A STUDY OF PATTERN AND OUTCOME OF ACUTE POISONING CASES IN A TERTIARY CARE HOSPITAL

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HOW TO CITE THIS ARTICLE:

Manjula. M, Sanjeev. S. G, Shruthi. "A Study of Pattern and Outcome of Acute Poisoning Cases in a Tertiary Care Hospital". Journal of Evolution of Medical and Dental Sciences 2013; Vol2, Issue 27, July 8; Page: 4877-4882.

ABSTRACT: - OBJECTIVE: The objective of the present study is to evaluate the characteristics of acute poisoning cases admitted to ICU over six months period. The demographic, clinical profile and outcome were analysed. **MATERIALS AND METHODS:** A hospital based study was carried out in the ICU in ESICMC &PGIMSR Bangalore. The study was carried out amongst inpatients admitted to ICU with acute poisoning. **RESULTS:** A total of 174 patients were admitted to the ICU with acute poisoning. 86 were male and 98 were female. The female-to-male ratio was 1.2:1. Most poisoning occurred in the age group of 25-40 years. The mean age of female and male were 28.54 years and 42.32 years respectively. Most common poisoning was Drug overdose 34.76%(60), followed by Organophosphorus poisoning 21.37%(38), Unknown poisoning 14.36%(26), Kerosene poisoning 12.06%(21), Acid consumption 8.62%(12), Rat poison ingestion 8.62%(17). Among the cases of acute poisoning 9.19% were fatal. **CONCLUSION:** The following conclusions were reached: (1) Females were at greater risk for poisoning than males, (2) Drug overdosage was the most common poisoning in our study.

KEYWORDS: Acute poisoning, Intensive Care Unit, Toxicology.

INTRODUCTION: Poison is a substance that causes damage to the body and endangers one's life, due to its exposure by means of ingestion, inhalation or contact.¹World wide various agents such as agrochemicals, drugs or environmental agents are used as poisoning agents² and also, intentional poisoning is the most important cause of mortality and morbidity.³ WHO estimated that 0.3 million people die every year due to poisoning.⁴ Acute pesticide poisoning is the most common form of poisoning world wide.⁵The profile of patients with acute poisoning and their choice of agents not only depend upon the socioeconomic, religious and cultural status, but it also greatly varies between different countries.^{6,7} However, there is scarcity of data from the Indian subcontinent regarding the epidemiology and outcome of patients presenting with acute poisoning, especially from those patients admitted to ICU. Hence, we aimed to determine the profile and outcome of acute toxicology in patients admitted to ICU of a tertiary care hospital in Bangalore, India.

METHODS: The study was conducted in the Intensive Care Unit of a tertiary care hospital in the city of Bangalore, serving primarily the urban subset of population. Relevant data were collected retrospectively from the patient records. Data on patient demographics, psychological analysis, toxins involved and use of toxicology screen were collected for all the patients admitted to the ICU with acute poisoning for a period of 6 months. Patients admitted to ICUs out of critical care department, those admitted in cardiac critical care unit and patients who were less than 18 years old were exclude from the study.

Patients were admitted to ICU according to ICU admission policy for toxicology patients based on International recommendations.⁸ Disease severity at admission to ICU was assessed by

means of Acute Physiology and Chronic Health Evaluation (APACHE) II score.⁹ Organ failure assessments was done by Sequential Organ Failure Assessment (SOFA) score,¹⁰ with SOFA score greater than three for any organ system denoting its failure. They were managed according to the standard protocols including the "ABCs" (airway, breathing, circulation), resuscitation with intravenous fluids, inotropes (if mean arterial pressure was less than 60 mm Hg, in spite of fluid resuscitation) and use of renal replacement therapy (RRT) (if serum creatinine was progressively increasing, with worsening of acidemia, with or without hyperkalemia or to clear the toxins) as required. Patients were intubated to secure the airway or when otherwise indicated. Similarly the patterns of weaning from inotropes and mechanical ventilation were as per standard ICU protocols. Prevention of absorption of toxin was attempted, with gastric lavage and activated charcoal, in selected patients presenting within 4 hours of oral ingestion of toxin. Blood toxin levels, urine toxicology screen and gastric lavage for toxins were sent as and when indicated. Specific antidotes were administered where indicated.

Abstracted patient data were entered into Microsoft Excel and further analysed using SPSS 16.0 (SPSS Inc., Chicago, IL, USA) software. Unpaired Student's *t* test was used to compare continuous data between two groups and categorical data were evaluated using Chi-square or Fisher's exact test, as appropriate. All tests were two-tailed and a *P* value of less than 0.05 was considered to be statistically significant.

RESULTS: A total of 174 patients were admitted to the ICU with acute poisoning. Out of them, 86(49.4%) were male and 98(56.3%) were female. The female-to-male ratio was 1.2:1. The most common mode of poisoning was suicidal (86.2%) followed by accidental (13.8%). Route of poisoning was oral in all cases (100%). Mean age group was around 36.2. {Table-1}

Most common poisoning was drug overdose 60 (34.76%) most commonly oral hypoglycaemic agents, followed by organophosphorus poisoning 38 (21.37%), kerosene poisoning 21(12.06%), acid consumption 12 (8.62%) and rat poison ingestion (aluminium phosphide) 17(8.62%) respectively, sometimes in combination with alcohol. In 26 (14.36%) cases, the agent of poisoning remained unknown {Table-2}. Among the cases of acute poisoning 15(9.19%) were fatal. Majority of the death were due to aluminium phosphide poisoning and rest were due to organophosphorus compound poisoning {Table-3}. Cause of death was refractory hypotension with severe metabolic acidosis and respiratory failure along with secondary complications.

DISCUSSION: Acute poisoning constitutes a significant proportion of ICU admissions and even though the overall mortality may be low, they may utilise considerable ICU resources.^{11,12} ICU course and outcome varies, but mortality may be high in patients with acute pesticide poisoning, especially aluminium phosphide poisoning.

Characteristic clinical syndromes, called toxidromes, may be associated with certain poisonings and hence, may aid in diagnosis of an unknown poison. However, all patients may not have all features associated with a particular toxin and toxidromes may overlap in patients who have consumed more than one agent. Hence, a high index of suspicion is required to identify and diagnose acute poisoning.

We observed a female preponderance in our Cohort. Other studies have also observed that the maximum number of patients belonged to 21-30 years age group and the most common cause for poisoning was suicidal, as in our cohort.¹³

Pesticide self-poisoning accounts for about one-third of the world's suicides, with developing countries like India accounting for a major portion of it.¹⁴ Understandably, due to their easy availability, pesticides have been reported as the most common agent for acute poisoning from the Indian subcontinent and drugs being more common in the Western countries. However, most of the Indian data have emerged from the rural background and the scenario in urban cities may resemble Western countries.¹⁵ This may explain the fact that drugs were the most common agents of poisoning in our cohort of patients, which basically represent urban India.

Even though the commonest agents for poisoning in our group of patients were the drugs, all the patients who died had consumed pesticide poison (aluminium phosphide and organophosphates). Drugs like analgesics, sedatives and antidepressants which have been associated with maximum mortality in case series from western countries¹⁶ may become secondary to pesticide poisoning in Indian context where exposure to agricultural poisons is rampant and is associated with higher mortality.¹⁷ In addition, among the various pesticides, the majority of deaths occur due to exposure to organophosphates, organochlorine and aluminium phosphide.¹⁸

Aluminium phosphide is a commonly used, low cost, easily available rodenticides used as a grain preservative in India. Hence, it is commonly abused for poisoning. Although the case fatality with aluminium phosphide poisoning has reduced in the recent year's secondary to advanced intensive care management, it is still associated with high mortality rates.¹⁹ Mortality with acute aluminium phosphide poisoning exceeds 60% and incidence is on the rise.²⁰

LIMITATIONS: This retrospective study was conducted in a single centre; hence, the results cannot be generalised. In addition, because of a small cohort size and low mortality rate, assessment of factors predicting outcome could not be done.

CONCLUSIONS: The present data give an insight into epidemiology of poisoning and represents a trend in urban India. Acute poisoning comprises a significant proportion of ICU admissions. The spectrum differs with organophosphorus compounds in rural as compared to drug overdosage in urban population. There is an increasing variety and complexity of toxins and hence a high index of suspicion is warranted because early diagnosis and aggressive therapy can reduce mortality rate.

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TABLE 1: Patient characteristics

Parameter of Interest	N=174
SEX	
Males (%)	86 (49.4%)
Females (%)	98 (56.3%)
MEAN AGE IN YEARS	36.2.
Less than 21 Years	5 (2%)
21-30 Years	102 (60.9%)
31-49 Years	50 (28.7%)
More than 40 Years	17 (9.7%)
MODE OF POISONING	
Suicidal	150 (86.2%)
Accidental	24 (13.8%)
Criminal intent	0
ROUTE OF EXPOSURE	
Oral	174 (100%)
Intravenous	0
Skin	0

TABLE 2: Agents of poisoning

DRUGS	60(34.76%)
Oral hypoglycaemic agents	28
Benzodiazepines	14
Salicylates	6
Alcohol	10
Antihypertensive drugs	2
ORGANOPHOSPHORUS COMPOUNDS	38 (21.37%)
KEROSENE	21(12.06%)
ACIDS	12 (8.62%)
ALUMINIUM PHOSPHIDE	17 (8.62%)
UNKNOWN	26 (14.36%)

TABLE 3: Mortality

POISONING AGENT	MORTALITY
TOTAL	15(9.19%)
Aluminium phosphide	10
Organophosphorus compound	5

ORIGINAL ARTICLE

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Date of Submission: 24/05/2013.
Date of Peer Review: 25/05/2013.
Date of Acceptance: 29/05/2013.
Date of Publishing: 02/07/2013