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Case Report

Accidental Ingestion of Muriatic Acid in an Elderly: A Case Report

*Smitha Rani1, Sapna Patel Mallenahally Chandregowda2, Vinay Javaregowda1, Arun Mohanram1

1Department of Forensic Medicine and Toxicology, JSS Medical College, JSS Academy of Higher Education and Research, Karnataka, India
2Department of Pathology, JSS Medical College, JSS Academy of Higher Education and Research, Karnataka, India

ABSTRACT

Muriatic acid is an aqueous hydrogen chloride solution and is considered strong and highly corrosive. It is widely used in household cleaning agents such as toilet bowl cleaners, bathroom tile cleaners and also used for unclogging drains as well as cleaning tough stains. Although accidental poisoning due to consumption of household poisons are more commonly reported in children, it is not uncommon in old age. When exposed, the geriatric age group have a higher risk of mortality because of associated co-morbidities. We report a case of accidental ingestion of floor cleaning acid in a 73-year-old female, who presented to the Emergency Medicine department within 30 minutes of consumption in an unresponsive state. She expired 15 hours later. Autopsy features and histopathological changes seen in the involved organs are presented and discussed. This case reiterates the need for proper storage of household items containing corrosive agents to prevent inadvertent loss of life.

1. INTRODUCTION

Corrosive ingestion is a common occurrence in India in comparison to the western world. Among the corrosives, the cases of acid ingestion outnumber the consumption of alkali. This disparity could be attributed to the easy availability of acids in developing countries where they form the composition of commonly used household cleaners compared to the more expensive caustic soda.1 Although 80 % of cases are reported in children aged below 5 years,2 it is not uncommon in old age. Among unintentional injury in the aging population, accidental chemical ingestion is the 3rd leading cause of death.3 Since geriatric age group have associated co-morbidities, they are at higher risk.4 Muriatic acid i.e. aqueous hydrogen chloride solution is the component of household cleaning agents such as toilet bowl cleaners, bathroom cleaners and is also used to unclog drains. Hydrochloric acid is stated to be the common corrosive consumed in developing countries such as India and Taiwan which is attributed to its easy accessibility as sanitary cleansing agents.5 They are sold widely in the commercial market leading to increased incidence of its poisoning. The mainstay of treatment of cases of hydrochloric acid ingestion is to closely monitor the patient and provide symptomatic support. Treatment usually involves correction of acidosis, pain relief, and haemolysis. Surgical intervention is indicated in suspected cases of perforation.6 We report a case of accidental ingestion of floor cleaning liquid containing muriatic acid in a septuagenarian.

2. CASE REPORT

A 73-year-old female, unintentionally consumed muriatic acid mistaking it for synthetic mango juice. The said acid was stored in a disposable tumbler by
her granddaughter to be used to remove the paint stains from the floor tiles. Immediately after ingestion, she complained of the burning of mouth and chest pain and was shifted to the hospital within 30 minutes. She was a known case of seizure disorder who was on antiepileptic drugs. The patient had undergone D J stenting for Hydroureteronephrosis. On examination the Glasgow coma scale was E1M1V1; blood pressure was 100/60 mm Hg; pulse rate was 64 bpm. Arterial blood gas analysis revealed pH=7.173, pO$_2$=81.8 mm Hg, pCO$_2$=30.5 mm Hg, lactate=1.4 mmol/L and HCO$_3$=11.7 mmol/L. In view of low GCS score, patient was intubated. Intravenous fluid comprising of Normal Saline 500 mL followed by isotonic bicarbonate at 150 mL/hr was administered. Patient was given antacid and anti-emetic medications through intravenous route. Patient later developed distension of abdomen. Computed Tomography (CT) Scan of the abdomen showed ascites and dilated small bowel. Coagulation profile revealed platelet count of 33,000; INR=2.37. Sodium level was 141 mEq/L, potassium level being 5.6 mEq/L, Chloride was 125 mEq/L. Four units of Fresh Frozen Plasma was transfused. Repeat arterial blood gas revealed severe acidosis; pH being 6.6, potassium level was 7.2 mEq/L. In view of severe hypotension, acidosis and coagulopathy, oesophago-gastro-duodenoscopy was not performed. Patient was on inotropic support and antiepileptic drug. She developed bradycardia followed by asystole and she died 15 hours after consumption of the acid.

2.1 Autopsy Findings

At autopsy; no external injuries were present. 500 mL of black colored fluid was present in the peritoneal cavity. Blackish discoloration of the left lobe of liver, stomach, transverse colon and spleen was noted. On opening, the oesophagus showed blackish discoloration and loss of mucosal folds. Stomach mucosa was friable, showed perforation (Figure 1) and contained 200 mL of black colored material with no identifiable food particles.

2.2. Ancillary Investigation Reports

Histopathological examination of the esophagus showed ulcerated mucosa, submucosal haemorrhage with thrombosed blood vessels and normal muscularis propria (Figure 2) whereas stomach had ulcerated mucosa and thrombosed submucosal vessels with features of coagulative necrosis (Figure 3). Toxicological analysis report confirmed the presence of hydrochloric acid in the stomach and intestine. Cause of death was opined as; death is due to peritonitis consequent upon perforation of the stomach due to the consumption of substance containing hydrochloric acid.

3. DISCUSSION

Elderly are at increased risk of unintentional poisoning due to improper storage, mistaken identification due to poor eyesight, confusion or dementia.$^{7}$ Transferring a corrosive chemical into an unlabelled or inappropriately labelled container such as a mineral water or soft drink bottle increases the odds of accidental ingestion,$^{8}$ as seen in the present case. Hydrochloric acid is a colourless non- fuming liquid which can acquire yellow tinge on exposure to air.$^{9}$
The color of the liquid was responsible for mistaken identity in the reported case. Acids can cause protein modification leading to coagulative necrosis and can result in perforation of the gastrointestinal tract, which was the cause of death in this case. Gastric damage can occur secondary to pooling of hydrochloric acid in the antrum because of pylorospasm.\textsuperscript{10} Perforation of stomach and peritonitis can occur within 24 to 48 hours when the quantity of acid consumed is higher and the stomach is empty.\textsuperscript{11} Chang et al who performed a retrospective analysis on the role of age in predicting the outcome of caustic ingestion found that mortality rate is 3 times higher in the geriatric age group.\textsuperscript{12} Caganova et al who retrospectively analysed medical reports of 176 adult patients with acute corrosive ingestion found that in the elderly age group the risk of a fatal outcome is six times higher after hydrochloric acid ingestion. Their 18-year study confirmed that aged patients with respiratory complications have the poorest clinical outcomes.\textsuperscript{13} In any case of toxic ingestion; initial management includes resuscitation and correction of acid / base imbalance. If the patient presents within one hour of toxic ingestion, neutralization can be tried. Supportive measures include IV fluids, antibiotic, and antacid. Steroids are not a popular choice since they mask the symptoms of peritonitis. A study suggested that with surgical intervention the patient survivability is higher than those patients, who are solely managed with supportive care.\textsuperscript{14} As per the guidelines on prevention of toxic exposures published by World Health Organisation, “Regulation and enforcement are important government actions for the promotion of safety and health in the manufacture, transport, storage, use and disposal of chemicals and chemical products”. It was opined that in the developing countries, legislation frequently fails due to insufficient resources available to ensure that people comply with the law.\textsuperscript{15}

Despite legislative restrictions and judicial directives in India, the acids are being sold freely.\textsuperscript{16} Hence laws restricting the concentration of the corrosives in the household cleaning agents should be enacted to decrease the associated morbidity and mortality.

4. CONCLUSION

Since tissue injury occurs almost immediately, the prevention of caustic ingestion is essential. This case reiterates the need for stringent legislative restriction on the sale and proper storage of corrosive household products. Safer alternatives for household cleaning should be adopted to prevent inadvertent loss of life.

CONFLICTS OF INTEREST

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