ORIGINAL ARTICLE

ACUTE POISONING TREATED IN MEDICAL INTENSIVE CARE UNIT

Fawad Rahim[1], Fahim Ullah[3], Mohammad Haroon[2], Muhammad Ashfaq[1], Ayesha Khan Afridi[4]

[1]Department of Medicine, Hayatabad Medical Complex, Peshawar, [2]Medical Intensive Care Unit, Khyber Teaching Hospital, Peshawar, [3]Department of Endocrinology, Hayatabad Medical Complex, Peshawar, [4]Department of Surgery, Khyber Teaching Hospital, Peshawar, Pakistan

ABSTRACT

Background: Acute poisoning including drug overdose is responsible for significant morbidity and mortality. The objectives of this study were to determine the frequency and distribution of acute poisoning in set up of a medical intensive care unit.

Material & Methods: This was a record based, cross-sectional study conducted at Medical ICU of Khyber Teaching Hospital, Peshawar, Pakistan from Feb. 1, 2015 to March 15, 2015. Ninty two patients with acute poisoning admitted to medical ICU between March 2009 and October 2014 were included. The demographic variables were; gender, age in years and marital status. The research variables were; the type of poisons, the number of poisons, route of poisons, mode of poisons, the need for ventilatory, inotropic and renal support, duration of stay, and outcome of patients. Counts and percentages were calculated for the nominal and means and SDs for numeric variables. Chi-square goodness of fit test was applied.

Results: Out of total of 92 patients, 55 (59.8%) were females and 37 (40.2%) were males with female to male ratio of 1.49:1. The mean age of the sample was 26.8±13.9 years. The mean duration of stay for the sample was 3.14±0.52 days. The differences of counts (frequencies) among different attributes of all the ten nominal variables except gender were statistically significant, assuming that all attributes have equal expected counts.

Conclusion: Acute poisoning is a common medical emergency. These patients commonly need ventilatory and inotropic support, and have high mortality rates. Proper triage and timely admission to intensive care unit may improve outcome of these patients.

KEYWORDS: Poisoning; Organophosphorus; Benzodiazepine; Aluminum phosphide.

This article may be cited as: Rahim F, Ullah F, Haroon M, Ashfaq M, Afridi AK. Acute poisoning treated in medical intensive care unit. Gomal J Med Sci 2016; 14:129-32.

INTRODUCTION

Acute poisoning is defined as the adverse effects occurring within 14 days following a single exposure to a chemical substance or multiple exposures in a short time span.[1] Acute poisoning including drug overdose is responsible for significant morbidity and mortality among otherwise healthy adults. Most cases of acute poisoning are the result of self-poisoning with the intention of suicide.[2-5] Majority of patients implicated in acute poisoning are young, with age range of 21 to 30 years and mean age of 32 in different studies.[3,6]

Drugs and pesticides are responsible for the majority of cases of acute poisoning presenting to emergency departments.[5,6-11] Benzodiazepine and other psychoactive drugs have been the most common drugs used for suicidal poisoning both in developed and developing countries.[2,4,6,8,10] Studies conducted in Turkey and Greece have found analgesics as the major poison in cases of self-poisoning.[9,12,13] Pesticide self-poisoning is responsible for about one-third of world's suicides.[14] Pesticides remain a significant cause of poisoning in developing world, and these are responsible for the majority of poisoning related deaths, particularly in India, Bangladesh and Pakistan.[15-18]

Cases of acute poisoning constitute 0.7 to 8.8% of all admissions to medical units and has in-hospital mortality rates ranging from 1.2 to 5.8% in different parts of the world depending on different factors.[4,5,7-13,19,20] Acute poisoning has been a less well studied subject in Pakistan. We share our experience

Corresponding Author:
Dr. Fahim Ullah
Department of Endocrinology
Hayatabad Medical Complex
Peshawar, Pakistan
E-mail: drfaheemullah@gmail.com

Date Submitted: 22-03-2015
Date Revised: 19-04-2016
Date Accepted: 11-08-2016

with cases of acute poisoning in this study with our main focus on patients' characteristics, the agents implicated and the course of stay and outcome of these patients. Adequate understanding of the local pattern of acute poisoning is important for satisfactory preparation for, and timely management of this emergency. Moreover data with regard to common etiologic agents of acute poisoning may assist the regulatory authorities to plan preventive policies.

The objectives of this study were to determine the frequency and distribution of acute poisoning in set up of a medical intensive care unit.

MATERIAL AND METHODS

This was a record based, cross-sectional study conducted at Medical Intensive Care Unit of Khyber Teaching Hospital, Peshawar, Pakistan from Feb. 1, 2015 to March 15, 2015. All patients with acute poisoning admitted to medical ICU between March 2009 and October 2014 were included in the study. A sample size of 92 patients was selected through non-probability consecutive sampling technique. Data was recorded from admission register and patients' charts on a structured Performa.

The demographic variables were; gender, age in years, and marital status. The research variables were; the type of poisons, the number of poisons, route of poisons, mode of poisons, the need for ventilatory, inotropic and renal support, duration of stay, and outcome of patients.

The attributes (categories) of gender were male and female, of marital status were single and married, of the type of poisons were medications, organophosphorus and aluminium phosphide, of number of poisons were one or two, of route of poisons were oral, inhalational and parenteral, of mode of poisons were suicidal, accidental and homicidal, the need for ventilator, renal and inotropic support were yes or no, and of outcome were survived or expired.

Gender, marital status, the type of poisons, number of poisons, route of poisons, mode of poisons, the need for ventilatory, renal and inotropic support and outcome of patients were nominal variables. Age and duration of stay were numeric variables.

Frequencies and percentages were calculated for the ten nominal and means and SDs were calculated for the two numeric variables. Chi-square goodness of fit test was used for univariate analysis of all the ten nominal variables to determine the significance of their observed counts to the expected counts of their respective attributes, assuming that they have equal expected counts. Data were analyzed using Social Science Statistics (online statistical calculator) available at URL: http://www.socscistatistics.com/Default.aspx.

RESULTS

Out of total of 92 patients, 55(59.8%) were female and 37(40.2%) were males with female to male ratio of 1.49:1. The mean age of the sample was 26.8±13.9 years. The mean duration of stay for the sample was 3.14±0.52 days.

The descriptive statistics for ten nominal variables/ data are given in column 4 of table 1 below as observed counts with percentages.

For inferential statistics the observed counts for all the attributes of the ten nominal variables were compared to their expected counts through Chi-square goodness of fit test as univariate analysis. The differences of counts (frequencies) among different attributes of all the ten variables except gender were statistically significant, assuming that all the attributes have equal expected counts. (Table 1)

DISCUSSION

A total of 92 patients with acute poisoning were included in the study. Out of total of 92 patients, 55 (59.8%) were female and 37(40.2%) were males with female to male ratio of 1.49:1. A study conducted in Mexico reported a female to male ratio of 1.5:1.[21] Females accounted for 58.8% of the sample in a study conducted in Rawalpindi while other authors have reported female predominance in total cases of acute poisoning.[2,3,5,10-12]

The mean age of patients was 26.8±13.9 years which is comparable to findings of a similar study carried out in Istanbul, Turkey where the mean age was 27±12 years.[20] Similar mean ages for males and females have been reported in studies conducted in Turkey.[10,22] This highlights the fact that adolescents and young adults are more susceptible victims of acute poisoning. Similar age trends have been observed in a study carried out by Fürst and his colleagues who reported 3rd decade as the peak age range.[19] In another study, 74% patients were less than 30 years old.[20]

Medications especially benzodiazepines were the most common agents 49(45.7%) used in our study which are comparable to other studies like for example Khurram et al, and Furst et al.[19,20,22]

Suicide was the intention in 84.8% patients in our study. This matches the tendency observed in other studies where suicide was reported as the aim for acute poisoning in 80-98% patients.[2-5,7,21,22] Two studies on deliberate self-poisoning carried out by Khurram et.al, and Qiasar et.al, have reported suicide as the intent of poisoning in 55% and 60% patients, respectively.[8,11]

During their stay in ICU, 29.3 % patients required ventilatory support. Fürst et.al, has reported that 14.2 % cases required ventilatory support, which is lower than our finding.[19] The higher prevalence of alcohol intoxication as compared to benzodiazepine

Table 1. Univariate analysis of the nominal variables in acute poisoning treated in medical ICU by Chi-square Goodness of Fit Test (n=92)

S. No.	Variables	Attributes	Observed frequency (%)	Expected frequency	Chi-square value	Degree of freedom	p-value
1	Gender	Male	37 (40.2)	46	3.522	1	<0.061
		Female	55 (59.8)	46			
2	Marital Status	Single	57 (62.0)	46	5.261	1	<0.022
		Married	35 (38.0)	46			
3	Type of poisons	Medications	49 (53.2)	30.6	25.194	2	<0.001
		Organophosphorus	33 (35.9)	30.7			
		Aluminium phosphide	10 (10.9)	30.7			
4	Number of poisons	One	91 (98.9)	46	88.043	1	<0.001
		Two	01 (01.0)	46			
5	Route of poisons	Oral	85 (92.4)	30.6	144.547	2	<0.001
		Inhalational	06 (06.5)	30.7			
		Parenteral	01 (01.1)	30.7			
6	Mode of poisons	Suicidal	78 (84.8)	30.6	110.276	2	<0.001
		Accidental	09 (09.8)	30.7			
		Homicidal	05 (05.4)	30.7			
7	Ventilatory support	Yes	27 (29.3)	46	15.696	1	<0.001
		No	65 (70.7)	46			
8	Inotropic support	Yes	28 (30.4)	46	14.087	1	<0.001
		No	64 (69.6)	46			
9	Renal support	Yes	01 (01.1)	46	88.043	1	<0.001
		No	91 (98.9)	46			
10	Outcome of poisoning	Survived	69 (75.0)	46	23.000	1	<0.001
		Expired	23 (25.0)	46			

and organophosphorus poisoning in the above mentioned study might have resulted in reduced need for artificial ventilation. Moreover, majority of our patients present late to intensive care unit only after developing complications like respiratory depression and aspiration pneumonia and, therefore, may have had higher need for ventilatory support.

Only one patient (1.1% of cases) with barbiturate poisoning underwent hemodialysis. Hatzitolios et al have reported frequency of hemodialysis as 3.4% and 2.2%, respectively.[13]

Regarding the outcome 23(25%) patients expired. The mortality rate observed in our study is comparable to those reported by Juárez-Aragón et al and Akkose et al.[21,22] But our mortality is higher than those reported by Islambulchilar et al, and Hatzitolios et al, where only 2.3% to 3.9% patients died.[4,8,10,13] Unlike all our study patients who were admitted to ICU because the severity of poisoning and resultant complications, these studies with lower mortality rates were conducted in general medical wards where majority of patients may not have had severe toxicity or complications. The above figures suggest that those patients who ultimately died were admitted to ICU with complications and end organ failure. Therefore, these patients spent less time in ICU before they died despite the fact that a very high percentage of these patients got ventilatory and inotropic support.

The limitations of this study included; duration from the time of poisoning and the time the patients spent in general medical wards before shifting to ICU were not determined. Moreover, the presence or absence of psychiatric problems before poisoning in these patients was not established. Further the expected counts for all the attributes of the ten nominal variables were assumed to have equal counts. These expected counts were not taken from literature.

CONCLUSION

Acute poisoning is a common medical emergency in intensive care settings. Benzodiazepines and organophosphorus compounds are the most common poisons encountered in our patients. Besides these patients usually need ventilatory and inotropic support, and have significant mortality rates. Therefore, ICUs should be prepared for such patients with specific antidotes and ventilators.

REFERENCES

1. IUPAC. Compendium of chemical terminology. 2nd ed. Oxford, UK: Blackwell Scientific Publications;1997.
2. Prkacin I, Vujanic S, Dabo N, Palcic I, Naumovski-Mihalic S. Cases of acute poisoning admitted to clinical Hospital Merkur in Zagreb in 1999. Arh Hig Rada Toksikol 2001;52:315-21.
3. Sorodoc V, Jaba IM, Lionte C, Mungiu OC, Sorodoc L. Epidemiology of acute drug poisoning in a tertiary center from Iasi county, Romania. Hum ExpToxicol 2011;30:1896-1903.
4. Islambulchilar M, Islambulchilar Z, Kargar-Maher MH. Acute adult poisoning cases admitted to a university hospital in Tabriz, Iran. Hum ExpToxicol 2009 April 1;28:185-90.
5. Akbaba M, Nazlican E, Demirhindi H, Sütoluk Z, Gökel Y. Etiological and demographical characteristics of acute adult poisoning in Adana, Turkey. Hum ExpToxicol 2007 May 1;26:401-6.
6. Pombo SD, Fernández JM, Rodelgo GS, Vallés PJC. Epidemiology of acute poisoning: study of 613 cases in the community of Madrid in 1994. Revista Clinica Espanola 1996 March;196:150-6.
7. Cengiz M, Baysal Z, Ganidagli S, Altindag A. Characteristics of poisoning cases in adult intensive care unit in Sanliurfa, Turkey. Saudi Med J 2006;27:497-502.
8. Khurram M, Mahmood N. Deliberate self-poisoning: experience at a medical unit. J Pak Med Assoc 2008;58:455-7.
9. Ozköse Z, Ayoglu F. Etiological and demographical characteristics of acute adult poisoning in Ankara, Turkey Hum ExpToxicol 1999;18:614-8.
10. Seydaoglu G, Satar S, Alparslan N. Frequency and mortality risk factors of acute adult poisoning in Adana, Turkey, 1997-2002. Mt Sinai J Med 2005;72:393-401.
11. Qaisar F, Shafi M, Majeed A, Kumar D, Memon A, Memon U. The epidemiology of deliberate self-poisoning presenting at a tertiary care hospital in Hyderabad Sindh, Pakistan. Brit J Med & Med Res 2014;4:1041-8.
12. Goksu S, Yildirim C, Kocoglu H, Tutak A, Oner U. Characteristics of acute adult poisoning in Gaziantep, Turkey. J Toxicol Clin Toxicol 2002 Jan 1;40:833-7.
13. Hatzitolios AI, Sion ML, Eleftheriadis NP, Toulis E, Efstratiadis G, Vartzopoulos D, et al. Parasuicidal poisoning treated in a Greek medical ward: epidemiology and clinical experience. Hum Exp Toxicol 2001;20:611-7.
14. Gunnell D, Eddleston M, Phillips MR, Konradsen F. The global distribution of fatal pesticide self-poisoning: Systematic review. BMC Public Health 2007;7:357.
15. India. National Crime Records Bureau. Accidental deaths and suicides in India, 2005. New Delhi: Ministry of Home Affairs;2006.
16. Heijnen H. WHO Bangladesh: International programme on chemical safety;2001.
17. Khan MM, Reza H. The pattern of suicide in Pakistan. Crisis 2000;21:31-5.
18. Khan MM, Reza H. Gender differences in nonfatal suicidal behavior in Pakistan: significance of sociocultural factors. Suicide Life Threat Behav 1998;28:62-8.
19. Fürst S, Habscheid W. Acute poisoning in patients of a medical intensive care unit. Dtsch Med Wochenschr 1993;118:849-53.
20. Tüfekçi IB, Curgunlu A, Sirin F. Characteristics of acute adult poisoning cases admitted to a university hospital in Istanbul. Hum Exp Toxicol 2004;23:347-51.
21. Juárez-Aragón G, Castañón-González JA, Pérez-Morales AJ, Montoya Cabrera MA. Clinical and epidemiological characteristics of severe poisoning in an adult population admitted to an intensive care unit. Gac Med Mex 1999;135:669-75.
22. Akkose S, Bulut M, Armagan E, Cebicci H, Fedakar R. Acute poisoning in adults in the years 1996-2001 treated in the Uludag University Hospital, Marmara Region, Turkey. Clin Toxicol (Phila) 2005;43:105-9.

CONFLICT OF INTEREST
Authors declare no conflict of interest.
GRANT SUPPORT AND FINANCIAL DISCLOSURE
None declared.

AUTHORS' CONTRIBUTION

Conception and Design:	FR, FU, MH
Data collection, analysis & interpretation:	FR, FU, MH, MA, AKA
Manuscript writing:	FR, FU, MH, MA, AKA