

Original Research Paper

The Study of Investigational Profile of Common Pesticide Poisoning Cases admitted at SAIMS, Indore

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Abstract

A prospective study was done in Shri Aurobindo Medical College Hospital, Indore during 1st January 2012 to 20th August 2013. 110 cases were admitted with history of pesticide poisoning during this period, out of them 10 cases were excluded, as they left the hospital within 1-2 hours of hospitalization. Most common poison was Organophosphorus (46 cases). Rodenticides 14 cases, Aluminium Phosphide 12 cases, Ethylene Di bromide 5 cases, others 3 cases and unknown poison was consumed by 2 peoples. Investigations like Liver function test, renal function test and electrolytes were studied in common pesticide poison i.e. Organophosphorus, Aluminium Phosphide and ethylene Di bromide. Liver function test was raised in most of the cases of ethylene Di bromide poisoning. Renal Function Test (RFT) was normal in most of the cases of Organophosphorus and Aluminium Phosphide and EDB poisoning. Sodium, Potassium and Chloride showed normal levels in most of the poisoning.

Key Words: Investigational Profile, Pesticide, Poisoning, Rodenticides, LFT

Introduction:

Poisoning and Hanging are the commonest methods of suicide worldwide. Millions of people die each year due to poisoning. Most pesticide related poisoning in developing countries can be attributed to lack of training in their use, poor regulatory / legislative control towards their access, and carelessness in providing protection to the body during their application. Pesticides have become a common manner of suicidal and accidental poisoning due to easy availability

SAIMS Medical college Hospital, Indore is catering the rural population and many pesticide producing factories are situated nearby. Due to this pesticide poisoning is common in this region. Many patients get admitted at SAIMS hospital, Indore with history of pesticide poisoning. The aim of this study was to follow these patients and to do the investigational study.

Materials and Methods:

A Performa was prepared to study the various investigational parameters of liver, and kidney function test and electrolytes.

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Proforma includes SGOT, SGPT & Serum Bilirubin, Blood Urea, Uric Acid & Serum Creatinine; Serum electrolytes including Sodium, Potassium & Chloride. The outcome of Patient was compared among various poisons.

Poison was confirmed in the toxicology lab of Department of Forensic Medicine and Toxicology, SAIMS, Indore. (Photo 1)

Various biochemical investigations were carried out in the central investigational lab of SAIMS, Indore. Blood, gastric lavage and urine samples were taken from each patient for toxicological analysis. Biochemical findings and other hematological investigations were studied from the report given by the consultant of the central lab.

Photo1: Chemical test for O-P Poisoning



Observation:

Out of total 100 cases, three Poisons were consumed by majority. (63%) These were Organophosphorus (46%), Aluminum Phosphide (celphos) in 12% and Ethylene Di bromide (5%

cases). So, more emphasis was given on these three poisons. Results of various biochemical tests are as follows:

- **Liver Function Test (LFT):**

A total of 46 patients had consumed Organophosphorus. SGOT was increased in 23 cases. It was normal in 47.82% cases. SGOT was below normal range in one case only.

SGPT was normal in 34 cases (73.9%). Bilirubin analysis was carried out in 30 cases, 50% of them were within normal range. (Table 1) In celphos poisoning SGOT was raised in 50% cases and was normal in 41.66 % cases. SGPT and Bilirubin was raised in 58.33 % cases normal in 33.33 % cases. (Table 2)

Out of total cases 5 had consumed Ethylene Di bromide. SGOT was increased in 80% cases and was normal in 20% cases. SGPT was raised in 40% cases and was normal in 40% cases. Bilirubin was raised in 60% cases and was normal in 40% cases (Table 3)

- **Renal Function Test (RFT):**

Renal function test were carried out in Organophosphorus poisoning, shows normal level of Serum Creatinine in 91.89% cases, Blood Urea in 90.90% cases and Uric Acid in 86.48% cases (Table 4) RFTs in the 12 cases of Celphos ingestion showed normal values of Serum Creatinine (63.63%), normal Blood Urea in 50% and normal Uric Acid in 58.33% cases.

Sukhmindar Jit Singh Bajwa [6] found effect of Celphos on multi-organs including kidney, in only 18% cases. (Table 5)

Among ethylene Di bromide poisoning, Serum Creatinine level was within the normal range in 40%. Urea level was within normal range in 60% cases. Uric Acid was within the normal range in 33% case (Table 6)

- **Electrolytes:**

Sodium level was normal in 69.04% cases of Organophosphorus poisoning. Potassium level was within the normal range in 90.47% cases and below normal in three cases.

Chloride level was within normal range in 39.02 % cases and increased in 24 cases. (Table 7) Sodium level was normal in 58.33% cases of Celphos poisoning. Potassium level was within the normal range in 50% cases.

Chloride level was within the normal range in 42.85% cases (Table 8) Sodium, Potassium and chloride were within the normal range in most of the cases, of ethylene Di bromide poisoning. (Table 9)

Discussion:

David Gunnell et al [1] found that the substances most commonly used for self-poisoning were agricultural pesticides. A. A

Moghadamnia et al [2], at northern Islamic Republic of Iran found Pesticide poisoning was more frequent. S A Kora et al [3] found 148 cases of OP poisoning out of a total of 232 poison cases studied.

Liver function test (LFT) was normal in most of the cases of Organophosphorus poisoning while raised in most of the cases of aluminum phosphide and ethylene Di bromide poisoning. Finding were not consistent with Sahin I et al [4] who found elevated levels of SGOT and SGPT in Organophosphorus poisoning cases. Antonio F. Hernandez et al [5] found increased level of SGOT and SGPT in organo phosphorus poisoning. Clinically no significant hepatotoxicity was observed by him.

Findings were consistent with other authors [6, 7] which showed increase in SGOT and SGPT value in Celphos poisoning.

Similar findings were seen in Manish Nigam et al [8], study which showed raised levels of SGOT, SGPT and Bilirubin (direct) in most of the cases of EDB poisoning. Ashish Goel et al [9] study showed elevated level of SGOT and SGPT in Organophosphorus poisoning while S. Singh et al [10] found hepatotoxicity due EDB poisoning.

Renal Function Test (RFT) was normal in most of the cases of Organophosphorus, Aluminium phosphide poisoning and ethylene Di bromide poisoning.

M. Atef [11] found increased value of Creatinine in (73.1%), urea in (27.8%), and uric acid in 32.1% cases in his study on 40 adult male rats. Manish Nigam et al [8] in his study found normal range of Serum Creatinine in 26 cases out of 27 live cases of EDB poisoning. Blood urea level was within the normal range in 24 live cases of EDB poisoning. Findings are not similar to S. Singh et al [10] who found nephrotoxicity due EDB poisoning.

Electrolytes Sodium and Potassium level was normal and chloride level was increased in most of the cases of Organophosphorus poisoning.

Decreased sodium and increased chloride level was seen in most of the cases of aluminum phosphide poisoning. Sodium, Potassium and chloride were within the normal range in most of the cases, of ethylene Di bromide poisoning.

Findings are similar to other authors' studies which showed [12, 13] no change in sodium level in Organophosphorus poisoning. Mohan Gurjar et al [14] found normal levels of Sodium in most of the cases but hyper or hypomagnesaemia in some cases. Changes in

Electrolyte level are not directly related to poisoning.

Celphos poisoning can cause diarrhea in some case which can lead to Electrolyte imbalance, especially in children. Manish Nigam et al [8] also found normal range of electrolytes in most of the cases of EDB poisoning.

Conclusion and Suggestion:

Toxicology is said to be one of the most neglected area in clinical practice. Two main reasons, responsible for this statement are first being India lacks good referral centers for treatment of poisoning cases. Secondly all poisoning cases are being Medico-legal cases, draws much less interest to the clinicians since they fear of court attendance and moreover less paying, and more time consuming.

Hence forth this study was undertaken to facilitate the clinicians and toxicologist for better judgment in regards to patient condition and co-relation with various investigative findings. Due to the risk involved in treatments of pesticide poisoning, there is general agreement that emphasis should be on preventing pesticide illness rather than relying on treatment.

SGOT was raised in most of the cases of EDB poisoning. RFT and Electrolytes showed normal results in most of the cases of above mentioned three pesticide poisoning. Before reaching to any conclusion further studies should be carried out.

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Table 1: LFT in Organophosphorus

LFT	SGOT	SGPT	Bilirubin
< Normal	1	0	5
Normal	22	34	15
> Normal	23	12	10
Percent of normal	47.82%	73.91%	50%

Table 2: Liver Function Test in Celphos

LFT	SGOT	SGPT	Bilirubin
< Normal	1	1	1
Normal	5	4	4
> Normal	6	7	7
Percent of normal	41.66%	33.33%	33.33%

Table 3: LFT in Ethylene Di bromide

LFT	SGOT	SGPT	Bilirubin
< Normal	0	1	0
Normal	1	2	2
> Normal	4	2	3
Percent of normal	20%	40%	40%

Table 4: RFT in Organophosphorus

RFT	S. Creatinine	Urea	U. acid
< Normal	1	1	2
Normal	34	30	32
> Normal	2	2	3
Percentage of normal	91.89%	90.90%	86.48%

Table 5: RFT in Celphos

RFT	S. Creatinine	Urea	U. acid
< Normal	1	1	2
Normal	7	6	7
> Normal	3	5	3
Percentage of normal	63.63%	48.3%	58.33%

Table 6: RFT in Ethylene Di bromide

RFT	S. Creatinine	Urea	U. acid
< Normal	0	0	0
Normal	2	3	1
> Normal	3	2	2
Percent of normal	40%	60%	20%

Table 7: Electrolytes in Organophosphorus

Electrolytes	Na	K	Cl
< Normal	2	3	2
Normal	29	38	16
> Normal	11	1	24
Percent of normal	69.04%	90.47%	39.02%

Table 8: Electrolytes in Celphos

Electrolytes	Na	K	Cl
< Normal	2	0	0
Normal	7	5	3
> Normal	3	5	4
Percent of normal	58.33 %	50%	42.85%

Table 9: Electrolytes in Ethylene Di bromide

Electrolytes	Na	K	Cl
< Normal	0	0	0
Normal	4	3	3
> Normal	1	2	2
Percent of normal	80%	60%	60%