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Spectrum, Complications and Outcome of Acute Pediatric Poisoning

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Abstract

This prospective study was aimed to study pattern and outcome of childhood poisoning at a tertiary care centre in North India. All pediatric patients admitted with poisoning during 2012 and 2013 were included, and socio-demographic and clinical details of the patients recorded. Acute poisoning was reported in 104 children aged 9 months to 16 years during the study period. They constituted 2.6% of total pediatric admissions during the period. Males were 58 (56%) and females 46 (44%). The mean age was 5 years (9 months-16 years). Poisoning was suicidal in 11 (10.6%) and accidental in 93 (89.4%). Cholinesterase inhibitor (ChEI) compounds (n = 27, 26%) and kerosene (n = 23, 21%) were the most common agents responsible for poisoning. ChEI poisoning and snake envenomation were associated with more complications. Overall mortality was 5 (4.8%); 4 patients died of ChEI poisoning and one of snake bite. In ChEI poisoning patients, mortality was higher in patients who had suicidal poisoning, seizures or required mechanical ventilation.

Keywords: complications, organophosphorus, pediatric, poisoning

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Introduction

Poisoning is the fourth most common cause of mortality in India[1]. Five to six persons per lakh of population die due to acute poisoning every year[2]. Pesticides form the commonest cause of poisoning in developing countries like India due to agriculture based economics, poverty, illiteracy and lack of protective clothing and easy availability of highly toxic pesticides. Among pesticides, organophosphorus compounds (OP) form the largest bulk of poisoning in India and produce significant morbidity and mortality[3].

Poisoning is not confined to adults only and accounts for about 7% of all accidents in children under 5 years[4]. Still pediatric poisoning is poorly documented in developing countries. Likewise, from India, limited data are available on morbidity and mortality related to poisoning in children, particularly the changes in its pattern over the years[5]. This paper studies the common intoxications in pediatric population of our place with particular emphasis on complications and outcome.

Methods

This prospective study was conducted in a tertiary care teaching hospital in north India. All pediatric patients aged upto 16 years, with acute poisoning of any source, who were hospitalised during 2012 and 2013, were included. Data regarding age, sex, circumstances of poisoning, duration of hospitalization, severity, complications, and outcome of the patients were recorded; the details of physical examination, laboratory

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investigations and the management offered were included. Cholinesterase inhibitor (ChEI) poisoning was defined on the basis of characteristic clinical features and included both carbamate poisoning and organophosphate (OP) poisoning. Patients included in the study followed standard treatment guidelines for the particular poisoning in our hospital. Important information was arranged in Microsoft Excel worksheet and statistical analysis was done using Graph Pad Instat statistical software. Student's t-test and Fischer's test were performed for statistical analysis. A *p*-value of less than 0.05 was considered statistically significant.

Results

A total of 104 pediatric patients, constituting 2.6% of total pediatric admissions, were included. 58 (56%) were male and 46 (44%) female. The mean age was 5 years (9 months-16 years, SD ± 4 years). About 40% patients received first aid before coming to the hospital. Poisoning was suicidal in 11 (10.6%) and accidental in 93 (89.4%). Patients with suicidal poisoning aged higher than those with accidental poisoning (13±1.8 v 4.1±2.9, p-Value < 0.0001). Different poisons are enlisted in **Table 1**.

Mean duration of hospitalization was 4±2 days. ChEI poisoning and snake envenomation were associated with more complications. Overall mortality was 5 (4.8%); 4 patients died of ChEI poisoning and one of snake bite. The patient who died of snake bite had vasculotoxic envenomation with disseminated intravascular coagulation (DIC) and renal failure. Kerosene ingestion was present in 23 patients; fever developed in 16 of them and pneumonitis in five. No patient required mechanical ventilation. One patient with corrosive ingestion developed esophageal stricture which required surgical excision with gastric interposition after repeated endoscopic dilatation failed. Phenytoin intoxication presented with cerebellar ataxia in all patients and phenobarbitone overdose patients had drowsiness requiring intravenous hydration and observation only. Paracetamol overdose patients presented with gastritis symptoms and none had hepatic or renal failure. See **Table 2**.

Table 1. Spectrum and outcome of poisoning

Poisoning	No (%)	Male	Suicidal	Accidental	Deaths
Household poisons	37 (35.6)	19	11	26	4
Cholinesterase inhibitor	27 (26)	15	7	20	4
(OP 15, carbamate 3, Unknown 9)	10 (9.6)	4	4	6	0
Rodenticide					
(Al phosphide 3, Coumarins 7)					
Household chemicals	30 (28.8)	17	none	All	0
Kerosene	23 (22)	13			
Corrosives	5 (4.8)	3			
Disinfectants	2 (1.9)	1			
Animal poisons	17 (16.3)	11	none	All	1
Snake bite	17 (16.3)	11			
Drug overdose	13 (12.5)	7	none	All	0
Paracetamol	4 (3.8)	1			
Phenytoin	3 (2.9)	2			
Barbiturate	3 (2.9)	2			
Thyroxine	2 (1.9)	1			
Iron	1 (0.96)	1			
Plant poison	7 (6.7)	4	none	All	0
Dhatura poisoning	7 (6.7)	4			

Table 2. Complications of different poisonings

Poison	Complication
OP compounds (27)	Death 4, respiratory failure 7
Snake bite (17)	Renal failure 3, respiratory failure 2, DIC 1, dialysis 1, Compartment syndrome 8, Death 1
Corrosive (5)	Esophageal stricture 1
Kerosene (23)	Pneumonitis 5

ChEI compounds were the commonest cause of poisoning as well as mortality (n=27, 26%). Mean age was 6.5 years (11 months-16 years, SD ± 4.4 years). 7 patients had consumed poison with suicidal intent. Most of the poisonings occurred in spring or autumn. Muscarinic symptoms were present on admission in 45%, though all patients developed some muscarinic symptom at some point of time. Nicotinic symptoms were encountered in 14 patients. Mechanical ventilation was required in 7 patients; all of them had developed nicotinic symptoms at some point of time. Overall mortality was 4(15%). Among the patients who died 3 were female, 3 suicidal, 3 had required mechanical ventilation and all had nicotinic symptoms. Suicidal poisoning, seizures and mechanical ventilation had a statistically significant relation with mortality. See **Table 3**.

Table 3. Prognostic factors of ChEI poisoning

	Total	Died	OR	95% CI	P-Value
Sex(female)	12	3	4.66	0.41-52.15	0.29
Suicidal	7	3	14.3	1.2-174.9	0.04
Mechanical ventilation	7	3	14.3	1.2-174.9	0.04
Nicotinic symptoms	14	4	11.6	0.56-239.9	0.09
Seizures	9	4	30.3	1.4-654.5	0.007

Discussion

The incidence of poisoning in our study was 2.6% which was comparable to other studies [6]. Most of the cases had accidental poisoning; suicidal causes have been found less often in other pediatric studies as well [7]. Suicidal poisoning was confined to 9-16 yr age group. Adolescent age group, being a sensitive developmental period where humans feel physiologically and psychologically more vulnerable to stresses and failures, is particularly predisposed to suicidal tendencies. Other researchers have also found the same[4,7]. Failure in school was especially an important stressor for suicide in many of our patients leading to clustering of suicidal cases around school examinations in autumn. ChEI compounds were the commonest cause of poisoning in our patients. Though ChEI poisoning is common in other studies as well[8], higher incidence of this poisoning in our study could be attributed to their widespread use. Clustering of ChEI poisoning cases in spring months could be explained by easy availability of pesticides in many households during the season for agricultural purposes. Kerosene ingestion is common in our place as in other parts of India because it continues to be used as a domestic fuel [5,6,8]. Kerosene poisoning was confined to accidental ingestion by toddlers who are attracted to it by its color and probably by the fact that many households store it in containers similar to those used for water. Acute hydrocarbon ingestion usually leads to aspiration and severe pneumonitis; other organ systems, like liver, central nervous system and heart, are involved less often. Fortunately, most of our patient didn't develop serious symptoms, probably because all our patients consumed it accidentally and the disagreeable taste may have prevented significant ingestion. Drug ingestion was predominantly accidental except for 2 cases of phenytoin toxicity due to drug-dispensing error (substituting syp dilantin for eptoin which has 5 times more concentration of drug).

Out of our patients, 5 (4.8%) died. Mortality due to poisoning in children has remained high over the last five decades (2.9%-4.7%)[5]. Mortality in study of Ram P et al was 7.4% [8]. OP poisoning was most fatal (15%). High mortality of OP poisoning has been reported in other studies[7,9]. Compared to the West, OP poisoning has higher mortality in resource poor settings due to high toxicity of locally available poisons, difficulties in transporting patients, paucity of health care facilities and antidotes[7,10,11]. Suicidal poisoning, seizures and need for mechanical ventilation were significantly associated with fatal outcome. Relationship of severe neurological symptoms or mechanical ventilation with mortality could easily be explained by severity of poisoning and delay in treatment till advanced symptoms developed. Intentional poisoning has been associated with increased mortality[7].

Conclusion

Poisoning is a true pediatric emergency with potential for serious morbidity and mortality. All potentially poisonous

chemicals, especially ChEI compounds, should always be stored in a secure place away from children. Special help should be provided to adolescents whenever they face any stressful event like poor exam performance or failed relationship because they appear to be particularly prone to suicide. Formulations containing potentially dangerous drugs like phenytoin should be standardized to ensure uniform concentration. Health education should be provided to adolescents at school and college level about poisoning and its first aid treatment.

Conflict of Interest

None Declared

References

1. Unikrishnan B, Singh B, Rajeev A. Trends of acute poisoning in south Karnataka. Katmandu University Medical journal. 2005; 3(2): 149-54.
2. Maharani B and Vijayakumari N. Profile of poisoning cases in a Tertiary care Hospital, Tamil Nadu, India. Journal of Applied Pharmaceutical Science. 2013; 3(01): 091-4.
3. Malik GM, Mubarik M, Romshoo GJ. Organophosphorus poisoning in the Kashmir Valley, 1994 to 1997. N Engl J Med 1998; 338: 1078.
4. Jepsen F, Ryan M. Poisoning in children. Current Paediatrics. 2005; 15: 563-8.
5. Rathore S, Verma AK, Pandey A, Kumar S. Pediatric Poisoning Trend in Lucknow District, India. J Forensic Res 2013; 4 (1): 179-80.
6. Niyaz AB, Kaisar A, Sethi AS. Poisoning in children. Indian Pediatrics 1991, 28: 521-524.
7. Kumar MR, Kumar GP, Babu PR, Kumar SS, Subrahmanyam BV. A retrospective analysis of acute organophosphorus poisoning cases admitted to the tertiary care teaching hospital in South India. Ann Afr Med. 2014; 13(2):71-5.
8. Ram P, Kanchan T, Unnikrishnan B. Pattern of acute poisonings in children below 15 years - A study from Mangalore, South India. J Forensic Leg Med. 2014; 25: 26-9.
9. Lin TJ, Walter FG, Hung DZ, Tsai JL, Hu SC, Chang JS, et al. Epidemiology of organophosphate pesticide poisoning in Taiwan. Clin Toxicol (Phila). 2008; 46(9):794-801.
10. Bruyndonckx RB, Meulemans AI, Sabbe MB, Kumar AA, Delooz HH. Fatal intentional poisoning cases admitted to the University Hospitals of Leuven, Belgium from 1993 to 1996. Eur J Emerg Med 2002; 9: 238-43.
11. Srinivas Rao Ch, Venkateswarlu V, Surender T, Eddleston M, Buckley NA. Pesticide poisoning in south India: Opportunities for prevention and improved medical management. Trop Med Int Health 2005; 10: 581-8.