www.jmscr.igmpublication.org
Index Copernicus Value: 79.54
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossrefDOI: https://dx.doi.org/10.18535/jmscr/v7i3.105

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Pancreatic Involvement in Different Agricultural Poisoning

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Abstract

Introduction: *Acute pancreatitis as a complication in agricultural poisoning like organophasphorous and other non OPs has been reported time to time but large scale studies are still lacking as a whole in agricultural poisoning group and especially in non OPs.*

Objective: *To find out prevalence of pancreatitis in agricultural poisonings and correlate the serum amylase and lipase level with clinical severity in terms of outcome.*

Study Design: *Hospital based observational study.*

Study Setting: *The study was done in the Department Of General Medicine, VIMSAR, Burla, Odisha.*

Study Duration: *Study duration was from November 2016 to October 2018(24 month)*

Subjects and Methods: *200 patients of age >14 years who have ingested any agriculturally used substance were included in the study. Past medical history of pancreatic, hepatic or kidney disease or any other causes of hyperamylasemia were kept as exclusion criteria. Serum amylase and lipase was measured on day 1, day 3 and day 5 after ingestion. Clinical features were noted and more than three times of upper normal limit were taken diagnostic and USG abdomen was done for radiological evaluation in biochemically diagnosed cases of pancreatitis.*

Results: *Organophosphorus compound were the largest group of poison with 121 patients followed by herbicide with 40 patients. Serum amylase was raised in 33% of the patients and 19.5% patients were having amylase more than 3 times UNL.19% of OP and 20% of herbicide poisoning cases were having amylase >330 U/L. Mean level of amylase was 160.5U/L in agricultural poisoning, 262.2U/L in death group,139.94U/L among survivor.15% of cases were having lipase raised more than 3 times of UNL. Mean lipase value was 130.91U/L.10(5%) of patients were having pancreatitis in ultrasonography. 15(7.5%) cases both pain abdomen and raised amylase >3 times was found and in 10 (5%) cases pain abdomen and raised lipase >3 times was found fulfilling the diagnostic criteria. Mortality was 17.55%. Mortality in poisoning complicated with pancreatitis was 50%.*

Conclusion: *Pancreatitis in agricultural poisoning is common. Not only the OPs but non-OPs like herbicide, pyrethroid, carbamate leads to pancreatitis as a complication. Serum amylase and lipase significantly correlate with disease severity in terms of mortality and can be useful as a prognostic indicator.*

Keywords: *Agricultural poisoning, OP-organophosphorous, UNL-upper normal limit.*

Introduction

In an agriculturally dependant and emerging country like India poisoning is a very common mode of suicide. Poisoning due to these substances is rising day by day due to poverty,

social and family burden, difficulty in farming. Suicide among farmers is a priority to be addressed in our society.

Due to their easy availability and integrity with agriculture it is the substance of choice as a self-poison and the incidence is higher in younger[1], economically backward group.[1,2] In India, Organophosphate compounds are prime substance for suicidal poisoning in most part of country especially south, central and eastern region where traditional agricultural livelihood is still challenging. Other used substances for poisoning are organophosphate, carbamates, organochlor-ine, pyrethroid and fungicide. Organophosphorus compound are principally used as pesticides and their exposure is highly prevalent in India.

OP insecticides increase the intraductal pressure and exocrine pancreatic flow. The increase in pressure leads to extravasation of pancreatic fluid. This increased pancreatic exocrine flow could be due to direct cholinergic hyperstimulation of pancreatic acinar and ductal cell.[3,4]

OP compounds cause a functional ductal obstruction at the same time as stimulation of pancreatic exocrine secretion. There is pancreatic interstitial edema, acinar cell vacuolization, hyperamylasemia and hyperlipasemia following OP intoxication.[4] Toxin induced direct cytotoxic injury to pancreatic cells occurs in both OPs and non OPs.

Case report on acute pancreatitis following acute OP, herbicides compound ingestion has been reported now and then, but regular large scale studies with reference to the pancreatitis is still lacking.

Hence an attempt was made to study pancreatic involvement in all agriculturally used substances poisoning through biochemical and radiological means.

Aims and Objectives

- To find out prevalence of pancreatitis in agricultural poisonings.
- To correlate the serum amylase and lipase level with clinical severity in terms of outcome.

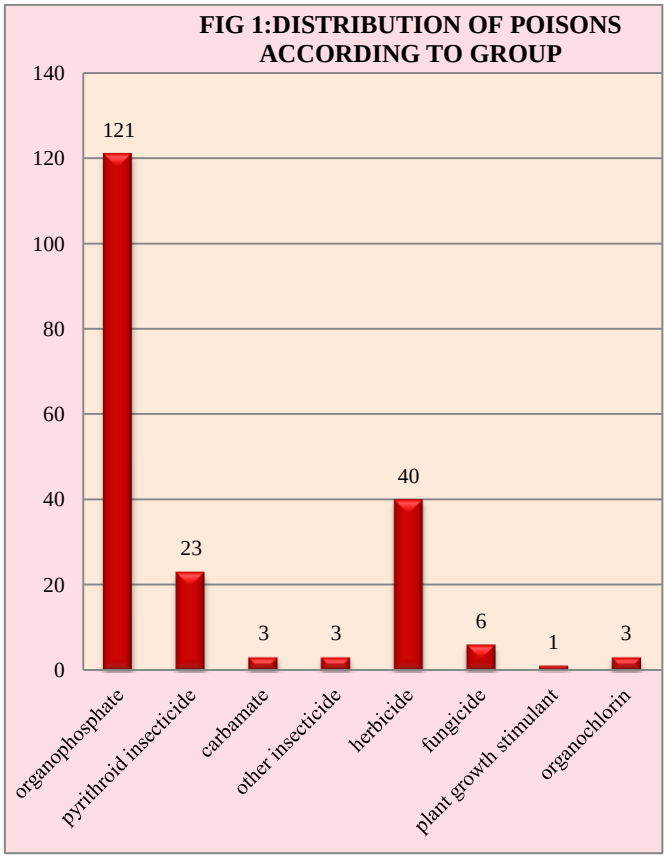
Material and Methods

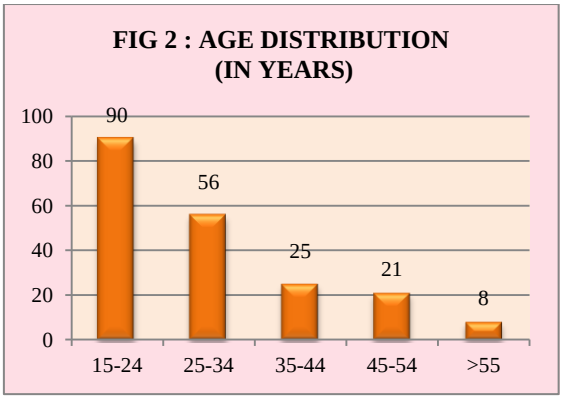
Hospital based observational study was done in the Department of General Medicine, VIMSAR, Burla, Odisha from November 2016 to October 2018(24 month). 200 patients of age >14 years who have ingested any agriculturally used substance were included in the study. Poisoning by route other than ingestion, co ingestion of other toxin or more than one toxin, Alcoholic, history of intake of drug causing pancreatitis, past medical history of pancreatic, hepatic or kidney disease or any other causes of hyperamylasemia were kept as exclusion crieteria.

Serum amylase and lipase was measured on day 1, day 3 and day 5 after ingestion. Upper normal limit was taken 110 U/L for serum amylase and 60 U/L for serum lipase. Clinical features were noted and more than three times of upper normal limit were taken diagnostic and USG abdomen was done for radiological evaluation in biochemically diagnosed cases of pancreatitis

Results

Out of 200(94 males and 106 females) cases OP compound (n=121) is the largest group of poison followed by herbicides (n=40) then pyrethroid (n=23) and fungicides (n=6). Among the OP compound chlorpyriphos (n=27) shares the most number of cases followed by triazophos (n=25) and then phorate and others. Among the herbicide 2 4 D (n=16) shares the biggest group followed by the deadly paraquat (n=10). Among pyrethroid, cypermethrin (n=20) and deltametrin (n=3 contributes to the pool. The incidence is very high in youngest age group 15-24 yr(n=90) and gradually decreases as the age progresses and very less after 55 years of age with mean 28.82 yr.





Out of 200 patients 44(22%) and 24(12%) are having symptoms of vomiting and pain abdomen respectively whereas 38(19%) are having tenderness. 15(7.5%) cases both pain abdomen and raised amylase >3 times was found and in 10 (5%) cases pain abdomen and raised lipase >3 times was found. Amylase was raised more than 3 times UNL (upper normal limit) in 39 (19.5%) patient s in which 22 (56.5%) are male and 17 (43.5%) are female. Serum lipase was raised in 30(15%) patient out of which 17 (56.6%) are male and 13 (43.4%) are female.

Table 1: Mean Level of Enzyme on Different Day in iu/l

SERIAL No.	PARAMETER	MEAN	STANDARD DAVIATION
1	SERUM AMYLASE DAY 1	160.58	173.11
2	SERUM AMYLASE DAY 3	139.1	138.57
3	SERUM AMYLASE DAY 5	105.93	114.24
4	SERUM LIPASE DAY 1	130.91	148.37
5	SERUM LIPASE DAY 3	118.3	130.03
6	SERUM LIPASE DAY 5	97.53	102.45

10 out of 30(33.3%) cases with raised lipase (>3times UNL) were confirmed to be having pancreatitis in USG. Similarly 10 out of 39(25.6%) cases with raised amylase were confirmed to be having pancreatitis in USG. Taking all the cases of poisoning into account 10 out of 200(5%) cases were having pancreatitis both biochemically and radiologically.

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10 out of 30(33.3%) cases with raised lipase (>3times UNL) were confirmed to be having pancreatitis in USG. Similarly 10 out of 39(25.6%) cases with raised amylase were confirmed to be having pancreatitis in USG. Taking all the cases of poisoning into account 10 out of 200(5%) cases were having pancreatitis both biochemically and radiologically.

Table 2: Comparison of Mean Level of Enzyme between death and Survivor

SI. NO.	PARAMETER	DEATH	SURVIVOR
1	SERUM AMYLASE DAY 1	260.22	139.44
2	SERUM AMYLASE DAY 3	212.37	123.55
3	SERUM AMYLASE DAY 5	154.82	95.55
4	SERUM LIPASE DAY 1	230.77	109.73
5	SERUM LIPASE DAY 3	207.37	99.4
6	SERUM LIPASE DAY 5	166.42	82.92

Overall mortality is 17.5%. In individual category mortality in male is 19.8% and that in female is 14.8%.

Mortality in case of pt having amylase >3 times UNL is 45.7% and 50% in case of pt having lipase raised >3 times UNL. This indicates increased mortality in biochemically pancreatitis cases especially in raised lipase cases.

Fig: 3 Distribution of Pancreatitis Cases in Different Poisoning

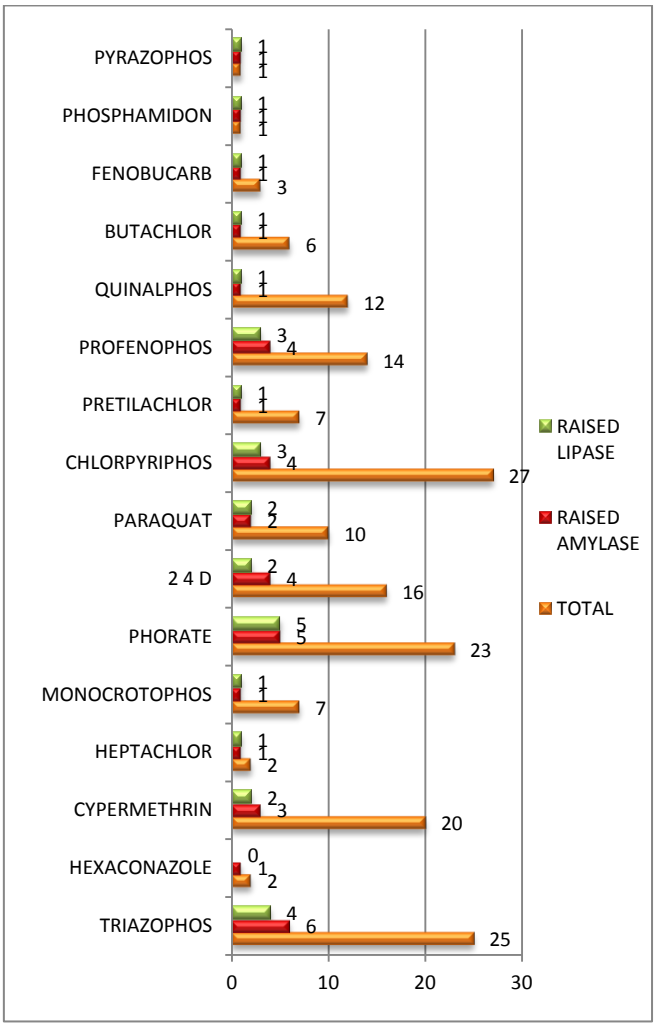

Table 3 : Pancreatitis and its Outcome in Terms of Serum Amylase

SERUM AMYLASE RAISED > 3 TIMES OF UPPER NORMAL LIMIT	DEATH	SURVIVOR	P VALUE
RAISED	**16**	**23**	**< 0.05**
NOT RAISED	**19**	**142**	

Table 4 : Pancreatitis and its outcome in terms of serum lipase

SERUM LIPASE RAISED > 3 TIMES UPPER NORMAL LIMIT	DEATH	SURVIVOR	P VALUE
RAISED	**15**	**15**	**< 0.05**
NOT RAISED	**20**	**150**	

Significant P value indicates strong correlationship between mortality and pancreatitis in poisoning.

Discussion

Majority of patients were in age group 14 to 25 and male to female ratio was 1.12:1. Organophosphorus compound were the largest group of poison with 121 patients followed by herbicide with 40 patients. Chlorpyriphos was the most common poison.

Serum amylase was raised in 33% of the patients and 19.5% patients were having amylase more than 3 times UNL.19% of OP and 20% of herbicide poisoning cases were having amylase >330 U/L. Mean level of amylase was 160.5U/L in agricultural poisoning,166.9 U/L in male and 153.01U/L in female,262.2U/L in death group,139.94U/L among survivors. Mean amylase in OP and herbicide group was 164.9U/L and 186.1U/L respectively.15% of cases were having lipase raised more than 3 times of UNL. Mean lipase value was 130.91U/L.

10(5%) of patients were having pancreatitis in ultrasonography.25.6% of patients with pancreatitis range hyperamylesemia and 33.3% of pancreatic range hyperlipasemia were radiologically proved. 15(7.5%) cases both pain abdomen and raised amylase >3 times was found and in 10 (5%) cases

pain abdomen and raised lipase >3 times was found fulfilling the diagnostic criteria. Mortality was 17.55%. Mortality of male was greater than female. Mortality in poisoning complicated with pancreatitis was 50%. One carbamate fenobucarb and pyrethroid cypermethrin had pancreatitis both biochemically and radiologically. One fungicide case was having isolated hyperamylesemia. In herbicide group 2,4 D, paraquat, pretilachlor had pancreatitis.

In a observational study done by Yi Li et al[5] from july 2013 to august 2014 in Zhengzhou university, China out of 177 cases herbicide poisoning by paraquat 1/3rd of patient had deranged pancreatic enzymes on day of admission.25(14.13%) patients were having very high amylase .case fatality in elevated group was 100% and 17% in normal group.

In a cross sectional study done by Mahantesh Ghaniger et al[6] in SDM medical college between 2013 1nd 2014 among 100 patients 36 patients had 3 fold elevated amylase levels, out of these 36 patients 11 patients had significantly raised lipase levels suggestive of acute pancreatitis confirmed by ultrasound abdomen. Among these 11 patients 2 patients died due to pancreatitis.

In a hospital based observational study done in Bankura Medical college by Abhay Nath Chaturvedi et al[7] between june 2012 to june 2013 out of 96 patients of OP poisoning 30(31.2%) had hyperamylesemia, 16(16.67%) had more than 3 fold rise of amylase(UNL taken 96 IU/L) and 13(13.5%) had more than 3 fold rise in lipase in serum.

A prospective study was done by the Department of Internal Medicine, University of Yuzuncu Yil, Van, Turkey[8] in 2002 to find the prevalence of pancreatitis in OP poisoning. Four of the total 47 patients with acute OP poisoning had obviously elevated Amylase and Lipase levels (Amylase> 300 U/L; Lipase >60 U/L). 12.76% patients were diagnosed acute Pancreatitis.

Ahmed Arshia et al[9] at the Medicine Department, Abbasi Shaheed Hospital Karachi did a observational study from 16th June 2006 to December 2006 in patients ages >15 years admitted with organophosphate poisoning (OP).Among 90 patients, 28 (31%) patients were having raised amylase,9 (10%) patients were having raised lipase and 2 (2.2%) patients were confirmed radiologiacally as pancreatitis.

Conclusion

Pancreatitis in agricultural poisoning is common. Not only the OPs but non-OPs like herbicide, pyrethroid, carbamate leads to pancreatitis as a complication. Serum amylase and lipase significantly correlate with disease severity in terms of mortality and can be useful as a prognostic indicator.

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