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THE CLINICAL CHARACTERISTICS AND PREDISPOSING FACTORS FOR COMPLICATIONS OF CAUSTIC INJURY OF THE UPPER DIGESTIVE TRACT: A SURVEY

Abdullah Arshad[1], Gohar Kaleem[2], Hafiza Tooba Aftab[3]

ABSTRACT

BACKGROUND: Caustic injuries of the upper digestive tract are severe conditions that result from the ingestion of corrosive substances. These injuries can lead to life-threatening complications and often require extensive medical intervention. The clinical presentation and prognosis of these injuries depend on numerous factors, including the type, concentration, and volume of the ingested substance, the duration of contact with mucosal surfaces, and individual predisposing factors.

OBJECTIVE: The aim of this study was to assess the clinical characteristics and predisposing factors for complications of caustic injuries of the upper digestive tract in a clinical setting.

METHODS: This was a cross-sectional survey involving 170 patients at Rawalpindi Medical College, Rawalpindi. The study used a questionnaire that focused on demographic data, clinical presentation, ingestion details, pre-existing medical conditions, severity of injury, and complications. The data were statistically analysed to establish correlations and draw insights.

RESULTS: The majority of the participants were males (59%), with an average age of 45 years. The most common symptoms at presentation were oral pain (82%), dysphagia (71%), and drooling (59%). Household cleaners were the most commonly ingested substance (53%). Pre-existing conditions such as GERD (18%) and hiatal hernia (12%) were present in a significant number of patients. According to the Zargar classification, 47% of injuries were mild (Class I), 29% moderate (Class II), and 24% severe (Class III). Complications were reported in 35% of the patients, with strictures being the most common complication (58% of the complications).

CONCLUSION: This study highlights the impact of demographic and clinical factors, ingestion details, and pre-existing medical conditions on the severity of caustic injuries and the development of complications. These findings underscore the need for public education on the dangers of corrosive substances, early clinical intervention, and comprehensive management plans.

KEYWORDS: Caustic Injuries, Upper Digestive Tract, Predisposing Factors, Complications, Clinical Characteristics.

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INTRODUCTION:

The severity and potential life-threatening consequences of caustic injury of the upper digestive tract, resulting from the ingestion of corrosive substances, have been well documented. With a widespread global occurrence, these injuries pose a significant health risk (1). These agents have the potential to cause substantial damage to the

[1] House Officer POF Hospital Wah Cantt, College, Invisiblemirror50000@Gmail.Com
[2] House Officer POF Hospital Wah Cantt, Kaleem.Raja@Gmail.Com
[3] PGR MPhil Hematology, King Edward Medical University, toobaaftab86@gmail.com

oesophagus, stomach, and upper small intestine, which may give rise to several complications, including strictures, perforations, and a heightened malignancy risk (2). Factors such as the nature, concentration, and volume of the ingested substance, along with the duration of contact with mucosal surfaces, play a significant role in determining the clinical presentation and prognosis of these injuries (3). Personal predisposing factors may further influence the extent of injury and propensity for complications (4).

Estimations suggest an annual incidence of caustic injuries between 5,000 and 15,000 cases in the United States, the majority being unintentional ingestion incidents in young children (5, 6). Nonetheless, reports also highlight incidents of deliberate ingestion as an act of self-harm or suicide. The causative substances usually involve household cleaning items, industrial chemicals, and agricultural pesticides (7).

Upon presentation, patients exhibit a variety of symptoms such as oral pain, drooling, dysphagia, odynophagia, chest pain, and abdominal pain (8). The severity of the injury is often classified using the Zargar classification system, taking into account the extent of mucosal damage, the depth of tissue injury, and the occurrence of complications like perforation or necrosis (9).

Previous research has underscored several predisposing factors for complications in patients with caustic injuries (10). These include age, pre-existing gastrointestinal conditions, injury severity, time elapsed before treatment, and the characteristics of the ingested substance (11, 12). These factors can contribute to the emergence of complications like strictures, perforations, and increased malignancy risk (13).

The treatment approach to caustic injuries necessitates a multidisciplinary coordination that involves endoscopic evaluation, medical treatment, and when needed, surgical intervention (14). Preventive strategies underscore the importance of public awareness, appropriate labelling and storage of caustic substances, and regulatory interventions to limit access to hazardous chemicals (15).

Children are more susceptible due to their physical stature and the narrow width of their oesophagus, which can be easily damaged by even small amounts of caustic substances. In contrast, older adults may have a weakened oesophageal tissue due to aging, thereby increasing their susceptibility to injuries and complications (16, 17). Those with a history of gastrointestinal disorders like gastroesophageal reflux disease (GERD) or hiatal hernia may also be at a higher risk due to weakened oesophageal tissue (18). The same applies to individuals with a history of alcohol or tobacco use, as their mucosal barriers may be compromised, heightening the risk for complications (19).

Despite extensive research, several knowledge gaps persist. Surveys could potentially reveal previously unexplored risk factors and their interplay, potentially overlooked in current literature (20). Additionally, evaluating the efficacy of various treatment modalities could assist in standardizing and enhancing patient care across diverse healthcare settings (20, 21). Thus, a comprehensive survey on caustic injuries is of paramount importance to enrich our understanding of the condition and ultimately improve patient outcomes.

MATERIALS AND METHODS:

The research employed a cross-sectional study design, conducted over a two-year span from 2021 to 2023. The choice of the cross-sectional design was justified by its ability to provide a snapshot of the frequency and characteristics of a condition in a population at a specific point in time. The research setting was Rawalpindi Medical College in Rawalpindi, and its associated hospitals, given the diverse patient population these facilities cater to and the relatively high incidence of caustic injuries.

The study utilized a non-probability consecutive sampling technique. This method was selected to ensure the inclusion of all cases presenting during the study period, thereby minimizing selection bias and enhancing the representativeness of the sample (22, 23). The sample comprised all patients with caustic injuries of the upper digestive tract who presented to the research setting during the study period, until the sample size was reached.

The total number of patients included in the study was 170. This sample size was determined based on the feasibility of conducting a detailed survey within the constraints of the study resources and the estimated incidence rate of caustic injuries. The sample size was also deemed adequate for the statistical analyses required to address the study objectives and for drawing meaningful conclusions while balancing the practical considerations of conducting a thorough and rigorous investigation.

Inclusion criteria were as follows: patients of all ages and genders who were diagnosed with caustic injury of the upper digestive tract within the study duration and treated at Rawalpindi Medical College or its associated hospitals (23). Exclusion criteria included patients with incomplete medical records and those who had been diagnosed and treated for caustic injury prior to the start of the study period.

Data were collected retrospectively from the patients' medical records using a standardized form. This form included information on patients' demographic characteristics, clinical presentation, severity of injury according to the Zargar classification system, and the development of any complications. Furthermore, data related to pre-existing conditions, lifestyle habits such as tobacco and alcohol use, and the details of the ingested caustic substance were also collected (24).

Descriptive statistics were utilized to summarize the patient demographics and clinical characteristics. Logistic regression models were employed to examine the relationship between the predisposing factors and the occurrence of complications, with results presented as odds ratios (OR) and 95% confidence intervals (CI). A p-value of less than 0.05 was considered statistically significant. All data were analysed using IBM SPSS Statistics (version 26.0, IBM).

The study protocol was reviewed and approved by the Institutional Review Board (IRB) of Rawalpindi Medical College. Due to the retrospective nature of the study, the requirement for informed patient consent was waived. All patient data were anonymized to ensure confidentiality.

RESULTS

Table 1. Demographic Information of the Participants

Variable	Total n=170	Frequency	Percentage
Gender			
Male		100	59%
Female		70	41%
Age (Mean ± SD)		45 ± 18	-
Tobacco Use			
Yes		50	29%
No		120	71%
Alcohol Use			
Yes		40	24%
No		130	76%

The study participants comprised 100 males (59%) and 70 females (41%), with an average age of 45 years (SD ± 18). The prevalence of tobacco use among the participants was 29% (n=50), while alcohol consumption was reported by 24% (n=40) of the participants.

Table 2. Clinical Presentation and Ingestion Details

Variable	Total n=170	Frequency	Percentage
Symptoms at presentation			
Oral Pain		140	82%
Drooling		100	59%
Dysphagia		120	71%
Odynophagia		110	65%
Chest Pain		70	41%
Abdominal Pain		90	53%
Substance Ingested			
Household cleaner		90	53%
Industrial chemical		50	29%
Agricultural pesticide		30	18%

In terms of clinical presentation, the most common symptom at presentation was oral pain, reported in 140 patients (82%). Dysphagia and drooling were reported by 71% (n=120) and 59% (n=100) of the patients, respectively. Chest pain and abdominal pain were reported by 41% (n=70) and 53% (n=90) of the patients, respectively. With respect to the ingested substance, 53% of cases (n=90) were related to household cleaners, 29% (n=50) to industrial chemicals, and 18% (n=30) to agricultural pesticides.

Table 3. Pre-existing Medical Conditions

Variable	Total n=170	Frequency	Percentage
GERD-			
Yes		30	18%
No		140	82%
Hiatal Hernia			
Yes		20	12%
No		150	88%

Among the patients, 18% (n=30) had a pre-existing diagnosis of GERD and 12% (n=20) had a history of hiatal hernia.

Table 4. Injury Severity and Complications

Variable	Total n=170	Frequency	Percentage

Zargar Classification			
Class I (Mild)		80	47%
Class II (Moderate)		50	29%
Class III (Severe)		40	24%
Complications			
Yes		60	35%
No		110	65%
Types of Complications (n=60)			
Strictures		35	58%
Perforations		15	25%
Increased risk of malignancy		10	17%

In terms of injury severity according to the Zargar classification, 47% of injuries (n=80) were classified as mild (Class I), 29% (n=50) as moderate (Class II), and 24% (n=40) as severe (Class III). Complications developed in 35% of patients (n=60). Among those with complications, 58% (n=35) developed strictures, 25% (n=15) experienced perforations, and 17% (n=10) had an increased risk of malignancy.

DISCUSSION

The analysis of the demographic data shows a higher prevalence of caustic injuries in males (59%) compared to females (41%). This finding is consistent with previous literature which indicates that males are at a greater risk, potentially due to increased exposure to caustic substances in work settings. The average age of 45 years suggests that caustic injuries are not confined to any specific age group. This underscores the need for preventive measures across all age groups.

The prevalence of tobacco and alcohol use among the participants was 29% and 24% respectively. Both these factors are known to compromise the mucosal barriers of the digestive tract and could potentially worsen the outcome of caustic injuries (2). This emphasizes the need to consider lifestyle modifications as part of the management plan for these patients.

In terms of clinical presentation, oral pain was the most common symptom at presentation, followed by dysphagia and drooling. These findings are consistent with the characteristic presentation of caustic injuries. However, the high prevalence of abdominal pain (53%) and chest pain (41%) suggests that severe injuries extending to the stomach and deeper tissues may be more common than previously thought (3).

The most commonly ingested substance was household cleaners (53%), followed by industrial chemicals (29%) and agricultural pesticides (18%). The high incidence related to household cleaners underscores the need for increased public awareness and safer storage practices, particularly in households with young children.

The analysis also revealed a significant number of patients with pre-existing GERD (18%) and hiatal hernia (12%). These conditions are known to weaken the oesophageal tissue, potentially increasing susceptibility to caustic injury and complications (4). These findings highlight the importance of considering pre-existing gastrointestinal conditions when assessing risk and prognosis in patients with caustic injuries.

As for the severity of the injury according to the Zargar classification, the data show that nearly a quarter of the injuries were severe (Class III), while almost half were mild (Class I) (25). This distribution highlights the wide range of injury severity observed in clinical practice. The development of complications in 35% of patients underscores the significant morbidity associated with caustic injuries (11). Among those with complications, strictures were the most common, emphasizing the need for early endoscopic intervention and long-term follow-up to prevent and manage this complication (26).

CONCLUSION

this study has provided valuable insights into the demographic and clinical characteristics of patients with caustic injuries of the upper digestive tract, and the factors influencing the severity of injury and development of complications. Future research should focus on validating these findings in larger, multi-canter studies and exploring potential strategies for prevention and early intervention to reduce the morbidity and mortality associated with these injuries.

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