

Poisoning by Polyethylene Glycol – An Adjuvant for Insecticides

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Background: Accidental poisoning in children with surfactant used as an agriculture adjuvant is uncommon **Case characteristics:** A 7-month-old girl presented with severe respiratory distress 48 hours following ingestion of surfactant, and required intubation and mechanical ventilation. **Outcome:** The child was successfully managed with supportive therapy. **Message:** Poisoning by polyethylene glycol can be severe and life-threatening.

Keywords: Insecticides, Respiratory failure, Surfactant.

With the increasing demands of agriculture, the use of insecticides and adjuvants has increased [1,2]. APSA 80, an All Purpose Spray Adjuvant with polyethylene glycol as a surfactant, is mixed with insecticides, fungicides, herbicides and defoliators at the point-of-use to increase their efficacy by better dispersion [3]. This chemical is hazardous according to the criteria of Occupational Safety and Health Administration (OSHA) hazard communication standards but yet considered less harmful than some other agricultural products such as organophosphorous compounds. It is an irritant to respiratory tract, and is harmful when swallowed [4].

We report a case of surfactant poisoning with delayed manifestation of severe respiratory distress as a result of upper airway edema in an infant.

CASE REPORT

A 7-month-old girl was brought to Accident and Emergency department of our hospital two days after intentional poisoning inflicted by mother, who had also consumed the same chemical. The child and mother were initially treated at a rural district hospital with stomach wash, atropine infusion and intravenous fluids. The mother succumbed on day 2 of poisoning due to acute onset of respiratory distress after being apparently stable for initial 24 hours. The details of the mother's condition, management and possible cause of the death were not available.

The child was stable for the first 48 hours, and then developed progressively increasing respiratory distress. On arrival, the child was conscious but irritable, and had tachycardia (heart rate 170-180 per min); pupils were bilaterally equal and reactive. Oxygen saturation in room

air was 88-90%. Pulses were normal and mean blood pressure was 65 mmHg. The child was in severe respiratory distress with tachypnea, chest retractions and an audible stridor. On auscultation, breath sounds were heard equally on both sides. Other systemic examination was unremarkable. Initial blood gas showed mild respiratory acidosis. Chest X-ray was normal. After initial stabilization, child was intubated with an appropriate sized endotracheal tube in view of worsening respiratory acidosis and distress. The child was ventilated with minimal pressures. A detailed history revealed poisoning with product APSA 80 whose active ingredient was a surfactant – polyethylene glycol. The chemical examination of compound did not show any traces of insecticides. After confirming the chemical nature of the ingredient, we stopped atropine infusion and commenced on intravenous steroids and adrenalin nebulization. The full blood counts, C-reactive protein and cholinesterase levels were within normal limits; blood culture was sterile. Renal function tests and liver function tests were unremarkable. The child continued to be hemodynamically stable on ventilator, except for excessive frothing.

An upper gastrointestinal endoscopy revealed swollen and sloughed supraglottis and vocal cords. Ventilation was continued till the oral secretions were minimal. The child was extubated successfully after 72 hours and remained stable thereafter. She was discharged home with no major morbidity, and was doing well on follow-up.

DISCUSSION

The most common chemicals for childhood accidental poisoning in developing countries are organo-phosphorous compounds and kerosene [4,5]. The widespread use and

ease of availability are the main reasons for this trend [6]. In our case, poisoning occurred due to a non-ionic surfactant (APSA 80). The chemical contents are surfactant (Poly (oxy-1, 2-ethanediyl),alpha-(nonylphenyl)-omega-hydroxy-), alcohol (1- Butanol) and fatty acids (fatty acids, tall oil) [4].

Clinical manifestations following poisoning by surfactant depends on the route and length of the exposure. The corrosive nature of the surfactant was the probable reason for significant upper airway obstruction in our case [7,8]. Many of the milder symptoms can be managed with only symptomatic treatment. Stomach wash should be avoided in suspected surfactant poisoning and one should monitor for respiratory distress which can be a delayed manifestation.

Unfortunately most of the agricultural product poisoning in India are presumed and treated as organophosphorus poisoning. Although these surfactants are considered low toxic chemicals, the above case demonstrates the serious implication following ingestion/aspiration and delay in instituting appropriate management. It is important for the treating physicians/pediatricians to consider poisoning with these compounds when the presentation is atypical and unresponsive to standard organophosphorus poisoning treatment.

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