

# Caustic ingestion burn in the emergency department of a third-level hospital in the north of Mexico.

## A case report

Nina Eiley Avila Chuey M.D.  
 Juan Antonio Perez Amador M.D.  
 Ricardo Eliud Cisneros Becerra M.D.  
 Ricardo Abraham Garza Treviño M.D.  
 Marco Antonio Hernandez Guedea M.D.

Nuevo Leon, Mexico

### Case Report

Emergency Medicine



#### Background:

Caustic ingestion is an infrequent reason for consultation in the emergency room; in adults, cases of ingestion are usually self-inflicted, with complications such as intestinal perforation and death in the acute phase, and long-term stenosis and development of carcinoma. We report the case of a 23-year-old male with a personal history of major depressive disorder and generalized anxiety. Four hours before admission he reported ingestion of 400 ml of a corrosive substance, starting with abdominal pain, for which he went to the emergency department. We describe the diagnostic approach and management provided in a third-level hospital in the north of Mexico, including the initial approach in the emergency department, nasoendoscopy of the airway, and upper endoscopy. After detecting and receiving early emergency care management, we describe the patient's positive evolution. The relationship between symptoms and the severity of the lesion may be imprecise since there are not enough statistical publications, it is necessary to develop studies and collect clinical data to obtain the standard management and optimal treatment of caustic ingestion and to investigate the factors that cause variability in the clinical picture and the evolution of the patients.

**Keywords:** Caustic ingestion, chemical burns, endoscopic management, corrosive substances

Caustic ingestion is an infrequent reason for consultation in the emergency room, usually seen in infants where it is generally accidental ingestion; however, in adults, cases of ingestion are usually self-inflicted and present a greater number of complications (1). Caustics are typically substances with a pH greater than 12, which cause damage when they come in contact with the skin, eyes, and mucous membranes, and the gastrointestinal system is not exempt in the event of ingestion. Lesions caused by alkalis tend to have a greater extension compared to acids because once in contact with the body, it generates a chemical reaction that consists of saponification of the fat which conditions liquefactive necrosis, facilitating perforation, and greater damage to the tissue involved, unlike lesions caused by acids which tend to cause limited damage by presenting a coagulative necrosis.

Early on the characteristic symptoms are abdominal pain, accompanied by sialorrhoea, glossitis, and vomiting, as well as airway compromise (2). Esophageal stricture is often one of the most feared complications and occurs as a late effect of caustic ingestion. The following is the case of a 23-year-old

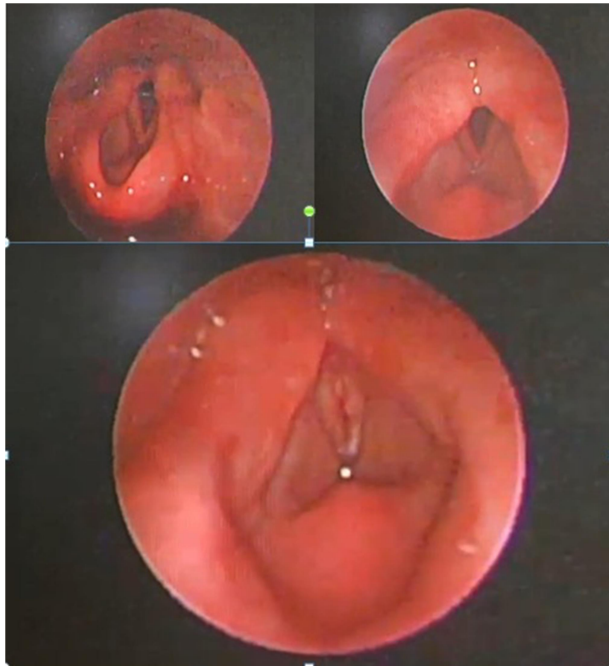
male who presented with ammonium hydroxide ingestion.

#### Case report

A 23-year-old male patient presents in the emergency room with a personal pathological history of major depressive disorder and generalized anxiety, of 4 months of evolution, under psychotherapeutic treatment in the psychology service since 1 month ago, denies pharmacological management, rest of the history denied. His condition began 4 hours before admission, after a discussion with relatives, the patient ingested approximately 400 ml of ammonium hydroxide, one hour after ingestion he presented abdominal pain, nausea, and vomiting, accompanied by sialorrhoea, relatives transferred the patient to a nearby first level clinic, where he was evaluated and was administered 8 mg of Dexamethasone intramuscularly and referred to our emergency department.

Upon arrival to our service, the patient presented the following vital signs: blood pressure: 110/70mmHg,

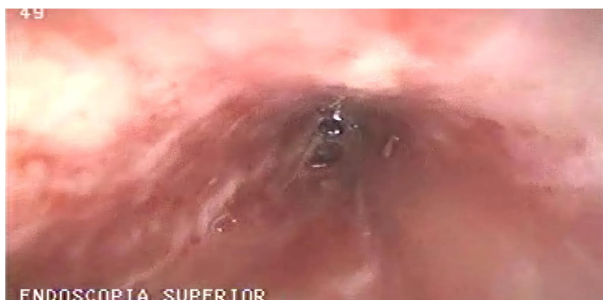
From the Department of Emergency Medicine Shock-Trauma Hospital Universitario "Dr. Jose Eleuterio Gonzalez", Monterrey, Nuevo Leon, Mexico. Received on November 21, 2024. Accepted on November 24, 2024. Published on November 27, 2024.



**Figure 1.** Nasoendoscopy showing tonsil with edema and erythema in the epiglottis, arytenoids, and arytenoepiglottic folds.

heart rate: 70 bpm, respiratory rate: 22 rpm, temperature 36.4°, oxygen saturation 97% on room air, and with a Glasgow Coma Scale score of 15. Physical examination showed no neurological alterations, in the oral cavity there was evidence of tongue and oral mucosa with erythema and edema, accompanied by sialorrhoea, in addition to changes in voice tone; chest without alterations to auscultation and palpation, abdominal examination was flat, soft, depressible and painful to deep palpation in the epigastrium, peristalsis present; extremities without alterations, with adequate capillary filling, peripheral pulses present.

Initial indications: On fasting, the fluid plan was started with Hartman's solution at a rate of 1000 ml for 12 hours. In addition, general laboratory tests were requested: blood chemistry, blood biometry, liver function tests, serum electrolytes, coagulation times, crossmatching tests, and arterial blood gases, reported to be within normal parameters. Otolaryngology was consulted, and nasendoscopy of the upper respiratory



**Figure 2.** Upper endoscopy at esophageal level, in all thirds, edema and erythema are observed, with multiple circumferential and longitudinal ulcers.



**Figure 3.** Upper endoscopy at gastric level in body and antral mucosa with erosions in most portions.

airway, highlighting an erythematous tongue with papillae enhancement, lingual tonsil grade 3+, presence of edema and erythema in the epiglottis, arytenoids, and arytenoepiglottic folds; the rest was observed without alterations (Fig. 1). The patient remained under observation, stable for the first six hours; however, sialorrhoea and dysphonia increased, so elective intubation was performed to protect the airway through a rapid orotracheal intubation sequence, without complications.

Twelve hours later, gastroenterology performed an upper endoscopy, and the following was reported: tongue, pharynx, hypopharynx and pyriform sinuses with edema and erythema; at esophageal level, edema and erythema were observed in the upper, middle and lower third of the esophagus, accompanied by multiple circumferential and longitudinal ulcers (Fig. 2). At the stomach level, in the body and antrum mucous membranes with erosions, in the incisura, lesser curvature, greater curvature and in the fundus, eroded mucous membranes were observed (Fig. 3), and the cardia with edema and Hill 1 erosions. The diagnosis of esophagitis due to Zargar II b caustic burns and Hill 1 gastritis is concluded.

The patient is admitted to the adult intensive care unit, where a nasojunal tube is placed as a temporary feeding line. Monitoring and support measures were continued. After 48 hours in the intensive care unit, the patient evolved favorably and was successfully extubated. The patient was discharged home, with no apparent sequelae and preserved functionality, followed up by the gastroenterology and psychiatry services.

## Discussion

In recent years, the chemical industry has developed a large number of compounds used for cleaning. Easy access to these products increases the incidence of caustic injuries, both in children and adults (3). Ingestion of corrosive substances is a major public health problem in Western countries and its

incidence is on the rise in developing countries, in direct relation to social, economic, and educational variables, mainly due to the lack of preventive measures (4). Epidemiological data worldwide are scarce, mainly due to the lack of reporting the caustic ingestion, making it difficult to estimate the real prevalence and incidence (4,5). The 2018 annual report of the American Association of Poison Control Centers (AAPCC) noted that household cleaners ranked second among all exposures to poisons and foreign bodies, accounting for 9% overall; a total of 103,387 exposures occurred in children aged 5 years or younger and 64,340 in adults, (3) in Mexico is almost nil epidemiological data on this condition (6).

Exposure to caustic substances can be divided according to intention; exposure in children is characterized mainly as exploratory ingestion and tends to be of small quantities, whereas adolescents and adults tend to ingest larger volumes in deliberate attempts at self-injury. Alkali caustic ingestion in adults has a high morbidity; the consistency and volume ingested correlate directly and proportionally with the clinical course of the patient. Damage to the gastrointestinal tract can lead to gastrointestinal perforation and death in the acute phase. Long-term complications include esophageal stricture formation and the development of esophageal carcinoma (7).

The initial approach and management in the emergency department are of vital importance. The anamnesis is a key point, identifying the noxious agent, its mechanism of exposure, whether accidental or intentional, intentionally looking for alarm data; in this clinical case, for example: signs of gastric and mediastinal perforation, such as subcutaneous emphysema, and signs of peritoneal irritation, such as acute abdomen, nausea and vomiting. Advanced airway management, using the rapid intubation sequence method, is recommended to protect the airway when suggestive changes secondary to alkali injury occur, e.g. dysphonia, sialorrhea, mass sensation, poor secretion management, stridor, or frank deterioration of the patient's alertness (5).

It is important to check other areas of contact such as skin and eyes; initially, the patient is taken to a decontamination area where clothing is removed and the areas exposed to the solution are irrigated with

abundant water. Decontamination of the digestive tract washing is contraindicated since it could extend the lesion, likewise, chelating substances such as activated charcoal, have no effect on the ingestion of caustics and will also obscure the vision of the lesions by endoscopy. (2).

The patient should be maintained with hemodynamic monitoring and laboratory control. The requirement for surgical management is defined by

invasive imaging studies, such as endoscopy or nasoendoscopy, which look for alarm data, such as profuse active bleeding and gastric perforation. It can be complemented with non-invasive imaging studies, such as computed tomography and visualization of free liquid in the abdomen, evidencing gastric or intestinal perforation (8). It has been shown that the use of glucocorticoids impairs the healing process and scar formation; likewise, in animal and human models the use of steroids, despite being associated with a greater number of infections, is also associated with a lower amount of esophageal stenosis (9). Due to the high ratio of patients who ingest caustics secondary to psychiatric problems, close follow-up by the psychiatric service and by a multidisciplinary team is important (10).

## Conclusion

The ingestion of caustic substances, although infrequent, increasing especially in adults due to suicide attempts, is a serious public health problem both in developing countries and in the third world, including Mexico. It is associated with considerable morbidity and mortality. The relation between symptoms and injury severity can be imprecise, and patients are urged to be monitored, as esophageal or gastric perforations can occur at any time. Endoscopy is considered the cornerstone of diagnosis, but with insufficient statistical publications, studies, and clinical data collection are needed to obtain the standard management and optimal treatment of caustic ingestion and to investigate the factors that cause variability in the clinical picture and evolution of patients. Less information is available on the quality of life after caustic ingestion. Future efforts should focus on primary injury prevention through public health interventions, with safety measures such as improved labeling and packaging, as well as enhanced education and advertising.

## Conflicts of interests

There was no conflict of interest during the study, and it was not funded by any organization.

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Nina Eiley Avila Chuey  
Department of Emergency Medicine  
Shock-Trauma Hospital Universitario  
“Dr. Jose Eleuterio Gonzalez”  
Monterrey, Nuevo Leon, Mexico.