

A Novel Method of Esophageal Remodeling: Thinking Outside the Box

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ABSTRACT

Caustic esophageal strictures are complex strictures with high rates of recurrence and complications. Management of these strictures requires a multipronged approach including endoscopic dilation and complex surgeries. Even with these modalities, treatment of each patient has to be individualized because it requires high clinical discretion. We present a 38-year-old female woman who had required esophagostomy and total gastrectomy in the acute phase after caustic ingestion. The definitive surgical procedure was deferred because of cicatrization of the proximal esophageal remnant. We remodeled scarred esophagus using a novel technique, which facilitated definitive surgery.

INTRODUCTION

Esophageal strictures can be difficult to treat and refractory to dilations.^{1,2} Esophageal anastomotic strictures can develop after surgery for corrosive ingestion or as a treatment of head and neck or primary esophageal malignancy. Indications for esophagectomy after caustic ingestion include stricture length >6 cm, poor response to dilation, and complications of dilation or perforation.³ Management of anastomotic strictures usually requires a multidisciplinary approach. Anastomotic strictures that developed after cervical esophagectomy can be managed with morbid surgery hypopharynx-colonic anastomosis. We describe a new technique of esophageal remodeling to help facilitate colonic transposition to avoid hypopharynx-colonic anastomosis.

CASE REPORT

A 38-year-old woman had presented at another hospital with vomiting, hoarseness of voice, and pain abdomen after suicidal ingestion of 25–30 mL of concentrated sulfuric acid. Esophagogastroduodenoscopy revealed diffuse ulceration involving the pharynx, epiglottis, arytenoid folds, entire esophagus, and stomach. The duodenum was normal. During hospitalization, 3 weeks later, the patient developed worsening of abdominal pain when she was detected to have a large defect in the fundus of the stomach on contrast-enhanced computed tomography. Laparotomy showed necrosis of the entire anterior wall of the stomach with an abscess cavity in the perisplenic area. Total gastrectomy and duodenal stump closure along with cervical esophagostomy and jejunostomy feeding were performed. She was subsequently evaluated for definitive surgery when she was found to have a narrowed esophageal remnant.

Eighteen months after the surgery, the patient was referred to our center for a definitive procedure. On esophagogastroduodenoscopy, the hypopharynx was scarred, and a stricture was noted in the 4-cm esophageal remnant, which, however, could be negotiated with a 5.4-mm ultrathin gastroscop (GIF XP-160; Olympus Corporation, Tokyo, Japan). We decided to remodel the esophageal remnant to facilitate anastomosis with the transposed colonic segment, with an intention to avert more complex and morbid hypopharynx-colonic anastomosis.



Figure 1. (A) Endoscopic view of the narrowed and scarred hypopharynx, (B) through-the-scope balloon placed across the stricture segment, and (C) visible externally through the esophagostomy site. (D) Subsequently, balloon dilation was done. (E) After dilation, an 18Fr Ryle tube placed across the stricture with one end brought out from the nostril, other end can be visualized externally at the esophagostomy site. (F) Abrogated endotracheal tube rail rooded over the Ryle tube externally from the esophagostomy site and assembly were stabilized.

A 0.035" guidewire (Revowave; Piolax Medical Devices, Yokohama, Japan) was negotiated through the endoscope across the strictured segment of the esophageal remnant and was brought out through the esophageal stoma. Over this wire, an 8–10 mm through-the-scope balloon (Controlled Radial Expansion; Boston Scientific Corp, Natick, MA) was advanced across the stricture, with a part of the balloon projecting out of esophagostomy stoma, and dilation was performed (Figure 1). Subsequently, 6 dilations were performed with balloons of increasing diameter at weekly intervals to reach a diameter of 15 mm. During each endoscopy session, triamcinolone acetonide 80 mg (Kenacort; Abbott Health Care Pvt Ltd, Mumbai, India) was injected in the stricture segment in 4 quadrants; however, the luminal diameter could not be maintained. To provide persistent dilation for an extended period, we placed scaffoldings in the form of a nasogastric tube (NG) and/or endotracheal (ET) tube across the strictured segment.

First, an 18Fr polyvinyl chloride NG tube (Romolene; Ramsons Pvt Ltd, Agra, India) was placed across the strictured segment over a 0.035" guidewire (Revowave; Piolax Medical Devices) and its proximal end was rerouted through the

nostrils and secured (Figure 1). As the patient tolerated this for a week, we took her up for endoscopic dilation and upgradation of the scaffolding. After dilating to 12 mm with a balloon dilator, an ET tube (Suction Above the Cuff Endotracheal Tube; PORTEX, Dublin, OH) of outer diameter 10.4 mm was threaded over the NG tube from the esophagostomy site, up to a length equivalent to that of the strictured segment. The scaffolding was upgraded to a diameter of 12.8 mm using incremental sizes of ET tubes after dilation with balloon dilators of equal/larger diameter (Figure 1). At this stage, a 12.8-mm ET tube along with a 12-Fr NG tube were used together to provide the scaffolding.

Two months later, a therapeutic gastroscope with an outer diameter of 12.6 mm (Olympus, GIF-2TH180; Olympus Corporation) was readily negotiated across the esophageal remnant. The patient was given q8 hourly and SOS 50 mg tramadol (Trambax; Ranbaxy, Mumbai, India) through the jejunostomy tube starting with the first NG tube insertion until she was taken up for definitive surgery. The patient then underwent to ileocolonic transposition with ileoesophageal anastomosis proximally and colojejunal pouch anastomosis distally. The postoperative period was uneventful. On follow-up,

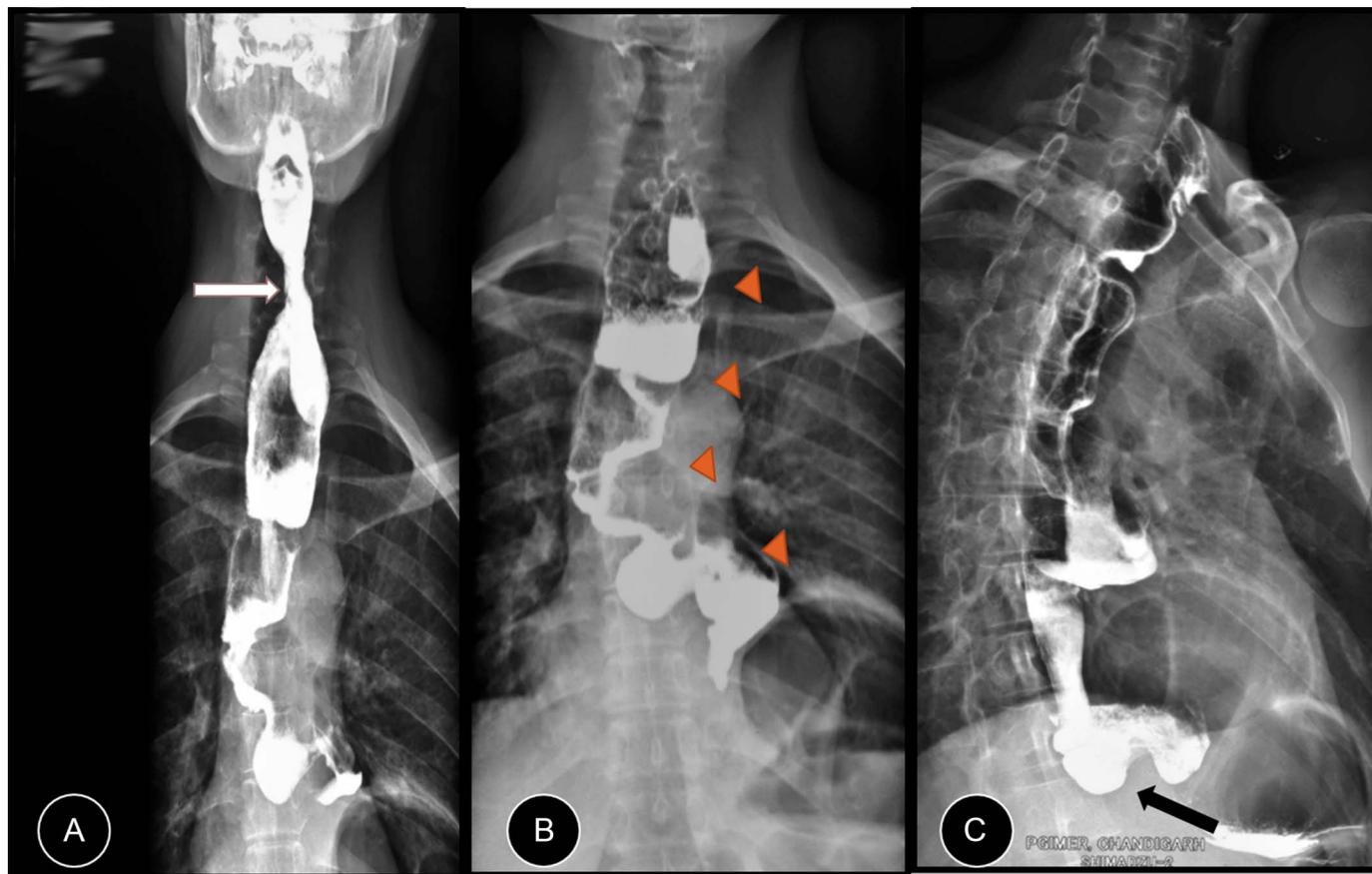


Figure 2. (A) Barium swallow after ileocolonic transposition shows only mild narrowing at the proximal anastomotic site (white arrow). (B) Good flow of oral contrast across the interposed segment of the ileum and colon (red arrowheads). (C) Opacification of the colojejunal pouch distally (black arrow).

6 months after surgery, the patient remained asymptomatic, and a barium swallow showed only slight compromise of the lumen at the anastomotic site (Figure 2). However, a standard 8.8-mm gastroscope (Olympus, GIF-Q180; Olympus Corporation) could be easily negotiated.

DISCUSSION

This report describes a novel method to remodel the esophageal remnant using a multipronged strategy including endoscopic balloon dilation, intralesional steroid injection, and an indwelling scaffolding. Caustic esophageal strictures are complex and difficult to dilate. Recurrence is seen in more than 90%, and such patients require long-term dilation.¹ Intralesional steroids, mitomycin, and different kinds of self-expanding stents have been tried to augment the effect of dilation.²⁻⁴ Despite these endoscopic procedures, some patients require surgery in the form of esophago-gastric or esophago-colonic anastomosis.⁵⁻⁷

Our patient had severe esophageal and gastric burns necessitating gastrectomy and esophagostomy. She developed cicatrization of the esophageal remnant, which precluded using that segment for restoring esophageal continuity. Attempts to

augment dilation with intralesional steroids failed. At this stage, it was decided to use esophageal scaffolding to remodel the esophageal remnant (Figure 1). An alternative would have been the use of self-expanding metal stents (SEMS). However, there is a risk of tissue overgrowth in up to 40% of the patients undergoing SEMS for benign lesions.⁸⁻¹⁰ Moreover, the narrowing of the remnant involved the esophageal inlet, and the SEMS would have had to project into the hypopharynx and out of the esophagostomy stoma. It was also felt that the patient may not tolerate the SEMS. Hence, after discussing with the patient, esophageal scaffoldings using nontraumatic tubing were considered. Some have used indwelling silastic stents placed preoperatively in children in the acute stage of caustic ingestion for long-term maintenance of patency, but the experience is limited.¹¹

To prevent injury to the nasopharynx, the scaffoldings used were tailored in a way that they molded on an 18Fr NG tube, which was taken out of the nostril. The other issue was of analgesia. For the entire duration, the patient was given around-the-clock tramadol, and she tolerated the procedure well. There were no complications throughout the treatment. This case is an example of ingenuity in the management of complex problems arising out of caustic ingestion.

DISCLOSURES

Author contributions: R. Kochhar conceptualized the manuscript. M. Ashat, YR Reddy, A. Gulati, and K. Lileswar collected data. M. Ashat and YR Reddy provided the images. SK Sinha revised the manuscript. M. Ashat is the article guarantor.

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