

Surgical Treatment of Corrosive Stricture of Esophagus and Stomach

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A total of 30 cases of esophageal and gastric caustic strictures were dealt with in Mayo Hospital from March, 1987 to August, 1996. Surgical treatment included transhiatal oesophagectomy without thoracotomy in 26 cases, surgical bypass in 4 cases. Reconstructive procedures involved the posterior mediastinal route in 24 cases and substernal route (retrosternal) in 6 cases. Esophageal substitutes used for reconstruction were, stomach (26 cases), colon (4 cases); all the esophageal substitutes were isoperistaltic. Complications included hoarseness of voice, unilateral pleural injury and cervical anastomotic leak. There was no operative, or perioperative death. Post operative swallow junction was considered good in 27 cases (90%). In our experience, transhiatal esophagectomy without thoracotomy is an ideal procedure for caustic strictures of the esophagus. In case of complicated strictures of the esophagus such as perforation of the esophagus, surgical bypass is an alternative procedure. Isoperistaltic stomach is the best option for esophageal replacement but when the stomach is also involved such as antral fibrosis, colon is an optimistic alternative.

Key words: Caustic stricture, esophageal reconstruction

Corrosive ingestion is not uncommon in our society especially in rural areas. Among adults, it is an intentional suicide attempt though accidental cases were also recorded. Among the corrosive agents, caustic soda is at the top. Bleaching powder, hydrochloric acid were also ingested in some cases. Alkali damages the esophagus more severely than the acid. Conversely acid ingestion damages stomach more leading to pyloric obstruction due to antral fibrosis^{1,2,3,4}. Acidic ingestion damages oesophagus and stomach very badly (antral fibrosis) leading to pyloric obstruction^{1,2,3,4}. All the cases which were dealt surgically were referred from Departments of Medicine and Gastroenterology of the various teaching hospitals. All these cases were initially treated by the gastroenterologists. One of the commonest reason for referral was perforation during dilatation. Perforation occurred proximal to the site of stricture, leading to pneumothorax initially then empyema thoracis if not dealt with energetically at the same time. In majority of the patients, the strictures were too tight, too long, not amenable to dilatation or too frequent dilatation with poor response and compliance⁵.

Materials & Methods

From March 1987 to August 1996, 30 consecutive patients with severe caustic esophageal stricture alone (26 patients) and caustic stricture of esophagus and stomach (4 cases) were included in the study. On admission, the patients were carefully prepared after correction of anemia, electrolyte imbalance and nutritional deficiencies using combinations of fluid replacement, jejunostomy feedings or supplemental intravenous feedings.

Postoperative oral feeding was carried out about the seventh post-operative day after the anastomosis had been shown to be intact by a gastrograffin swallow.

Results

Twenty six patients underwent transhiatal esophagectomy without thoracotomy and in six patients

surgical bypass was done. All underwent esophageal reconstruction at the same time.

There were 18 females and 12 males ranging in age from 13 years to 50 years. Caustic soda was the most frequently ingested agent, followed by hydrochloric acid and sulphuric acid. The intent to commit suicide was the motivation for most of adult patients, and in good number of cases accidental ingestion occurred. Only in one case homicidal attempt was recorded.

The interval between ingestion of caustic agent and surgical procedure ranged from six months to five years. Twenty percent of cases were operated within six months after the ingestion and others after longer intervals. No paediatric cases was dealt with.

Age	n ^o
0-12 years	-
13-20 years	08
21-25 years	12
26-35 Years	06
36-50 years	04

Ingested Agents	n ^o
Caustic soda	20
Bleaching powder	6
Hydrochloric and Sulphuric acid	4

Level of esophageal strictures with the help of fiberoptic endoscope	
Variable Level	n ^o
Stricture level	
20cm	12
25cm	10
28cm	03
30cm	02
32cm	02
Hypopharynx	01

Esophageal strictures were commonest in proximal upper one third of esophagus and then the middle one third of the oesophagus.

Barium swallow was carried out in every patient except in complicated cases such as esophageal perforation. In four cases stomach was also involved in addition to the esophagus.

Antral fibrosis was seen in 3 cases while the entire stomach was shrivelled into tea pot deformity in one case.

Preoperative Assessment

Weight loss of more than 20% was seen in 25 patients while weight loss between 10-15% was seen in 5 patients. Serum albumin varied between 2.5gm and 3.5gm/dl.

All patients exhibited varying degree of anaemia, hypovolaemia, hyponatraemia, and hypokalaemia.

Majority of the patients were built up by I/V. Saline, blood transfusion and T.P.N. for at least two weeks. In few cases, feeding jejunostomy was done before operation. Colonic preparation was being carried out by klean enema at least 24s hours before operation.

Technique

Transhiatal oesophagectomy without thoracotomy was carried out in 26 patients. Upper long mid line incision was made. Stomach was mobilised by saving the epiploic arch. Right gastric and right gastroepiploic arteries were saved, Short gastric vessels were divided. Left gastric artery was tied, twice and then divided at its origin from coeliac trunk. Extensive Kocherisation of second and portion of third part of duodenum was done, so that pylorus come to lie at esophageal hiatus. Blunt dissection of the oesophagus was carried out by passing right hand in the oesophageal hiatus. Lower two third of the oesophagus mobilised from below and proximal one third of the oesophagus mobilised from above by making an incision along the medial side of left sternomastoid extending towards the suprasternal notch. Strap muscles were divided on that side. Left recurrent laryngeal nerve visualised and saved. Blunt dissection of the cervical and superior mediastinal part of the oesophagus was done from above. Great care was taken to avoid injury to the membranous part of trachea, left bronchus and arch of aorta. The part between supra sternal notch to the angle of Lewis is totally blind. Fear of injury lies in this part of esophageal dissection. In this way, the whole oesophagus is mobilised bluntly and then excised in the cervical area proximal to the site of stricture.

Only in 6 cases surgical bypass procedure was carried out because of esophageal perforation during dilatation as emergency or in established cases of empyema thoracis due to old perforation.

Esophageal n=	Substitutes
Stomach	2
Right colon	2
Transverse and left colon	2

Stomach as an esophageal substitute was used in majority of the patients. Single layer (4 zero proline) interrupted or continuous sutures.

Complications

Complications after esophageal reconstruction	n=
Torrential haemorrhage	nil
Temporary hoarseness of voice	5 cases
Unilateral pleural injury	10 cases
Bilateral pleural injury	1 case
Thoracic duct injury	Zero
Aortic injury	Zero
Anastomotic leak	2 cases

Long term follow up was upto 8 years.

Fifty percent of cases developed gastroesophageal reflux postoperatively, which responded to H₂ receptor blocker and motilium

Two cases developed anastomotic stricture that responded to the repeated dilatation. Both were in colonic interposition.

Discussion

Only 20% of the caustic stricture of the oesophagus are being referred for surgery by trained gastroenterologist when there is fear of perforation, or perforation has occurred, or too long a stricture that is not amenable to dilatation or repeated dilatations with no fruitful results observed^{6,7}.

The ideal treatment of caustic stricture of the oesophagus is transhiatal oesophagectomy without thoracotomy^{8,9}. It is less traumatic and time saving procedure as compared to two step (Tanner Lewis) or three step McKewin oesophagectomy. It is important to core out the esophagus as there is 5-7% incidence of carcinoma oesophagus in lye strictures. In uncomplicated cases of caustic strictures the periesophageal dissection is not difficult, however, transhiatal oesophagectomy is contraindicated. In case of esophageal perforation there is massive sepsis resulting in extensive fibrosis. Under those circumstances surgical by pass is a good alternative. The average blood loss varies from 1-2 pints.

Regarding the oesophageal substitute, in our experience stomach is an ideal substitute for the esophagus with following characteristics superb blood supply, all coats, inherent acceptability, stout organ, no dissemination of infection, single cervical anastomosis. The anastomotic dehiscence was not recorded in this series^{10,11}.

Regarding the colon, blood supply becomes poor after mobilisation, lack of serosal covering and triple anastomosis. There is a chance of dissemination of the infection¹⁰. The incidence of anastomotic leak is higher as compared to the stomach even in larger series, where colon is used as substitute, though healed spontaneously on T.P.N. or nutrition through feeding jejunostomy¹². In our limited experience for colonic substitute, the postoperative stricture incidence is also higher which

did respond to dilatation.

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