

Prospective Descriptive Autopsy-Based Observational Study of Acid Poisoning in a Tertiary Care Centre in Western Zone of Tamilnadu

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Abstract

Ingestion of corrosive substances is a serious public health problem and medical emergency. It has the propensity to cause severe to serious injuries to gastrointestinal and respiratory tracts. The present study aims to explore the postmortem findings of acid poison in Coimbatore region, conducted in Coimbatore medical college from June 2017 to December 2018. The following parameters were collected and analysed: the deceased's sex and age, type of corrosive substance ingested, Post mortem findings, injuries, viscera chemical analysis reports and cause of death. A total number of 12 cases were analysed. Among these 5 cases (41.7%) were hydrochloric acid poisoning deaths, 3 cases (25%) were sulphuric acid poisoning deaths, 3 cases (25%) were non mineral acid poisoning and one case(8.3%) of self immolation by acid. Most of the deceased were aged between 41 to 60 years (45.5%) and were females (54.5%). Suicidal deaths (72.7%) were the common manner of death. Postmortem findings of acid ingestion were black or blackish gray color 2nd degree to 3rd degree acid burns noted over lips and front of chest. Internal findings are tongue –grayish black color. Blackish patchy lesions noted in the larynx and trachea. Esophagus and stomach- dark black in color and excoriated mucosa. In severe poisoning perforation of stomach seen in the lesser curvature. The symptoms related to gastrointestinal tract injuries predominate while respiratory symptoms were less common. Strictly enforcing regulations for manufacturing and selling of household cleaning products can significantly reduce the incidence of corrosive acid poisoning.

Keywords: Corrosive substance; Mineral acid; Black excoriation; Stomach perforation.

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Introduction

Corrosive ingestion is a serious public health problem. It is one of the most important events in medical emergency and clinical Toxicology[1].

Ingestion of corrosive substances may cause severe to serious injuries to upper gastrointestinal tract and respiratory tract[1,2,3].

And corrosive injury is associated with numerous life threatening complications. Acid and Alkali are the two primary types of agents responsible for corrosive exposure. The estimated prevalence of corrosive poisons is 2.5-5; morbidity is above 50% and the mortality is 13%[4] The present study aims to find out responsible corrosives from clinical and autopsy findings in Coimbatore region.

Materials and Method

It is a prospective descriptive autopsy based observational study conducted in the Department of Forensic medicine, Coimbatore Medical College, Coimbatore from June 2017 to December 2018 after obtaining approval from the Institutional Ethics Committee. The following parameters were collected and analysed: the deceased's sex and age, type of corrosives, Post mortem finding, fatal injuries, viscera analysis reports and cause of death.

Result

A total number of 12 cases were analysed. Among these 5 cases(41.7%) were Hydrochloric acid poisoning deaths, 3 cases (25%) were sulphuric acid poisoning deaths, and 3 cases (25%) were non mineral acid poisoning and one case is self immolation by acid(8.3%).

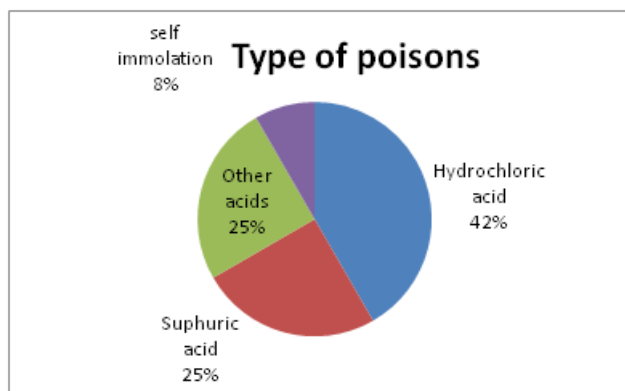


Figure 1: Type of poisons

Most of the deceased are aged between 41 to 60 years(45.5%) and were females(54.5%). Suicidal deaths(72.7%) are common manner of death.

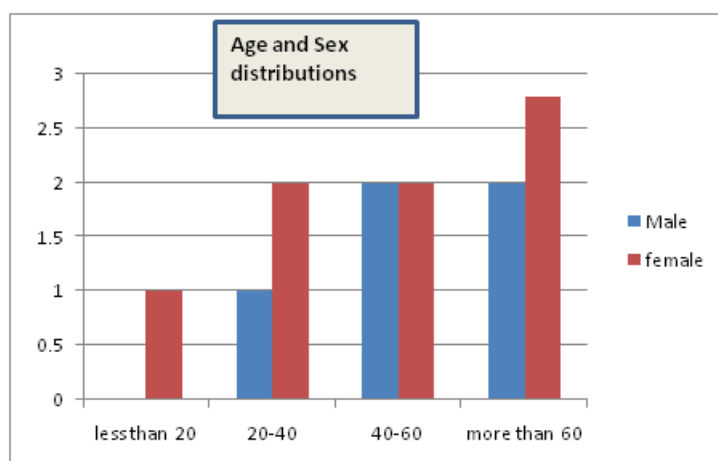


Figure 2: Age and sex distribution

Postmortem Findings: Black or blackish gray color acid burns noted over lips and front of chest, abdomen. The burns were 2nd degree to 3rd degree. Internal findings are - Tongue swollen and brown or grayish black color.

Tongue



Figure 3: Tongue

Blackish patchy lesions noted in the larynx and trachea. Esophagus is dark black in color and excoriated. Stomach mucosa was eroded and black in color. In severe poisoning perforation of stomach noted over lesser curvature.

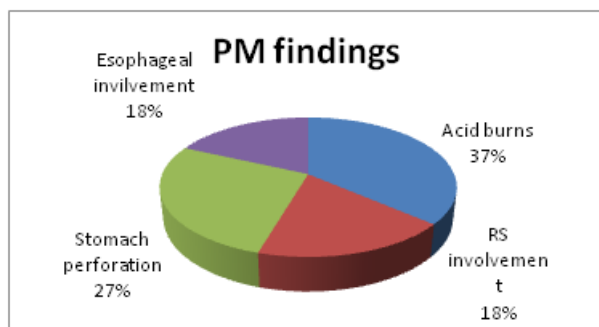


Figure 4: PM findings

Esophagus Interior of Stomach



Figure 5: Esophagus Interior of Stomach

Perforation of stomach



Figure 6: Perforation of stomach

Omental findings



Figure 7: Omental findings

In self-immolation case findings were 1st degree to 2nd degree acid burns seen over the face, front of trunk & thighs and skull bone erosions.



Figure 8:

Discussion

A corrosive is one which corrodes and destroys tissues it comes in contact [4,5,6]. Corrosive substances are including acids and alkalis. They act by extracting water from tissues, coagulate cellular protein and convert hemoglobin into haematin [4,5,6].

They are commonly used as sanitary cleaning agents and drain openers [2]. Most common abused acid is hydrochloric acid which is accessible, often used in countries like India and Taiwan. Commonly used alkalis are sodium hydroxide and potassium hydroxide more common in European union and USA [2].

Corrosive substances with pH of less than 2 or greater than 12 are highly corrosive and can cause tissue necrosis. In contact with acids, tissue protein transformed into acid protein; hemoglobin into hematin. Final outcome is coagulation necrosis. Contact with alkalis tissue protein transformed into proteinates and fats into soaps, finally causes liquefactive necrosis [2,5,7]. Severity of the injuries depends on several factors like nature of corrosive substance, pH value, quantity ingested, duration of exposure and act of swallowing [2,5,7]. Ingestion of solid or gel form causes injuries in the oropharynx and proximal part of esophagus; liquid form causes injuries on distal part of esophagus and stomach. Corrosive injuries classified as 1st degree: superficial damage, mucus edema and erythema. 2nd degree: caustic penetration into sub mucosa and muscular layer. 3rd degree: perforation of esophagus and stomach

Conclusion

The management of corrosive injuries requires multidisciplinary approach and good coordination of different specialists. Females of 5th decade are more likely to ingest corrosive poisons for suicide. Most of corrosives were common household cleaning products mainly Hydrochloric acid. The symptoms related to gastrointestinal tract predominate while respiratory symptoms were less common. Strictly enforcing regulations for manufacturing and selling of household cleaning products can significantly reduce the incident of corrosive poisoning.

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