

CASE REPORT

ALUMINIUM PHOSPHIDE POISONING: A CASE REPORT

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This paper reports the case of a family in which three children were presented at Emergency Room (ER) with poisoning after the use of a pesticide at home. Initially, the cases were managed as routine cases of organophosphorus poisoning; however, the death of two children made the health team members realise that the poison's effects were delayed and devastating. Later, the compound was identified as Aluminium Phosphide (ALP), and the life of the last surviving child in the family was saved.

CASE REPORT

Three young children of ages 8, 5, and 3 years were brought to the ER of a private tertiary care setting in Karachi, Pakistan. These children were admitted with complaints of diarrhoea, vomiting, and drowsiness. On admission, it was notified by the parents that the night before they had used an insecticide (25 tablets) to kill bed bugs in their children's room. The insecticide was bought at the cost of Rs. 400/- (\$5) from a door to door vender who sold these tablets in a closed jar by publicising them as bugs killing tablets. The next morning the parents noticed that all their three children were drowsy and were experiencing breathing problems so they rushed to the ER. The condition of the eldest child (8 year old girl) was very serious and she expired on her way to the hospital. Keeping in view the history and the children's condition, the 3 year old child (male) was admitted in the Intensive Care Unit, whereas, the 5 year old child (male) was admitted in the Paediatric Unit. The health team assumed that the inhaled poisoning was because of an organophosphorus compound utilised to kill bed bugs, so both these children were managed accordingly. After two days of treatment, the youngest child (3 year old) revealed improvement in his haemodynamics so he was discharged from the hospital. However, after 10 hours of his discharge from hospital the child expired at home. This unexpected event made the paediatric health team members realise that the poison may not have been an organophosphorus poison, as this poison does not have delayed effects.

After this event, the health team members re-examined the lastly surviving child (5 year old) both clinically and diagnostically. On the third day of hospitalization, though this child appeared clinically stable, his clinical examination revealed delayed capillary refill of 4 seconds. Moreover, his Echo revealed Ejection Fraction (EF) of less than 50%. After these findings, the child was shifted to the Cardiac Step-down Unit, where Dopamine infusion was started and the child was closely monitored for his haemodynamic status. As the nature of poison was unknown, so the child's parents were asked to bring the specimen for

further investigation. It was shocking to observe that the compound was not a branded insecticide as it was unlabeled. The compound seemed to be a commercially prepared tablet and it released a strong garlic odour. Further analysis of the compound by the Pakistan Council of Scientific and Industrial Research (PCSIR) confirmed that it was Aluminium Phosphide. On knowing the type of poison and its cardiopulmonary toxicity, the child was managed for 2 more days with Methylprednisolone, Dobutamine infusion, Oxygen administration, and Ipratropium Nebulisation at the Paediatric Cardiac Step-down Unit. After 48 hours of therapy, Echocardiography was repeated. This showed an improvement in EF to 60%. Finally, the child was saved and after two more days of close observation, the child was discharged from hospital and followed in the consulting clinic. Currently the child is fine and the family is going through grieving process.

DISCUSSION

Aluminium Phosphide (ALP) pills produces a lethal Phosphine gas when it comes in contact with Hydrochloric Acid or water in the stomach. Phosphine is an extremely toxic colourless gas that releases a fishy or garlic-like odour.¹ It is used for the fumigation of stored grains and the elimination of rodents in agriculture. Due to the poisonous nature of the compound it is not commonly available; however, it is often sold in the black markets. In the past, ALP has been used by Indian villagers as a way of committing suicide. No specific antidote has been identified as yet for ALP.

The ingestion or inhalation of ALP has multisystem manifestations as it affects multiple systems, including gastrointestinal, respiratory, cardiovascular, musculoskeletal, central nervous system, and urinary system.¹⁻³ Intentional or unintentional exposure to this compound can result in the victim having nausea, vomiting, abdominal pain, diarrhoea, thirst, arrhythmia, sino-atrial block, chest tightness, decreased EF on echocardiography, dyspnoea, pulmonary oedema, muscle pain, fatigue, chills, stupor, syncope, vertigo, fatigue, parasthesia, electrolyte imbalance, burning sternal pain, and renal and liver

damage.¹⁻³ Cardiac toxicity in the affected individuals can manifest as cardiac failure and pulmonary oedema due to poor EF. Popp *et al*¹ suggested that death may occur after a 30 minute exposure to 290 to 600 ppm, and serious effects may develop after exposure to 7 ppm for several hours. As the compound is reported to hold lethal and delayed effects, therefore, an observational period of 72 hours is recommended to enable identification and management of pulmonary oedema in the victims.^{1,3}

From this case, the Paediatric Health Team members learnt that rather than relying on the purpose for which the chemical in question is used, knowing the composition of the poison is important to effectively manage paediatric patients admitted with poisoning. It was also realised that the health care professionals at the ER have the vital responsibility of taking the lead in

knowing the chemical composition of the poison. A few more important lessons learnt from the situation were that regardless of the route of poisoning, parents should be asked to bring the specimen to the hospital setting. Also, the sample of unknown poisons should be sent for analysis to initiate effective and timely management of the cases. It is recommended that cases of poisoning should be taken seriously.

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