



Wheat Pill Poisoning: Management and outcome in cases reported in DG Khan District.

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Article received on:
08/06/2020

Accepted for publication:
12/09/2020

INTRODUCTION

Poisoning is a major health problem with 84% fatality rate especially in rural areas of underdeveloped countries. Most of the poisons in rural areas were taken with suicidal intention.¹ Only 5-10% of victims reach hospital.² Wheat pill is an insecticide which is cheap and easily available on stores and commonly use in houses for grain storage. Majority of the cases were reported from rural areas where agriculture is the leading industry.³ The mechanism of action involves liberation of phosphine gas, which is released when the pill comes in contact with moisture or stomach acid; the resulting free radicals damage mitochondria and causes cellular hypoxia. Phosphine mainly binds cytochrome oxidase and changes the valency of the Haem component of hemoglobin. Thus, RBCs are unable to carry and transport Oxygen to the cells. When this oxygen deprived blood reaches organs specially the heart it causes cardiac necrosis.^{4,5} The victim

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ABSTRACT... Objective: To determine the clinical manifestations and prognosis of victims presenting with wheat pill poisoning. **Study Design:** Prospective Cohort Study. **Setting:** Emergency Department in District Headquarter Hospital DG Khan. **Period:** February 2019 to January 2020. **Material & Methods:** Patients admitted with history of accidental or suicidal wheat pills poisoning were followed over a period of 3 to 6 months. Symptomatic treatment was initially given for 2-3 hours. The patients were retained in CCU for 24 hours before shifting to ward. Research tool (proforma) was designed for collection and interpretation of data. Acute Physiology and Chronic Health Evaluation Score 2 (APACHE-2) score was used for prognosis and recovery. **Result:** Out of 96 victims of aluminum phosphide ingestion male/female ratio was 2:1, 64% (n= 64) were females and 36% (n=32) were males. Higher incidence was found in age group (16–25 years (n= 27 victims). Overall mortality was 63 (65.6%). **Conclusion:** Wheat pill was a poison of choice among teens and adults in Pakistan as it is freely available and cheap. Arrhythmia and metabolic acidosis are the major causes of death after wheat pills ingestion. Coconut oil was found effective in delaying the absorption.

Key words: Arrhythmias, DG Khan, Female, Metabolic Acidosis, Poisoning, Suicide, Wheat Pills.

Article Citation: Khan AN, Khan R, Siddiqui N, Rana SP, Faqirullah, Masood R. Wheat Pill Poisoning: Management and outcome in cases reported in DG Khan District. Professional Med J 2021; 28(8):1096-1100.
<https://doi.org/10.29309/TPMJ/2021.28.08.4791>

may present with a symptom of cardiac failure, arrhythmias, tremors, blurred vision, seizures, and eventually shock.⁵

Wheat pills ingestion was the popular method of suicide among young females in South Eastern countries of Asia.⁶ The number of cases reported in tertiary care hospitals were actually less than 20% of incidences actually happening in the community.⁷ There has been little progress in our understanding of the characteristics of the poison and limited data is available. The purpose of this study was to study the profile of victims presenting to ICU with wheat pill poisoning and the course of disease. It will be helpful for doctors serving in emergencies to early diagnose the poisoning from its clinical manifestations and greatly help to reduce the mortality rate.

MATERIAL & METHODS

A prospective cohort study. Patients who

presented with a history of wheat pill ingestion at casualty department of DHQH DG Khan. The data was collected on a specially designed tool i.e proforma chart table. Data was collected over a period of one year from February, 2019 to January, 2020. 96 victims with a history of wheat pill/s ingestion irrespective of age and gender were included in the study. The sampling technique was non-probability convenient sampling. The diagnosis was based on history of consumption of wheat pills. All victims with history of wheat pills were treated symptomatically. Diseased specific mortality rate was determined by calculating total number of deaths due to Aluminum Phosphide ingestion during Feb 2019 to Jan 2020 per thousand admissions in the hospital during same period.

Patient Management

In all suspected cases of wheat pill poisoning, gastric lavage with coconut oil was initially done within half hour and then shifted to intensive care unit for monitoring. Symptomatic treatment and fluid therapy were initiated. Despite routine lab investigations; ABGs, PCO₂ and blood pH was also monitored every six hourly. If pH was less than 7.35 then alkaline therapy (NaHCO₃) was started to correct metabolic acidosis. For gastric irritability, metoclopramide and magnesium oxide were administered. Antiarrhythmic drugs amiodarone & inotropic (i.e. dopamine & dobutamine) support were started to correct hypotension. APACHE-2 score was used for the evaluation of patient's health, prognosis of the treatment and hospital stay. APACHE 2 score has twelve physiological variables (table-I) Patient age and health condition were given numerical values for calculation. Glasgow coma scale and total length of hospital (ICU) stay was also calculated. Data was analyzed on SPSS 23. MEAN \pm Standard Deviation was calculated for numeric variables such as age and length and length of hospital stay. Frequencies and percentages were calculated for symptoms, lab reports, medication and mortality. To measure an association of APACHE-II score expected frequencies (f^e) and the observed frequencies (f^o) with age, sex and ICU stay, chi-square test was applied. Two tail test and value less than 0.05 (P-value) was considered

statistically significant.

	Physiological Variable	APACHE 2 Score		
		0	2	5
1	Temp (C)	36-38.4	32-33.9	<34
2	Mean Blood Pressure	110/70>	90/60>	60/40>
3	Heart rate	70-109	55-69	<39
4	Resp rate	12-24	6-9	<5
5	Oxygen saturation	>90%	>55%	<55%
6	Arterial pH (mean)	7.33	7.25	7.15
7	Na+ (mEq/l)	>130	>111	<110
8	K+ (mEq/l)	3.5>	2.5>	<2.5
9	S.Creatinine (mg/dl)	<1.4	<2.5	>2.5
10	Haemocrit (%)	30-45	30-29.9	<20
11	WBC	3-14	1-2.9	<1
12	Glasgow coma scale	15/15	12/15	<11

Table-I. APACHE-2 Scoring Chart ¹⁸
 *(Note: Score 0 +5 > see Reference # 18)

RESULTS

Females constituted 64%. Overall mortality was 66.6% n=64 (Table-II). Most common symptoms were vomiting 67(90%), hypotension 40(52%) & arrhythmias (42%), followed by anxiety (41%), confusion & metabolic acidosis (37%) patient who consumed more than one tablet and who presented late (i.e 3-6 hrs) did not survive. All the victims, who did not survive had significantly reduced bicarbonates levels. Arterial Blood Gasses value of victims who did not survive (49/100) were pH 6.96 \pm 0.086, PaO₂ mmHg 92.88 \pm 3.6, PaCO₂ mmHg 31.42 \pm 2.23, HCO₃ mEq/L 10.09 \pm 1.58 7, Anion gap mEq/L 23.50 \pm 2.44. There is no such antidote available in the market. The drug is very fast acting produces phosphine gas that causes tachypnea and asphyxia terminally leading to death.

Most of the poisoning cases (n=19) retained for 24 hours and treated symptomatically. The survival rate was not much in the absence of antidote, only 32 (30.5%) survived. Survival rate depends upon many factors including lesser amount of ingestion (half tablet or expired tablets) (n=16), early arrival (n=23), 50% male survived where as only 18 % female able to combat the effects.

20% (n=19) discharged within 24 hours but 40% (n=38) retained for 2-3 days. 07 patients needed ventilator support and couldn't managed to survive, all patients admitted needed inotropic support. Patient were followed up out of 32, 12 developed chronic renal failure after 2 -3 moths of discharge and died within 06 months. APACHE score was useful in predicting mortality rate in ICU admitted poisoning patients. In our study we distributed our patients in three categories depending upon severity of score. Table-III.

Comparison of male and female tendency of suicide

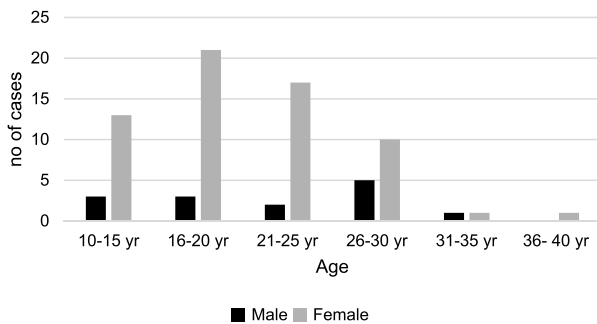


Figure-1. Comparison of Male, Female Tendency of Suicide.

Total Patients (96)	Age Group	Mean Age	Male to Female Ratio	Overall Mortality Case 66.6 %
Male 32 (33.3%)	26-30	27±2.44	1:2	18 (56.2%)
Female 64 (66.6%)	12-28	18±7.45		46 (69.6%)

Table-II. M/F Ratio.

Score	Mortality	
	Observed	Expected
11-20	7% (n=5)	10%
21-30	30% (n=20)	26%
31-40	61% (n=39)	56%

Table-III. APACHE Score observed score.

DISCUSSION

Aluminum phosphide is a highly poisonous substance. Medical critics still say if a patient with suspected aluminum phosphide poisoning survived then either it was not aluminum phosphide or the poison was already exposed to moisture.⁹ In literature the reported mortality of this compound varies from 55-90%.¹⁰ In an autopsy

study of unnatural deaths in Northwest India, aluminum phosphide was found to be the most common suicidal poison.¹¹ Many countries such as Iran, Malaysia and New Zealand have banned its domestic sale. In the European countries its supply is restricted under 1998 pesticide act.^{9,10,11}

The tendency of suicide among females was higher than males. Out of 64 females n=41 (66%) were young females under 25 years. Our results favor the findings of Pyar A, Anwer A, and Khan MJ et al where young female's percentage was 57% and 61%.^{12,13} Khan MJ et al determined organophosphorus as a primary poison of choice which was in consistent with our findings and Pyar A, Anwer A et al. We found that wheat pill poisoning was the poison of choice among young females.^{12,13}

In our study 86 (90%) victims ingested wheat pills to commit suicide, the manner of administration was inline with the findings of Sadia et al and Qureshi MA et al.^{14,15} We have found no case of homicidal wheat pill poisoning our finding favors the results of Qureshi MA et al but slightly differ with Sadia et al study conducted in Sargodha where she found in 5% cases it was administrated with homicidal intention.^{14,15}

Most of the patient reached hospital within 2-3 hours after ingestion, we found that gastric lavage with coconut oil prevent further absorption and useful in the early management of poisoning. Qurashi MA results also showed similar findings.¹⁵

Out of 62 admitted cases only 32 survived. Beside all possible systematic support 64 died. Autopsy report showed left ventricular myocardial infraction. Our findings favor findings of Khan et al in Lahore. He reported 70% mortality rate. Much higher mortality rate 90% was also reported in study of by Iftikhar et al 90%.^{16,17}

APACHE-2 with high values more than 35 in our study showed high mortality rate which were inconsistent with and Knaus et al and Naveed S study conducted in Aga Khan Hospital Karachi^{19,20} the observed values are lesser than expected values of APACHE -2. Naveed S et al had also

found over estimation of mortality risk value in ICU.²⁰

CONCLUSION

Aluminum phosphide is a very fast acting poison and poison of choice among young females. The drug causes permanent multiorgan damage, leading to death. APACHE-2 score is helpful in predicting the prognosis of the admitted patients in ICU. There is a need of follow-up studies and to design active management algorithms for wheat pill poisoning management

ACKNOWLEDGEMENT

We are thankful to Dr Ibrar Hassain Incharge ICU and Emergency department and Professor Dr Ibrar Ashraf Head Forensic Medicine Department DG Khan Medical College for their facilitation. Special thanks to, Alina Nawaz, Faiza Nadeem and Salman Pervaiz for their commitment in data collection and analysis. The literature search was done by principal author and Riffat Masood. Riffat Masood and Faqirullah were involved in statistical data analysis and interpretation of results. Rabia Malik and Salman Pervaiz Rana helped in literature search.



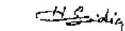
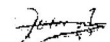
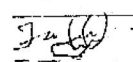
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