Original Article

Accidental poisoning in children

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Abstract

Objective: To assess the pattern of acute poisoning in children at Liaquat National Hospital, Karachi.

Methods: The one-year descriptive study was conducted in the Paediatric Emergency Unit of the Liaquat National Hospital, Karachi, from April 1, 2006 to March 31, 2007, involving all patients under 12 years of age who visited the unit with a history of accidental exposure to toxic substances. Demographic data and all other relevant information were obtained mainly by retrieving hospital records and the admission register. Immediate outcomes were analysed in terms of admission, discharge and 'left against medical advice' (LAMA).

Results: During the study period, 43 cases of accidental poisoning were registered, constituting 0.58% of the total emergency visits. Most (46.5%) were less than 3 years of age. Pharmaceutical products (34.9%) were the leading cause of ingestion followed by kerosene oil (25.6%), organophosphorous (16.3%), alkali (9.3%) and acid (7%). Regarding the outcome of these cases, 29 were admitted, 7 were discharged and 7 patients left against medical advice.

Conclusion: In our study, a small percentage of children presented with acute poisoning. Pharmacologic agents were a common source of poisoning in children. There is a need to further study and identify risk factors of acute poisoning in children.

Keywords: Poisoning, Children, Immediate outcome (JPMA 62: 331; 2012).

Introduction

In spite of successful interventions and safety measures to prevent accidental poisoning in paediatric population, toxic exposure continues to be a common occurrence.[1-4] By definition, poisoning is exposure of an individual to a substance that can cause symptoms and signs of organ dysfunction leading to injury or death.[5] Epidemiological studies on accidental poisoning in children exhibit a consistent pattern regarding age and gender, being predominant in children less than 6 years of age and having male preponderance as they are more active with a drive to explore the environment.[6]

Toxic exposure surveillance system (TESS) of the American Association of Poison Control Centre (AAPCC) reported 1.08 million instances of toxic ingestion in the year 1998 by children less than 6 years of age. The consumer product safety commission incidence shows poisoning in children was 450 per 100000 population in 1994-2003.[7]

In a wide perspective, paediatric poisoning shows diverse variability that ranges from lack of maternal knowledge, improper storage of substances and insufficient supervision to curious impulsive behaviour of the child.[2] Ingestion was found to be the major route of poisoning by the American Poison Control Centre.[8] The various toxic ingestions included are kerosene oil, most common in developing countries of South Asia and some parts of Africa[7,9] followed by organophosphorous compounds like pesticides specially in a country like Pakistan because of the lack of safety measures from manufacturers to caregivers. Other hazardous compounds used by young children out of inquisitiveness are pharmaceuticals like cough/cold preparations to sedatives/hypnotics.[8]

Despite the latest adopted measures and safety campaigns, the number of ingested and/or toxic-related injuries from chemicals and medications continue to rise and the exact scale of problem is difficult to establish. Considering the available literature, defining and characterising poisoning in children can be carried out by data collection of substances involved, age and gender affected and the immediate outcome in emergency room. This study was conducted in a semi-private tertiary care hospital to assess the pattern of acute poisoning in children in terms of etiology, clinical presentation, immediate outcome and admission requirement.

Patients and Methods

The objective of the study was to determine the pattern of accidental poisoning in the paediatric age group and their immediate outcome. The duration of this descriptive study was one year, from April 1, 2006 to March 31, 2007. The study was conducted at the Paediatric Emergency Unit at the Liaquat National Hospital, Karachi.

All patients under 12 years who visited the emergency department with a history of accidental exposure to toxic substances were included in the study. Data was obtained mainly by retrieving hospital records and the admission register. Further, the available patient files (one-year record) were also reviewed and relevant information was collected.

Demographic data was recorded in each case, including age, gender, and the time of arrival at the hospital after exposure. Variables like organ system involved and presenting signs and symptoms for 43 patients were retrieved. General management steps to stabilise vitals (ABCs), correction of hydration, acidosis, hypoglycaemia, etc. were carried out in all cases. Specific measures like decontamination, gastric lavage, administration of activated charcoal and antidotes were taken according to the type of poison involved and the duration since exposure. Immediate outcomes were measured in terms of admission in the Paediatric ICU for those who were vitally and haemodynamically unstable, admission in the Paediatric Medical Ward for observation for those who were haemodynamically stable, to observe remote complications, discharge from the Paediatric Emergency for those patients who were vitally and haemodynamically stable and those who arrived early, took little quantity of the offending agents and also those who had no chances of remote complications. After given appropriate treatment, they were discharged and followed up in Paediatric Outdoor Patient Department. Alternatively they left against medical advice (LAMA) due to their financial or domestic problems.

Data thus obtained was entered and analysed using statistical package SPSS version 10. Frequencies and percentages were reported for categorical variables and mean±SD were reported for continuous variables. In our study, neither a research ethics committee approval nor an informed consent was needed.

Results

During the study, 43 children presented with acute poisoning. This comprises 0.58% of all Paediatric Emergency Unit admissions during the said period. In terms of baseline characteristics, the mean age at presentation was 2.84±0.8 years and the median age was 3 years (Table-1). Majority (46.5%) of the patients were less than 3 years of age, 37.2% were less than 2 years of age, while 11.6% were between 3 to 5 years of age and 4.7% were above the age of 5. Of the total, 55.8% patients were male.

Table-1: Baseline characteristics.

Age Groups	Frequency	Percent
Mean age	2.84±0.8 years	
1-2 years	16	37.2
2-<3years	20	46.5
3-<5 years	5	11.6
>5 years	2	4.7
Sex		
Male	24	55.8
Female	19	44.2
Types of poisons		
Kerosene	11	25.6
Organophosphorus	7	16.3
Mercury	3	7.0
Alkali (bleach)	4	9.3
Acid	3	7.0
Pharmacologic agent	15	34.9
Body system involved in Poisoning		
Gastrointestinal tract	11	
Respiratory system	9	
Bleeding	7	
Nervous system	2	
Cardiovascular system	2	
Outcome		
Admitted	29	67.4
Discharge from ER	7	16.3
LAMA	7	16.3

Table-2: Characterctics of common poisonings.

Name of poison	Number of cases	Age distribution	Sex distribution (M:F)	Complications	Outcome			
					ICU	WARD	LAMA	DC
Kerosene	11	2-3 years	7:4	5 (Respiratory symptoms)	5	5	1	Nil
Organophosphorus	7	1-3 years	5:2	4 (Respiratory symptoms)	4	2	1	Nil
Alkali (Bleach)	4	1-2 years	1:3	3 (Bleeding)	3	Nil	1	Nil
Acid	3	2-3 years	1:2	2 (Bleeding)	2	Nil	1	Nil
Mercury	3	1-3 years	All females	2 (Bleeding)	Nil	2	Nil	1
Pharmacologic agent	15	1-3 years	2:1	15(11 GIT, 2CVS and 2 CNS)	3	3	3	6

GIT: Gastrointestinal Trac. CVS: Cardiovascular System. CNS: Central Nervous System.

Table-3: Characterstics of discharged and LAMA Patients.

	Discharged (n=7)	LAMA (n=7)
Age	1-5 years	1-5 years
M:F	5:2	2:5
Presentation	6 GIT, 1 asymptomatic	Asymptomatic
Duration	<30 min. to 1 hour	<30 min - 2 hours
Vitals (at presentation)	Normal	5 Normal, 2 hypotension
Vitals (on discharge)	Normal	5 Normal, 2 hypotension

LAMA: Left against medical advice.

As regard the type of agents involved, 34.9% of the patients had ingested pharmaceutical agents followed by ingestion of kerosene oil in 25.6%. In 16.3% of the cases, the product of exposure was organophosphorous. In 9.3%, the offending agent was an alkali, while it was acid in 7%.

Details of the clinical features showed gastrointestinal system[16] to be the most frequently involved system followed by the respiratory system,[13] bleeding, neurological system[3] and cardiovascular system.[2]

Regarding the outcome of these cases, 67.4% were admitted. Among the admitted patients, 17 (39.5%) were admitted in the Paediatric Intensive Care Unit, while 12 (27.9%) were admitted in the Paediatric Medical Ward. Patients in the ICU belonged to 1-3 years of age. Nine out of these 17 patients in the ICU had respiratory distress. Five of the patients with respiratory distress were exposed to kerosene oil poisoning, while the other 4 were exposed to organophosphorous poisoning. Besides, 5 of the 17 patients in the ICU were admitted due to bleeding from mouth; 3 of them presented with bleeding due to alkali ingestion while 2 presented with bleeding due to acid ingestion. The last 3 of the 17 patients were admitted in the ICU due to ingestion of pharmacologic agents (Table-2).

Among the 12 patients of poisoning admitted to the ward, 5 cases were of kerosene oil poisoning, 2 were of organophosphorous insecticide poisoning, 2 were of accidental ingestion of a piece of thermometer (basically they were admitted for observation of GI bleeding due to the ingestion of a piece of the glass of thermometer rather than mercury).

The 7 patients who were discharged belonged to 1-5 years of age. Five were males and 2 were females. Six patients had gastrointestinal symptoms, while 1 patient was asymptomatic. They arrived within an hour of exposure to the toxic agent. All were vitally and haemodynamically stable (Table-3).

Regarding the 7 LAMA patients who belonged to 1-5 years of age, 5 were vitally and haemodynamically stable, while 2 were hypotensive. Regarding reasons for LAMA, 4 patients left due to non-affordability. In 2 cases, the parents thought that the child was not sick enough to get admitted. In one case, the reason was unknown (Table-3).

Discussion

There were 43 cases with acute poisoning seen during our one-year study. This seems to be equal to other local studies that have quoted about 60 and 30 admissions per year from three teaching hospitals of Lahore and Karachi respectively.[10,11]

Unintentional poisoning exhibits strong age stratification. The problem is particularly acute in toddlers and older children in the age range of 1-5 years. Children belonging to this age group are extremely keen to explore the environment and have acquired the mobility to do so. Children of these ages also possess strong oral orientations.[12]

Most of the children in our study were less than 5 years of age as has also been observed in other studies.[8] Similarly, mean age of presentation (2.8) is also comparable with other local and regional studies.[7] Further analysing the age distribution among the under-5, 37.2% were below 2 years. This figure seems to be lower than other studies reported from Pakistan and India.[13] In our study, males were slightly higher in number. This finding is consistent with the results of most of other research studies on accidental poisoning among children.

The observation of pharmaceutical products as a group being the commonest cause of childhood poisoning is no different to other studies.[8,9,14] A report from India showed very high incidence of drug poisoning, Other studies have shown drugs to be very important cause of poisoning, but not necessarily the leading one. A study from Japan has reported household to be the leading cause of paediatric poisoning.[15]

Similar results have also been reported from India.[16]

Kerosene oil was the second most common agent involved in our study. Kerosene oil is the commonest hazardous substance ingested accidentally by children living in Third World countries like Pakistan, India,[9] and Sri Lanka.[17] Kerosene is ingested accidentally by children due to their inquisitive behaviour. Surprisingly, in this era of development and technology, kerosene poisoning cases are reported from industrialised cities. Kerosene oil is a hazardous substance in accordance with the definition of Environmental Protection Agency of USA. Kerosene is a petroleum distillate hydrocarbon.[9] The toxic effects on the body are due to its chemical properties of being more aromatic, having lower viscosity and surface tension.

Organophosphorous poisoning was found to be the third most common agent. This finding in our study is different from some others.[8] Organophosphorous poisoning is an important clinical problem in several countries of the world among the adult age group. The symptomatology of organophosphorous insecticides is that they irreversibly inhibit both cholinesterase and pseudocholinesterase activity. Subsequent accumulation of acetylcholine at synapse causes an initial over-stimulation followed by exhaustion and disruption of neurotransmission in both central and peripheral nervous systems.[18]

Though poisoning is a common occurrence during childhood, fortunately, very few patients require hospital admission and even fewer patients need treatment in a Paediatric Intensive Care Unit.[3] In our study, 7 patients were discharged, while 29 patients were admitted. Among the admitted patients, 17 were admitted in the Paediatric ICU, while 11 were admitted in the Paediatric Medical Ward.

The numbers in our study were comparatively higher than the West.[6] The probable cause was the lack of awareness in the community about the management of toxic ingestion. This points to one of the most important issues regarding healthcare delivery system in Pakistan.

In our study, 7 patients left against medical advice. This status of outcome is different from other studies. Financial constraints were the main reason in our setup because our hospital belongs to the private sector and suffers from a lack of philanthropic support.

Conclusion

A small percentage of children presented with acute poisoning in our study. Pharmacological agents were a common source of poisoning in children. There is a need of further studies to identify risk factors of acute poisoning in children. The key lessons include implementing admission criteria guidelines in children with accidental ingestion of toxic substance, strategic planning and educational programmes for better prevention.

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