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Research Article

Clinical profile of poisoning in children: a hospital based study

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ABSTRACT

Background: Poisoning is a common medical emergency in children and most of the cases are accidental in nature. The objective was to study clinical profile of children presenting with poisoning to the pediatric emergency department of a tertiary care hospital in Mumbai, India.
Methods: This is Prospective study conducted in a Pediatric ward over a period of 18 months after obtaining permission from institutional ethics committee. Total 50 cases fulfilling the inclusion criteria were enrolled in the study over the period of 18 months. Neonates and the children with snake, scorpion and animal envenomation were excluded. Children with allergic drug reaction or food poisoning were excluded. Descriptive analysis of the collected data was performed using SPSS v.15.
Results: Fifty cases of poisoning formed 1.3% of all paediatric admissions (3700 admissions). Most of the cases were accidental (94%). There were 84 % children between 1-5 years of age with male preponderance. Kerosene oil poisoning remained the commonest (32%) accidental poisoning in this study. An interesting trend was concentrated HCL poisoning (now a common household product) as the second commonest poisoning (17.3%). This was followed by poisoning with various drugs used by adults in the house.
Conclusions: Acute accidental kerosene poisoning in children is of frequent occurrence in the paediatric emergency department; and thorough knowledge about the management of each poison is essential. Most of the accidents are preventable and prompt treatment can reduce mortality and long term morbidity.

Keywords: Poisoning, Kerosene, Accidental poisoning

INTRODUCTION

Poisoning is a common medical emergency in children. Most of the poisoning in children is accidental. Poisoning account for 1- 6% of bed occupancy in children hospitals and 3.9% in pediatric intensive care unit in India.[1] According to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), poisoning in childhood is common because children are curious and explore their world with all their senses, most commonly by mouthing.[2] Toddlers are at increased risk due to their increased motor abilities and explorative curiosities. It is a common cause of unnatural death in children. It is the second most common cause of injury resulting in the hospitalization of children under the age of five years.[1] The most common agents involved are over-the-counter (OTC) medications, prescription medications, household products, paraffin/kerosene, pesticides, poisonous plants and animal or insect bites.[3] Unfortunately poisoning in children is becoming more common due to easy access of poison, children with temperamental and behavioural issues, increased screen media exposure, lack of adequate supervision etc. These accidents are preventable because the main reasons for such incidents are a lack of knowledge, a lack of awareness and a lack of adult supervision. The cause of paediatric poisonings varies in different age groups and hence, preventive strategies should be planned accordingly. The present research was aimed to study the

pattern and outcome of childhood poisoning under the age of 12 years at a tertiary care centre in Mumbai, India to characterize the problem of acute paediatric poisoning.

METHODS

This is prospective study conducted in a paediatric ward over a period of 18 months after obtaining permission from institutional ethics committee. All children aged 1 month to 12 year with suspected or alleged history of poisoning admitted in paediatric ward were included in the study. Total 50 cases fulfilling the inclusion criteria were enrolled in the study over the period of 18 months. Neonates and the children with snake, scorpion and animal envenomation were excluded. Children with allergic drug reaction or food poisoning were excluded. All of the required information was extracted and recorded in a data collection form. The collected information included patient demographic profiles (i.e., age, gender and nationality), the type of poison, the time of arrival at the hospital after exposure, the time of exposure, the length of the hospital stay, the medical intervention and the outcome of the unintentional poisoning. Data were entered and analyzed using SPSS v 15. Numerical data is expressed as median with range and categorical data is expressed as ratio and proportions. Categorical data is compared using chi-square test and numerical data is compared using non-parametric Mann-Whitney U test. Level of significance is kept at $p < 0.05$.

RESULTS

Total of 3700 children were admitted in paediatric ward during the study period, out of these 50 children were admitted with acute poisoning, making the prevalence of poisoning 1.3% at our centre.

Total 50 cases (36 boys and 14 girls) were included in final analysis. Incidence of poisoning was more common in males (72%), almost 3 times those in females (28%). Statistically also this association was found to be significant (p value=0.003).

Youngest child was 11 months old boy and oldest child was10 year old boy. It was observed that maximum number of children (84%) belonged to group 1-5 year age followed by 14% in age group 5-10 years. Incidence was found to be higher from lower socio-economic strata of society. Statistically significant association was found on applying chi-square test (p value <0.0001)

Most of the cases (94%) were due to accidental ingestion of the concerned agent. Chronic ingestion was observed in only 3 cases (6%) which were due to excess drug given by parents to the children or accidentally taken by the child. A total of 4% of the patients came with history of acute ingestion of the poisoning agent in contrast with just 3 children who had chronic poisoning due to drug over dosages.

Hydrocarbon poisoning (kerosene) was the commonest type of poisoning accounting for 32% of total cases followed by insecticide poisoning in 10% cases (Table 1).

Table 1: Type of poisoning.

Type of poison	Total cases	%
Hydrocarbons		
Kerosene	16	32
Turpentine	1	2
Corrosives		
Bleaching powder solution	4	8
Caustic soda	3	6
Detergent powder	2	4
Phenyl	3	6
Non-corrosives		
Insecticides	5	10
Drugs		
Anti-convulsants	3	6
Cardio vascular drugs	2	4
Supplements (iron tablets)	2	4
Others	1	2
Oils	4	8
Food Poisoning	3	6
Miscellaneous	1	2

Vomiting alone was the commonest presenting symptom (62%). Respiratory and CNS symptoms were noted in 14% and 24% respectively (Table 2).

The study observed that most patients (78%) were brought to the hospital for therapeutic intervention within 4 hours of ingestion of the poisoning agent. However in 6 patients we observed a time lag of more than 24 hours since ingestion and presentation. These being children with chronic drug overdose (3) and caustic soda ingestion (3) (Table 2).

Table 2. Symptoms of poisoning.

Symptoms	Total cases	%
Vomiting	31	62
Cough and breathlessness	7	14
Irritability and drowsiness	8	16
Ataxia	3	6
Convulsions	1	2
Burning sensation and difficulty in swallowing	3	6
Vomiting + cough and breathlessness	3	6
Vomiting+irritability/drowsiness	5	10
Vomiting+burning sensation in mouth and difficulty swallowing	3	6
Ataxia+drowsiness	1	2

In hydrocarbon poisoning 4 cases out of 17 were shown slightly raised total leucocytes count. These were the

patients who developed chemical pneumonitis following kerosene ingestion.

Out of 12 cases of corrosive poisoning, 2 were found to have abnormal counts. On statistical analysis (chi-square test), this difference was found to be insignificant. X-ray chest suggestive of pneumonitis was found in 4 out 17 (23%) cases of hydrocarbon poisoning. All these were patients with kerosene ingestion.

Out of 2 cases of iron tablet poisoning, 1 case was found to have raised serum iron (serum iron=141 mg %). In all 3 cases of anticonvulsant overdoes, therapeutic drug monitoring revealed serum drug levels above therapeutic range.

Complications were observed in very few children in our study, the overall rate being 6 out of 50 (12%). All of them were observed in children consuming hydrocarbons and corrosives. Chemical pneumonitis was seen in 25% cases of kerosene poisoning (4 out of 16). Oesophageal stricture as a complication was seen in 25% of corrosive poisoning (3 out of 12). In the study, it was observed that ingestion was the only route of poisoning and all cases were found in domestic setting.

DISCUSSION

Poisoning in children is an alarming situation for both the parents and the doctors attending the patients. It is also a significant preventable cause of morbidity and mortality in this age-group. The incidence of all childhood poisoning in our study was 1.3%. This low incidence could be attributed to the shorter duration of the study. As the majority of children with poisoning are of the 1-5 years age group, the curiosity is maximum and they cannot give proper history of the ordeal they are in. In our study, this age group comprises of 84% of our study population. This higher risk group is also described by other authors.[4-7] No child above 10 years were there in this study, however, 5-10 years group was 14%. This is on the lower side of other studies where the >5years age group are higher, however, this could be because of the lesser number of cases and study group including only those less than 12 years. Poisoning in children is usually as a result of accidental ingestion as opposed to intentional, which is usually the case in adult patients. In our study, 94% of our patients were of accidental poisoning while the remaining 6% were because of overdose due to chronic anticonvulsant drug ingestion. This is in line to the reports by other authors like Bacha, Kohli and Farnaghi et al who reported 77.5%, 96.9% and 90% respectively.[4,6,8]

Frequency of poisoning in children is more common among boys (72%) as compared with girls (28%) with a ratio of 2.57:1, which is statistically significant. Similarly, male preponderance is also seen in other studies, however one study in Ethiopia reported similar frequency in both boys and girls.[4,6-9] Sixty percent of our study children are from the lower socioeconomic class which is similar to the findings by two other studies from Pakistan and Iran.[7,8] This is found to be statistically significant and is an important risk factor for accidental poisoning in children due to poor storage facilities in such households and along with poor supervision and parental neglect due to poverty and large family size. Also, families in the lower strata keep kerosene in empty water bottles which could be easily reached by children.

The most common agent of poisoning in our study is kerosene (32%). This is similar to studies by Ashgar (27%) and Kohli (27%); however, studies in Ethiopia, the most common agent was drugs, both prescription and over the counter.[4,5,9] Second to kerosene is corrosive poisoning (bleaching powder, caustic soda and phenol), with 24% of the total study group of 50 cases coming in with it. This is higher than that reported in other studies.[6,7,9] However, only 16% were brought to the hospital for drug poisoning. Insecticide poisoning accounted 10% of our study, this is also similar to the findings of other authors from Iran and Pakistan, this may be attributable to the fact that all these countries and India are majorly agricultural countries.[5-9] Twenty four percent of our study group were admitted for corrosive poisoning in the form of bleaching powder, caustic soda, detergent powder and phenyl.

This study also revealed that most of the patients (39/50) presented to the hospital within 4 hours of ingestion of the offending agent, indicating a fair level of awareness amongst the general population to seek medical care following such an incident at home. This aspect has not been well analysed on other studies, however, the need for early intervention is emphasised. Some of our patients presented late i.e., within 4-24 hours (10%) or even after 24 hours (6%). Three of 6 patients who presented late were those who had consumed caustic soda and these were the ones who had oesophageal strictures, requiring long term management. The most common symptoms of the poisoning with which the patients were brought to the hospital were vomiting (62%), this is owing to the bad taste and gastric irritation of the ingested poisons. Vomiting itself has a beneficial effect in that it removes the offending agent quickly, especially in cases of hydrocarbon poisonings where gastric lavage is contraindicated. This is followed by irritability and drowsiness (16%) and cough with breathlessness (14%). However, in other studies, respiratory distress and unconsciousness were the most common presentation since the most common cause of poisoning in their setting was drugs.[5] There was no presentation with unconsciousness among our patients, although, one patient presented with convulsion. Complications were seen only in very few cases in our study (6/50), and they were seen in kerosene poisoning (4/16) and corrosive poisoning (2/12) in the form of chemical pneumonitis and oesophageal strictures respectively. Since the amount of kerosene consumed was few (2-4 ml) and are presented within 4 hours of consumption, chemical pneumonitis

seems to be due to the innate toxicity of kerosene due to its low viscosity and surface tension, which allows it to spread over a large surface area and set up an inflammation following its aspiration into the respiratory tract.[10] Those who consumed caustic soda developed oesophageal strictures and presented with dysphagia. These patients required supportive treatment and prolonged admission. Caustic soda is known to cause liquefaction necrosis followed by fibrosis and depends on the amount of caustic soda consumed. Dilatation was done for those patients with oesophageal strictures.

The total white cell count was on the higher side in 17.6% (3/17) of hydrocarbon poisoning and also in 16% (2/12) of cases of corrosive poisoning. However, on statistical analysis, this was not found to be significant. Chest radiogram was suggestive of pneumonitis in 23% (4/17) of all the hydrocarbon poisoning cases and they all have ingested kerosene. In all the 3 cases of anticonvulsant overdose, the serum levels were above the therapeutic range. After reducing the dosages of these drugs and thus achieving normal therapeutic levels, simultaneous seizure control was achieved. Most of the patients required only supportive management in the form of gastric lavage and antacids and were fit to be discharged after a 24 hours observation period. None of our patients required mechanical ventilation.

Acute poisoning in children is of frequent occurrence in the paediatric emergency and thorough knowledge about the management of each poison is essential. The most common poison being kerosene, the first healthcare provider must take care not to give gastric lavage to the patient and instead remove the lingering substance from the skin and the clothes and thereafter observe the patient for any signs of complications. However, ingestion of drugs should be managed aggressively by gastric lavage and by giving activated charcoal at the appropriate dosing. Patients with organophosphorous poisoning, as soon as it is suspected, should be started with atropine injection immediately, while decontamination is being carried out simultaneously. In all types of poisoning, airway, breathing and circulation should be monitored at all times and intravenous lines must be secured liberally in order to be able to provide medical management quickly when required.

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