Original Research Paper

Poisoning Pattern in the Cases Reported by Chemical Examiner Laboratory - Punjab, India

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Abstract:

Punjab is one of the leading food grain producing states in India. However, in Punjab, increased productivity has been fuelled by the excessive use of agriculture based chemicals or agro-chemicals like pesticides, insecticides, herbicides etc. Common poisons used or consumed by the people of Punjab are related to agriculture based chemicals like organophosphorus compounds (OP), organochlorine compounds (OC), carbamates, herbicides, fungicides and metallic compounds like Aluminium Phosphide (AlP) and Zinc Phosphide (ZnP). The analysis of available data was conducted from 1st April, 2016 to 31st March, 2017. During this period, 1918 viscera cases were analysed for the various poisons by seven analysts. AlP and OP were found to be the most common poisons in this study. So, there is an urgent need to develop less toxic but equally effective alternatives of these agro-chemicals in Punjab.

Key Words: Chemical Examiner Laboratory, Punjab, Poisoning, Viscera, Agro-chemicals

Introduction:

Poisoning by agriculture based chemicals is a global public health problem particularly because of poor regulatory frameworks. Singh et al,[1] in their study, reported that AlP (marketed in India as tablets of Celphos, Alphos, Quickphos etc. and commonly known as wheat pills in Punjab) poisoning was found to be the major cause of death among all cases of poisoning in northwest India. Since the first available report of AlP poisoning in the early 1980s from India, it is now one of the most common causes of poisoning among agricultural pesticides.[2-4]

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The objective of the present study was to assess the poisoning pattern in the cases reported by Chemical Examiner Laboratory (CEL), Punjab, India. Such knowledge can be helpful to control the open sale of these chemicals/poisons by the state government and to develop less toxic and equally effective alternatives of these agro-chemicals by agricultural scientists.

Materials and Methodology:

The CEL, Govt. of Punjab, is the only government laboratory in the state of Punjab covering all districts where viscera for chemical analysis in poisoning or suspected cases of poisoning are received from Police officials and are analyzed. Analysis of available data from 1st April, 2016 to 31st March, 2017 was conducted. During this period, 1918 viscera cases were analysed for the various poisons by seven analysts.

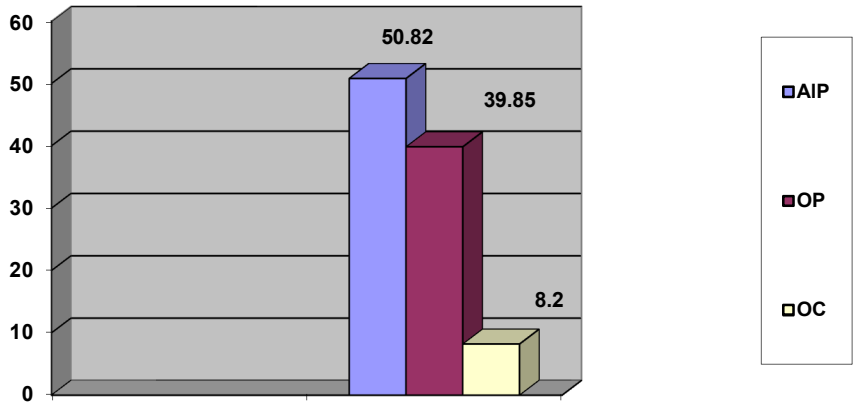
Observations and Results:

Various poisons (**Table 1**) were found to be positive in 793 cases (excluding ethyl alcohol and morphine). AlP (50.8%) was found to be the most common poison in this study, followed by

Table 1: Type of poison reported

Type of Poison	AlP	OP	OC	CO	ZnP	Carbamate	Phenyl	Total
Cases	403	316	65	05	02	01	01	**793**

Fig 1: Percentile of common poisons



OP (39.9%) and OC (8.2%) (**Figure 1**). Blood Ethyl Alcohol Level (BAL) more than 350 mg%, which can be fatal and in which death may occur,[5] was found in one case only.

Discussion:

It is well known that India has a high incidence of poisoning, being the 4th most common cause of mortality in rural India.[6] Poisoning with agro-chemicals has become more common in the modern times because of their low cost and easy availability. AlP is being used as a common outdoor and indoor pesticide in developing countries as it is cheap, effective, free from toxic residue and does not affect seed viability.[7] Each year, around 300,000 deaths occur worldwide due to pesticides.[8]

Malik, et al,[9] in their study in cases of suspected poisoning deaths from Kamrup district coming to the GMCH morgue, Guwahati, Assam, reported OC and OP as the most common poisons. In our study, AlP and OP were found to be the most commonly used poisons in Punjab. As Punjab is an agricultural hub and easy availability with no restriction on the sale of these agro-chemicals, it could be the main reason for high incidence of poisoning by these agro-chemicals.

AlP has currently aroused interest because of increased use in non-agricultural purpose in addition to agricultural purpose. A 3 gm tablet of AlP contains 56% of the active ingredient and only a part of the tablet is usually sufficient for the suicidal purpose.[5] The tablet liberates toxic phosphine gas when it comes in contact with gastric juice. Therefore, it is suggested that legislation related to storage, sale, purchase and utilization of these agriculture based poisons (Especially OP and AlP) should be strictly implemented to reduce deaths due to these poisons in Punjab.

Open sale of most toxic agro-chemicals should be restricted by state government agencies and users of these must be licensed. Government should make attempts to develop less toxic and equally effective alternatives in consultation with agricultural scientists.

Conflict of interest: None

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References:

1. Singh D, Dewan I, Pandey AN, Tyagi S, Spectrum of unnatural fatalities in the Chandigarh zone of north-west India-a 25 year autopsy study from a tertiary care hospital. J Clin Forensic Med 2003;10:145-52
2. Singh S, Dilawari Jb, Vashist R, Malhotra HS, Sharma BK, Aluminium phosphide ingestion. Br Med J 1985;290:1110-1.
3. Murali R, Bhalla A, Singh D, Singh S. Acute pesticide poisoning: 15 years experience of a

large North-West Indian hospital. Clin Toxicol (Phila) 2009;47:35-8.

4. Goel A, Aggarwal P. Pesticide poisoning. Natl Med J India 2007;20:182-91.
5. Parikh CK. Parikhôs textbook of medical jurisprudence forensic medicine and toxicology. 6th ed. CBS Publishers & Distributors Pvt. Ltd: p.10.17-8
6. Mohanty MK, Arun M, Jagdish Rao PP, Kumar GP. Delayed toxicological reports in poisoning deaths-indian scenario. J Ind Society Toxicol 2005;1(1):14-6.
7. Chugh SN. Aluminium phosphide poisoning: present status and management. J Assoc Physicians India 1992;40:401-5
8. Gunnell D, Eddleston M, Suicide by intentional ingestion of pesticides: A continuing tragedy in developing countries. Int J Epidemiol 2003;32:902-9
9. Malik Y, Chaliha RR, Malik P, Jaswal M. Toxicology unit in department of forensic medicine emphasis from a study from North East India. J Indian Acad Forensic Med 2012;34(4):299-300