

CLINICAL SPECTRUM OF ACUTE CORROSIVE INGESTION INJURIES OF GI TRACT AT VIMS HOSPITAL

Mansoor Ali K¹, Halli Karibasappa², Khalid Muqueem³, Nihal Sultana⁴

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Corresponding Author:
Dr. Mansoor Ali K,
Email: mannile123@gmail.com

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¹Assistant Professor, Department of Medical Gastroenterology, Vijayanagara Institute of Medical Sciences, Ballari, Karnataka, India.

²Associate Professor, Department of Medicine, Vijayanagara Institute of Medical Sciences, Ballari, Karnataka, India.

³Associate Professor, Department of General Surgery, Vijayanagara Institute of Medical Sciences, Ballari, Karnataka, India.

⁴Consultant Diabetology, Ballari Health City Hospital, Ballari, Karnataka, India.

Abstract

Background: Corrosive injury of the upper gastrointestinal tract is a worldwide clinical problem. The present study was conducted to evaluate the clinical profile cases of corrosive injury of GI tract and to analyze the outcome of corrosive injury of GI tract. **Materials and Methods:** Detailed history to evaluate the presence of oropharyngeal, esophageal and gastric symptoms. After routine serum chemistry and blood grouping each patient was subjected to plain radiographs of chest and abdomen for evidence of perforation. Within next 24 hours under local xylocaine anesthesia esophagogastroduodenoscopy using a flexible Olympus GIF TYPEQ150 video endoscope was attempted in all patients to assess the location, extent and severity of injury to upper GI tract. The injury was graded according to modified 6 point classification by Zargar and colleagues into I,IIA,IIIB,IIIA,IIIB. **Results:** Epigastric pain and vomiting occurred in 50 (100%) and 44(88%) of patients respectively. Burning sensation in the oral cavity was seen in 40 (80%) and hematemesis in 46(92%) patients. The other symptoms noted were sialorrhoea 30 (60%), odynophagia 44 (88%), dysphagia 40(80%) and heart burn 25 (50%). Severe gastric burns (IIIB or more) were seen in 34 patients (68%). 3 patients (6 %) had mild burns (I) and 2 patients had moderate burns (IIA) and 11(22%) patients had a normal study. **Conclusion:** Corrosive acid ingestion causes burns of both the Oesophagus and Stomach in high percentage of patients. Upper gastrointestinal endoscopy was found to be a safe reliable and predictable tool to identify the extent and severity of injury.

INTRODUCTION

A corrosive is a substance that causes damage on contact with tissue surfaces both histologically and functionally. Corrosive substances can be classified typically into two types based on their pH and proton donating/accepting nature. Acids are substances which act as proton donor and alkalis are substances which act as proton acceptors. Release of thermal energy for neutralizing the corrosive on contact with tissues is responsible for the damage to the tissues. There are several factors which influence the extent of injury caused by the corrosive to the GI tract like the volume of the substance consumed, pH of the corrosive, concentration at which it was consumed, ability of the substance to penetrate tissues and a property of the corrosive known as titrable acid/alkali reserve (TAR). The circumstance of consumption of

corrosive agent is usually with suicidal intent in adults.

The commonest sources of acids which Indian patients have easy access to are toilet cleaners, car batteries for polishing gold and silver ornaments, in laboratories and industrial work places.

More concentrated acid is nitric acid which is greatly accessible in laboratories and industries. Chemical analyses of these showed hydrochloric acid to be in a range of 7.48 – 9.50 N (maximum concentration 13.1 N) and sulphuric acid to be in a range of 26.40 – 35.40 N (maximum concentration 36.8 N).^[1]

The pH or pKa of a chemical is a measure of how easily the chemical accepts or donates a proton. These terms determine the strength or likely hood of serious damage with tissue contact. Substances with a pH or pKa less than 2 are strong acids and those with greater than 12 are strong bases. The severity

of tissue injury from acids and bases is determined by the substance's pH or pKa concentration, duration of contact and volume of contact.^[2]

The mortality rate after caustic ingestion has decreased in the past 20-30 years from 20% to less than 1% as a result of lower concentrations of caustic solutions, improved surgical and anaesthesiologic techniques and more effective antibiotics and nutritional support.^[3] Approximately 10% of caustic ingestion results in severe injury requiring treatment. Caustic ingestions between 1% and 2% result in stricture formation.

Most series of studies of acid ingestion have concluded that symptoms and signs were unreliable in predicting the extent and severity of injury. Some have proposed a caustic injury score for predicting severity taking into consideration certain indices like age, presence of peritoneal signs, pH level, HCO₃ etc. as prognostic factors but have not been conclusive.^[1,4,5,6]

MATERIALS AND METHODS

A total number of 50 patients who were admitted to Acute Medical Care Ward of Vijayanagara institute of medical sciences, ballari with the history of corrosive acid ingestion were studied prospectively during a period of 12 months from June 2018 to June 2019.

Inclusion Criteria

All patients with history of corrosive acid ingestion presenting within 24 hrs of consumption.

Exclusion Criteria

Those who presented beyond 24 hours of consumption

The initial history was directed towards ascertaining details regarding the corrosive consumed i.e. type of

acid, concentration, amount and whether suicidal, accidental or otherwise.

Subsequently detailed history to evaluate the presence of oropharyngeal, esophageal and gastric symptoms. After routine serum chemistry and blood grouping each patient was subjected to plain radiographs of chest and abdomen for evidence of perforation. Within next 24 hours under local xylocaine anaesthesia esophagogastroduodenoscopy using a flexible Olympus GIF TYPEQ150 video endoscope was attempted in all patients to assess the location, extent and severity of injury to upper GI tract. The injury was graded according to modified 6 point classification by Zargar and colleagues into I,IIA,IIB,IIIA,IIIB. Endoscopy was possible in all patients

All patients at admission were kept nil by mouth, iv antibiotics, iv fluids and iv pantocid. After initial endoscopy, patients with grade I and IIA injury were allowed oral fluids and eventually discharged. Patients with grade IIB injury and above were given nil oral for initial 2 weeks and subsequently allowed oral liquids if tolerated.

Upper gastrointestinal endoscopy was repeated at the end of 4 weeks in all patients to assess degree of healing. These patients were also subjected to barium studies (barium swallow) during early follow up period of up to 2 months to look for development of complications.

Statistical Analysis

Mean age, standard deviation is calculated and Pearson chi-square test used to analyse the variables and comparison and predicting the outcome. Data's were analysed using Statistical package-SPSS software version 11.5. The significance of difference in mean between the groups was calculated by Fisher exact test. Variables were considered to be significant if P<0.05.

RESULTS

Fifty patients with a definite history of corrosive acid ingestion were included in the present study. There were 22(44%) women and 28(56%) men. Their ages ranged from 19 years to 69 years with mean age of 31.10±11.17 years.

Table 1: Age and sex distribution

DECADE	MEN	WOMEN	TOTAL	PERCENTAGE
0-9	-	-	-	-
10-19	2	2	4	8%
20-29	16	15	31	62%
30-39	5	2	7	10%
40-49	2	2	4	8%
50-59	1	1	2	4%
60-69	2	-	2	4%
TOTAL			n=50	100%

Cause for Ingestion

In all 50 patients the injury was suicidal while there were no accidental cases of injury and suicidal attempt in all cases were first time

Nature and Amount Ingested

All patients had consumed acid in liquid form. However, the nature of the acid consumed differed. The commonest corrosive acid ingested was Hydrochloric acid(n=48) followed by sulphuric acid(n=1), phenyl(n=1).

The exact volume ingested was difficult to ascertain in each case but ranged apparently from 15ml to 100ml. The concentration of the acids ingested by the patients was not known.

Table 2: Symptoms

SYMPTOMS	NUMBER	PERCENTAGE%
Epigastric pain	50	100
Vomiting	44	88
Oral burns	40	60
Haematemesis	46	92
Sialorrhoea	44	68
Odynophagia	44	88
Dysphagia	40	80
Heart burn	25	50

Interval before Admission to the Hospital

All patients presented between 12hours to 24hours after ingestion with a mean interval of 14.27hours. Epigastric pain and vomiting occurred in 50 (100%) and 44(88%) of patients respectively. Burning sensation in the oral cavity was seen in 40 (80%) and haematemesis in 46(92%) patients. The other symptoms noted were sialorrhoea 30 (60%), odynophagia 44 (88%), dysphagia 40(80%) and heart burn 25 (50%).

All the symptoms were maximal in Grade IIB & beyond.

Oropharyngeal Burns

Burns of one or more of the following – lips, tongue, buccal mucosa, soft palate, hard palate or pharynx were seen in 40(80) patients.

Abdominal Signs

Epigastric tenderness was seen in 44(88%) patients, while 2had diffuse abdominal tenderness and guarding 4 showed normal abdomen.

All patients were admitted to the hospital and mean duration of stay in hospital was 5±3 days.

Endoscopy Findings

Upper gastrointestinal endoscopy, to assess the extent and severity of burns was possible in 50 patients.

Esophageal Burns

GRADE	NUMBER	%AGE
0	-	-
I	5	10
IIA	2	4
IIB	35	70
IIIA	4	8
IIIB	4	8

Severe esophageal burns (IIB or more) were found in 43 patients (86%), while 7 had mild to moderate burns (grade I and IIA).

Table 3: Gastric Burns

GRADE	NUMBER	%AGE
0	11	22
I	3	6
IIA	2	4
IIB	27	54.5
IIIA	6	12
IIIB	1	2

Severe gastric burns (IIB or more) were seen in 34 patients (68%).3 patients(6 %) had mild burns (I) and 2 patients had moderate burns (IIA) and 11(22%)patients had a normal study.

DUODENAL BURNS:

The endoscope could not be passed into the duodenum due to pylorospasm in 34 patients. 16patients had a normal duodenal mucosa.

Table 4: simultaneous comparison of esophageal and gastric burns.

	0	I	IIA	IIB	IIA	IIIB
0	-	-	-	1	1	1
I	-	1	-	-	-	-
IIA	3	1	1	-	1	-
IIB	8	1	-	17	4	-
IIIA	-	-	-	1	6	-
IIIB	-	-	-	-	-	4

Isolated involvement of the esophagus was seen in 20(40%) patients while 3(6%) patients had isolated involvement of the stomach.

38Patients (76%) had burns of both esophagus and stomach simultaneously.

21 patients (42%) had burns of a similar degree in both esophagus and stomach, while the others had difference of one or two grade.

Overall no mortality was noted. Among the survivors (n=16) 32 % of patients were subjected to feeding gastrostomy. No endoscopy related complications were encountered in any patients. No emergency surgery was undertaken.

FOLLOW UP AND SHORT TERM COMPLICATIONS

Repeat Endoscopy after 4 Weeks: 50 patients turned up for repeat endoscopy at the end of the month.

Table 5: Outcome of Endoscopic grading

Endoscopic grading		Outcome		Total
		NORMAL	STRICTURE	
Esophageal	I	5	0	5
	IIA	2	0	2
	IIB	0	35	35
	IIIA	0	4	4
	IIIB	0	4	4
Total		7	43	50
P-0.000(pearsons chi square test)				
Endoscopic grading.		Outcome		Total
		NORMAL	STRICTURE	
Gastric	O	11	0	11
	I	3	0	3
	IIA	2	0	2
	IIB	1	26	27
	IIIA	0	6	6
	IIIB	0	1	1
Total		17	33	50

P-0.004(Pearsons chisquare test)

43of 50(86) %patients came for follow up with > grade IIB esophageal injury had developed stricture while the remaining 7(14%) had healed to one grade lower.

33 of 50(66%) endoscopically evaluated patients on follow up UGIE with gastric injury > grade IIBand beyond had developed strictures& 17 patients with milder grade burns had healed without sequele.

DISCUSSION

Corrosive burns of the upper gastrointestinal tract due to acid ingestion are common in India. In the present study involving a total of 40 patients all had easy access to acids, as they are commonly used as toilet bowel cleansers in Indian households and are available freely and cheaply in the market.

In the present study, hydrochloric acid was the commonest agent ingested (50/50) 100%. This is a parameter where Indian data differs strikingly from western data where alkali consumption is more common than acid ingestion. The reason is attributed to the easy availability of acids when compared to alkalis.^[7] The mean duration since consumption when the patient was subjected to upper GI endoscopy was 14.27 hours. The incidence of strictures was higher in the patients who underwent endoscopy later than 12hours, but the difference was not statistically significant.

In the present study suicidal intent was the commonest cause for ingestion 50 out of 50 patients (100%). The degree of injury could not be correlated with the type of acid as other factors like exact amount ingested and concentration were difficult to ascertain.

Contrary to the general belief in the western literature that the esophagus is spared in acid ingestion, the present study found the esophagus involved in all patients (100%). Zargar et al.^[5] reported esophageal burns in 87.7% of their patients, while Dilawari⁸ et al reported esophageal involvement in 13 out of 15 patients (87%). Moreover 43 out of 50 patients (86%) had severe esophageal injury and esophagus was diffusely involved in all 43 patients (86%). The early use of endoscopy was crucial in determining the high incidence of esophageal involvement in acid ingestion.

the present study found the esophagus involved in all patients (100%) and acute gastric injury was seen in 78 % of the patients (n=39). The incidence of significant esophageal and gastric injury as well as stricture was higher in the patients with normal physical examination and the difference was statistically significant. This correlates with studies which have the shown the poor predictive nature of oropharyngeal in predicting the occurrence of esophageal or gastric injury following corrosive ingestion.^[9]

In the present study, epigastric pain (100%) and vomiting (88%) were the commonest symptoms

encountered. This was similar to that of Dilawari et al 94% and 88% respectively.

However, in the study by Zargar et al⁵ odynophagia (73%) and dysphagia (56%) were the commonest symptoms encountered. Where as in the present day study, was seen in 88% and 80% respectively.

In the present study all 43 patients with >grade IIB and above esophageal burns available for follow-up had developed esophageal stricture by 2 months. In the present study gastric stricture occurred in 33 of 50(66 %)of patients with grade IIB and beyond at follow up of 2 months as compared to 33% of patients in study by Dilawari et al.^[8]

CONCLUSION

Corrosive acid ingestion causes burns of both the Oesophagus and Stomach in high percentage of patients (100% and 78% in present study). Symptoms and signs were unreliable in predicting the severity and extent of injury. In short term follow up of 2 months all survivors with grade IIB esophageal and gastric injury developed stricture and was statistically significant.

Upper gastrointestinal endoscopy was found to be a safe reliable and predictable tool to identify the extent and severity of injury.it was useful in

deciding treatment and assessing prognosis and predicting the outcome according to grade of initial injury.

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