

CASE REPORT

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The Study of Emergency Laboratory

Abnormalities of Poisoning Cases admitted at Narayana medical College and Hospital, Nellore

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ABSTRACT

Aim: This study was designed to evaluate the relationship between laboratory parameters and the degree of intoxication in patients attempted to commit suicide using various toxic agents admitted to the emergency department.

Methods: 537 patients who attempted to suicide during the period of 4 years between April 2009 and April 2013 admitted to the emergency department were included in this retrospective study. Fatal poisonings were studied for socioeconomic status, type of poison and way of manner (accidental, suicidal or homicidal). The initial laboratory findings and clinical status of patients were evaluated. Clinical severity of patients was also graded according to the Bardin classification on admission.

Results: Oral intake of poison was found to be the most common route for suicidal purpose. Acute renal failure was observed during admission in some patients of grade 2 and 3. Cholinesterase activity was measured significantly depressed in the grade 1, 2 and 3. SGOT, SGPT and ALP levels were significantly higher in the grade 1 and 2, but they were considerably elevated in the grade 3 compared to normal reference.

Conclusions: There is decrease of cholinesterase activity appears to be associated with clinical severity in acute organophosphate intoxication. Liver function enzymes were increased in patients of grade 1 and 2 renal failure.

Key Words: poisoning, suicide, Organophosphorus, cholinesterase, APACHE score

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 handling pesticides while using in fields and basic education.

Organophosphates (OPs) are toxic substances which frequently cause intoxication in human [1]. The toxic effects of these compounds are the consequence of the

inhibition of acetylcholinesterase in the nervous system, leading to an accumulation of the neurotransmitter acetylcholine at synapses and myoneural junctions and then the continued over stimulation of acetylcholine receptors. Organophosphate poisoning (OPP) cases constitute a great percentage of suicide patients in many developing countries [2]. In acute poisoning, the severity of symptoms parallels the degree of acetylcholinesterase (AChE) activity [3]. Scoring

systems such as the APACHE (Acute Physiology and Chronic Health Evaluation) and SAPS (Simplified Acute Physiology Score), Organophosphate intoxication grading for the evaluation of intoxication[4,5]. Both clinical features and laboratory parameters are very important for accurate diagnosis in poisonings[6-8]. Laboratory confirmation of the diagnosis may be necessary in order to provide optimal patient care. Emergency laboratory tests may give information about first acute organ damage and the degree of poisoning in patients with acute OPP. The aim of the current study was to assess the relationship between the laboratory parameters and degree of organophosphate intoxication in patients attempted to commit suicide at the time of admission.

MATERIALS AND METHODS

Retrospective studies of 537 poisoning cases were recorded during the period of 4 years between 2009 and 2013 at Emergency Department, Narayana Medical College Hospital Nellore, and Andhrapradesh. Patients were evaluated at the time of admission in the ED. A Performa was prepared to study the various investigational parameters of liver, and kidney function test and electrolytes. A detailed history had been taken from the patient attender or patient's family member. Investigations include SGOT, SGPT, Blood Urea, Serum Creatinine, Serum electrolytes and cholinesterase. Patients who intended to commit suicide with organophosphate agents and graded these patients according clinical findings in relation to Bardin classification. After the diagnosis, in addition to general supportive measures (i.e. washing of the whole skin surface, gastric lavage, administration of cathartics and activated charcoal), a standard therapy method with atropine and pralidoxime was given to the patients. All the patients were stabilized in emergency room and shifted to intensive care unit for further management, during there hospital stay clinical outcome was also noted.

The initial emergency laboratory parameters: Serum cholinesterase (SChE, Method with S-butrylthiocholine iodide. Cholinesterase catalyzes the hydrolysis of S-butrylthiocholine iodide to thiocholine iodide and butyrate. Thiocholine iodide reacts with 5, 5'-dithiobis-2-nitrobenzoate and forms the yellow colored product 5-mercapto-2-nitrobenzoate. The rate of formation of this product is directly proportional to the catalytic cholinesterase activity. It is determined by measuring the increase in

absorbance at 480 nm. Abs. calculation mode: kinetic. Precision: reproducibility was determined using human samples and controls in an internal protocol. Mean values: level 1; 1728 U/L, level 2; 9545 U/L. CV within run: 1.0 % (level 1), 0.99 % (level 2). CV between run: 2.2 % (level 1), 1.8 % (level 2). Analytical sensitivity: 4.5 U/L, creatinine, Urea, aspartate aminotransferase (AST), alanine aminotransferase (ALT) levels were determined by autoanalyser.

Statistical Analysis

Data were represented as Mean \pm S.D. Test of significance between the different grades of poisoning was analyzed using ANOVA. Probability values of < 0.05 were considered significant and correlation between the different laboratory parameters was analyzed using Spearman's rank correlation test.

Results

In total 537 cases, 77 cases were seen in <20 age group, 202 cases seen 20-30 age group, 112 cases seen in 30-40 age group, 59 cases seen in 40-50 age group and 87 cases were seen in \geq 50 age group. 257 (47.8%) were males and 280 (52.2%) were females were recorded.

Out of 537 cases, BZD over dose poisoning observed in 8%, Chemical poisoning observed in 5.7%, hair dye poisoning observed in 21.9%, Pesticide poisoning observed in 30%, Herbicide poisoning observed in 0.93 %, Insecticide poisoning observed in 3.3%, Medicine overdose observed in 4%, Rodenticide poisoning observed in 2.4%, Oleander poisoning observed in 1.8%, scorpion sting observed in 5% and accidentally snake bite observed in 15.8 %. Out of 537 cases, Suicidal cases registered were 77.65% and Accidental cases registered were 22.35%.

Overall hospital mortality in poisoning cases 9% died during the course of treatment. Majority deaths are seen in organ phosphorus compounds secondary to respiratory paralylysis, pneumonia and septicemia and sudden cardiac arrest.

Results of various biochemical tests:

Liver function Test (LFT):

In organophosphorous poisoning (Pesticide-30%+Herbicide-0.93%+insecticide3.3%+ Rodenticide-2.4%) cases, SGOT was increased in 72%, normal in 47.8% cases. SGPT was normal in 79%. ALP was observed to be high in 55% cases. Out of total 537 cases, 21.9% consumed hair dye, SGOT was increased in 70% cases and was normal in 30% cases. SGPT was raised in 40% cases.,ALP levels was raised in 39% cases (Table 3).

Renal Function Test (RFT):

Renal function test were carried out in Organophosphorus poisoning, shows normal level of Serum Creatinine in 85% cases, Blood Urea in 90% cases and Uric Acid in 82% cases. RFTs in the 60% cases of hair dye ingestion showed normal values of Serum Creatinine, normal Blood Urea in 40%. Among medicine overdose poisoning, Serum Creatinine levels was within the normal range in 80%. Urea level was within normal range in 60% cases.

INR/APTT levels: INR levels were normal in 70% cases of Organophosphorus poisoning. APTT levels were within the normal range in 80%. PT levels were normal in 60% cases of hair dye poisoning. APTT levels were within the normal range in 60% cases.

Cholinesterase levels:

In Organophosphorus poisoning, the mean \pm SD of Cholinesterase (mg/dl) levels 3750.25 ± 2150.51 observed in 56%, whereas, 825.5 ± 445.15 observed in 44%.

Table.1. Age AND GENDER wise distribution of cases.

AGE GROUP/GENDER	N	%
< 20	77	14.34
>= 50	87	16.20
20-30	202	37.62
30-40	112	20.86
40-50	59	10.99
MALE	257	47.86
FEMALE	280	52.14
Grand Total	537	100.00

Table 2. Types of poisoning

TYPE OF POISON	N	%
BZD over dose	43	8.01
Chemicals	31	5.77
Hair dye poison	118	21.97
Herbicides	5	0.93
Insecticides	18	3.35
Drugs/Medicines	22	4.10
Oleander Seed	10	1.86
Pesticides	165	30.73
Rodenticide	13	2.42
Scorpion sting	27	5.03
Snake bite	85	15.83
Grand Total	537	100.00

Table 3. Laboratory parameters on day of admission

Parameters	Organophosphorous poisoning	Hair dye poisoning	Medicine overdose
Serum Cholinesterase (U/L)	3750.25 ± 2150.51	--	--
SGOT (IU/ L)*	280.41 ± 90.8	190.55 ± 55.10	--
SGPT (IU/ L)*	320.25 ± 120.2	250.25 ± 75.42	--
Creatinine (mg/dl)*	1.0 ± 0.31	1.45 ± 0.76	--
Urea (mg/dl)	80.0 ± 22.5	64.44 ± 17.25	70.36 ± 11.13

Discussion

The study involved 537 patients. Our study showed that highest number of patients 202 (37.62%) belonged to age group 20-30 years. Various studies had reported very high female preponderance. The most of self poisoning substances were belongs to agricultural pesticides [9]. In a study, 148 cases of OP poisoning out of a total of 232 poison cases studied[10]. Liver function test (LFT) was normal in organophosphorus poisoning and raised in hair dye poisoning cases. The finding of current study were not consistent with other study, [11] in which elevated levels of SGOT and SGPT in organophosphorus poisoning cases [12] and in hair dye poisoning [13,14]. Whereas in other study[15] showed raised levels of SGOT, SGPT and Bilirubin (direct) in most of the cases of EDB poisoning. A study found hepatotoxicity due EDB poisoning[16]. Renal Function Test (RFT) was normal in most of the cases of organophosphorus, hair dye poisoning, whereas, a experimental study [17] found increased level of Creatinine in (73.1%), urea in (27.8%), and uric acid in 32.1% cases in 40 adult male rats. Manish Nigam et al [15] in his study found normal range of Serum Creatinine in 26 cases out of 27 live cases of EDB poisoning. Blood urea level altered in organophosphorous and hair dye poisoning cases. Findings were not similar to S. Singh et al [16] who found nephrotoxicity due to EDB poisoning.

Conclusion and Suggestion:

SGOT/SGPT was raised in most of the cases of OP poisoning. RFT and cholinesterase levels showed normal results in most of the cases of above mentioned three poisoning. 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 and non availability of toxicology information center. In next, 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 the study was undertaken to facilitate the clinicians and toxicologist for better judgment in regards to patient condition and co-relation with various investigative findings.

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