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Case Report

Household poisoning in children: Case series

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ABSTRACT

Household poisons are substances in home that can cause harm when swallowed, inhaled or touched. They include medicines, detergents, cleaning products, toiletries, garden chemicals and other common household products. Each year hundreds of people from all age groups require medical attention for poisoning from products commonly found around the home. This type of poisoning occurs more commonly in children under five years of age. We are presenting summary of 7 cases of common household chemicals poisoning among pediatric age group brought for post-mortem examination at Department of Forensic Medicine, Lady Hardinge Medical College, New Delhi.

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1. Introduction

The widespread use of chemicals in various fields and their easy availability has led to a higher incidence of accidental and intentional poisoning in developing countries, including India. A wide range of products commonly used for household purposes includes cleaners, pesticides, antiseptics, kerosene, and paint thinner, etc. Any of these products can cause poisoning if misused or handled, especially in the pediatric age group.

Throughout the World, acute poisoning is one of the commonest emergencies, and requires immediate intervention. According to WHO, poisoning represents a major cause of morbidity and mortality in the world, posing a significant public health risk particularly to pediatric age group.¹ In developing countries, it is a common cause of hospital admissions.² The rate of mortality from poisoning in developed countries, is estimated to be 1% to 2%, however India reports a higher rate, varying between 15 to

30%.³

We here present series of cases of deaths due to ingestion of common household products in children which came for autopsy at Department of Forensic Medicine, Lady Hardinge Medical College, New Delhi over a period of 1 year.

2. Case Summaries

2.1. Case 1

A 2.5 years old female after consuming about 15ml of a mosquito killer liquid, following which she developed drowsiness and brought to Hospital, where she died while receiving treatment after 36 hours. She had complaints of cough, vomiting, rapid breathing and respiratory distress after consuming the liquid, prior to which she had no complaints. On autopsy, there was blood-tinged fluid coming out of the nostrils, rest was unremarkable. Internally, organs were congested. Brain and lungs were edematous also. Pleural cavities had about 100ml of blood-tinged fluid each. Multiple hemorrhagic spots were

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present over bilateral lungs and heart more-so-over anterior surfaces. Gastric mucosa was also hemorrhagic, stomach had about 50ml of mucoid materials. About 350ml of straw-colored blood was present in the peritoneal cavity. Viscera were sent for toxicological analysis which came positive for transfluthrin. The bottle provided by parents which had airtight wick broken for refilling purpose was also positive for 0.1% transfluthrin. Histopathology examination was not performed.

2.2. Case 2

A 1.5 year old female child after consuming about 30ml of 'Thinner fluid' containing acetone was brought to Hospital with complaints of tachycardia, tachypnea and vomiting, where she died while receiving treatment in a few hours. On autopsy, externally there were no associated findings, however, internally, organs were congested. Brain was congested and oedematous. Pleural cavity had about 50ml of straw colored fluid. She had esophageal and gastric necrosis and ulceration with associated upper gastrointestinal bleeding. Heart and lungs showed multiple areas of petechial hemorrhages at places. Chemical examination of viscera was positive for acetone.

2.3. Case 3

A 1.5 years old male child after consuming some dishwasher detergent at home was brought to hospital in unconscious state with history of bloody vomitus, where he died after a few hours. On autopsy, there were no associated external findings. Brain was oedematous and congested. Meninges were adherent to skull. Pleural cavity was unremarkable. Bilateral lungs showed features of pneumonia. Stomach was empty and mucosa was hemorrhagic. In kidneys, corticomedullary differentiation was lost. Viscera were sent for toxicological analysis which came negative for common poisons.

2.4. Case 4

A 2.5 years old female child after consuming unknown quantity of insecticide was brought to hospital with complaints of laboured breathing, coughing, vomiting and subsequently unconsciousness, where she died while receiving treatment after a few days. On autopsy, there were no associated external findings. Brain and lungs were congested and oedematous. Bilateral pleura contained about 50ml of straw coloured fluid. Heart and lungs showed petechial hemorrhagic spots at places. Peritoneal cavity contained about 150ml of straw coloured fluid. In kidneys, pelvicalyceal architecture was distorted. Viscera were sent for toxicological analysis which came positive for Diazinon.

2.5. Case 5

A 7 year old male child after consuming unknown quantity of engine oil was presented to hospital with complaints of dyspnea, tachycardia, and vomiting where he died in ICU after three weeks. On autopsy, there were no associated external findings. Brain was congested and oedematous. Bilateral lungs were hard and had hemorrhagic spots all over. Peritoneal cavity had about 300ml of straw coloured fluid. Stomach was empty and showed hemorrhagic spots at places. Viscera were sent for toxicological analysis which came positive for various hydrocarbons. Histopathology examination was not performed.

2.6. Case 6

A 2 year old male child after consuming unknown quantity of rat kill poison (Zinc Phosphide) was brought to Hospital with complaints of breathlessness and tachycardia, where he died after a few a hours. In hospital, he developed elevated liver enzymes with hyperbilirubinaemia, and hypoalbuminaemia. On autopsy, there were no associated external findings. On internal examination, brain, and both lungs were congested and oedematous. Pleural cavity contained about 50ml of straw coloured fluid. Lungs showed features of lobar pneumonia with areas of consolidation. There were multiple areas of petechial hemorrhagic spots over bilateral lungs and heart. Stomach had about 50ml of mucoid material. Mucosa was hemorrhagic. Toxicological analysis of stomach confirmed the presence of zinc phosphide. Phosphine levels in blood, stomach and liver were 1.1ng/mL, 4500 ng/g, and 3 ng/g. Histopathological examination of bilateral kidneys show tubular injuries, including attenuation of proximal tubular brush borders, blebbing and sloughing of brush borders, vacuolization of cells, and detachment of tubular cells from their underlying basement membranes, more markedly present over proximal tubules.

2.7. Case 7

A 2 year male child after ingesting unknown quantity of unknown acid (kept as toilet cleaner) was brought to hospital in unconscious state, where he died after 21 days. On autopsy, there were no associated external findings. Internally, organs were congested and oedematous. Heart and lungs showed areas of petechial hemorrhages. Bilateral pleurae and peritoneal cavity had straw coloured fluid. Stomach was empty and mucosa was congested. Viscera were sent for toxicological analysis which came negative for common poisons. Histopathology examination was not performed.

3. Discussion

Household chemicals are those non-food chemicals that are commonly found and used in and around the any household. They are designed particularly to assist cleaning, house and other maintenance, cooking, pest control and general hygiene purposes. In addition to having slightly adverse up to seriously toxic effects when swallowed, chemical agents around may contain poisonous or corrosive substances.⁴

Most unintended exposures occur at home. These household items can prove toxic if misused by humans. Medicines, batteries, laundry packages, detergents, cosmetics, etc. can cause damage if swallowed, inhaled, splashed or spilled on skin or eyes.

In USA, according to Poison Statistics, National Data 2020, young children (younger than 6 years) comprise a disproportionate percentage of the cases, though it affects all age groups, from infants to seniors. Peak poisoning frequency occurs in 1-2 years old age group.⁵ The Swedish Poisons Information Centre has reported 81,102 human exposures in 2016. The Poisons Centre in Denmark reported 41,000 queries in first three years of its existence.⁶⁻⁸

In India, analysis of data based on telephone calls received by the NPIC (April 2006-March 2016) has highlighted a high incidence of poisoning due to household products. The home and its surroundings can be dangerous places for children, particularly for the possibility of unintentional poisoning. Children are naturally curious, exploring in and around the home. Exploratory habits, generalized inquisitiveness, mouthing tendencies and newly acquired mobility could be the likely reasons for high incidence in younger pediatric age group. Additionally, improper packaging, no warning signs, ignorance and poor storage facilities also contribute to accidental poisoning.

The increase in frequency of these poisonings is due to introduction, easy availability and increased use of newer household products containing harmful chemicals. More than 90 percent of the time, poisonings happen in people's homes. A majority of these poisonings occur in the kitchen, bathroom and bedroom.^{6,9}

None of the household products considered necessary in daily life, can be labeled safe. Most poisonings occur when parents or caregivers are home but not paying attention. Thus there is need for poison proofing of homes, as children below the age of six years are more prone to accidental poisoning. The poisons prevention programme would essentially revolve around creating awareness, about essential Do's and Dont's in household environment. Poison prevention can be greatly aided by educating parents, grandparents, and other caregivers about the possible risks that the home environment may provide that could result in poisoning, particularly unintentional poisoning. Since home products are the most frequent poisoning triggers, it is vital to store them properly and use them sparingly and according to instructions. Additionally, it is imperative that adults

strictly supervise youngsters who are the most susceptible. Essentially, as children become older, the poison prevention strategies need to switch from protection to education. Toxicovigilance must be increased to ensure household chemical safety. It is crucial to identify high risk exposure scenarios, vulnerable groups, and compounds engaged at the regional level for hazardous effects, especially those causing morbidity and mortality.

It's crucial to manage chemicals responsibly in daily life. For any type of poisoning, prompt diagnosis and the start of therapeutic intervention are essential. The Poisons Control Programme (PCP) offers a framework for the efficient handling of various poisonings. It offers a comprehensive framework for poisoning prevention and management in order to ensure the chemical safety of the community, workers, industrial sites, and environment at large. The provision of information and counsel, medical management, analytical laboratory services, accessibility of antidotes, prevention, toxicovigilance, teaching and training, environmental health monitoring, research, and hazard management are among the crucial PCP components. Poisons Control Centers (PCCs), which primarily consist of three units – Poisons Information Centre (PIC), Analytical Laboratory, and Treatment Facility – can be established to achieve the PCP's objectives. The PIC, a specialized unit provides prompt, tailor made information, on early diagnosis and management of poisoning. The Poisons Information Centre constitutes an essential part of the programme, having multiple roles and helps in effective management and prevention of poisoning.¹⁰

4. Conclusion

Due to advent of newer products in the market incidence of household poisoning specially among children are increasing. When it comes to accidental poisoning, preventive measures are the key. This is especially true in a household with young children. With proper education, stricter guidelines for manufacturers and setting up of PICs, this trend can be checked.

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None.

6. Conflict of Interest

None.

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