



Research Article

Section: Surgical Gastroenterology and General Surgery

Endoscopic Findings and Clinical Outcomes in Adults Following Acidic and Alkaline Caustic Ingestion: A Retrospective Study at a Tertiary Care Hospital

Dr. Preethan Nagappa^{*1}, Dr. Bidarahalli K Prasanna², Dr. Shariq Ahmed Khan³ & Dr. Preksha V⁴

^{1,2}Department of Surgical Gastroenterology, Kempegowda Institute of Medical Sciences and Research Centre, Bangalore

^{3,4}Department of Surgical Gastroenterology and General Surgery, Kempegowda Institute of Medical Sciences and Research Centre, Bangalore

ARTICLE INFO

Article History:

Received: 28-07-2025

Accepted: 25-08-2025

Keywords:

Caustic ingestion

Alkaline vs. Acidic

Zargar classification

Endoscopy

Clinical outcomes

*Corresponding author:

Dr. Shariq Ahmed Khan

Department of Surgical
Gastroenterology and General
Surgery, Kempegowda Institute of
Medical Sciences and Research
Centre, Bangalore

ABSTRACT

Introduction: Caustic ingestion is a critical medical emergency with potential for significant gastrointestinal injury and long-term complications. This retrospective observational study, conducted at KIMS Hospital (Tertiary care hospital), Bangalore Urban, Karnataka compared endoscopic findings and clinical outcomes among adult patients who ingested either acidic or alkaline substances. The study aimed to evaluate differences in demographics, intent of ingestion, mucosal injury severity, treatment approaches, and short-term outcomes. **Material and Methods:** Adult patients with caustic ingestion who underwent endoscopic evaluation within 96 hours of ingestion at KIMS hospital between April 2022 and April 2025 were included. Data on demographics, type and amount of substance, intent, comorbidities, Zargar grading, treatments, and outcomes were collected. Exclusion criteria included hemodynamic instability, perforation, severe respiratory distress, non-corrosive ingestion, or confounding comorbidities. Descriptive statistics summarized patient characteristics, while Mann-Whitney and Chi-square tests assessed differences between acidic and alkaline groups, with significance set at $p < 0.05$. **Results:** A total of 88 patients were included. Age and gender distribution were similar across groups. Suicidal ingestion predominated, and most patients had no comorbidities. Sulphuric acid and sodium hydroxide were the most commonly ingested substances in their respective groups. Zargar grading showed comparable mucosal injury severity in the esophagus, stomach, and duodenum. Conservative management was the primary approach for both groups. Although overall recovery was high, the alkaline group had slightly higher mortality and significantly more post-treatment complications ($p = 0.03$). One-month follow-up showed significantly more antral gastritis and fewer complication-free cases in the alkaline group. **Conclusion:** Both acidic and alkaline ingestions resulted in similar injury severity and required primarily conservative management. However, alkaline agents were associated with more complications and poorer short-term outcomes, underscoring the need for close follow-up and individualized care in these patients.

INTRODUCTION

Caustic substance ingestion continues to pose a significant public health concern, particularly in low and middle-income countries where household cleaning agents and industrial chemicals are often accessible without proper regulation or labeling. The ingestion of such substances, whether intentional or accidental, leads to a spectrum of gastrointestinal injuries, the severity of which depends on several variables including the nature of the agent-acidic or

alkaline-its concentration, volume consumed, and the duration of contact with mucosal surfaces. Acidic compounds typically cause coagulative necrosis that may limit deep tissue penetration but lead to extensive gastric damage. In contrast, alkaline substances are known for causing liquefactive necrosis, facilitating deeper penetration and more widespread injury, especially to the esophagus. These pathophysiological differences are reflected in distinct patterns of

endoscopic findings and clinical complications, making early evaluation and classification essential for guiding management [1,2].

The need for region-specific studies is particularly pertinent given the variability in the types of substances ingested, health-seeking behavior, and availability of medical care. In India, data on caustic ingestion are largely fragmented and limited to case series or smaller observational reports. A structured retrospective investigation from a tertiary care institution like KIMS Hospital in Bangalore fills a critical gap by providing clinically relevant insights derived from a larger cohort of patients presenting with confirmed caustic ingestion. The patient demographic in such settings is diverse, including individuals with varying socioeconomic backgrounds, mental health conditions, and exposure to different caustic agents. Moreover, the patterns of ingestion-accidental versus intentional-often differ, with suicidal intent being notably prevalent among adult patients [3-5]. Endoscopic evaluation, particularly within the first 96 hours of ingestion, plays a vital role in assessing the extent of mucosal damage. The Zargar classification system has been widely adopted as a standardized method to grade injury severity in the esophagus, stomach, and duodenum. Early endoscopy allows clinicians to stratify patients based on risk and initiate targeted interventions, ranging from conservative management and nutritional support to surgical procedures in cases of severe injury or complications like perforation, stricture formation, or gastric outlet obstruction. However, delays in presentation, comorbid medical conditions, and differences in healthcare access can influence the timing and feasibility of such evaluations [6,7].

This retrospective study examines adult patients who presented to KIMS Hospital with confirmed cases of caustic ingestion, analyzing their demographic profiles, clinical presentations, types and quantities of substances ingested, and timing of endoscopy. It also documents their management-medical or surgical and evaluates outcomes such as mortality, complications, and hospital stay duration. By comparing cases of acidic and alkaline ingestion, the study aims to determine whether the nature of the corrosive agent significantly influences injury patterns and prognostic outcomes. An important aspect of this investigation is its use of consistent grading criteria and statistical methods to ensure objectivity in comparisons. For instance, variables such as endoscopic injury grades, management strategies, and post-treatment complications were rigorously assessed using inferential statistics like the Mann-Whitney and Chi-square tests to evaluate significance [8-10].

Furthermore, follow-up data at one month post-discharge help in understanding long-term sequelae and the burden of complications such as stricture formation, gastric scarring, or persistent gastritis. findings have the potential to inform both acute and chronic care strategies, enabling more tailored clinical decisions based on the type of corrosive exposure. In

addition, they supported the development of institutional protocols for the early triage, endoscopic evaluation, and long-term monitoring of patients following caustic ingestion. The results underscore the importance of early diagnosis, evidence-based management, and continued follow-up, particularly in resource-limited settings where complications may otherwise go unrecognized [11,12]. The objectives of the study were to compare the severity of mucosal injury using Zargar's endoscopic classification between acidic and alkaline caustic ingestions, analyze the demographic profile, intent of ingestion, and associated comorbidities in affected patients, document the clinical management approaches including medical, endoscopic, and surgical interventions along with their outcomes, and identify potential predictors of complications such as mediastinitis and strictures, as well as overall mortality.

MATERIALS AND METHODS

This retrospective observational study was conducted at the Department of Surgical Gastroenterology, KIMS Hospital, Bangalore from April 2022 - April 2025. Ethical approval has been obtained from the Ethical Approval Committee of KIMS Hospital, Bangalore.

Study Population

The study included adult patients aged 18 years or older who presented to the emergency department of KIMS Hospital with a history of caustic substance ingestion and underwent endoscopic evaluation within 96 hours, as supported by recent evidence permitting accurate grading up to four days post-ingestion. Patients were excluded if they had hemodynamic instability, perforation, severe respiratory distress, ingested non-corrosive substances, had confounding pre-existing conditions, were pregnant, or were transferred after receiving prior management elsewhere.

Data Analysis

Data were collected on demographics (age, gender), clinical details (type, quantity, and intent of caustic ingestion), endoscopic findings (Zargar's classification for esophagus, stomach, duodenum), management (medical or surgical interventions), and outcomes (complications, mortality, hospital stay). Statistical analysis was performed using SPSS Version 22.0. Descriptive statistics included mean, standard deviation, frequencies, and proportions. Inferential analysis used Mann-Whitney and Chi-square tests, with statistical significance defined as $p < 0.05$ for comparing variables between two groups.

RESULTS

The study compared age, gender distribution, type of corrosive compounds consumed, and quantity ingested between individuals exposed to acidic and alkaline substances. The mean age of patients in both groups was similar- 30.04 ± 11.33 years for the acidic group and 30.95 ± 12.28 years for the alkaline group-with no statistically significant difference ($p=0.71$). Gender distribution showed

a male predominance in the acidic group (62.2%) and a slight female predominance in the alkaline group (51.2%), but this variation was not statistically significant ($p=0.21$). Among acidic substances, sulphuric acid was most commonly consumed (40.0%), followed by oxalic acid (31.1%) and hydrochloric acid (28.9%). In the alkaline group, sodium hydroxide was the most frequently ingested (30.2%), followed

by potassium hydroxide (20.9%) and phosphoric acid (18.6%), while ammonium hydroxide was the least common (2.3%). The mean quantity ingested was higher in the alkaline group (78.95 ± 78.59 ml) compared to the acidic group (57.89 ± 50.48 ml), but the difference was not statistically significant ($p=0.51$), indicating no meaningful variation in the volume of substance consumed between the two groups.

Table 1: Comparison of number of days Oesophago-Gastro-Duodenoscopy Performed After Poison Ingestion Using Chi Square Test

Variable	Category	Acidic		Alkaline		P-Value
		N	%	N	%	
OGD Performed	Within 24 hrs	6	13.3%	9	20.9%	0.41
	24-48 hrs	21	46.7%	20	46.5%	
	48-72 hrs	17	37.8%	11	25.6%	
	72-96 hrs	1	2.2%	3	7.0%	

The timing of OGD was similar between groups, with most procedures performed within the first two days post-ingestion; no statistically significant difference was observed ($p=0.41$).

Table 2: Comparison of Patients Characteristics Based on the Corrosive Compound Ingested Using Chi Square Test

Variable	Category	Acidic		Alkaline		P-Value
		N	%	N	%	
Co-intoxicants	Alcohol	3	6.7%	3	7.0%	0.52
	Cannabinoids	3	6.7%	6	14.0%	
	Nil	39	86.7%	34	79.1%	
Intention	Accidental	10	22.2%	5	11.6%	0.19
	Suicidal	35	77.8%	38	88.4%	
Comorbidities	DM	1	2.2%	1	2.3%	0.97
	HTN	1	2.2%	3	7.0%	0.28
	IHD	2	4.4%	1	2.3%	0.58
	COPD	2	4.4%	1	2.3%	0.58
	CKD	1	2.2%	2	4.7%	0.53
	Hypothyroidism	2	4.4%	2	4.7%	0.96
	Psychiatric illness	6	13.3%	3	7.0%	0.33
	Nil	30	66.7%	31	72.1%	0.58

Both groups showed similar patient characteristics, with most cases involving suicidal intent and no co-intoxicants or com-orbidities; none of the differences in co-intoxicant use, intent, or comorbidity distribution reached statistical significance.

Zargar Endoscopic Classification of Corrosive Injury

Grade 0 – Normal mucosa

* No injury seen.

Grade I – Edema and hyperemia of mucosa

* Mild injury, superficial.

Grade IIa – Superficial ulcers, friability, blisters, exudates, hemorrhage, whitish membranes

*Non-circumferential lesions.

Grade IIb – Deep or circumferential ulcerations

Grade IIIa – Focal necrosis, small scattered areas of brown-black or gray discoloration

*Transmural injury but localized.

Grade IIIb – Extensive necrosis with large areas of brown-black or gray discoloration, perforation possible

*Extensive and deep transmural injury.

Table 3: Comparison of Zargar Grade of Oesophagus, Stomach & Duodenum Among Study Patients Using Chi Square test

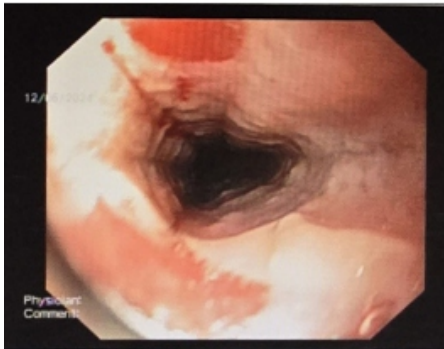
Variable	Category	Acidic		Alkaline		P-Value
		N	%	N	%	
Oesophagus	Grade I	4	8.9%	5	11.6%	0.99
	Grade IIa	9	20.0%	10	23.3%	
	Grade IIb	3	6.7%	2	4.7%	
	Grade IIIa	1	2.2%	1	2.3%	
	Grade IIIb	1	2.2%	1	2.3%	
	Normal	27	60.0%	24	55.8%	
Stomach	Grade I	12	26.7%	8	18.6%	0.71
	Grade IIa	4	8.9%	7	16.3%	
	Grade IIb	1	2.2%	2	4.7%	
	Grade IIIa	2	4.4%	4	9.3%	
	Grade IIIb	3	6.7%	3	7.0%	
	Normal	23	51.1%	19	44.2%	
Duodenum	Grade I	1	2.2%	2	4.7%	0.46
	Grade IIa	2	4.4%	0	0.0%	
	Grade IIIa	1	2.2%	2	4.7%	
	Grade IIIb	1	2.2%	0	0.0%	
	Normal	40	88.9%	39	90.7%	

Zargar grading of the oesophagus, stomach, and duodenum showed mostly mild-to-moderate injuries with normal findings Endoscopy Images

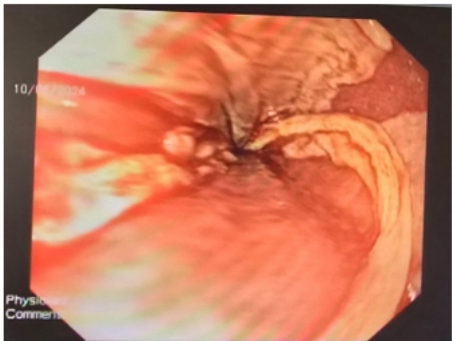
in over half the patients; injury patterns were similar between acidic and alkaline groups, with no statistically significant differences.



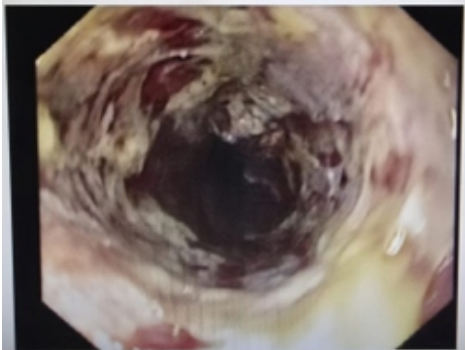
Esophagus Zargar I (edematous mucosa)



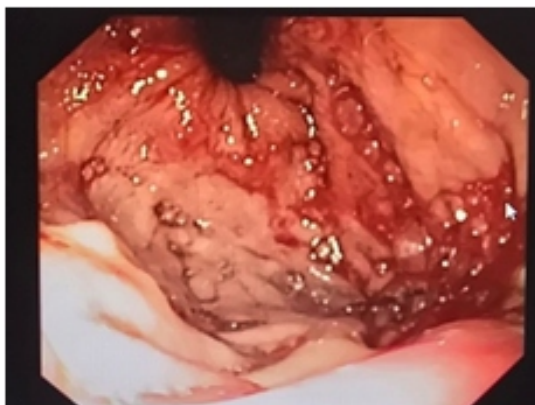
Esophagus Zargar IIa (superficial ulcers)



Esophagus Zargar IIb (deep circumferential ulcers)



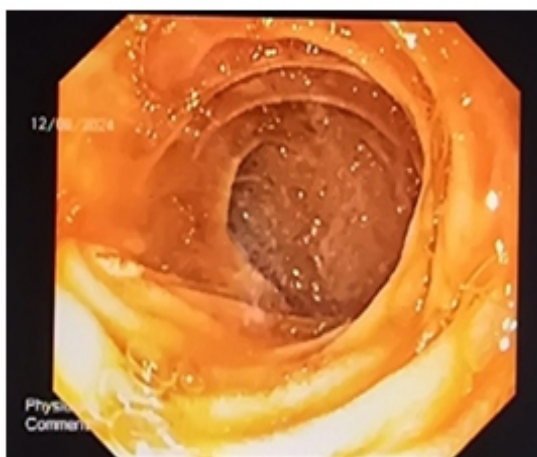
Esophagus Zargar IIIa (scattered necrotic mucosa)



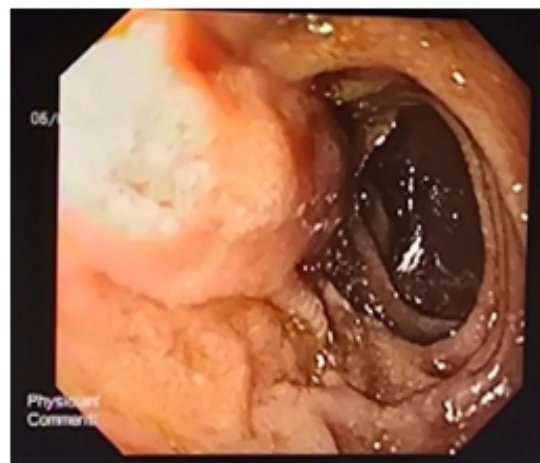
Stomach Zargar IIa (superficial ulcers)



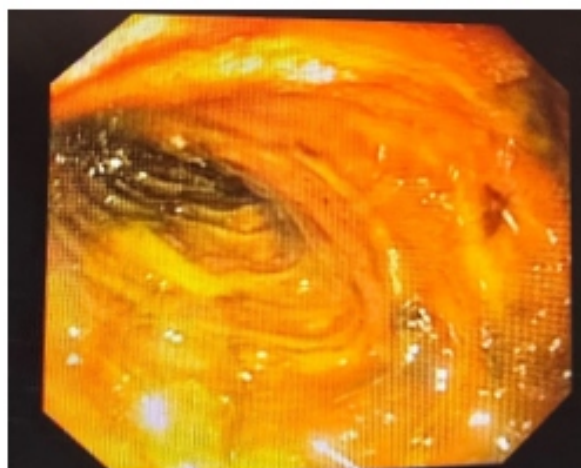
Stomach Zargar IIIb (extensive necrosis)



Duodenum Zargar I (edematous mucosa)



Duodenum Zargar IIa (superficial ulcers)



Duodenum Zargar IIIa (deep ulcers with scattered necrosis)

Table 4: Comparison of Treatment Procedure and Management Course Among Study Patients Using Chi Square test

Variable	Category	Acidic		Alkaline		P-Value
		N	%	N	%	
Procedural details	Conservative	41	87%	40	90.9%	0.68
	Feeding jejunostomy	0	0.0%	1	2.27%	
	Total Gastrectomy with Feeding jejunostomy	1	2.12%	1	2.27%	
	Gastro-jejunostomy	1	2.12%	0	0.0%	
	Tracheostomy	4	8.51%	2	4.54%	
Course in the Hospital	Tracheostomy	4	8.9%	2	4.7%	0.43
	Antibiotic therapy	8	17.8%	10	23.3%	0.52
	ICU	4	8.9%	4	9.3%	0.95
	Intubation	0	0.0%	1	2.3%	0.30
	Symptomatic treatment	34	75.6%	31	72.1%	0.71

Management was predominantly conservative in both groups, with minimal surgical interventions and similar hospital courses; no statistically significant differences were observed in treatment approach or supportive care measures.

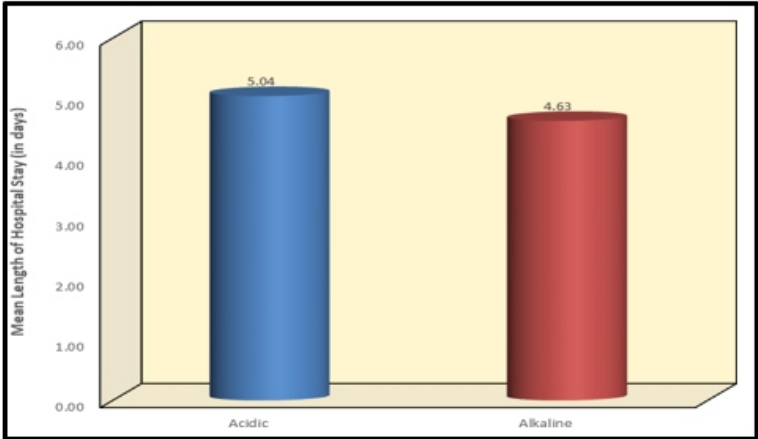


Figure 1: Mean Length of Hospital Stay (in days) between 2 Groups

The average hospital stay was slightly longer in the acidic group than in the alkaline group, but the difference of 0.41 days was not statistically significant, indicating similar hospitalization durations.

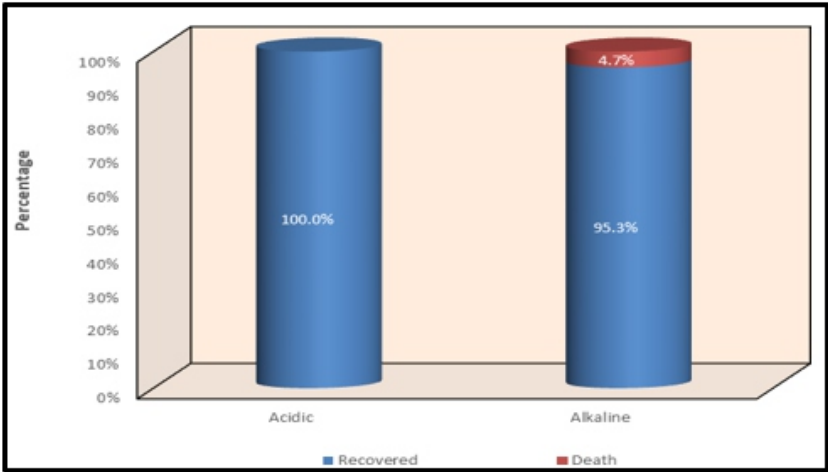


Figure 2: Distribution of Patient Outcomes between 2 Groups

All acidic group patients recovered, while the alkaline group had a 4.7% mortality rate; however, this difference was not statistically significant, indicating broadly similar outcomes.

Table 5: Comparison of Post-Treatment Complications Between 2 Groups Using Chi Square test

Variable	Category	Acidic		Alkaline		P-Value
		N	%	N	%	
Complications	Mild stricture esophagus	0	0.0%	1	2.3%	0.30
	Scarred Esophagus	2	4.4%	1	2.3%	0.58
	Scarred stomach	2	4.4%	2	4.7%	0.96
	Mediastinitis	2	4.4%	1	2.3%	0.58
	Complex Stricture Esophagus	1	2.2%	0	0.0%	0.33
	Deformed duodenum	1	2.2%	1	2.3%	0.97
	Pinpoint antrum-GOO	0	0.0%	1	2.3%	0.30
	Antral Erosions	11	24.4%	14	32.6%	0.40
	Shock	0	0.0%	1	2.3%	0.30
	Death	0	0.0%	2	4.7%	0.14
	No complications	29	64.4%	17	41.5%	0.03*

Post-treatment complications were significantly more common in the alkaline group, where only 41.5% had no complications compared to 64.4% in the acidic group;

specific complications like antral erosions and deaths were also higher in the alkaline group.



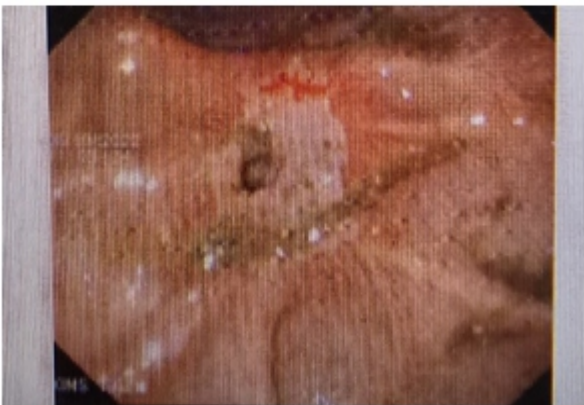
Stricture Esophagus Lower Third]



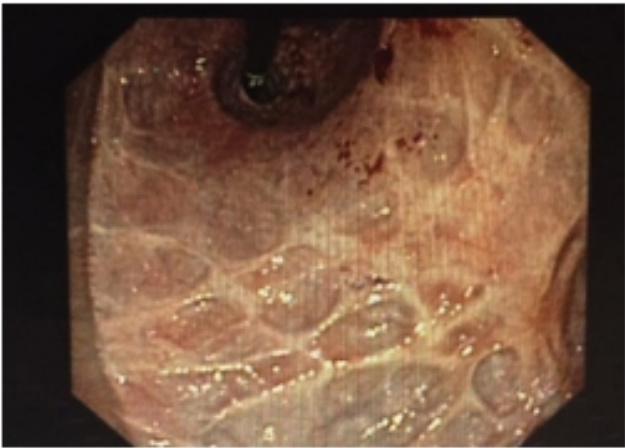
Partial Gastric Outlet Obstruction



Complete Gastric Outlet Obstruction with Food particles



Scarred Stomach



Scarred Stomach

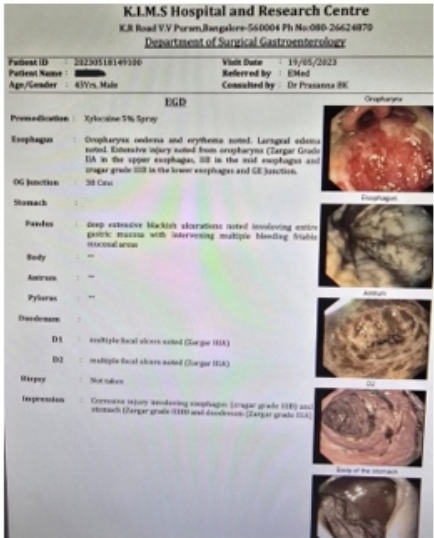
Table 6: Comparison Of Follow-Up After 1 Month between 2 Groups Using Chi Square test

Variable	Category	Acidic		Alkaline		P-Value
		N	%	N	%	
Follow up	Scarred stomach	2	4.4%	6	14.0%	0.12
	Antral gastritis	15	33.3%	23	53.5%	0.04*
	Lax LES	1	2.2%	1	2.3%	0.97
	Complex Stricture Esophagus	1	2.2%	2	4.7%	0.53
	Deformed duodenum	0	0.0%	1	2.3%	0.30
	Simple esophageal stricture	0	0.0%	1	2.3%	0.30
	Lost to follow up	1	2.2%	4	9.3%	0.15
	No complications	28	62.2%	13	30.2%	0.003*

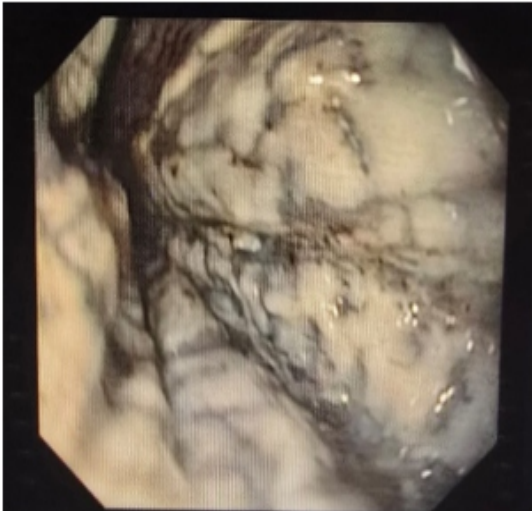
* - Statistically Significant

At one-month follow-up, antral gastritis and persistent complications were significantly more common in the

alkaline group, where only 30.2% remained complication-free compared to 62.2% in the acidic group, indicating better recovery in the latter.



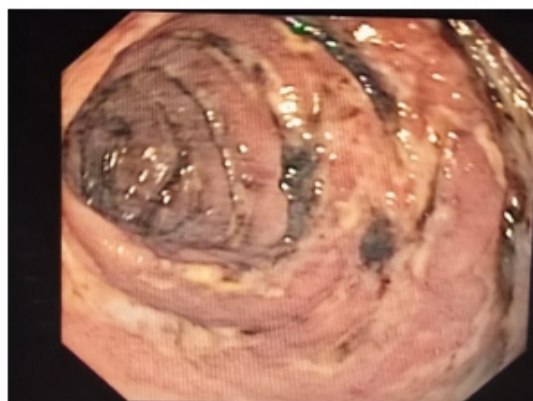
Male Patient post ingestion of 200ml of Oxalic acid



Esophagus Zargar IIIb (extensive necrosis)



Stomach Zargar IIIb (extensive necrosis)



Duodenum Zargar IIIa (multiple deep ulcers with areas of necrosis)

DISCUSSION

Based on the findings presented in the results, the current study provides important insights into the clinical spectrum, endoscopic grading, and outcomes of patients presenting with caustic substance ingestion. The demographic distribution revealed a predominance of young adult males, suggesting that this group may be more prone to risk-taking behaviors or accidental exposure in occupational settings. The male predominance aligns with previous literature, highlighting a gender-related vulnerability often associated with sociocultural and behavioral factors. Intentional ingestion cases were also notably high, reflecting the psychiatric and psychosocial dimensions associated with caustic poisoning, particularly in low-resource or high-stress environments [13,14].

Clinically, most patients presented with symptoms of odynophagia, dysphagia, and epigastric pain, which are consistent with the initial mucosal injury caused by the corrosive agent. Acid ingestion was more common than alkali, likely due to easier access to toilet cleaners and other acidic household products in this population. However, it is well-documented that alkali substances, due to their liquefactive necrosis, cause deeper penetration and more extensive injury compared to the coagulative necrosis caused by acids. This difference in pathophysiological injury patterns was reflected in the endoscopic findings, where higher Zargar grades were more frequently observed in patients exposed to alkali agents. The severity of mucosal damage as graded by Zargar's classification remains an important prognostic indicator, and in this study, higher grades were associated with increased complications and prolonged hospital stay [15,16].

Endoscopic evaluation within 96 hours proved to be both feasible and clinically valuable in stratifying injury severity. The modification of timing from the traditional 24–48 hours to within 96 hours, based on recent evidence, allowed for a more inclusive approach without compromising diagnostic accuracy. Most patients underwent endoscopy within three days, which is within the acceptable diagnostic window. In patients with Zargar grade IIB or above, conservative management alone

was insufficient, and a subset required either nutritional support via nasogastric tube or surgical interventions for complications such as strictures or perforation. underscored the importance of early endoscopic assessment not only for diagnostic purposes but also for guiding treatment strategies and anticipating complications [17,18].

The management outcomes in this study were closely linked with the extent of injury observed during endoscopy. Conservative medical management with proton pump inhibitors, antibiotics, and steroids was the mainstay of therapy in patients with lower Zargar grades. However, patients with grade III injuries showed higher complication rates, including bleeding, infection, and delayed strictures, necessitating prolonged hospitalization and sometimes surgical correction. The mortality rate, though relatively low, was primarily seen in patients with extensive esophageal or gastric necrosis, highlighting the potential lethality of caustic ingestion in severe cases [19].

Follow-up after one month revealed that a significant number of patients developed post- injury complications such as esophageal strictures and feeding difficulties, reinforcing the need for structured long-term surveillance and supportive care. These sequelae not only impact nutritional status but also quality of life and psychological well-being. It was also observed that early initiation of nutritional support and appropriate use of dilatation procedures in patients developing strictures contributed positively to the functional recovery, thus highlighting the role of multidisciplinary care [20].

The statistical comparisons between groups using Mann-Whitney and Chi-square tests further validated the clinical observations. Significant differences were found in the quantity of substance ingested, timing of endoscopy, and length of hospital stay across different grades of injury, reinforcing the correlation between early intervention and improved outcomes. The use of standardized endoscopic grading and objective clinical parameters strengthened the reliability of the data [21].

Emphasized the importance of early endoscopic evaluation, comprehensive clinical assessment, and timely management in improving outcomes following caustic ingestion. The

correlation between endoscopic findings and clinical progression highlights the utility of the Zargar classification in both acute care and long-term follow-up. Furthermore, preventive strategies including education on the safe storage of corrosive substances and mental health support could play a crucial role in reducing the incidence and severity of such injuries [22,23].

CONCLUSION

This study found that patients ingesting acidic or alkaline corrosives had similar demographics and ingestion patterns, with suicidal intent being most common. Both groups showed comparable clinical features and were primarily managed conservatively, with endoscopy revealing mostly mild-to-moderate injuries. Although hospital stays and recovery rates were similar, the alkaline group had slightly higher mortality and more post-treatment complications, especially antral gastritis and scarred stomach. These findings highlight the importance of early diagnosis, appropriate care, and structured follow-up to prevent long-term complications, particularly in cases involving alkaline substance ingestion.

CONFLICT OF INTEREST: NONE

All images and details are taken after due consent from research participants.

REFERENCES

1. Scott NB, Pocock NS. The health impacts of hazardous chemical exposures among child labourers in low-and middle-income countries. *International journal of environmental research and public health*. 2021 May 20;18(10):5496.
2. Contini S, Scarpignato C. Caustic injury of the upper gastrointestinal tract: a comprehensive review. *World journal of gastroenterology: WJG*. 2013 Jul 7;19(25):3918.
3. Hasan T. Body mass index and use of healthcare services in children: analyses from the Born in Bradford cohort study (Doctoral dissertation, University of York).
4. Babu S. Prevalence of *Helicobacter Pylori* in Patients with Peptic Ulcer Disease Undergoing Upper GI Endoscopy in KIMS Hospital, Bangalore (Master's thesis, Rajiv Gandhi University of Health Sciences (India)).
5. Rafeey M, Ghojzadeh M, Sheikhi S, Vahedi L. Caustic ingestion in children: a systematic review and meta-analysis. *Journal of caring sciences*. 2016 Sep 1;5(3):251.
6. Zargar SA, Kochhar R, Mehta S, Mehta SK. The role of fiberoptic endoscopy in the management of corrosive ingestion and modified endoscopic classification of burns. *Gastrointestinal endoscopy*. 1991 Mar 1;37(2):165-9.
7. Paspatis GA, Arvanitakis M, Dumonceau JM, Barthet M, Saunders B, Turino SY, Dhillon A, Fragaki M, Gonzalez JM, Repici A, van Wanrooij RL. Diagnosis and management of iatrogenic endoscopic perforations: European Society of Gastrointestinal Endoscopy (ESGE) position statement—update 2020. *Endoscopy*. 2020 Sep;52(09):792-810.
8. Mohammadi AB, Nahandi MZ, Ostadi A, Ghorbani A, Hallaj S. Endoscopic, laboratory, and clinical findings and outcomes of caustic ingestion in adults; a retrospective study. *Gastroenterology and hepatology from bed to bench*. 2022;15(1):59.
9. Ducoudray R, Mariani A, Corte H, Kraemer A, Munoz-Bongrand N, Sarfati E, Cattani P, Chirica M. The damage pattern to the gastrointestinal tract depends on the nature of the ingested caustic agent. *World journal of surgery*. 2016 Jul;40(7):1638-44.
10. Haug RH, Brandt MT. Closed reduction, open reduction, and endoscopic assistance: current thoughts on the management of mandibular condyle fractures. *Plastic and reconstructive surgery*. 2007 Dec 1;120(7):90S-102S.
11. Joseph S. 2022 Scientific Session of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), Denver, Colorado, 16–19 March 2022: Posters. *Surg Endosc*. 2022;36:S70-218.
12. Abbas A, Brar TS, Zori A, Estores DS. Role of early endoscopic evaluation in decreasing morbidity, mortality, and cost after caustic ingestion: a retrospective nationwide database analysis. *Diseases of the esophagus*. 2017 Jun 1;30(6).
13. Vezakis AI, Pantiora EV, Kontis EA, Sakellariou V, Theodorou D, Gkiokas G, Polydorou AA, Fragulidis GP. Clinical spectrum and management of caustic ingestion: a case series presenting three opposing outcomes. *The American journal of case reports*. 2016 May 20;17:340.
14. Austin C, Probst TM. Masculine gender norms and adverse workplace safety outcomes: the role of sexual orientation and risky safety behaviors. *Safety*. 2021 Jul 28;7(3):55.
15. Elkaramany M. An overview of corrosive injury of the upper gastrointestinal tract: Discussion of types, clinical evaluation, and management procedures. *Advances in Digestive Medicine*. 2018 Dec;5(4):115-20.
16. Zargar SA, Kochhar R, Nagi B, Mehta S, Mehta SK. Ingestion of strong corrosive alkalis: spectrum of injury to upper gastrointestinal tract and natural history. *American Journal of Gastroenterology (Springer Nature)*. 1992 Mar 1;87(3).
17. Gralnek IM, Stanley AJ, Morris AJ, Camus M, Lau J, Lanis A, Laursen SB, Radaelli F, Papanikolaou IS, Gonçalves TC, Dinis-Ribeiro M. Endoscopic diagnosis and management of nonvariceal upper gastrointestinal hemorrhage (NVUGIH): European Society of Gastrointestinal Endoscopy (ESGE) Guideline—Update 2021. *Endoscopy*. 2021 Mar;53(03):300-32.
18. Waddingham W, Kamran U, Kumar B, Trudgill NJ, Tsiamoulos ZP, Banks M. Complications of diagnostic upper Gastrointestinal endoscopy: common and rare—recognition, assessment and management. *BMJ Open*

- Gastroenterology. 2022 Dec 1;9(1).
19. Sheikh I, Jamshed N, Neseem A, Aggarwal P, Kedia S, Khan MA, Das CJ, Sahu AK. Role of high-dose methylprednisolone in Zargar Grade IIB corrosive esophageal burns: A randomized control study. *Turkish Journal of Emergency Medicine*. 2024 Jan 1;24(1):20-6.
 20. Ioannidis O, Anestiadou E, Koltsida A, Ramirez JM, Fabbri N, Ubieto JM, Feo CV, Pesce A, Rosetzka K, Arroyo A, Kocián P. Optimizing Perioperative Care in Esophageal Surgery: The EUROPEAN PERIOPERATIVE MEDICAL NETWORKING (EUPEMEN) Collaborative for Esophagectomy. *Diseases*. 2025 Jul 22;13(8):231.
 21. Jin Y, Ma M, Yan Y, Guo Y, Feng Y, Chen C, Zhong Y, Huang K, Xia H, Libo Y, Si Y. A convenient machine learning model to predict full stomach and evaluate the safety and comfort improvements of preoperative oral carbohydrate in patients undergoing elective painless gastrointestinal endoscopy. *Annals of Medicine*. 2023 Dec 12;55(2):2292778.
 22. Cheng HT, Cheng CL, Lin CH, Tang JH, Chu YY, Liu NJ, Chen PC. Caustic ingestion in adults: the role of endoscopic classification in predicting outcome. *BMC gastroenterology*. 2008 Jul 25;8(1):31.
 23. Kim JH, Kim JM, Park B, Park JS, Park JH, Lim SG, Shin SJ, Lee KM, Lee GH, Noh CK. Role of Emergent Endoscopic Evaluation for Corrosive Injuries: Should We Do It or Not?. *In Vivo*. 2025 Jul 1;39(4):2474-84.

How to cite: Preethan Nagappa, Bidarahalli K Prasanna, Shariq Ahmed Khan, Preksha V. Endoscopic Findings and Clinical Outcomes in Adults Following Acidic and Alkaline Caustic Ingestion: A Retrospective Study at a Tertiary Care Hospital. *International Medicine*, 2025;11(1): 1-11.