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To Study the Survival Rate of Patients Who Will Be Admitted Consumption of Aluminium Phosphide

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Abstract: 'Poison'– The term first appeared in English Literature around the year 1230. It refers to a substance with an inherent property of being harmful to life or health. The earliest used poison, used in wars and official executions, included plant extracts, animal venoms and minerals. The aforementioned poisons are still used in the present day though they are not amongst the more prevalent ones, the trends having changed over the last millennium. Aluminium Phosphide poisoning occurs most commonly through ingestion and is seen more frequently in young males in their third decade. Fresh AlP is associated with higher and quicker fatality with respect to stored poison, less survival, more mortality.

Keywords: Aluminium Phosphide & Survival Rate.

INTRODUCTION

Pesticide poisoning, whether due to self, accidental, occupational or for homicidal purpose, is a global public health problem, causing more than half of deaths due to poisoning, and self-poisoning accounts for one-third of the world's suicide rate [1]. Aluminium Phosphide (AlP) is a solid fumigant pesticide, cheap, easily available, orally effective and widely marketed in India as 3 g tablets of Celphos, Quickphos and Phostoxin, containing 56% aluminium phosphide and 44% ammonium carbonate. Each tablet is capable of liberating 1 g of active principle, the Phosphine gas (PH_3). Lethal dose of AlP is 150-200 mg for a 70 kg human being [2].

The incidence of AlP poisoning has increased over the last few years. Bajaj reported 7000 deaths in one year in India [3]. Siwach a publication in 1995 reported highest number of poisonings in North India to be due to AlP (67.7%) followed by OPC and barbiturate compounds, with an attendant mortality of 67.6% in patients consuming AlP [4]. In few areas of developing countries, pesticide poisoning causes more deaths than infection [5].

MATERIALS & METHODS

We studied patients of Aluminium Phosphide (AlP) poisoning admitted in the MICU of department of medicine in the MGM Medical College and MY Hospital, Indore.

Ours was a 1-year prospective study. The diagnosis was based on history with or without corroborative evidence to the effect.

Inclusion Criteria

All patients with history of exposure to AlP, regardless of age and sex, were included in the study.

Exclusion Criteria

- Pre-existing cardiac, respiratory, hepatic or renal disorder.
- Concomitant exposure to another toxin.
- Prisoners and orphans were not included being dependent population.

Individual patients were personally evaluated at the time of admission. A standard proforma was followed in each case, recording the patients' particulars, details of exposure to AlP, complaints and physical examination. The treatment followed was recorded in each case.

An attempt was made to trace all relevant reports from the concerned departments, after due permission. We aimed at getting a psychiatric evaluation of patients done after full medical recovery, wherever it was feasible.

At no time did we swerve from the ethics laid down before any study. All patients, received treatment according to the protocol routinely followed, with no attempt at altering the management in any group solely for academic interest.

The data, thus compiled was tabulated and analysed for – clinical presentation in AlP poisoning, its deleterious effects and complications, prognostic markers and finally, mortality – benefit with therapy.

Various variables were studied, for their possible bearing on the final outcome, through a regression analysis. The statistical methods put to use were:

- Chi square test
- Student unpaired t-test
- Multi variate regression analysis – Used to study the combined effect of different variables on mortality.

RESULTS

Demography

The age-wise distribution of patients revealed that maximum number of patients belonged in the third decade (32.76%), with nearly 81% patients falling between second to fourth decades. The number fell progressively, away from the mode.

Table-1: Distribution according to Age

Age		101
(years)	No. of patients	
0-10		0
11-20	20	(19.80)
21-30	33	(32.67)
31-40	29	(28.71)
41-50	12	(11.88)
51-60	2	(1.98)
61-70	5	(4.95)
71-80		0 (0)
Mean + SD	32.45	+/- 13.082

Table-2: Distribution according to the dose consumed

No. of Tabs	No. of patients
	87
<1	11 (12.64)
1 – 2	63 (72.41)
> 2	13 (14.94)

Table-3: Distribution according to state of AlP

State of AlP	Prospective (84)
S	30 (35.71)
F	54 (64.29)

The distribution according to the state of AlP, showed a predilection towards ingestion of fresh AlP, with nearly 64% patients taken fresh tablets, as depicted above.

Mortality vis-à-vis dose of AlP

Coming to the relationship between individual parameters and mortality, it was found that as the number of tablets ingested increased,, mortality increased, as revealed here:

Nearly 10% of individuals who had consumed <1 AlP tablet expired, while the percentage increased significantly and progressively with increase in number of AlP tablets – 40% for 1-2 tablets ingested and 54% for >2 tablets consumed.

Table 4: Relationship between No. of Tablets of AlP & Mortality

No. of Tabs	MORTALITY	
	Total (33)	
< 1 (11)	1	(9.09)
1-2 (63)	25	(39.68)
> 2 (13)	7 (53.84)	
Unpaired t- test Coeff.	0.772	
P – value	0.442	

Mortality vis-à-vis state of AlP

A significant relationship (p value <0.05) was found between the state of AlP consumed and the final outcome, 42.59% of individuals who had ingested 42 fresh toxin, expired, whereas out of the consumers of old stored AlP, 80% patients survived, hence confirming the view that fresh, sealed toxin is associated with higher mortality w.r.t. stored AlP.

Table-5: Relationship between State of AlP and Mortality

State of AlP	MORTALITY	
	Total	
S	6/30	(20.0)
F	23/54	(42.59)
Pearson Chi-square	8.407	
p-value	0.015	

DISCUSSION

Aluminium Phosphide (AlP) is an epidemiologically significant poison. It is a potent toxin, with rapid deleterious effects, associated with high mortality. The frequency of poisoning with AlP mandated a detailed study which was conducted in the MGM Medical College and MY Hospital, Indore on 101 patients admitted to the MICU of Department of medicine. The aim was to study the clinical profile of these patients, from presentation, through investigations and treatment to their final outcome.

DEMOGRAPHY

In the present study 32.67% patients were in their third decade and a large majority (81.19%) fell between ages of 11 and 40 years. Similar results were found in a study conducted at Rohtak, Siwach 1988, where 43.8% patients belonged in their third decade, while 86.8% were between 10 and 39 years of age [6].

A male dominant pattern was seen in our study, with 67.33% patients being males. Siwach [6], 1988 in his study on 114 patients of AlP poisoning, reported 61.4% of all patients as being male, and later in 1995, reported 68% of 559 patients as male. Our study has shown a similar trend which may be due to easier access of males to the toxin, especially in the agriculture industry. (Siwach, 1994 reported male: female ratio of 1.62:1) [7].

CONCLUSION

Through this comprehensive study, we have reached certain conclusions as enumerated below:

- Aluminium Phosphide poisoning occurs most commonly through ingestion and is seen more frequently in young males in their third decade.
- Fresh AlP is associated with higher and quicker fatality with respect to stored poison, less survival, more mortality.

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