

Case Report

Homicidal Aluminium Phosphide Poisoning

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ABSTRACT

Dead body of a female was brought for postmortem examination at the mortuary of New Civil Hospital, Surat. History revealed that her husband had given three tablets to her on the pretext that these tablets would help in the birth of a male child. She became ill soon after consuming the tablets and died within 12 hours of ingestion while under treatment. Autopsy revealed death from aluminium phosphide poisoning. This unusual case is presented here.

Key Words: *aluminium phosphide, homicide*

Introduction

The first ever case of aluminium phosphide poisoning was reported in 1981 by MGM College, Indore, India. Since then, the incidence of aluminium phosphide poisoning has been relentlessly increasing, particularly in North India.¹ Easy availability, low cost, efficacy of action, and rapid death all make it an ideal choice as a suicidal agent.

The Case

The dead body of a 22-year-old female was brought for autopsy to the mortuary of New Civil Hospital, Surat. Case papers revealed that the deceased had been pregnant, and had consumed three tablets given by her husband at 3 pm on the previous day. He administered them to her on the pretext that they would be helpful in

the birth of a male child. Soon after ingestion, she became ill and was rushed to a hospital at around 7 pm. She was conscious on arrival at the hospital. Gastric lavage was done. Suspicion was aroused that it could be a case of aluminium phosphide poisoning. At around 1 am, she became unconscious and subsequently died at 3.30 am. At postmortem examination (later that same morning), the clothing of the deceased appeared to be stained greenish. No particular odour could be made out in the vicinity of the body or the clothing. Postmortem lividity appeared bluish in color. Lips and fingernails were also discoloured bluish. There was no discharge from the mouth, ears, or nostrils. No external injuries were noted. Internally, all the organs appeared congested. The heart contained dark red, fluid blood. The most striking finding was seen in the stomach. The stomach mucosa was intensely congested, and contained about 100cc of greyish-green semi-solid material having a garlicky odour. The remains of two tablets with more or less intact aluminium foil were present. The tablets were later identified as aluminium phosphide. Each tablet was 2 cm in diameter and 0.5 cm thick. It emanated a garlicky odour.

Relevant viscera and body fluids (entire stomach with its contents, a piece of small intestine with contents, a piece of liver, one half of each kidney, and 50 ml of blood) were sent for chemical analysis in saturated solution of common salt. The chemical examiner's report confirmed the presence of aluminium phosphide in all the viscera, as well as in the stains in the clothing. Even the vomitus collected from the house revealed the presence of aluminium phosphide. The cause of death was furnished as shock due to aluminium phosphide poisoning.

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Discussion

Aluminium phosphide is a solid fumigant pesticide that has been in use in India for decades. It is cheap, easy to use, efficacious, and freely available in the market. It is sold under various brand names such as Celphos, Alphos, Quickphos, Phosphotex, etc. Aluminium phosphide is very effective as a fumigant pesticide to protect grains, and is also capable of killing rodents.² It is commonly available in rural households of most parts of North India, being a highly popular grain preservative. It is generally sold as tablets in small containers, which are removed and mixed with the grain. On exposure to moisture, the tablets release phosphine, which fumigates the grain and preserves them. As time passes, phosphine evaporates completely leaving virtually no residue in the grain.⁴ Ironically, day-by-day, deaths due to this chemical are steadily increasing due to deliberate ingestion, and at several places has acquired the dubious distinction of being the leading method of suicide, even surpassing organophosphorus compounds. Two studies have been carried out in Surat in the recent past on the trends of poisoning fatalities. Aluminium phosphide was found to be responsible for the maximum number of deaths in both the studies.⁵

Aluminium phosphide acts by liberating phosphine (PH_3) gas, which is toxic not only to pests, insects, and rodents, but also to humans. This gas is liberated rapidly in moist environment, and in the presence of hydrochloric acid. Most cases of human toxicity are acute in nature, and result from the toxic effects of phosphine, liberated in the stomach in the presence of moisture and hydrochloric acid.³

Aluminium phosphide is available in the form of dirty white/ grayish-green tablets, each normally weighing 3 grams. Each tablet contains approximately 56% aluminium phosphide and 44% ammonium carbonate, and can liberate 1 gram of phosphine gas. Though phosphine is a colourless and odourless gas, aluminium phosphide has a garlicky or decaying fish odour due to the presence of substituted phosphines and diphosphines. The residues left over in the grain after liberation of phosphine comprise phosphites and hypophosphites of aluminium, which do not cause ill effects on human consumption.² Phosphine causes widespread organ damage. It binds with and blocks cytochrome oxidase in the Krebs cycle during cellular respiration, resulting in cellular hypoxia. It also causes focal myocardial necrosis that probably results in transmembranal exchange of ions (Na^+ , K^+ , Mg^+ , Ca^+) causing arrhythmias and rapid death.² Just

150-500 mg of unexposed tablet of aluminium phosphide is lethal for an adult. Inhalation of phosphine gas over 300 ppm is dangerous for humans. Mortality rate with ingestion of aluminium phosphide/ inhalation of phosphine varies from 35% to 100%. This depends to a large extent on the amount consumed, the relative freshness or otherwise of the compound, promptness or delay in treatment, duration of shock, and efficacy of treatment. The mode of poisoning is usually intentional (suicidal), occasionally accidental, and rarely homicidal. Homicidal cases are usually seen in children, invariably administered by their parents, as part of a suicide pact. Accidental cases of fatal phosphine gas poisoning have been reported when aluminium phosphide was used as a grain fumigant for bulk shipment of food.

Normally aluminium phosphide is not popular as a homicidal poison because it possesses an unpleasant rotten fish/ garlicky odour, and also because there is usually very little time lag between ingestion and death, as well as the fact that it can be easily detected in the body tissues after death.

But the case reported here is one in which a husband used it to kill his wife. The interesting aspect of this case was that the victim/ wife was fully aware that she was being administered something. But she did not know the nature of what she was being given. She was asked to swallow them as medicinal pills to help her conceive a male child, and she did this willingly. Because the tablets were wrapped in aluminium foil, neither the colour nor the smell could be made out. The victim died within 12 hours of ingestion.

References

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