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A STUDY ON CAUSTIC INGESTION AND OUTCOME

***Dr. P. Srujan, M.D., Dr. D. Sridhar, M.D. and Dr. Rohith, M.D.,**

Associate Professor of Medicine, Osmania Medical College / Osmania General Hospital, Hyderabad, Telangana State. General Medicine.

***Corresponding Author: Dr. P. Srujan, M.D.**

Associate Professor of Medicine, Osmania Medical College / Osmania General Hospital, Hyderabad, Telangana State.

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ABSTRACT

Introduction*:** Poisoning is one of the most commonly used suicidal methods in India. Caustic ingestion is one among them. ***Aims & Objectives*:* To find out the prevalence & pattern of Corrosive injury and to elicit the clinical features / clinical course and outcome by endoscopy. ***Material & Methods:*** A prospective cross - sectional study with 50 Patients presenting with caustic ingestion were the study subjects evaluating with clinical history and all relevant investigations as per norms. ***Results***: In our study the most commonly used corrosive was acid (70%), Alkali was only 30%. Among the acid, Carbolic acid (phenol) was the most commonly used acid. Out of 50 patients, 40 patients were discharged. 8 patients died within 48 hours ***Conclusion:*** Females had outnumbered the males in our study(64:36).The quantity and concentration of caustic consumed determined the outcome. Patient with Grade – III injury had more morbidity in the form of stricture involving upper gastro intestinal tract.100% mortality observed in Grade – IV injury.

KEYWORDS: Corrosive Injury (CI); UPGIE-Upper Gastrointestinal Endoscopy.

INTRODUCTION

Poisoning is one of the most commonly used suicidal methods. Caustic ingestion is one among them. In most of the poisoning mortality is observed in most instances. But once the life is saved immediately, the subsequent morbidity rarely witnessed. This is not so in caustic ingestion. Various studies conducted in the northern and southern parts of India documented significant exposure to caustic substances in both household,accidental and industrial products[1,2].

CAUSTIC AGENTS

There are two major types of caustic agents, namely

1. Acid
2. Alkali

Acids

A. Organic - Carbolic & Oxalic acids

B. Inorganic - Hydrochloric acid, sulphuric acid & Nitric acid.

Alkalis

A. Sodium hydroxide

B. Potassium hydroxide

C. Lime

Even though acid and alkali have different pathogenesis for causing injury, the degree of injury in both depend.[3,4] on

1. Agent
2. Concentration
3. Quantity
4. Physical state
5. Duration of exposure

Alkali causes more injury than acid, owing to its physical properties of being odourless and tasteless, it is ingested in larger quantity before the protective reflex is invoked. Also alkali has rapid tissue penetration.[1,4]

Caustic injury can produce devastating and progressive injury to esophagus and stomach.[1,2] Although most commonly affected body areas are the face, eyes, and extremities, all reported fatalities were as a result of ingestion.

On the contrary, little has been proven in the way of medical treatment of caustic ingestion. There are very few studies regarding the epidemiological pattern of corrosive ingestion and on their follow up. Hence the present study.

AIMS AND OBJECTIVES

- To find out the prevalence & pattern of Corrosive injury.
- To analyse the Age – Sex distribution among patients admitted with corrosive ingestion.
- To elicit the circumstances for poisoning.
- To identify the common corrosives ingested.

- To elicit the clinical features / clinical course and outcome.
- To assess the grade of esophageal injury by means of upper GI Endoscopy and correlate it with the outcome.

MATERIALS AND METHODS

The study population includes 50 consecutive cases of caustic ingestion that were admitted in our Acute Medical Care, Department of General medicine, Osmania General Hospital, Hyderabad between January 2019 and July 2020. Patients were followed up prospectively at 1 month and 3 months after discharge.

Inclusion Criteria

The cases included were those with caustic ingestion alone

Exclusion Criteria

Mixed poisoning patients were excluded.
Ethical Committee Clearance obtained and Informed Consent obtained from all patients included in the study.

As in all other poisoning, the initial step was to stabilize the vitals. A detailed history regarding the type and quantity of caustic ingested, the circumstances, presenting symptoms and details of first aid, if any were recorded. A thorough physical examination including the oral cavity was done. Then the patients were assessed for endoscopic procedures. If the patient was fit (Hemodynamically stable), the upper gastro intestinal endoscope was done within 48 hours.

In the mean while routine blood investigation, X-ray test were taken. Patients were kept nil per oral and supported with parenteral nutrition.

According to the grade of injury in upper gastro intestinal endoscope further planning was made. If the patients had less than Grade– II and were able to swallow the saliva, they were started on liquids with caution to avoid aspiration. If the injury was more than grade II, nasogastric tube was placed under endoscopic guidance and feeding was started through the NG tube. Every patient would be counseled separately and also with their family in medical ward as well as in Psychiatric OP Department. The patient would then be discharged after fixing date for barium swallow, usually after 12 weeks. Patients were discharged with nasogastric tube insitu for feeding. Patients were advised to follow up in Medical Gastroenterology OP / concerned Medical OP. In our study the patients were followed up at 1st month and 3rd month to assess the Grade of dysphagia clinically and then subjected to barium swallow study. If the patients had any complications like stricture / gastric outlet obstruction further plan of treatment was discussed with the patient usually endoscopic dilatation or surgery would be the modality of treatment.

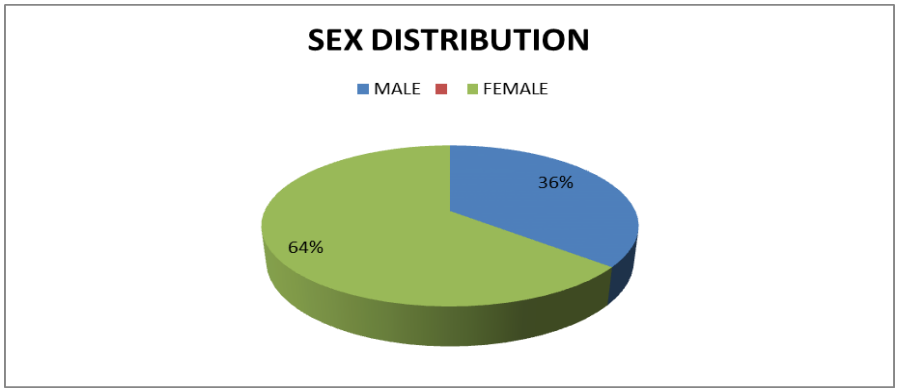
Grade	Endoscopic Findings
I	Edema and erythema
IIA	Hemorrhage, erosions, blisters, ulcers with exudate
IIB	Circumferential ulceration
IIIA	Focal deep gray or brownish black ulcers
IIIB	Extensive deep gray or brownish black ulcers
IV	Perforation

Grade IIA Injury

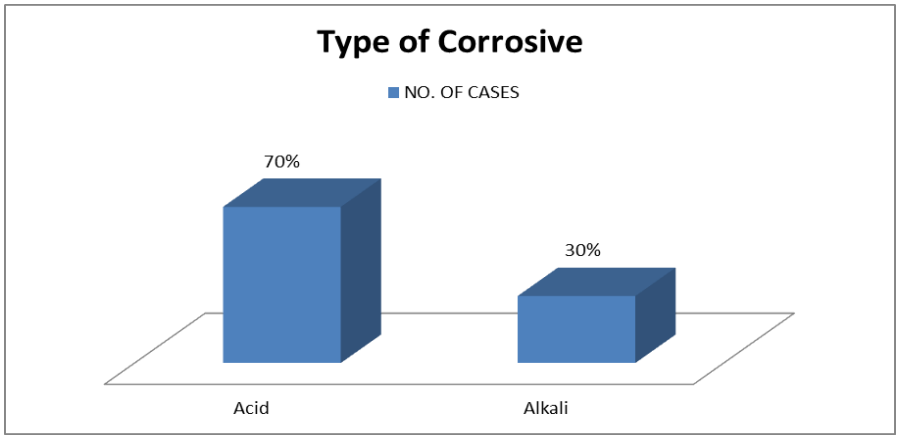
OBSERVATION AND RESULTS

Table 1: Age Distribution of Patients.

Age in years	No. Of cases (n=50)
15-24	23
25-34	12
35-44	8
45-54	4
55-64	2
65-75	1



Graph – I



Graph - II

Among the acid, Carbolic Acid (phenol) was the most commonly used acid. The most commonly used alkali was bleaching powder.

Table 2: SUB TYPES OF CORROSIVE.

CORROSIVE	NO. OF CASES
Carbolic Acid	26
Nitric Acid	2
Hydrochloric Acid	5
Sulfuric Acid	2
Unknown	1
Bleaching Powder	14

QUANTITY CONSUMED

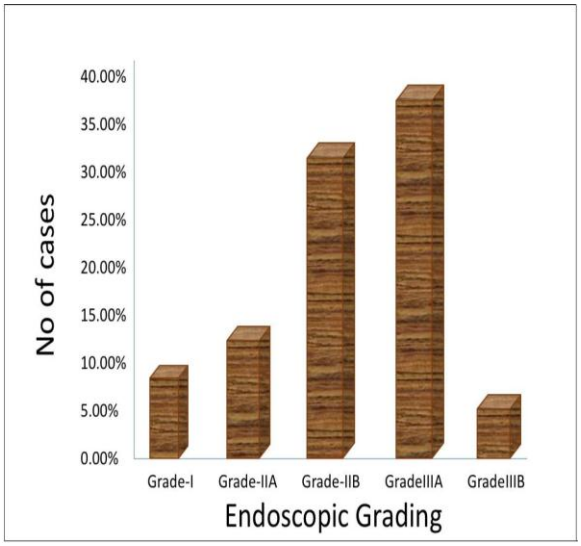
The average quantity of corrosive consumed by the patients in our study was 50ml. The quantity ranged from 15ml – 100ml. The patients with more quantity had severe grade of injury in the UGI endoscopy.

Table 3: Quantity Consumed.

CIRCUMSTANCE	NO. OF CASES
Suicidal	92%
Accidental	8%

Clinical Features

In our study out of 50 patients, 49 patients presented with vomiting out of which 35 patients had haemetemesis. Almost every patients presented with excessive persistent salivation. Out of 50 patients 18 patients had Respiratory Distress, among them 16 patients stridor. Other common presentation was dysphagia out of 50 patients 48 patients presented with dysphagia among them 38 had odynophagia. Abdominal pain was present in 44 patients.



Graph III: Upper Gastro Intestinal Endoscopy.

Table 4: Clinical Features.

Clinical features	N =50(%)
Vomiting	98%
Persistent Salivation	100%
UGI Bleeding	70%
Dysphagia	96%
Odynophagia	76%
Stridor	32%
Respiratory Distress	36%

Table 5: Endoscopy Grading.

ENDOSCOPIC GRADING	NO. OF CASES
Grade – I	9.5%
Grade - II a	14.2%
Grade - II b	33.3%
Grade – III a	38%
Grade – III b	4.75%

Mortality Rate

Out of 50 patients, 40 patients were discharged. 8 patients died within 48 hours. Out of these 8 patients, 5 patients Forensic Report showed perforation of the stomach. All these patients were admitted with Glasgow Coma Scale < 7/15.

Follow UP

In our study we planned to have follow up of the patients every 15 days and then to assess the grade of dysphagia at 1st and 3rd month.

At 3rd month we had follow up of 30 patients (75%), out of 40 patients, 10 patients were lost to follow up. Out of these 30 patients, 10 had dysphagia of Grade – III. i.e., Dysphagia for soft food. 9 had Dysphagia of Grade IV i.e. Dysphagia for liquids. 11 Patients had No Dysphagia.

For all the above patients who had dysphagia, Barium swallow study was done, which showed following pattern of stricture pattern.

Table 6: Stricture Pattern.

STRICTURE PATTERN	NO. OF CASES
Esophagus	13
Antral Stricture	2
Both	2
Normal	4

Treatment of Complication

In our study out of 13 patients, 11 underwent endoscopic stricture dilatation and 4 had surgery. Antrectomy was done in 2 patients and pharyngocoloplasty was done in remaining two of our patients.

DISCUSSION

The mean age group of the patients in our study were 29.5 years with range from 15 – 75 (23 patients).The study conducted by *broor et al*[4] included totally 138 patients (over the period of 5 years). With mean age of 47 ranging from 14-97. In 2003, Study conducted by *Shivakumar et al*,[5] with totally 30 patients was published. The mean age group was 28.5 years, which was nearly equal to our study.

In our study 64% of Female Patients and 36% of Male Patients had consumed Corrosives. Female patients had outnumbered the male patients. But in the study by *Broor et al*[4] Male patients (84) had outnumbered the Female patients (74). A study conducted by *Thomas et al*,[6] showed total number of cases as 78 out of which 61 are male and 17 are female. Acid (70%) was the most common caustic consumed in our study. Only 30% had consumed Alkali. While in MC. Guigan MA, et al., Jungler DJ et al,[7] Alkali was the most common type of corrosive consumed. The Eliasher R et al[8] study also showed Alkali as the most common type consumed than acid. Acid substances were ingested in 55.1% cases and alkali substance was ingested in 35.9% cases in a study conducted by *Thomas* et al.[6]

In our study Carbolic Acid was the most common Acid Consumed. This was due to easy availability of Toilet cleaner with carbolic acid. In Spanish Study Nitric Acid was the most common acid type consumed. The study conducted by *Gupta et al*[9] showed Sulphuric Acid as the most common type. So the most common sub type of acid consumption depend upon the local availability of the particular subtype.

Bleaching Powder (Sodium Hypochloride) was the most common Alkali consumed in our study. All the patients with alkali injury in our study had consumed only sodium hypochloride. In *Jougland J et al* study, sodium hydroxide was the most common alkali consumed.

In our study Suicidal was more common than accidental ingestion. Most of the study from Western World indicates the Accidental Consumption more than Suicidal. In a study conducted by *Havanond et al*[10] most of the cases were suicidal -92% and the rest 8% were accidental which is exactly the same compared to

our study.In a study conducted by *Poley et al.*[11] 85% cases were of suicidal ingestion, 15% cases were of accidental ingestion.

In our study, 98% of patients presented with vomiting, out of these 70% had haematemesis. In the study conducted by *Shivakumar et al*[5] 56% of patients presented with UGI Bleed, 96% presented with Dysphagia. Almost all patients presented with persistent salivation. 33% presented with Respiratory Distress and Stridor. Compared to our study the stridor percentage (50%) was more in the study conducted by *Shivakumar et al*[5] In the study conducted by *Havanond*[10] 84% cases presented with vomitings and only 2% cases had stridor which is less when compared to our study.

In our study, the mean amount of corrosive the patient had taken was around 50ml. The range varies from 15-100ml. The amount of corrosive consumed played significant role in the injury of the upper Gastro Intestinal Tract. In a study conducted by *Rodriguez Vargas et al*[12] showed that the mean volume of corrosive ingested was 16ml which is less when compared to our study.

In upper gastro intestinal endoscopy above 38% had Grade – IIIa Injury. 4.75% had Grade – IIIb Injury. 33.3% had Grade – IIb and 14.2% had Grade - IIa. 9.5% had Grade I injury. More or less same percentage of different grades of injury was noted in study conducted by *Shivakumar et al*[5] Whereas study conducted by *Gupta et al*, out of 15 patients, above 10 patients had Grade–III Injury. In our study Stomach was involved in 40% of the patients.

All the Grade – III injured patients had stomach involvement. Duodenum involvement was noticed only in 20%. In spanish study also the same percentage of stomach and duodenum involvement was noticed. But, Grade – III injury in this study was only 13%.The mean duration of the hospital stay of the caustic ingested patients were 6.5days. The duration of hospital stay varies from 3-15 days. This duration of stay includes the initial toxicological ICU stay also.

The mortality rate in our study was 16%. Out of 50 patients admitted, 8 patients were died. All these patients were admitted with Glasgow Coma Scale < 7/15. The Forensic Report of 5 patients had showed the perforation in the stomach. In 3 patients the stomach had torn in two pieces. The mortality rate of study done by *Shivakumar et al*[5] was 25%. In a study conducted by *Struck et al,*[13] showed a mortality rate of 18% which is close to our study.

In our study we had follow up of 75% of patients. We had follow up at 1st and 3rd months. Out of 30 patients, 10 patients had Grade – III Dysphagia, 9 patients had Grade – IV dysphagia, 11patients had no dysphagia. For those patients with dysphagia barium swallow study was done. Out of 19 patients, 11 patients had esophageal Stricture, 2 patients has antral stricture 2, patients had both. In study conducted by Cheng et al[14] 66 out of 273 patients developed esophageal stricture (24.18%).In a study conducted by Mamede and De mello Felho et al.[15] 73% cases developed esophageal stricture.

CONCLUSION

- Females had outnumbered the males in our study. (64:36)
- The common age group was between 15 - 25 years (23 out of 50 Cases).
- Acid was the most common corrosive consumed in our population.
- Suicidal ingestion was more common than accidental in our study group.
- The quantity and concentration of caustic consumed determined the outcome.
- Patient with Grade – III injury had more morbidity in the form of stricture involving upper gastro intestinal tract.
- 100% mortality observed in Grade – IV injury

REFERENCES

1. Chirica M, Kelly MD, Siboni S, Aiolfi A, Riva CG, Asti E, et al. Esophageal emergencies: WSES guidelines. World J Emerg Surg, 2019; 14: 26. doi: 10.1186/s13017-019-0245-2.
2. Bonavina L, Chirica M, Skrobic O, Kluger Y, Andreollo NA, Contini S, et al. Foregut caustic injuries: results of the world society of emergency surgery consensus conference. World J Emerg Surg. 2015; 10: 44. doi: 10.1186/s13017-015-0039-0. DOI
3. Ananthakrishnan N, Parthasarathy G, Kate V. Chronic corrosive injuries of the stomach-a single unit experience of 109 patients over thirty years. World J Surg, 2010; 34(4).
4. Broor SL, Raju GS, Bose PP et al: Long term results of endoscopic dilatation for treatment of corrosive oesophageal strictures. Gut, 1993; 34: 1498.
5. Shiva Kumar S, Rajan SK, Jayanthi V, Doss Madhu Prabhu CR et al, Corrosive ingestions Acute complications, Japi, 2003; 51.
6. Thomas MO, Ogunleye EO, Somefun O. Chemical injuries of the oesophagus: aetiopathological issues in Nigeria. J Cardiothorac Surg, 2009; 4(1): 56.
7. Gaudreault P, Parent M, McGuigan MA et al: Predictability of oesophageal injury from signs and symptoms: A study of caustic ingestion in 378 children. Pediatrics, 1983; 71: 767.
8. Laryngoscop aug, 2006; 116(8) 1422 – 1426.
9. Gupta SK, Croffie JM, Fitzgerald JF. 2001. Is esophagogastroduodenoscopy necessary in all caustic ingestions? J Pediatr Gastroenterol Nutr, 32(1): 50–53.
10. Havanond C, Havanond P. Initial signs and symptoms as prognostic indicators of severe gastrointestinal tract injury due to corrosive ingestion. J Emerg Med, 2007; 33(4): 349–353.
11. Poley J-W, Steyerberg EW, Kuipers EJ, Dees J,

Hartmans R, Tilanus HW, Siersema PD. Ingestion of acid and alkaline agents: outcome and prognostic value of early upper endoscopy. Gastointest Endosc, 2004; 60(3): 372–377.
12. Rodriguez Vargas BO, Monge Salgrado E, Montes Teves P, Salazar Ventura S, Guxman Calderon E. Caustics injuries in the upper gastrointestinal tract: clinical and endoscopic features. Rev Gastroenterol Peru, 2016; 36(2): 135–142.
13. Struck MF, Beilicke A, Hoffmeister A, Gockel I, Gries A, Wrigge H, Bernhard M. Acute emergency care and airway management of caustic ingestion in adults: single center observational study. Scand J Trauma Resusc Emerg Med, 2016; 24: 45.
14. Cheng H-T, Cheng C-L, Lin C-H, et al. Caustic ingestion in adults: The role of endoscopic classification in predicting outcome. BMC Gastroenterology, 2008; 8: 31. doi:10.1186/1471-230X-8-31.
15. Mamede RC, de Mello, Filho FV. Ingestion of caustic substances and its complications. Sao Paulo Med J, 2001; 119(1): 10-5.