



SURGICAL MANAGEMENT OF PATIENTS WITH CORROSIVE ESOPHAGEAL STRICTURE: EXPERIENCE AT A TERTIARY CENTER IN AHMEDABAD, GUJARAT.

Gastro Surgery

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ABSTRACT

Background: Caustic ingestion can result in a number of injuries ranging in severity from minimal mucosal erythema to transmural necrosis of the esophagus and stomach with viscus perforation. In this study, we have reviewed 21 patients of corrosive esophageal stricture surgically treated over a period of 3 years at our centre and their post-operative complications and outcome in terms of ability to take oral feeds and weight gain. **Material And Methods:** This is a prospective study of surgically treated patients of corrosive ingestion. A total of 21 surgeries were performed with colonic interposition in 13(61.9%) patients and gastric pull-up in 8(38.09%). Post-operative complications and outcome were evaluated. **Results:** 21 patients of corrosive ingestion were surgically treated at our hospital, out of which colonic conduit was created in 13(61.9%) patients and gastric pull-up in the remaining 8(38.09%) patients. Incidence of recurrent vomiting with delayed initiation of oral feeds was more in patients with anti-peristaltic colonic conduit(19.04%).

KEYWORDS

Corrosive stricture, gastric pull-up, colon conduit, isoperistaltic, anti-peristaltic, pharyngoileoplasty.

INTRODUCTION:

Corrosive substances are those that cause destruction or damage to living tissue on contact, and may usually be grouped into acids or alkalis¹.

Caustic ingestion can result in a number of injuries ranging in severity from minimal mucosal erythema to transmural necrosis of the esophagus and stomach with viscus perforation². After recovery from the initial injury, esophageal stricture may develop. This complication is the most important complication of corrosive damage to the esophagus^{2,3} and, despite good initial management, approximately 5–12% of patients develop esophageal stricture^{4,5}.

Alkaline caustics and acids are the commonest chemicals implicated in caustic burns. The literature regarding the treatment of these patients is quite controversial and inconclusive. As for the complications and ineffectiveness of the dilation in more severe strictures, surgical replacement of esophagus may be required.

The mainstay of treatment of established stricture has been graded dilatation at intervals of 10–14 days for 6 to 12 months after the initial insult or until fibrosis is no longer progressive⁶.

When repetitive dilatation fails to relieve symptoms or in cases where the patient refuses to undergo repeated dilations, more aggressive techniques are indicated to reconstruct the conduit^{2,7}.

The gastric tube is widely accepted as the first choice for an esophageal substitute followed by colonic interposition and jejunal free flap. In this study, we have reviewed 21 patients of corrosive esophageal stricture surgically treated over a period of 3 years at a tertiary center in Ahmedabad, Gujarat.

MATERIAL AND METHODS:

From 2018 to 2021, 31 patients of corrosive ingestion were treated at the SVP hospital. Their clinical and pathological data were reviewed. 18 females and 13 male patients ingested caustic substances

respectively. Patients aged 18 to 37 years. The caustic materials for injuries were liquid lye and acids (10 and 21 respectively). Ingestion was associated with suicidal intent in majority of the cases. The time intervals the patient came to our hospital after ingestion varied from several hours to several days. Three patients who ingested large amount of acid died of severe acidosis and cardio-respiratory failure (one developed gastric perforation). Four patients, who ingested less amount of acid did not develop serious esophageal complications and were managed conservatively.

One patient did not come for regular follow up and was lost during the study. The remaining patients developed swallowing difficulties within 1–2 weeks of corrosive ingestion and hence feeding jejunostomy was done and regular follow up with barium study and endoscopy.

Selection Criteria:

1. Difficulty in swallowing, unable to take liquids and solids or swallow saliva.
2. Tolerating feeds through feeding jejunostomy with BMI >18kg/m²
3. Serum albumin >3.2gm/dl

Management:

All the patients were stabilized in the acute emergency situation in the ICU setting with correction of any apparent hydration deficiency or acid-base imbalance.

Patient underwent endoscopic grading of injury. Patients with ulceration, blisters, even areas of extensive necrosis always tended to develop esophageal strictures.

23 patients underwent feeding jejunostomy and were followed with barium study and endoscopy at regular intervals to document esophageal stricture.

Two out of these 23 patients developed high esophageal stricture (scope could not be negotiated and barium study could not be

performed due to risk of aspiration) and hence,refused for surgical management.

Esophageal Replacement:

21 patients underwent surgical treatment for corrosive esophageal stricture,14 among which underwent repeated dilatations following jejunostomy,with level of stricture in majority varying between C8 to T6 level,while one patient had high esophageal stricture.Majority of the patients underwent surgery 6 -8 months after ingestion.The colon was commonly used as an esophageal substitute for reconstruction in 13 patients(7 isoperistaltic and 6 antiperistaltic),gastric pull-up was done in the remaining 8 patients as shown in table 1.

Table 1 surgical procedure of esophageal replacement(n=21)

Colonic interposition	13	61.9%
1.right colon(isoperistaltic)	7	33.3%
2.left colon(antiperistaltic)	6	28.5%
Gastric conduit	8	38.09%

Surgical Procedure For Colonic Interposition:

The operation was carried out through an upper abdominal incision and a cervical oblique incision along the inner border of the sternocleidomastoid muscle.Retrosternal was the most commonly used route.A sufficient colon segment for graft was mobilized from colonic mesentery. The middle and left colonic arteries were identified and freed respectively(for antiperistaltic). The root of the vessels elected was clamped with bulldog clamps for about 15 min. In the same time, the estimated ends of the graft were clamped with intestinal clamps and watched. If the colon expressed normal color, peristalsis and marginal arterioles would be pulsating (especially those in both ends of the segment), it would be transected.Left colon in antiperistaltic manner was used in 6 patients while in 7 patients right colon in isoperistaltic manner was used and pharyngoileoplasty (isoperistaltic) with tracheostomy was done in one patient.The proximal end of graft was elevated gently from abdomen up to the neck through the tunnel.A proximal esophagocolic and hypopharyngoileal anastomosis was performed with hand-suturing single-layer technique.

Gastric conduit was constructed with the help of gastrointestinal staplers and was based on right gastroepiploic artery as shown in image 1.

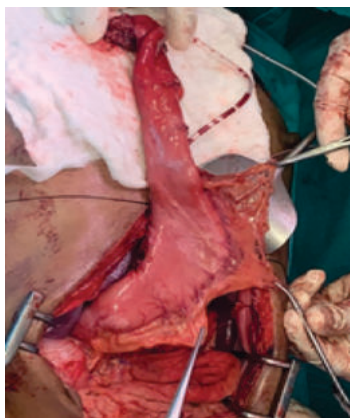


Image 1 showing gastric conduit based on right gastroepiploic artery.

RESULTS:

Total of 21 patients of corrosive ingestion were surgically treated at our hospital,out of which colonic conduit was created in 13 patients and gastric pull-up in the remaining 8 patients.Results of operation were satisfactory with no postoperative death and improved swallowing ability(except in one case of surgical failure) and weight gain when followed for 1 year as shown in table 4.

7 patients developed post-operative complications with surgical failure in one patient of high esophageal stricture. 4 patients developed cervical anastomotic leakage with conduit necrosis in one patient,5 patients developed swallowing difficulties with frequent vomiting and faecal eructations in the immediate post-operative period(more commonly in patients with antiperistaltic colonic conduit),one developed aspiration pneumonitis(pharyngoileoplasty case) and

anastomotic stricture(as shown in table 2 and 3)

Table 2 post operative complication(n=21)

Cervical anastomotic leakage	4	19.04%
Recurrent vomiting(faecal eructation)	5	23.08%
Aspiration pneumonitis	1	4.76%
Conduit necrosis	1	4.76%
Anastomotic stricture	1	4.76%

Table 3 distribution of post-operative complications according to surgical procedure performed

	Anastomotic leak	Conduit necrosis	Recurrent vomiting	Stricture
Gastric pull-up	1	-	-	-
Right colon (isoperistaltic)	2	1	1	1
Left colon (anti-peristaltic)	1	-	4	-

Table 4 Post-operative Outcome

Outcome	No. of patients
Hospital Readmission	0
Reoperation	0
Mortality	0
Average weight gain(kg)	3.2(0-7)
Not tolerating oral feeds	0
Surgical failure	1(4.76%)

DISCUSSION:

A successful management of corrosive injury involves prompt recognition and early treatment.Clinically apparent esophageal strictures occurred in 10%-30% of patients with a caustic injury⁸, even higher in some other reports^{9,10}.

In our study, 23 patients presented with esophageal strictures that needed replacement. Treatment of the strictures after esophageal injury was very difficult, and dilation has been used in many hospitals¹¹.Dilatation therapy, furthermore, required frequent admissions to hospital and multiple anesthetics with inherent risks. Surgical intervention is a good way to solve the problem of strictures, in the form of esophageal replacement.

In our study,both stomach and colon(iso and antiperistaltic) is used as a conduit for esophageal replacement.Post-operative complications of recurrent vomiting with fecal eructations prolonging the hospital stay was more commonly seen in patients with antiperistaltic colon conduit with anastomotic stricture seen in one patient of very high esophageal stricture with isoperistaltic colon replacement.

Timing Of Replacement:

The time for operation of esophageal replacement after corrosive injury is still under controversy.

Bassiouny et al¹² found in rats that collagen deposition peaked during the second week but continued for a long time after corrosive injury of esophagus. It took about 6-12 mo before full fibrosis stopped to develop after the injury¹³.Early operation may promote the risk of anastomotic stenosis. So, it is believed that the chance of successful surgical management is greater if the operation is carried out at least six months after the injury.

In our study,all patients were taken after 6 months for surgical intervention,one patient developed anastomotic stricture.

CONCLUSION:

Certainly good nutrition and careful peri-operation treatment are important for the healing process of anastomosis.Jejunostomy must be performed for the nutrition of patients who cannot tolerate oral nutrition.

The keys for a successful surgical procedure are the adequate and good vascular supply for the esophageal replacement, as well as the absence of tension at the anastomosis.In our study,isoperistaltic colon conduit was found to be better than antiperistaltic conduit in terms of frequent vomiting,fecal eructation in the post-operative period.With regard to other post-operative complications,colon and stomach was found to be comparable as esophageal substitute.

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