



GASTROJEJUNOSTOMY; AN EFFECTIVE SURGICAL OPTION TO MANAGE CORROSIVE INDUCED GASTRIC OUTLET OBSTRUCTION

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ABSTRACT:... **Objectives:** To assess the efficacy of early Gastrojejunostomy to manage corrosive induced gastric outlet obstruction. **Study Design:** Prospective, Descriptive, & Interventional. **Study Period:** February 2011 to April, 2015 **Setting:** Surgical Department Aziz Bhatti Shaheed Teaching Hospital Gujrat. **Material & Methods:** Data of 21 patients presenting with corrosive induced gastric outlet obstruction during the study period were analysed with reference to effectiveness of early gastrojejunostomy in symptomatic improvement and nutritional outcome. **Results:** Total of 21 patients with corrosive induced gastric outlet obstruction were managed during the study period. Only 02 patients were male and 19 (90.47%) were female. Mean age was 19.06 years. House hold toilet cleaner was the only corrosive used in all cases. Suicidal intention was the commonest intention, only one patient was known case of some psychological illness. Gastrojejunostomy proved to be an effective option in relieving. **Conclusion:** Early gastrojejunostomy (within 6-8 weeks of corrosive ingestion) is an effective surgical procedure to achieve good symptomatic and nutritional outcome in corrosive induced gastric outlet obstruction.

Key words:

Pyloric stenosis, gastric outlet obstruction, corrosive gastrointestinal injury, Lye ingestion

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INTRODUCTION

According to the annual report of the American Association of Poison Control, there were 206,636 cases of human exposure to cleansing substances both alkali and acids in 2000. Twenty –seven of these cases (of ingestion) resulted in death.¹ Children accounts for 80% of accidental corrosive ingestion², however ingestion of corrosive in adults is more often suicidal in intent and therefore tend to be more serious.

Most commonly household bleaches contain hydrogen peroxide (3%), sodium hypochlorite or low concentrations of sodium hydroxide (1%), and are mild to moderate irritants with a pH ranging from 10.8 to 11.4.³ Accidental ingestion bleaches produces minimal injury to the gastrointestinal tract; long term damage is rare. However the ingestion of large quantities of bleach may be associated with serious damage including stricture formation.

Drain cleaners are more dangerous. Drain cleaner contain sodium hydroxide in concentrations ranging from 4% to 54%. These agents produces severe harm to the gastrointestinal tract including perforation.^{20,21} Stricture formation is consistently seen with ingestion of drain cleaners.²⁴

Acid ingestion is less frequent in United States (<5%) but appears to be more common in countries like India and Pakistan where hydrochloric acid and sulphuric acid are easily accessible.¹⁴

Any Solutions with a pH of less than 2 or greater than 12 are known to be highly corrosive. Alkali causes tissue destruction by producing liquefactive necrosis.² A 22.5% solution of NaOH in contact with the esophagus for 10 seconds and 30% NaOH for 1 second can produce a full thickness injury.² Esophagus and stomach are the front line organs exposed to and bear the major burnt on exposure to corrosive. Cicatrization of

the stomach is the frequent affect which has been reported in one third of these cases.^{4,23} Initial injury on exposure to corrosive thrombosis of small blood vessels caused by production of heat. Mucosal sloughing occurs 4 to 7 days after the initial injury followed by bacterial invasion, inflammatory response and development of granulation tissue. Scar retraction begins by the third week and may continue for several months.^{23,24} The ultimate outcome is in the form of stricture formation and shortening of the involved segment of GIT. Shortening of esophagus affect the LES pressure leading to increased gastroesophageal reflux, which in turn accelerates and precipitate the stricture formation.⁵

Exposure of GIT to acid induces coagulation necrosis and eschar formation and this may limit tissue penetration. In some studies it is reported that stomach is preferentially affected by the acid^{18,19,24,25} however recent studies have reported extensive damage to esophagus as well.⁴

Dysphagia and gastric outlet obstruction leading to significant weight loss over short period of time is the major adverse effect and outcome of strictures formed in upper GIT due to corrosive ingestion. Fluid and electrolyte imbalance and metabolic disturbances due to frequent vomiting is one of the contributing factor in mortality of these patients.^{19,20}

Though several publications have reported the profile and various methods of management of corrosive strictures of esophagus^{4,6}, there are only a few reports highlighting the management of corrosive strictures of the stomach.^{7,8}

We are sharing our experience with surgical management of patients with corrosive strictures of the stomach.

MATERIAL & METHODS

This is a retrospective, descriptive, interventional study conducted during the period from February 2011 to April 2015 at surgical unit, Aziz Bhatti Shaheed (Teaching) Hospital (ABSTH) Gujrat. ABSH is a teaching hospital affiliated with

Nawaz Sharif Medical College, University of the Gujarat. Surgical Department catering 60 beds, 30 beds each in both male and female wards. Surgical department is accredited with College of Physicians & Surgeons of Pakistan for postgraduate training in surgery.

The patients of all age groups and gender with history of corrosive ingestion were included in the study. Patients profile, mode, presenting symptoms and clinical signs were recorded. Patients resuscitated with correction of fluid and electrolyte imbalance. Upper GIT contrast study in the form of barium swallow / meal was performed in all patients after upper GIT endoscopy. Length, character, level and extent of corrosive induced stricture noted. Residual gastric stump was assessed. Serial endoscopic dilatation of oesophageal strictures were performed where indicated. Tube feeding jejunosotomy under local anaesthesia was performed in selected patient who are severely malnourished and underweight. Base line investigations including Blood CP, LFTs, including total proteins, RFTs, and electrolytes were performed. Screening for hepatitis done in all patients. Elective exploration through upper midline abdominal incision was performed. Isoperistaltic retro colic Gastrojejunostomy was performed by side to side jejunal anastomosis with available / residual gastric stump. Post-operative patients were managed in Surgical HDU. Second generation cephalosporin and proton pump inhibitors were given to all patients. Enteral / parenteral feeding was continued postoperatively till patient became able to take and tolerate oral feed.

Postoperative course was observed in surgical ward, complications if any recorded. Patients were discharged after 10 days and followed up fortnightly initially and monthly later on. Special focus was given on ingestion and tolerance of food and weight gain. Data was recorded on a preformed proforma and results were formulated, analysed and compared with both national and international literature.

RESULTS

A total of 21 patients were reported and included in this study during the study period. Nineteen out of twenty one patients (90.47%) with alleged corrosive ingestion were young females. Mean age was 19.06 years. Most of the patients were from lower / lower middle class of society. Household toilet cleaner was the only corrosive type ingested by all patients. Suicidal intention was the commonest intention for ingestion in all cases except in one case where it was ingested accidentally. Two out of twenty (One male & one female) gave history of some psychiatric illness. Ten out of total 21 patients (47.61%) were married. Mean time elapsed between ingestion and presentation to surgeon was 39 days. All the patients were initially managed in emergency

at the time of insult, however most of them presented later on to physicians with intractable vomiting after the development of stricture and then referred to surgeon.

Upper GIT obstruction in the form of gastric outlet obstruction was the commonest presenting complaint. In 6 out of 21 patients (28.57%) we did feeding jejunostomy to build them up nutritionally, however this procedure was poorly tolerated by our patients in terms of compliance and failed in achievement of goal. Upper GIT endoscopy was performed in all patients to see the nature, site and extent of obstruction. Barium meal contrast study was performed in all patients before surgical intervention to assess the residual stomach.

S/No	Age Years	Sex	Marital status	Substance ingested	Intention	Duration
1	18	FM	Yes	Toilet cleaner	Suicide	6-8 Weeks
2	23	FM	No	Toilet cleaner	Suicide	6-8 Weeks
3	21	FM	No	Toilet cleaner	Suicide	6-8 Weeks
4	30	FM	Yes	Toilet cleaner	Suicide	6-8 Weeks
5	37	FM	Yes	Toilet cleaner	Suicide	6-8 Weeks
6	18	FM	No	Toilet cleaner	Suicide	12 Weeks
7	22	FM	No	Toilet cleaner	Suicide	6-8 Weeks
8	25	FM	Yes	Toilet cleaner	Suicide	4-6 Weeks
9	24	FM	Yes	Toilet cleaner	Suicide	7-9 Weeks
10	16	FM	No	Toilet cleaner	Suicide	>10 Weeks
11	32	FM	Yes	Toilet cleaner	Suicide	6-8 Weeks
12	28	FM	Yes	Toilet cleaner	Suicide	6-8 Weeks
13	18	FM	No	Toilet cleaner	Suicide	6-8 Weeks
14	20	FM	No	Toilet cleaner	Suicide	6-8 Weeks
15	30	FM	Yes	Toilet cleaner	Suicide	6-8 Weeks
16	22	FM	Yes	Toilet cleaner	Suicide	6-8 Weeks
17	18	M	No	Toilet cleaner	Suicide	6-8 Weeks
18	18	FM	No	Toilet cleaner	Suicide	6-8 Weeks
19	16	FM	Yes	Toilet cleaner	Suicide	4 weeks
20	18	FM	No	Toilet cleaner	Suicide	6 weeks
21	20	FM	No	Toilet cleaner	Accidental	5 weeks

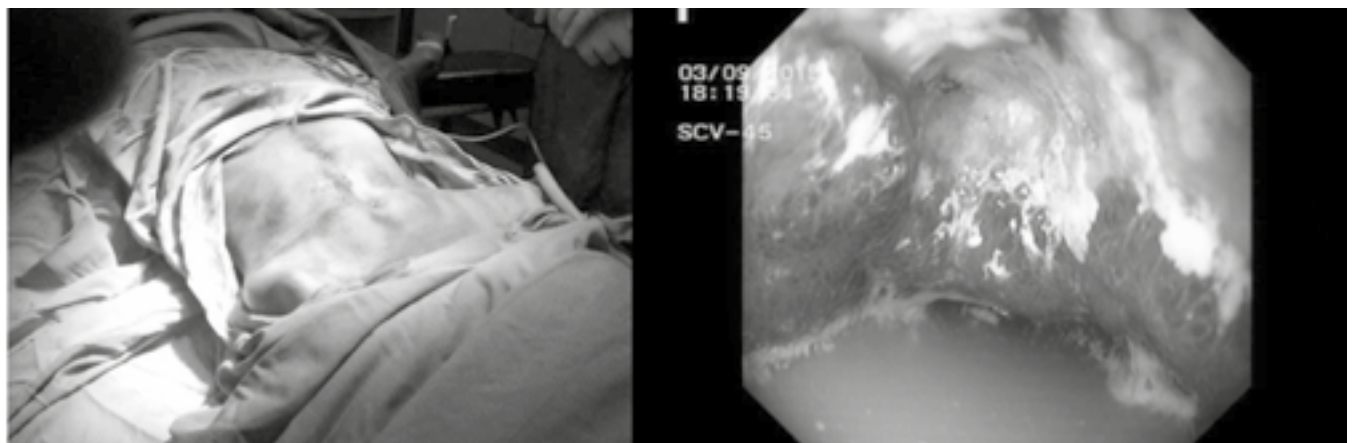
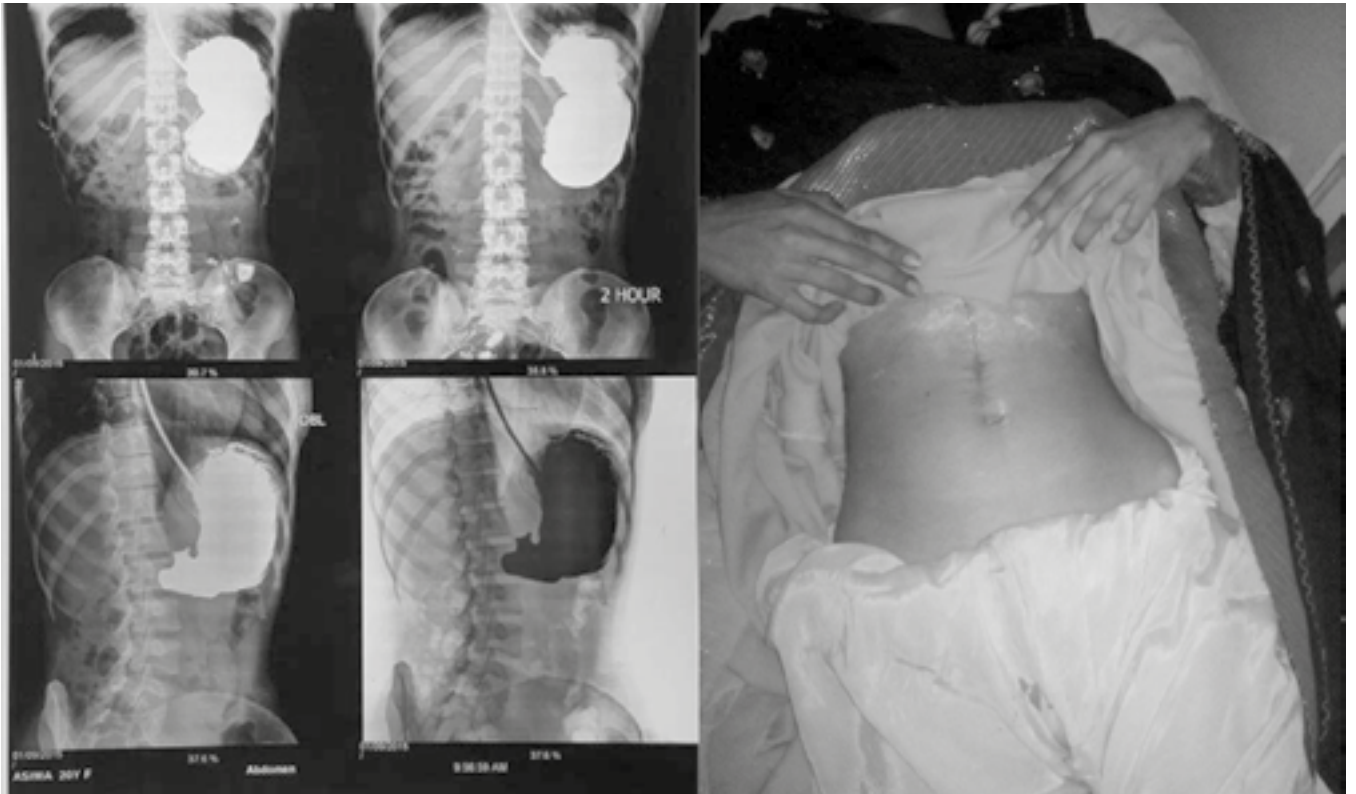
Table-I. Summary of the demography, cause & intention of corrosive ingestion:

S/ NO	Endoscopic findings	Procedure performed	Follow up
1	Antrum scared, small gastric remnant	Gastrojejunostomy Anastomosis at fundus	Substantial weight gain Mild reflux
2	Pyloric stricture	Gastrojejunostomy	Mild dumping
3	Pyloric stricture	Gastrojejunostomy	Well , weight gain
4	Pyloric stricture	Gastrojejunostomy	Well , weight gain
5	Pyloric stricture	Gastrojejunostomy	Gastritis on PPI
6	Pyloric stricture	Gastrojejunostomy	Well
7	Negotiable LES stricture Pyloric stricture	Feeding jajunostomy, Poor compliance, TPN & Gastrojejunostomy	Oesophageal dilatation
8	Pyloric stricture	Gastrojejunostomy	Well
9	Pyloric stricture	Gastrojejunostomy	Mild reflux
10	Pyloric stricture	Gastrojejunostomy	Mild reflux
11	Pyloric stricture	Gastrojejunostomy	Gastritis
12	Pyloric stricture	Gastrojejunostomy	Gastritis
13	Antrum & pyloric	Gastrojejunostomy	Well
14	Pyloric stricture	Gastrojejunostomy	Well
15	Mid oesophageal & pyloric stricture	Oesophageal Dilatation Gastrojejunostomy	Oesophageal dilatation
16	LES negotiable stricture & Pyloric stricture	Feeding Jajunostomy Gastrojejunostomy	Well
17	Pyloric stricture	Absconded	Absconded
18	Pyloric stricture	Gastrojejunostomy	Well
19	Pyloric stricture	Gastrojejunostomy	Well
20	Pyloric stricture	Gastrojejunostomy	Well
21	Pyloric stricture	Feeding jajunostomy Gastrojejunostomy	Expired

Table-II. Upper GIT endoscopic findings & Procedure performed with outcome

S/No	Complications	Number / %age
1	Reflux	03 (15.78%)
2	Dumping	01 (05.27%)
3	Gastritis	02 (10.52%)
4	Feeding jajunostomy related complications	03 (15.78%)
5	Wound infection	04 (21.05%)
6	Chest infection	02 (10.52%)
7	Oesophageal perforation	01 (05.27%)
8	Mortality	01 (05.27%)

Table-III. Complications



DISCUSSION

Ingestion of corrosive agents is a common cause of benign strictures of upper gastrointestinal tract in Asian countries mostly in indo-Pak region. Easy and cheap availability of hydrochloric acid in the form of drain opener and toilet cleaner makes it most frequent cause of corrosive injury. Acid produce "coagulative necrosis" of the tissue eventually leading to eschar formation at the site of contact of corrosive.^{9,10,23,24} The ultimate effect of corrosive injuries is in the form of segmental and extensive stricture formation in the aerodigestive tract. Stomach is more likely to be damaged by acids. Acids induce spasm of pyloric musculature, leading to delay in the outflow of acid from stomach, prolonging the contact time with the stomach wall. Long term affect manifest in the form of gastric outlet obstruction by causing pyloric stenosis. Associated injuries to the oesophagus are common as seen in our patients.

In our study mode of injury and intention of ingestion of corrosive agent remained same in 20 out of total 21 our patients, all were females with suicidal intention. This is because of easy availability of drain openers / toilet cleaners in every house.

Onset of clinical symptoms in most of the our patients was within 6 to 8 weeks after the ingestion of corrosive agent and these are comparable with what was reported from India & Taiwan⁷. However it is reported in the literature that stricture can develop up to one year after the ingestion of corrosive.

The main adverse outcome after corrosive ingestion to upper GIT is in the form of severe nutritional deficiency due to dysphagia, gastric outlet obstruction. Degree of malnutrition is directly proportional to the time elapsed between corrosive ingestion and presentation for definitive treatment. Timely intervention in the form of dilatation of strictures can reduce the severity of obstructive symptoms and hence nutritional adverse effects. Delay in definitive treatment, adversely affect the nutritional status of the patient

and rapid deterioration in the general health of the patient. Poor nutritional status adversely affect the treatment / surgical outcome.^{23,24} Delay in surgical intervention more than 6-8 weeks after the corrosive ingestion, with the intention to build up the patient nutritionally by means like total parenteral nutrition or by feeding jejunoscopy is not feasible in our setups. Affordability is the main limitation as for as TPN is concerned and Tube feeding jejunoscopy is poorly tolerated by our patients and their relatives. We observed that our patient and their parents in whom we did feeding jejunoscopy showed poor compliance and feel feeding tube a social stigma for their young daughters. Feeding tubes may not be used affectively in our setup due to multiple factors and failed to achieve the goal of nutritional build up in patients with corrosive induced gastric out let obstruction.³

Early surgical intervention (within 6 weeks) in the form of Gastrojejunostomy in corrosive induced gastric outlet obstruction provided there is no significant oesophageal involvement is turn to be a most effective surgical procedure to relieve the gastric outlet obstruction.^{24,25} In our study we did Gastrojejunostomy in corrosive induced gastric outlet obstruction in 19 patients with in 6 to 8 weeks duration, all patients tolerate the procedure well in terms of relieve in obstruction and maintaining their weight and general health. There was one mortality that cannot be attributed to the surgical procedure.^{22,23}

There are number of surgical options mentioned in the literature in the treatment of corrosive induced gastric strictures. Gastric resections partial or total was procedure of choice in some reported studies. Resection gastric surgery considered to be safe and free of significant complications both in short term and long term.^{11,19}

In a study on corrosive strictures of the stomach by Chaudhary et al⁸ resection surgery was performed in 59% (20/34) of patients. Poor nutritional status and extensive perigastric adhesions were taken as indication for bypass surgery by them. In contrast, Hsu et al⁷ favoured gastrojejunostomy

(80%) over gastric resection in their series of 30 patients, they however did not cite any reason for their preference.¹⁶

For complete corrosive induced gastric outlet obstruction, the important question is whether a simple bypass surgery such as gastrojejunostomy would be adequate or partial gastrectomy of the obstructive site would be more suitable. Ozcan, et al^{12,20} used gastrojejunostomy as the treatment of choice for all children with gastric outlet obstruction secondary to acid ingestion. This series provided asymptomatic long term results in all patients. Chaudhary, et al⁹ reported that 32% of patients with gastric outlet obstruction underwent gastrojejunostomy without stomal ulcer afterwards. However, gastrojejunostomy procedures without resection of non-viable gastric tissue are not recommended due to risk of carcinoma, metaplasia and late marginal ulcers.^{18,19,20}

Due to the simplicity of the procedure the gastrojejunostomy procedure, it should be a safe alternative treatment in patient with extensive perigastric adhesions, unhealthy duodenum and poor general condition.⁸ These patients must also be cautioned for the long-term risks and should have regular follow-up and endoscopic examination.^{19,20,25}

CONCLUSION

Corrosive induced gastric outlet obstruction should be managed surgically preferably within 6-8 weeks of insult for better outcome. The type of surgery depends on the endoscopic and radiological evaluation and findings on laparotomy. In selected patients simple early gastrojejunostomy is an affective by pass procedure in relieving obstructive symptoms and rapid restoration of weight and health of patients. Routine follow-up should be advised in order to assure the normal gastrointestinal function and early detection of late complications.

Litigation on sale and purchase of house hold acid products and awareness among public by using print and electronic media play an affective role in

primary prevention of this health issue. Psycho-social aspect of this medico- social problem must be addressed by involving psychiatric / psychological experts.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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