CLINICAL CHARACTERISTICS AND PREDICTORS OF OUTCOME IN WHEAT PILL POISONING: AN EXPERIENCE IN TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: To determine clinical characteristics and predictors of outcome in wheat pill poisioning (Aluminium Phosphide poisioning)

Study design: Descriptive retrospective

Patients and methods: This study was carried out in Lady Reading Hospital, MTI, Peshawar from January 2017 to December 2017. A total of 31 patients were included in the study. Diagnosis was based on history of ingestion of wheat pills (Aluminium Phosphide ALP). Gastric lavage was done with vegetable oil and diluted potassium permanganate. ECG and arterial blood gases were performed in all patients.

Results: Out of 31 patients, 18 (58%) were female and 13 (42%) were male. Female to male ratio was 1.4:1. Mean age of the patients was 25 ± 2.31 years. In almost all cases, poisoning was taken for suicidal purpose (96.77%). Most common presenting symptoms were vomiting and abdominal pain followed by hypotension, tachypnoea, cyanosis and GI bleeding. ECG abnormalities in the form of SVT, VT and VF were found in 64.5 % cases. Mechanical ventilation was required in 51.6% of cases. Overall mortality was 33.2%.

Conclusion: ALP is a very lethal poison because no specific antidote is available till now. Public awareness and policy making is required to discourage over the counter sale of wheal pills .

Key Words: Aluminum Phosphide poisoning, Metabolic Acidosis, Cardiac Arrhythmias

INTRODUCTION

Poisoning remains a common cause of morbidity and mortality worldwide. Every year about 300,000 people die due to Pesticide poisoning all over the world.[1] The most common pesticide agents used are organophosphates and aluminum phosphide.[2] Pakistan is an agricultural country. Wheat pills are cheap and extensively used to protect rice and stored grains from rodents and household pests. Wheat pill contain aluminum phosphide which is a highly potent indoor and outdoor insecticide and rodenticide. It reacts with moisture and water and produces phosphine gas which is colorless, flammable and extremely toxic with smell of putrefy fish or garlic. Therefore aluminum phosphide is also known as fumigant pesticide.[3] Although the exact mechanism of action of aluminum phosphide is still unknown, however it appears to be the inhibition of cytochrome- C oxidase and oxidative phosphorylation which ultimately results in exhaustion of adenosine triphosphate (ATP) and cell death[4].One quarter of a tablet may be fatal(150-500 grams)[5]. Aluminum phosphide poisoning effects multiple organs and hospital mortality ranges from 55-90%.[6] Phosphine gas fundamentally effects heart, lungs, kidneys , gastrointestinal tract and induces acid base disturbances. Symptoms and signs include nausea, vomiting, abdominal cramps, irritability, palpitations, shock, pulmonary edema, cardiac arrhythmias, cyanosis and dyspnea[7]. Clinical presentation and end result of the poisoning depends on multiple factors like the quality of the tablets, amount ingested, previous exposure of the tablets to air or humidity and time interval between ingestion and appearance of symptoms.[8,9,10] Unfortunately no precise antidote is available and the management is essentially supportive. Definite therapy include gastric lavage with coconut oil and administration of magnesium sulphate.[11]

The diagnosis depends on clinical suspicion or history of tablet intake. It can also be made on silver nitrate test on gastric contents or breath.[12]

The objective of this study was to study the clinical manifestations and predictors of poor prognosis in wheat pill poisoning patients presenting to a tertiary care hospital of Khyber Pakhtunkhwa.

MATERIAL AND METHODS

This descriptive retrospective study was conduct-

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ed at Lady reading hospital MTI Peshawar from January 2017 to December 2017. During this period case histories of all patients with acute poisoning who presented to Emergency department of this hospital were explored and a total of 31 patients with ALP intoxication were found. Diagnosis was confirmed on basis of history of consumption of wheat pills. All patients with wheat pill poisoning were initially assessed by on call medical unit team. Supportive measures were initiated in Emergency department including protection of airway, intravenous fluids, magnesium sulphate infusion, vasopressor and inotropic drugs. Gastric lavage was performed with vegetable oil and diluted Potassium permanganate (1 : 10000 dilutions) . Arterial blood gases analysis and ECG were also done in all ALP poisoning patients. All these patients were then shifted to intensive care unit.

About 20 variables were taken from the case notes and analyzed using SPSS version 21. Differences with P value less than 0.05 were contemplated significant.

Our study was approved by hospital ethical committee and research board.

RESULTS

In our study females constituted 58 %(n= 18). Female to male ratio was 1.4:1. Mean age of the patients was 25 ± 2.31 years. (15-60 years). However most of the patients were 18-30 years old. Among 31 patients, 21 (67.7%) were single while 10(32.3%) were married. 18 patients (58%) belonged to Peshawar city while the remaining 13 patients (42%) were referred from rural areas. Among enrolled patients, 07 patients (22.58%) were suffering from mental disease, 15 patients (48.38%) attempted suicide in the previous years while 9 patients (29.03%) had history of substance abuse. In 30 patients (96.77 %) poisoning was the result of suicidal attempts, only one patient who was a 12 year old boy accidently took ALP tablet. In our study, mortality was 33.2%. Mean number of tablet swallowed was 1.22±0.71 (0.5-4). Mean dose of ALP ingested was 5.2gm. Most common manifestation were vomiting and abdominal pain as shown in table 01.

Intubation and mechanical ventilation was required in 16 patients (51.6%). complications of intoxication in order of frequency are shown in the table 02.

After analyzing the data we applied Chi-Square and T - test(p value less than 0.05) and found significant association between ECG abnormalities / shock at presentation and metabolic acidosis with poor prognosis of ALP poisoning.

DISCUSSION

ALP is an intensely poisonous compound when swallowed from a newly opened container.[13] In our study mortality came out to be 33.2%. Worldwide mortality is reported in the range of 55-90 % [6].

We found more female patients with wheat pill intoxication as compared to males. This is in agreement with an international study conducted by Moghaddauni et. al in Iran[14]. Similar gender distribution was found by Pokhrel and his colleagues in their study conducted in

Table 01: Clinical Presentation of patient with wheat pill poisoning

Sr. No	Clinical Features	No. of patients	Percentage
1.	Vomiting	28	90.30
2.	Abdominal Pain	26	83.8
3.	Hypotension/Shock	20	64.5
4.	Cardiac Arrhythmias	19	61.2
5.	Tachycardia	16	51.6
6.	Cyanosis	15	32.2
7.	Dyspnoea	14	45

Table 02.Complications of ALP poisoning

Sr. No	Complication	No. of patients	Percentage
1.	Aspiration pneumonia	24	77.4
2.	Pulmonary edema / Shock	22	70.9
3.	ECG abnormality	20	64.5
4.	Metabolic Acidosis	20	64.5
5.	Jaundice	14	45.1
6.	GI Bleeding	10	32.25

Nepal[15]. In our community it may be because of family bifurcation, poverty and social problems. Also in rural areas female have an easy approach to the poison.

Mean age of the patients in our study was 25 years. Rathore and his colleagues reported that ALP is a common method of poisoning among the young age group [16]. In our society unemployment, breakdown of love affairs and failure in school/college examination are main reasons for suicidal intentions in this age group. This could be prevented by family and financial support.

In sub-continent wheat pill is the most common poison use for suicide. In countries like Pakistan, India and Nepal it is cheap and easily available over the counter. Other contributing factors include drug abuse, family breakdown, social conflicts, history of mental disorder and spiritual believes. In contrary, in European countries its marketing is restricted under 1998 pesticide Act[6]. In some Asian countries like Iran ALP sale is discouraged and prohibited. In our study almost all patients took ALP tablets with suicidal ideas. Singh and his co-workers described similar findings in their clinical research conducted at India[17]. Shadnia and his colleagues from Tehran, Iran retrospectively studied ALP poisoning and very similar findings were published[18].

There is paucity of studies and limited data is available on the factors determining the mortality in ALP intoxication. At time of presentation more than half of the patients were in state of shock(mean systolic pressure 80) and needed inotropic support and mechanical ventilation, a finding which is similar to the study of Mehrpour, where all of the patients were mechanically ventilated[8]. ECG abnormalities including SVT, VT, VF were seen in 64% of our patients. In an Iranian study, Fakhredin et.al reported 86% cardiac arrhythmias in expired patients. We found metabolic acidosis in non survivors as a leading cause of death.

Ashu and Madhurita published their study stating that outcome in wheat pill poisoning is related to ECG changes, hypotension and need for mechanical poisoning[19]. According to our study same relations were found.

CONCLUSION

Wheat pill intoxication is a serious condition due to non availability of specific antidote. Step may be taken to limit its sale over the counter. Public awareness rising about its danger is the need of the day. We suggest doctors training programs about emergency management at primary care level to tackle its occurrence.

REFERENCES

1. Singh D, Dewan I, Pandey AN, Tyagi S. Spectrum of unnatural fatalities in the Chandigarh zone of northwest India: a 25 year autopsy study from a tertiary care hospital.J Clin Forensic Med 2003;10:145-52.
2. Goel A, Aggarwal P. Pesticide poisoning. National Medical Journal of India.2007;20(4):182-91.
3. Gunnell D, Eddleston M, Phillips M, konradsen F. The global distribution of fatal pesticide self-poisoning: systemic review. BMC public health. 2007;7(1):357 in susceptible and resistant strains of lesser grain borer (rhyzopertha dominica). Comp Biochem Physiol.1982;73:411-15.
4. International programme on chemical safety (IPCS). International Chemical Saftey Cards (ICSCs), Aluminium Phosphide (ICSC). Available from:http://www.inchem.org/documents/icsc/icsc/eic5.htm
5. Chungh SN, Dushayant K, Ram S, Arora B. Incidence and outcome of aluminium phosphide poisoning in a hospital study. Indian J Med Res 1999;94:232-35.,
6. Bogle RG, Theron P, Brooks P, Dargan PI, Redhead J. aluminium phosphide poisoning. Emerg Med J. 2006; 23:33-35.
7. Gupta S. Ahlawat SK. Aluminium phosphide poisoning- a review. Clinical Toxicology . 1995;33(1)19-24.
8. Mehrpour O, Alfred S, Shadnia S, Keyler D, Soltaninejad K, Chalaki N, et al. Hyperglycemia in acute aluminium phosphide poisoning ;as a potential prognostic factor. Human & experimental toxicology. 2008;27(7):591-5.
9. Sharma A. Oral aluminium phosphide poisoning. Indian pediatrics. 1995;32(3):339-42.
10. Darbari A, Tandon S, Chaudary S, Bharadwaj M, Kumar A, Singh GP. Eosphageal injuries due to aluminium phosphide tablet poisoning in India. Asian Cardiovascular and Thoracic Annals. 2008;16(4):298-300.
11. Shahida S, Rahimi M, Pajomand A, Rasouli MH, Abdollahi M. Successful treatment of acute aluminium phosphide poisoning ; possible benefit of coconut oil. Hum Exp Toxicol.2005;24:215-18
12. Chugh SN, Ram S, Chugh K, Malhotra KC. Spot diagnosis of aluminium phosphide ingestion: an application of a simple test. J Assoc Physicians India 1989;37:219-20.
13. Mahajan , Varun V, Pargal L. Aluminium phosphide poisoning: an agent of sure death. Indian J Forensic Med and roxicology. 2012;6:231-35.
14. Moghadamnia A, Abdollahi M. an epidemiological study of poisoning in northern Islamic Republic of Iran. East mediterr health j. 2002;8(1):88-94.
15. Pokhrel D, Pant S, Pradhan A, Mansoor S. a Comparative Retrospective Study of Poisoning Cases in central , Zonal and District Hospitals. Kathmandu University Journal of Science, Engineering and Technology. 2010;4(1):40-8.
16. Rathore R, Muhammad U, Morbidity, Mortality and Management of Wheat Pill Poisoning. Journal of Services Institute of medical Sciences. 2007;8(10:88-94.
17. Singh S, dilawari J, Vashist R, Malhotra h, Sharma B. aluminium phosphide ingestion. British medical Journal (clinical research ed. 1985;290(64750):1110.
18. Shadnia s, Sasanian G, Allami P, Hosseini A, Ranjbar A, Amini-Shirazi N, et. al. A retrospective seven year study of aluminium phosphide poisoning in Tehran: opportunities for prevention. Human and experimental toxicology. 2009;28(4):209-13.
19. Ashu m and Madhurita S. Acute aluminium phosphide poisoning : Can we predict mortality? Indian J Anes.2010;54:302-07.