Fr stent tube was replaced with a guide wire, the laryngoscope (Nagashima Medical Instruments, Tokyo, Japan) (Fig. 2) was inserted along the guide wire and fixed to the stenotic area (Fig. 3a). Under microscopic
view, the membranous cicatrix was resected using osteotrite forceps (Fig. 3b–d), and then the caudal mucosa was sutured to the cranial mucosa using 4-0 Monocryl (Ethicon, Tokyo, Japan) with a 13-mm needle (Fig. 3e). The length of the stenosis was approximately 2 mm, so suturing was easy. Triamcinolone acetonide was injected around the suture. Two weeks postoperatively, the narrowest segment of the lumen remained around 5 mm (Fig. 3f). Balloon dilatation and intralesional triamcinolone acetonide injections were performed twice afterward every 2 weeks, but no change in lumen diameter was achieved. Endoscopic cicatrectomy and triamcinolone acetonide injection were performed twice for 4 weeks, dilating the narrowest segment of the lumen to around 8 mm. Endoscopic cicatrectomy was then performed every 2 weeks for 18 weeks, but triamcinolone acetonide was recalled from the market, and dexamethasone was injected instead. Although this procedure was performed 9 times, the lumen was maintained at only around 6 mm. The combination of endoscopic cicatrectomy and intralesional dexamethasone injections was not very effective. She and her parents felt swallowing foods difficult after 2 weeks of operation. After re-entry of triamcinolone acetonide onto the market, the lumen was dilated over 10 mm with two procedures by the combination of endoscopic cicatrectomy and intralesional triamcinolone acetonide injections. Esophagoscopy then did not show esophageal stricture (Fig. 4). And then, she could be fed orally with no problems. But very slight stenosis remained when we checked it using soft balloon. Then the stenosis was dilated by balloon with triamcinolone acetonide local injection, and the interval of manipulation was increased (Fig. 5). After 10 sessions of manipulation, the stricture was not evident even by soft balloon. And dilation was no longer necessary for no symptoms by 7 years 4 months of age. No recurrence of stricture has been apparent for 5 years and 11 months.

2. Discussion

Esophageal stricture may develop in 7–15% of patients with corrosive burns, forming within 3–4 weeks after injury [2,4]. Esophageal dilatation, such as esophageal bougienage or balloon dilatation as applied in the current case, has been the primary treatment for focal esophageal stricture. Fluoroscopically guided esophageal balloon dilatation is generally considered a safe, easy, and effective treatment for a variety of esophageal strictures in children. Overall success rates of balloon dilatation including stenosis after esophageal anastomosis have been reported within the range of 67–90%, although the success rate in patients with corrosive esophageal stricture is low (29–70%). Furthermore, the rupture rate of balloon dilatation for corrosive esophagitis is higher than for postoperative strictures, since corrosive esophagitis increases tissue resistance and reduces tissue elasticity due to progressive fibrosis and dense scarring [2]. The patient in the present case underwent balloon dilatation 13 times in 22 weeks, but no amelioration of constriction was obtained. Thirteen is a substantial number of attempts, and alternative options should be explored after this stage is reached.

Surgical interventions have been used in patients for whom balloon dilatation has been required repeatedly or has failed. If
strictures are short in length, segmental esophagectomy and anastomosis can be performed. However, when strictures are long or the region of severe scarring is extensive, esophageal replacement is often required. In esophageal replacement, many technical options using the whole stomach, gastric tube, colon, or jejunum for reconstruction are available, all with distinct disadvantages and advantages. Pediatric operations have traditionally been performed through laparotomies or thoracolaparotomies, but laparoscopic surgery has recently been reported, with the various advantages of minimally invasive surgery [3,5].

Intralesional corticosteroid injections have preventive effects on stricture formation by interfering with collagen synthesis, fibrosis, and chronic scarring [6,7]. It has been suggested that triamcinolone acetonide prevents the cross-linking of collagen and thus avoids scar contracture; thus, if the scar is stretched and corticosteroid injected into it, contracture may not occur [6,8]. Other corticosteroids also decrease the fibrotic healing that appears to occur after dilation [6,7]. In the present case, triamcinolone acetonide showed better efficacy than dexamethasone, probably due to its long-acting effects. Many investigators have used triamcinolone acetonide at 10 mg/mL [6,8], and we selected the same concentration. Although the volume per injection has varied among investigators, 0.2 mL was injected in the present case because the esophagus just below the piriform fossa is narrow in infants and the volume able to be injected in 3–4 quadrants is limited.

Endoscopic cicatrectomy using a laryngoscope for corrosive esophageal stricture has not been previously reported. Balloon dilation was not effective in the present case, even though this treatment was used in conjunction with intralesional triamcinolone acetonide injections. Surgical intervention would typically be considered as the

![Fig. 3.](image1) a) The laryngoscope is inserted along the guide wire and fixed to the stenotic area. b, c) The cicatrix is resected using osteotrite forceps under microscopic view. d) After resection of cicatrix. e) The caudal mucosa is sutured to the cranial mucosa. f) The narrowest segment of the lumen is maintained at around 5 mm by 2 weeks postoperatively.

![Fig. 4.](image2) Esophagoscopy does not show esophageal stricture.

![Fig. 5.](image3) The course of treatment.
next option. However, the position of the stricture just below the piri-form fossa meant that esophagectomy or esophageal replacement might risk damage to the recurrent laryngeal nerve. A laryngoscopic examination was performed first, and a very clear view of the stenotic area through the laryngoscope was confirmed. It was thought that vertical lysis or releasing incisions using a laryngoscope might affect similar as balloon dilation. Endoscopic cicatrectomy and intralesional triamcinolone acetonide injections by laryngoscope were then selected and proved most effective. The length of the stenosis was approximately 2 mm and suturing was easy. However, if the length is over 5 mm, suturing might be difficult. This operation can be performed only in cases with esophageal strictures close to the piri-form fossa and short of the length, but it could provide minimally invasive surgery with good cosmetic results. Thus, adequate knowledge with endoscopic cicatrectomy techniques could be one useful option for the pediatric surgeon.

Conflicts of interest

None.

References