Suicidal Death Due to Floor Cleaning Material: A Case Report

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Abstract :
Deaths from exposure to caustic substances are infrequently reported in the Forensic Medicine literature. Cases of deaths due to Sulphuric acid, Nitric acid and Hydrochloric acid ingestion in patients of depression were being reported. But, in this case the relative of patient gave history of ingestion of Domestic floor cleaning material, constituent of which was unknown to the relative. A death due to domestic floor cleaning material is rarely reported in literature. In this case patient was admitted in Pravara Rural Hospital with the history of burning pain from mouth to abdomen, dyspnoea and haematemasis. Patient died during treatment, and then body was referred for postmortem examination. Thinning, softening and friability of wall of stomach and brownish-blackish discoloration, corrosion and inflammation of mucous membrane of lips, oral cavity, pharynx, oesophagus and stomach was the presenting feature of consumed poisoning. These characteristic features confirm that the effect was due to acid poisoning. As Mineral acid and Phenol is a domestic poison which is used as sanitary and lavatory cleaner in household. Keeping this fact in mind, viscera was preserved for chemical analysis to confirm the nature of poison. The various issues concerning with the case have been discussed.

Key Words: *Suicide, Death, Domestic poison, Acid poisoning.*

Introduction

"All substances are poisons; there is no such thing as a non-poison"- Paracelsus. The word 'poison' is evolved from the Latin word 'potion' i.e. 'to drink for health'. But in the due course of time, the definition of 'poison' has changed reversibly to its present form i.e. any substance, in any amount, by any route, if it produces harmful effects (3 Ds–disease, deleterious effect or death) over the body, it will be labeled as poison. A Substance which when ingested, inhaled, applied or administered is capable of acting deleteriously on the body i.e. produce ill health or death.[1]

Poisons were known to the mankind from ancient times. Primitive man was aware of natural poisons from animal and plants and used them on his weapons. Poisoning is the commonest method adopted in India to commit suicide.[2] Pesticides and insecticide poisons are an important cause of morbidity and mortality. It has been estimated that 95% of fatal pesticide poisoning occur in developing countries, many of which are in the Asia-Pacific region.[1]

Exposure to corrosive poisons (acids and alkalis) are usually accidental in nature and recorded in children.[3] However ingestion of corrosive substance in adult is more often suicidal.

The present case describes the death of a psychotic person after consuming poison in the form of floor cleaning material (corrosive poison).

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Case report

A 52 year old, married, male and farmer by occupation reported to medical officer at Rural Hospital of Kopergaon, Maharashtra with complain of ingestion of poisoning. He

has history of chronic alcoholism since last 15 years, thereafter he attempted suicide 3 months back by taking overdose of the sedative pills. Since three weeks prior to death he was suffering from mental condition of sadness, easy fatigability, lack of concentration, sleeplessness, lack of appetite, loss of interest in work and daily activities and at last he locked himself in a room three days prior to the death. He was admitted in hospital with complaint of ingestion of Domestic floor cleaning material, constituent of which was unknown to the relative. He complained of vomiting, burning sensation in chest, severe pain in epigastric region, dyspnoea and haematemasis, then he lost his consciousness after four hours. The patient's condition gradually deteriorated and he died after five hours after admission. A medico legal autopsy was performed 12 hours after the death.

Pathophysiology

Solutions with a pH of less than 2 or greater then 12 are highly corrosive. Strong acids like sulfuric and hydrochloric acid are proton donors. The pH of the exposed area is decreased from the local physiologic (environmental) pH to near 0 as hydrogen ions disassociate. The free hydrogen ions facilitate amide bond hydrolysis causing protein structures to collapse. When strong acid (pH<2) comes into contact with internal tissue, it causes coagulation necrosis, tissue disintegration, and/or ulceration of tissue. Coagulation necrosis produces rapid tissue changes which include consolidation of normally loose connective tissue, thrombosis of intramural vessels, ulceration, fibrosis, and hemolysis of erythrocytes.

Postmortem Examination Findings

Postmortem examination on the deceased revealed thinning, softening and friability of wall of stomach along with congestion, erosion and inflammation of gastric mucosa which appeared brownish-blackish (Fig.1,2). There was also corrosion and inflammation of mucous membrane of lips, oral cavity, pharynx and oesophagus which highlighted the typical signs of death due to poisoning (Fig.3). Other findings included pulpy and softened spleen, congested mucosa of trachea, chalky white teeth and inflammed skin of palmer surface of right hand (Fig.4 & 5) The liver and spleen were not fixed to thoracic cage. These characteristic features confirm that the effect was due to corrosive poisoning (Fig.6)

Routine viscera and pleural fluid were collected and packed, sealed and labeled and sent to FSL for chemical analysis.

Figure 1 : Corrosion and inflammation of mucous membrane of lips.

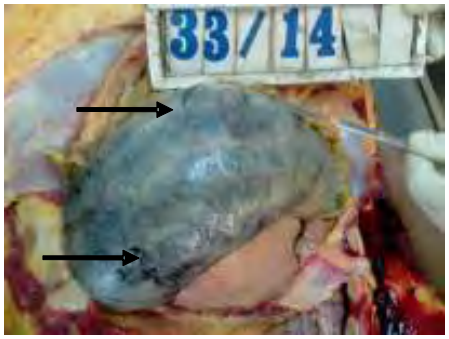

Figure 2 : Stomach outer wall showing brownish-blackish discoloration due to corrosion and inflammation and prominent vessels

Figure 3 : Stomach wall thinned with brownish-blackish discoloration of mucosa and muscosal wall

Figure 4 : Pulpy and eroded surface due to softening of spleen

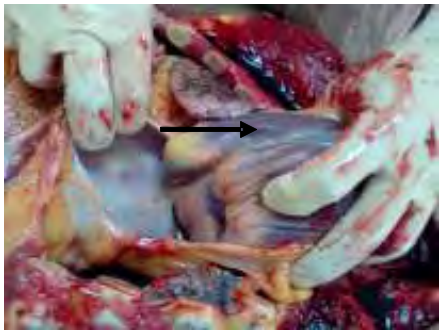

Figure 5 : Heart with prominent vessels and dark red color due coagulative nacrosis.

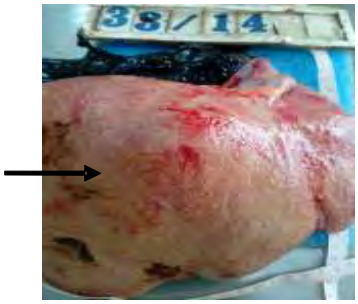

Figure 6 : Cirrhosis and yellowish discoloration of Liver

Discussion

A recent study from Maharashtra, India found that poisoning was the leading cause of unnatural deaths and the third leading cause of hospital admission.[4] The poisons in daily use may be classified into three groups, domestic house hold poisons, medicinal house hold poisons and garden poisons.[5] In the present case the consumed poison is floor cleaning material which is a domestic household poison.

Before commencing the postmortem examination, the medical officer should obtain all available details and history of the case so that attention may be directed to salient points. The opinion of even the most eminent medical officer may be of little value if he is ill-informed of the clinical facts.[6]

Gimmon et al "Recognize children, psychotics, and persons attempting suicide as being individuals most commonly involved in acid ingestion."[7]

The noteworthy point in this case was that the individual was suffering from severe major depressive disorder with strong suicidal ideas and despite under constant invigilation of attendants he had managed to consume the acid. The easy availability of acid with the goldsmiths contributed to selection of this mode of attempting suicide.

When a strong acid or a strong alkali comes into contact with internal tissue, it causes coagulation necrosis, tissue disintegration and or ulceration of tissue. Coagulation necrosis produces rapid tissue changes which include consolidation of normally loose connective tissue, thrombosis of intramural vessels, ulceration, fibrosis, and haemolysis of erythrocytes. Post mortem features of the present case are in accordance with these features which are suggestive of consumption of acid. The brownish blackish discoloration of stomach was due to coagulative necrosis.

Corrosives can be highly irritative & unpleasant taste, which can lead to choking and gagging after ingestion. The chemical coming into contact with glottic and epiglottic structures may cause chemical epiglottitic and airway compromise and lead to death due to choking and gagging due to spasm of respiratory tract.[7] In present case the patient also complained of dyspnoea which was probably due to ingestion of corrosive material.

Corrosive compounds can be found in a variety of cleaning agents, drain openers, bleaches, toilet bowl cleaners, and detergents. Acid ingestion tends to occur less frequently in the United States (<5%) but appears to be more common in countries like India where hydrochloric acid and sulfuric acid are easily accessible.[8] Acids are generally available as toilet bowel cleaners (sulfuric acid, hydrochloric acid), anti rust compounds (hydrochloric acid, oxalic acid, hydrofluoric acid), battery fluids (sulfuric acid), and swimming pool cleaners (hydrochloric acid). Common household corrosives Product name in India Lysol disinfectant floor cleaner their contents are Benzakonium chloride (4%), Hydrochloric acid (8.5%), Alizarin cyanide, Quinoline and Domex contents are Sodium hypochlorite (mini 5%–10% w/w), Sodium hydroxide and Chlorox content is Sodium hypochlorite (5.25%). In present case the deceased had consumed floor cleaning material which is highly corrosive in nature.

Conclusion

The most common causes of deaths due to poison in India includes consumption of insecticide poison. However cases of corrosive poisoning are commonly accidental. Suicides by consumption of corrosive substances are more commonly done by psychotic persons. In present case the deceased was a psychotic person as evident from the history taken and ingested poison was floor cleaning material which is a corrosive substance. As per postmortem examination the signs are in accordance with typical acid poisoning. However, case was further investigated by sending viscera to the chemical examiner to determine the actual nature of the poisonous substance ingested.

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