



## OPERATIVE INTERVENTIONS IN POST ACID INGESTION GASTRIC OUTLET OBSTRUCTION: A SINGLE INSTITUTE STUDY

### General Surgery

<b>Birju Patel*</b>	2 <sup>nd</sup> Year Resident, Department of General Surgery, Smimer Hospital, Surat, Gujarat, India *Corresponding Author
<b>Harish Chauhan</b>	Professor, Department of General Surgery, Smimer Hospital, Surat, Gujarat, India
<b>Asif Memon</b>	2 <sup>nd</sup> Year Resident, Department of General Surgery, Smimer Hospital, Surat, Gujarat, India

### ABSTRACT

**Background:** Corrosive injury resulting in gastric outlet obstruction (GOO) is fairly uncommon in world literature. We aim to study the socio-demographic variables of corrosive acid ingestion patients presenting as symptomatic GOO, along with the surgical procedure performed in these patients, post-operative complications and long term follow up data.

**Methods:** We included all patients with clinical features of gastric outlet obstruction following acid ingestion, who were operated in our department between January 2018 and January 2019. We collected patient's demographic data, parameters during surgery, body weight and nutritional status pre- and post-operatively, which were all derived from case records and outpatient records. Follow up data of the patient were collected when possible.

**Results:** During the study period, 62 patients were enrolled in the study; 32 males, average age 35.76±3.53 years, 81% had suicidal intent of ingestion and 19% accidental; average follow-up period was 7.5 months. After an average period of 6 months, 66% underwent gastrojejunostomy. Approximately, 15% suffered complications like surgical site infections, postoperative fever, pulmonary infections and postoperative vomiting.

**Conclusions:** Staged treatment for GOO patients was seen to be associated with good clinical outcomes and few complications. Bypass of cicatrised stomach without resection gives acceptable results.

### KEYWORDS

Complication, Corrosive, Gastric, Gastro-jejunostomy.

### INTRODUCTION

Gastric outlet obstruction (GOO) is a relatively uncommon consequence with a wide range of etiological causes. Although it is difficult to ascertain the incidence of gastric outlet obstruction, it is thought to have likely declined as treatments have improved for gastritis and peptic ulcer disease, which have traditionally been the most common etiology.<sup>1</sup> Corrosive injury resulting in GOO is also uncommon.<sup>2</sup> The damage following corrosive ingestion may be acute resulting in perforation or necrosis of the stomach or may result in progressive scarring which may lead to outlet obstruction.

Although cicatrization of the stomach following corrosive ingestion is rarely seen, it remains one of its main long- term complications.<sup>3</sup> Patients may develop symptoms of GOO within 3 months of corrosive ingestion and strictures may develop from 1 year to 6 years after the initial ingestion of a corrosive.<sup>1</sup> Majority of such patients with late sequel require surgery. In this article we present our experience of managing such patients at our tertiary level care hospital in Surat. We aim to study the socio-demographic variables of patients who present to us with corrosive ingestion, surgical procedure performed on these patients and complications experienced by these patients post operatively.

### METHODS

For this retrospective study we included all patients with clinical features of gastric outlet obstruction after acid ingestion, who were operated in the Department of General surgery, Smimer Hospital, Surat between January 2018 to January 2019. The study was performed according to the prescribed guidelines provided by the Indian Council of Medical Research, New Delhi. Smimer Hospital is a major healthcare provider and a teaching hospital in the region with a combined capacity of over 1000 beds. Our hospital is a referral centre for corrosive injury patients, with an average of at least 15 cases of acute corrosive ingestion, mostly acid getting admitted in a month.

After obtaining approval of the institutional ethics committee, we extracted information about the patients who underwent surgery for gastric outlet obstruction after ingestion of acidic corrosive during the above-mentioned study period. From our medical record registry, we extracted patient related information on demographic data, intent of ingestion of corrosive acid, immediate and late management the patient received, indications of the surgery, details of surgical procedure done and complications faced by the patient. We also collected patient parameters during surgery, patient's body weight and

nutritional status pre- and post-operatively, which were derived from case records and outpatient records. Follow up data of the patient were collected when possible. Collected data was compiled and entered in Microsoft excel sheets. Using Epi Info statistical software, we analyzed the data for descriptive statistics using appropriate statistical techniques.

### RESULTS

During the study period, 62 patients were operated for symptomatic gastric outlet obstruction following corrosive acid ingestion at our centre. The intent of acid ingestion was suicidal in 50 patients, accidental in 12 patients (Table 1). The type of corrosive ingested was bathroom cleaning acid (Hydrochloric acid) in all patients. Of the 62 patients, 47 had normal oesophagus on pre-operative upper GI endoscopy and barium study. The remaining 15 patients had single oesophageal strictures, which were easily managed endoscopically. Upper middle and lower oesophageal strictures were noted in nine, four and two patients respectively. There were 32 males and 30 females in our study population and the mean age of patients at first admission was 35.76±3.53 years (Table 1).

**Table 1: Baseline characteristics of study patients.**

<b>Total number of patients</b>	<b>62</b>
Males	32 (52%)
Average age±Standard deviation	35.76±3.53 years
<b>Intention of acid ingestion</b>	
Suicidal	50 (81%)
Accidental	12 (19%)
<b>Average duration between ingestion and definitive surgery 6.5 months</b>	
Average follow up period	7.5 months

**Table 2: Operative details of the study patients.**

<b>Definitive surgical procedures done</b>	
Gastrojejunostomy	41 (66%)
Feeding jejunostomy	17(27%)
Total gastrectomy with jejunal pouch	4 (7%)
<b>Average weight gain in patients at 1months after surgery 1.7 kgs</b>	
<b>Post-operative complications</b>	
Surgical site infections	2 (3%)
Postoperative fever	3 (4%)
Pulmonary infections	1 (2%)
Post-operative vomiting	4 (6%)

41 patients had feeding jejunostomy placed at their first admission as they were not able to take anything orally. Among the others feeding jejunostomy (FJ) was done between 2 weeks to 6 weeks with a median of 4 weeks (Table 2). Even in patients presenting after 6 months of acid ingestion with symptoms of dysphagia or gastric outlet obstruction feeding jejunostomy was the initial procedure done for nutritional management. Such patients underwent definitive surgery between 1-2 months after the feeding procedure.

The pre-operative serum albumin levels were low in most of our patients with mean 2.88 mg/dL. The definitive surgery done in 41 patients was gastro-jejunosomy (GJ) done as isoperistaltic, retrocolic, retrogastric using a loop of jejunum 15 to 20 cms from duodenojejunal flexure and hand seven two layered anastomoses. In 17 patients feeding jejunostomy was continued for long term follow up and in 4 patients total gastrectomy with jejunal pouch oesophageal anastomoses was done as he had a fully cicatrised stomach. Immediate post-operative complications included surgical site infection in 2 patients, post-operative fever in 3 (POF), pulmonary complication (PUL) in 1 and post-operative vomiting causing delay in tolerating oral feeds in 4 patients (VOM). None of our patients developed any anastomotic leak. Inpatients with post-operative vomiting FJ feeds were continued and all recovered well with conservative management.

There was no immediate post-operative mortality. Follow up of patients was done at 2nd week and then monthly. All the patients gained weight following definitive surgery (average 1.7kg). Of all patients, 33 patients were available for long term follow up (more than 3 months). Among these, two patients expired, one due to cardiac cause and other due to tuberculosis at 9 months and 10 months after surgery respectively. Among the 33 patients, 2 patients (both in GJ group) had symptomatic bile reflux gastritis controlled by medical management. None of the patients had clinical recurrence of gastric outlet obstruction or non-dilatable oesophageal disease.

## DISCUSSION

In this study we present our experience of treating patients with post corrosive acid ingestion GOO. The development of GOO occurs 7 days to 6 years after corrosive ingestion and presents with post-prandial epigastric fullness, non-bilious vomiting and a succession splash.<sup>6</sup> Studies have shown that more than 2/3rd of the patients will require surgical intervention.<sup>7</sup> Oesophageal damage from ingestion of caustic liquids, either acidic or alkaline, is more common than gastro duodenal damage. The protection of the duodenum may be due to antral spasm after corrosive exposure, causing closure of the pylorus. In one cohort of 179 patients with caustic ingestions (either acid or alkali), oesophageal injury was seen in 79% of patients, while gastric and duodenal injury were seen in 51% and 6%, respectively. There were five gastric strictures and two duodenal strictures resulting in GOO (4%), compared with 25 oesophageal strictures.<sup>8</sup>

Studies performed in different parts of India have shown that mostly bathroom acid is used as the substance of ingestion and intention is suicidal in most of the cases.<sup>9</sup>

Moreover, corrosive injury in developed countries usually is accidental in nature. In contrast, in India, young adults consume different corrosives used for housecleaning with suicidal intent. This study was conducted at a tertiary level hospital in Western India and our findings are similar to other studies.

Conservative management of such patients is unsatisfactory. It has been seen that surgical management of such patients is usually delayed due to various patient factors like poor general health, anaemia and time taken for gastric inflammation to settle.<sup>10</sup> As a result, many patients get feeding jejunostomy as the initial procedure. In the similar context, some authors have reported early definitive surgery for GOO. In a series of 31 patients, Tseng et al reported early definitive surgery within 2 months of injury, with encouraging clinical results.<sup>11</sup>

Similar encouraging results were demonstrated by Hwang et al, who compared early definitive surgery within four months after corrosive injury with delayed surgery and showed that early definitive treatment resulted in better quality of life parameters.<sup>12</sup> However, in our patients, we waited on an average 6 months before performing a definite surgical procedure, so as to allow the inflammation and cicatrization to settle down and we observed good results. Also, the time lag allowed excluding those patients who may have developed more severe

oesophageal cicatrization and warranted gastro oesophageal bypass. Corrosive ingestion is associated with the development of oesophageal carcinoma in many cases, but very rarely in gastric carcinoma.<sup>13</sup> Though many authors have previously proposed resection of scarred stomach tissue, we prefer bypass in most patients and we have not seen any secondary malignancy during follow up.<sup>14</sup>

There are a few limitations of the study. Since this study was conducted at a single centre, the results of this study cannot be generalized to other centres. Moreover, future studies should be done with a larger sample of patients and with longer follow up period.

## CONCLUSION

Ingestion of corrosive carries high late morbidity. GOO is one of the clinical outcomes in these patients. Treatment of such patients should be staged, with initial feeding jejunostomy, followed by the definitive surgical procedure. Delayed definitive surgery, like in our study population, showed good clinical improvement and fewer complications. Resection of cicatrized stomach just to prevent occurrence of rare malignancy may not be justified.

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**Ethical approval:** The study was approved by the institutional ethics committee

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