



Corticosteroid injection of impassable caustic esophageal strictures without dilatation: Does it pave the way to interval endoscopic dilatation?

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ARTICLE INFO

Article history:

Received 17 October 2019

Received in revised form 19 February 2020

Accepted 27 February 2020

Key words:

Caustic
Corrosive
Stricture
Corticosteroid
Dilatation

ABSTRACT

Background/Purpose: Endoscopic dilatation of caustic esophageal stricture is the mainstay of therapy. The need for esophageal replacement has decreased over the past decades owing to advancement in techniques of dilatation. In this study, we aimed to assess our results of four-quadrant corticosteroid injection of impassable caustic esophageal strictures followed by a trial endoscopic dilatation.

Methods: During the period from June 2003 to May 2017, in 340 patients in whom a trial of endoscopic dilatation after corrosive ingestion failed, corticosteroid was injected in 4 quadrants at the site of the stricture in the same setting. After 2 weeks, another trial of endoscopic dilatation was done.

Results: Out of the 340 patients with failed first trial of endoscopic dilatation followed by four-quadrant corticosteroid injection, the second trial of endoscopic dilatation, after 2 weeks, was possible in 255 patients (75%). In the remaining 85 patients (25%), the endoscope could not pass and they were candidate for esophageal replacement.

Conclusions: Four-quadrant corticosteroid injection of impassable caustic esophageal stricture followed by endoscopic dilatation is a minor procedure which decreased the need of a major procedure to replace the injured esophagus.

Type of the study: Clinical research paper.

Level of evidence: Level III.

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1. Introduction

Corrosives ingestion is common in children, especially in the developing countries [1]. The corrosive substance may be an acid or an alkali. Alkali causes severe damage to the esophagus owing to the liquefactive necrosis which results from it [2].

Some children can pass the acute stage without permanent damage to the esophagus, while others develop esophageal stricture. Clinical manifestations of esophageal strictures vary from drooling of saliva to occasional dysphagia according to the degree of the stricture [3].

Endoscopic dilatation is the mainstay of treatment of caustic esophageal strictures. In mild and moderate esophageal strictures, graded dilatation using Savary–Gilliard dilators is usually possible, while in severe strictures, this could not be achieved. In the past decades, these patients were candidate for esophageal replacement [4]. Advancement in techniques of dilatation like corticosteroid injection, Mitomycin application and endoscopic incision of the stricture has improved the

results of the endoscopic dilatation and decreased the need for esophageal replacement [5].

In this study, we aimed to evaluate our results of injecting impassable caustic esophageal strictures with corticosteroid then trying to dilate them to decrease the need for replacing the esophagus.

2. Material and methods

During the period from June 2003 to May 2017, and after approval of the institutional review board, 340 patients, in whom a trial of endoscopic dilatation after corrosive ingestion failed, presented to Department of Pediatric Surgery, Faculty of Medicine, Ain Shams University. The patients presented with dysphagia of variable degrees; it ranged from absolute dysphagia to dysphagia to some solids.

The initial management was done in the toxicology department in our hospital. This consisted of general supportive measures, the most important of which is management of any respiratory or hemodynamic instability. The patient was allowed to resume his oral intake as his condition allowed. The patients who couldn't resume their oral intake were kept on intravenous fluids and proton pump inhibitors until starting oral intake or a feeding gastrostomy was done. In the past decades, they were giving systemic steroids and antibiotics, but they modified

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their protocol based on the recent studies which failed to prove their effect in decreasing the rate of stricture formation.

The first endoscopic dilatation was done 6 weeks after the corrosive ingestion. Failed dilatation was considered if the endoscope guide wire could not pass beyond the stricture site. Triamcinolone acetonide (40 mg/ml) was diluted by adding 3 ml of normal saline to obtain 4 ml solution of this compound. We used a flexible endoscope with an outside diameter of 9 mm².

The steroid was injected through an injection needle which passed through a side channel in the endoscope. The needle stops at the stricture as viewed by the endoscope. The injection starts as the needle tip protrudes from the sheath taking care not to penetrate the esophageal wall. 1 ml of the solution was injected in each quadrant. Elevation of the mucosa around the stricture confirms that the solution was injected in and not outside the esophagus.

Feeding gastrostomy was done in the same session if the child had suboptimal growth parameters (as recommended by the nutrition clinic) to enable the patient to start enteral feeds.

After 2 weeks, another trial of endoscopic dilatation was done (Fig. 1). We did dilatation using bougies (Savary–Gilliard dilators). We aimed to reach by dilatation an appropriate esophageal lumen diameter (approximately the size of the child's thumb finger). After dilatation, corticosteroid was injected to decrease the possibility of recurrence of the stricture.

The patients were followed up clinically in terms of dysphagia, radiologically by doing contrast swallow in patients with recurrent

dysphagia after a dysphagia free period and endoscopically in patients with evident stricture.

If dysphagia was present, another session of dilatation was done. If no dysphagia, follow up is continued every 2 weeks for 3 months, then every 3 months for 2 years. All the patients were followed up in the nutrition clinic (using growth curves) to assess the adequacy of dilatation or the need for feeding gastrostomy to meet the patient's nutritional requirements.

3. Results

In our series, 210 patients (62%) ingested alkaline corrosives (household bleaches) and 130 patients (38%) ingested acidic corrosives (drain cleaners). 194 patients (57%) were males and 146 patients (43%) were females. Their age ranged between 1.5 and 6 years (mean 3 years and median 3.5 years).

Out of the 340 patients with failed first trial of endoscopic dilatation followed by four-quadrant corticosteroid injection, the second trial of endoscopic dilatation after 2 weeks was possible in 255 patients (75%).

The stricture length ranged between 2 and 5 cm. After the dilatation session, all the patients were able to tolerate regular oral diets. The tolerability of regular oral feeds decreased with time; immediately after the successful dilatation, the patients were able to ingest solids, semi-solids and liquids. After a few days, some patients were able to ingest only semisolids and liquids and after another few days, other patients

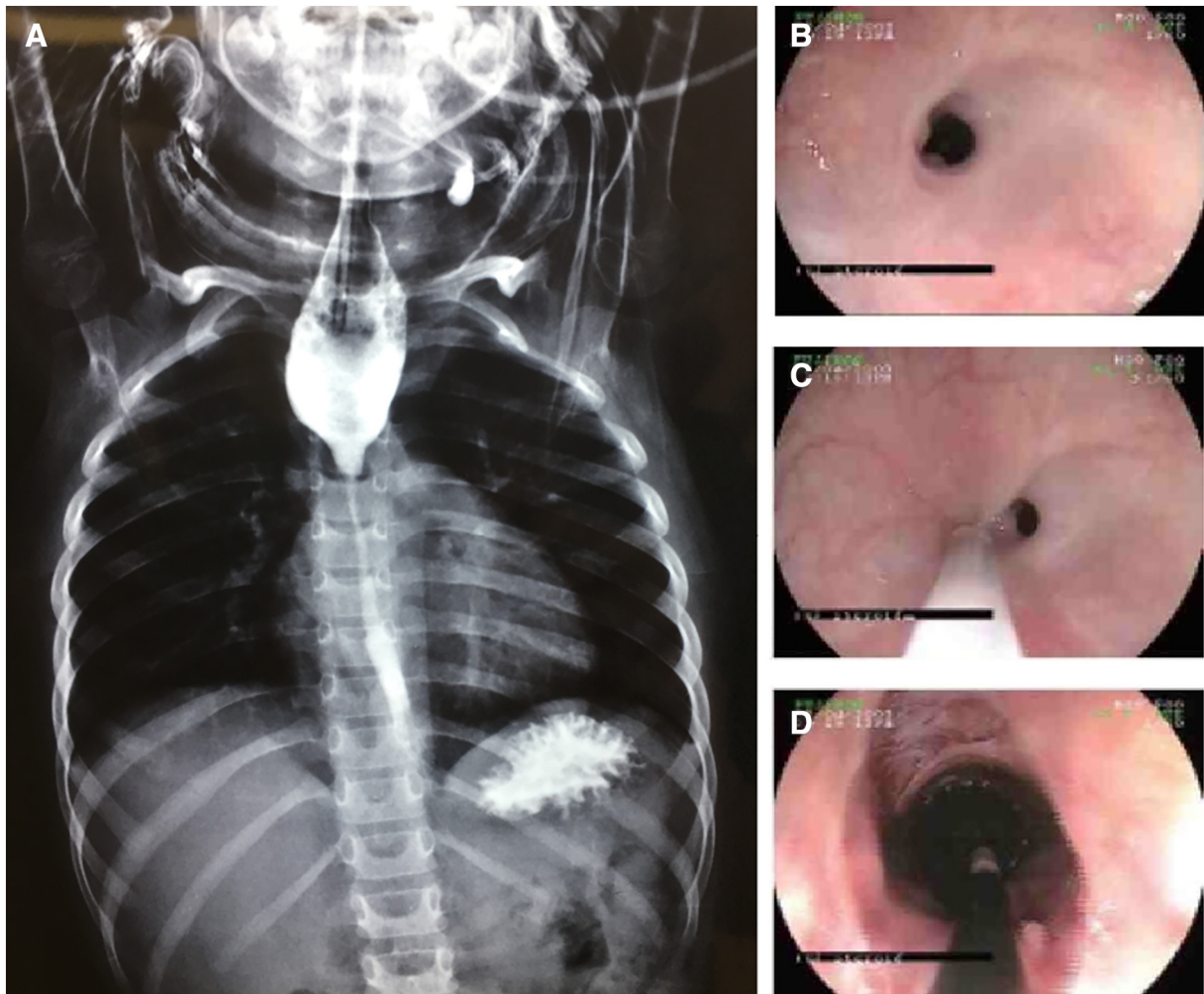


Fig. 1. (a) Contrast swallow showing a severe caustic esophageal stricture. (b) Endoscopic view of the stricture (the guide wire could not pass the stricture). (c) Injection of the stricture with triamcinolone acetonide. (d) Endoscopic view of the stricture after 2 weeks (the guide wire could pass the stricture).



Fig. 2. Endoscopic view of a recurrent stricture after a 4 month dysphagia free period preceded by 2 successful dilatations and corticosteroid injection.

were able to ingest only liquids. In addition, a number of patients came with absolute dysphagia at the next dilatation session.

In 56 patients (22%), only one dilatation session was required while 199 patients (78%) needed more dilatation sessions (Fig. 2).

56 patients (22%) needed one or more sessions of corticosteroid injection without dilatation. This was because of multiple strictures in 43 patients (17%); the upper stricture was injected first and the lower one was injected in the next session and was because of recurrent impassable stricture in 13 patients (5%).

The number of total dilatations ranged between 2 and 15 (mean 4). The follow up period ranged between 2 years and 5 years (mean 3 years and median 3.5 years).

In the remaining 85 patients (25%), the endoscope could not pass and they were candidate for esophageal replacement (Fig. 3).

In the study, 133 (39%) patients needed feeding gastrostomy to meet their caloric requirements including those who were candidate for esophageal replacement.

4. Discussion

Corrosive ingestion is common in children, especially in the developing countries. The corrosive substance can cause damage to the esophagus or to the stomach according to its nature. Follow up of the child is required to diagnose and manage those who will develop strictures [6].

Flexible endoscopy is the cornerstone of treatment in those who have dysphagia following history of corrosive ingestion. The endoscope shows the stricture as narrowing in the esophageal lumen; sometimes, the endoscope can't pass beyond it. A trial of passing the guide wire through the endoscope and trying to pass the area of narrowing is done. If this succeeds, graded dilatation of the stricture using the Savary–Gilliard dilators ensues [7,8].

In the past decades, failure to pass the guide wire through the stricture meant the need to replace the esophagus [9]. Recently, multiple techniques have been developed which increased the effectiveness of the endoscopic dilatation. Among these techniques, corticosteroid injection of the stricture has been practiced in many centers [10].

Corticosteroids are known to have an antifibrosis effect by decreasing collagen synthesis [11]. Its use as adjunctive in endoscopic dilatation of caustic esophageal strictures depends on this property. Many centers inject triamcinolone acetonide with the endoscopic dilatation to reduce the possibility of further fibrous tissue formation which decreases the frequency of dilatation sessions the child may need [12,13].

Impassable caustic esophageal stricture is a challenging entity. Some centers use techniques like incision of the stricture using electric cautery [14]. Others use balloon dilatation of the stricture [15].

However, injection of an impassable caustic esophageal stricture with triamcinolone acetonide without dilatation is not a common practice. In our center, we applied this technique over a period of 15 years as a rescue. For those patients, the only possible solution was replacement of the esophagus.

The technique was proved to be successful in 75% of the cases. This means that this simple and minor procedure saved the native esophagus and avoided exposing the patients to the complications of a major procedure known as esophageal replacement.

The most important prognostic factor is the frequency of dilatation (the length of the dysphagia free period). If the time between dilatations

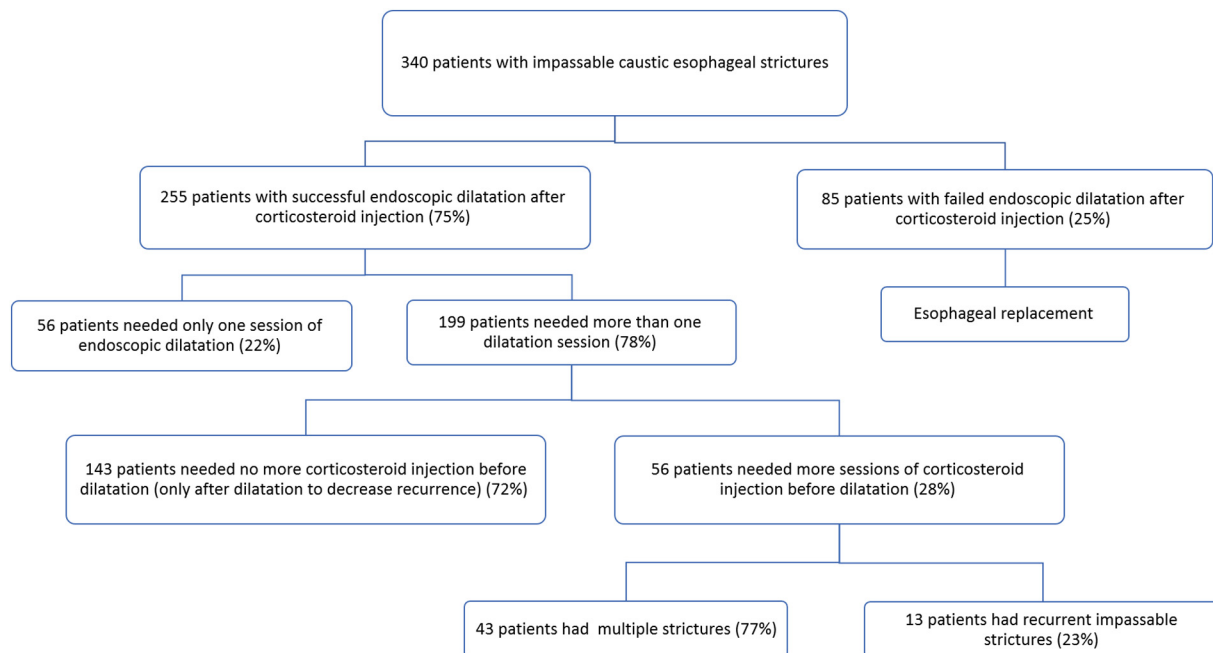


Fig. 3. A patient flow diagram showing how many patients had impassable strictures, how many patients had successful dilatations, how many patients had repeated corticosteroid injection, and how many failed.

increased, this meant that the response of the stricture to the steroid injection and the dilatation is good and the patient was a good candidate to this approach.

We did not find complications during the application of this technique. The risk of perforation, which is the most common complication of endoscopic dilatation was avoided by not doing the dilatation in the first endoscopic session of these severe strictures and only injecting the stricture with steroid.

In an effort to decrease the consequences of corrosives ingestion, the government put obligations on the manufacturing companies of these substances to make the containers with covers not easily opened accidentally by children. They also provided advices in the media on the hazards of swallowing these substances and the importance of keeping them out of the reach of children.

5. Conclusion

Four-quadrant corticosteroid injection of impassable caustic esophageal strictures followed by endoscopic dilatation is a minor procedure which decreased the need of a major procedure to replace the injured esophagus.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval

The study was approved by the institutional review board.

Informed consent

Informed consent was obtained from all individual participants included in the study.

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