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A Study On Severity Of Organophosphorus Posioing By Correlating The Serum Level Of Amylase, Lipase, And Creatine Kinase Level

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Abstract

Background: Organophosphorus Compounds (OPC) are widely used poison especially in India due to easy availability and low cost. Organophosphorus (OP) are insecticides which have widespread use in agriculture to control weeds, pests, or plants diseases, because of its specific action these OP compounds are useful in crop protection and increased productivity, OP poisoning is one of the major type of poisoning in India. The OP compounds likely to have more adverse effects in developing countries like India, because it is easily available and people are less aware leading to high morbidity and mortality. The OP compounds act by inhibiting acetylcholine esterase enzyme at nerve endings and neuromuscular junction, causing overstimulation of acetylcholine receptors. Signs and symptoms of poisoning are mainly due to muscarinic, nicotinic and central nervous system (CNS) receptor overstimulation. In acute OP poisoning, the severity of poisoning correlates the decrease in pseudocholine esterase activity.

Aim Of The Study: To estimate the Serum levels of Amylase, Lipase and CK in acute OPC poisoning on admission and serially till discharge or death and to correlate the same with POP scale, complications, Intermediate Syndrome (IMS), mechanical ventilation requirement and outcome.

Methods: An observational study done consisting of 100 patients at Between 2021-2022 in the Department Of General Medicine, Government Medical College, Tiruvallur, Tamil Nadu, India, Chennai for a period of 5 months. Patient selected after applying inclusion and exclusion criteria and statistical analysis was done.

Results: In our study, raised serum Amylase, Lipase and CK levels significantly correlated with initial clinical severity by POP Scale, IMS, complications, ventilation requirement and outcome. It also had a negative correlation with Serum AchE levels.

Conclusion: We conclude that increased Serum levels of Amylase, Lipase and CK correlated with poor clinical outcome and can be used as newer biochemical markers in predicting the severity of OPC poisoning.

Keywords: Organophoshorus Poison, Serum Amylase, CPK Level

Introduction

Agriculture constitutes the major component of Indian economy. Incidence of poisoning by pesticides and consequent admission to the hospital has been increasing in recent decades. OPC ranks the foremost in the list of agents which cause pesticide poisoning. OPC are widely used insecticides in agricultural industry and are common causes of morbidity and mortality due to poisoning worldwide especially in developing countries like India. [1] Due to easy availability and low cost OP compounds poisoning are becoming a major source of health hazard hence it is important to recognize the entire spectrum of

symptoms. Causes of poisoning are suicidal, accidental and homicidal. Suicidal poisoning is the most common cause in developing countries because of its cheapness and easy availability in the market.[2] The morbidity and mortality depends on the time lag between the exposure and the onset of management. Identification, risk stratification, early diagnosis and prompt treatment of OP poisoning victims are equally vital. [3] World Health Organization (WHO) estimates that around 0.3 million people die every year globally due to various poisonings and pesticide poisonings causes more than 2,20,000 deaths in developing countries like India because of cheap and easy availability of highly hazardous pesticides. In many Indian reports, the rates of poisoning as suicidal method range from 20.6% (10.3% organophosphorus) to 56.3% (43.8% organophosphorus).[4]Laboratory evaluation play a crucial role in confirmation and assessing severity of OPC poisoning. Serum acetylcholinesteraselevel is measured in OPC poisoning. It is not specific and does not correlate with the severity of poisoning and cannot be used as a prognostic indicator[5] .Estimation of serum amylase, lipase and creatine kinase is useful biomarkers in organophosporous poisoning. This study is undertaken to know the efficacy of newer biochemical markers like amylase, lipase and creatine kinase as indicators in assessing the severity of organophosphorus poisoning.

Methods: An observational study done consisting of 100 patients at Between 2021-2022 in the Department Of General Medicine, Government Medical College, Tiruvallur, Tamil Nadu, India, Chennai for a period of 5 months. Patient selected after applying inclusion and exclusion criteria and statistical analysis was done. Inclusion Criteria:All cases of acute organophosphorus poisoning admitted to our hospital within 24 hours with clinical features and physical evidence of consumption of the poison irrespective of age and gender. Exclusion Criteria:Consumption of Organophosphorous poison with alcohol .Other pesticide poisoning.Mixed poisoning.Other routes of ingestion (skin, ear and eye)Known medical illness like chronic liver disease, malignancy, renal failure, myopathy, autoimmune disorder, coronary artery disease.Patients on drugs like aspirin, statins, steroids, analgesics, ocps.Patients with lipid disorders and gall stone diseases.After obtaining the informed consent details of history and clinical examination were recorded. Peradeniya OP poisoning scale was applied to all study subjects and the severity of OP poisoning was graded as mild, moderate, severe. In all study subjects blood was collected on admission, day 2, day of discharge for estimation of serum amylase, lipase, acetyl cholinesterase and creatine phosphokinase. Other routine investigations were done.

Statistical analysis:

Continuous variables are represented in mean, median, mode and standard deviation.Categorical variables are represented in frequencies and percentages.When a Categorical Variable is associated with a categorical variable, the variables are represented in both by tables and bar diagrams. For test of significance, chi-square test is used. Fisher's exact test is used when more than 20% of the cell values have expected cell value less than 5. When a continuous variable is associated with continuous variable, correlation tests are used.When the paired samples variable such as variable at admission, day one and at discharge is associated with the categorical variables such as outcome, clinical severity, and then repeated measures ANOVA is used.P-value less than 0.05 is considered statistically significant.Data was analysed using SPSS software version 16.

Results

TABLE :1 AGE AND SEX DISTRIBUTION

			Sex		Total
			F	M	
Age category (Years)	<20	Count	4	7	11
		% within Age	36.4 %	63.6 %	100.0%

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	21-30	Count	11	18	29
		% within Age	37.9 %	62.1 %	100.0%
	31-40	Count	7	13	20
		% within Age	35.0 %	65.0 %	100.0%
	41-50	Count	1	21	22
		% within Age	4.5%	95.5 %	100.0%
	51-60	Count	1	7	8
		% within Age	12.5 %	87.5 %	100.0%
	>60	Count	1	9	10
		% within Age	10.0 %	90.0 %	100.0%
Total		Count	25	75	100
		% within Age	25.0 %	75.0 %	100.0%

Table :2 Types of Compound and Outcome

			Outcome		Total
			Death	Discharge	
Compound	Bromophos	Count	0	4	4
		% within Compound	.0%	100.0%	100.0%
	Chlormephos	Count	1	0	1
		% within Compound	100.0%	.0%	100.0%
	Chlorpyrifos	Count	3	10	13
		% within Compound	23.1%	76.9%	100.0%
	Demeton	Count	1	0	1
		% within Compound	100.0%	.0%	100.0%
	Diazinon	Count	1	4	5
		% within Compound	20.0%	80.0%	100.0%
	Dichlorphos	Count	0	1	1

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		% within Compound	.0%	100.0%	100.0%
	Dicrotophos	Count	1	4	5
		% within Compound	20.0%	80.0%	100.0%
	Dimethoate	Count	0	2	2
		% within Compound	.0%	100.0%	100.0%
	Endosulphan	Count	2	1	3
		% within Compound	66.7%	33.3%	100.0%
	Ethion	Count	0	2	2
		% within Compound	.0%	100.0%	100.0%
	Femaphos	Count	0	2	2
		% within Compound	.0%	100.0%	100.0%
	Fenthion	Count	0	2	2
		% within Compound	.0%	100.0%	100.0%
	Fonofos	Count	1	0	1
		% within Compound	100.0%	.0%	100.0%
	Isofluorphat	Count	1	0	1
		% within Compound	100.0%	.0%	100.0%
	Malathion	Count	0	5	5
		% within Compound	.0%	100.0%	100.0%
		Count	14	5	19
		% within Compound	73.7%	26.3%	100.0%
		Count	1	1	2
		% within Compound	50.0%	50.0%	100.0%
		Count	2	4	6
		% within Compound	33.3%	66.7%	100.0%
		Count	4	1	5
		% within Compound	80.0%	20.0%	100.0%
		Count	0	3	3
		% within Compound	.0%	100.0%	100.0%
		Count	0	2	2
		% within Compound	.0%	100.0%	100.0%

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		Count	2	3	5
		% within Compound	40.0%	60.0%	100.0%
		Count	0	7	7
		% within Compound	.0%	100.0%	100.0%
		Count	0	1	1
		% within Compound	.0%	100.0%	100.0%
		Count	0	2	2
		% within Compound	.0%	100.0%	100.0%
Total		Count	34	66	100
		% within Compound	34.0%	66.0%	100.0%

TABLE :3 QUANTITY EXPOSURE

			Outcome		
			Death	Discharge	Total
Quantity (ml)	<25	Count	0	27	27
		% within Quantcate	.0%	100.0%	100.0%
	26-50	Count	1	29	30
		% within Quantcate	3.3%	96.7%	100.0%
		Count	5	6	11
		% within Quantcate	45.5%	54.5%	100.0%
		Count	15	3	18
		% within Quantcate	83.3%	16.7%	100.0%
		Count	13	1	14
		% within Quantcate	92.9%	7.1%	100.0%
Total		Count	34	66	100
		% within Quantcate	34.0%	66.0%	100.0%

Table :4 Duration of Presentation and Clinical Severity by POP score

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			POP Score			Total
			Mild	Moderate	Severe	
Duration	<3	Count	23	11	3	37
		% within durcat	62.2%	29.7%	8.1%	100.0%
	4-6	Count	5	9	17	31
		% within durcat	16.1%	29.0%	54.8%	100.0%
	7-9	Count	0	6	8	14
		% within durcat	.0%	42.9%	57.1%	100.0%
	10-12	Count	1	0	4	5
		% within durcat	20.0%	.0%	80.0%	100.0%
	>12	Count	1	1	11	13
		% within durcat	7.7%	7.7%	84.6%	100.0%
Total		Count	30	27	43	100
		% within durcat	30.0%	27.0%	43.0%	100.0%

Fisher's Exact Test Value = 46 p-value= <0.001

Table :5 Clinical Severity by POP Score and Outcome

			Outcome		Total
			Death	Discharge	
POP score	Mild	Count	0	30	30
		% within popscore	.0%	100.0%	100.0%
	Moderate	Count	0	27	27
		% within popscore	.0%	100.0%	100.0%
	Severe	Count	34	9	43
		% within popscore	79.1%	0.9%	100.0%
Total		Count	34	66	100
		% within popscore	34.0%	6.0%	100.0%

Chi-Square test value = 68 p-value=<0.001

Table :6 Clinical Severity and Mean Acetyl Cholinesterase (AchE) values

	POP score	Mean	Std. Deviation	N
Ach Day 1	Mild	5163.70	2141.799	30

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	Moderate	3990.96	2185.931	27
	Severe	447.77	365.618	31
	Total	3142.59	2687.519	88
Ach Day 2	Mild	3934.77	1083.934	30
	Moderate	2959.89	1028.229	27
	Severe	439.61	328.203	31
	Total	2404.41	1738.862	88
Ach Discharge	Mild	5092.03	1138.736	30
	Moderate	4833.81	801.782	27
	Severe	2025.97	1290.781	31
	Total	3932.72	1791.592	88

Table :7 Clinical Severity and Mean Serum Amylase

	POP score	Mean	Std. Deviation	N
Amylase Day 1	Mild	84.73	48.225	30
	Moderate	154.59	131.818	27
	Severe	248.94	147.786	31
	Total	164.01	135.144	88
Amylase Day 2	Mild	80.93	49.373	30
	Moderate	124.00	80.139	27
	Severe	396.03	309.277	31
	Total	205.15	236.775	88
Amylase Discharge	Mild	65.63	18.365	30
	Moderate	77.85	22.300	27
	Severe	208.42	179.641	31
	Total	119.68	125.479	88

p-Value<0.001 (Repeated Measures ANOVA Used)

table :8 Clinical Severity and Mean Serum Lipase:

	POP score	Mean	Std. Deviation	N
Lipase Day 1	Mild	71.53	17.716	30
	Moderate	93.78	49.825	27

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	Severe	192.26	105.996	31
	Total	120.89	87.199	88
Lipase Day 2	Mild	71.93	20.794	30
	Moderate	87.48	37.286	27
	Severe	300.35	242.141	31
	Total	157.17	179.152	88
Lipase Discharge	Mild	66.30	14.408	30
	Moderate	73.74	19.542	27
	Severe	178.32	154.783	31
	Total	108.05	105.691	88

p-Value = 0.007 (Repeated Measures ANOVA Used)

Table :9 Clinical Severity and Mean creatine Kinase

	Popscore	Mean	Std. Deviation	N
CK Day 1	Mild	75.17	38.930	30
	Moderate	97.44	82.926	27
	Severe	302.84	211.099	31
	Total	162.20	169.965	88
CK Day 2	Mild	74.30	30.005	30
	Moderate	148.93	243.244	27
	Severe	679.71	595.233	31
	Total	310.47	464.831	88
CK Discharge	Mild	67.67	23.527	30
	Moderate	73.41	27.057	27
	Severe	293.16	331.573	31
	Total	148.86	223.100	88

p-Value< 0.001 (Repeated Measures ANOVA Used)

table :10 Correlation between Duration of Presentation and AchE values, Serum Amylase, Lipase & CK values

		duration	quantity	hospstay	Atropine dose
Ach Day 1	Pearson Correlation	-.390**	-.692**	-.199*	-.554**
	Sig. (2-tailed)	.000	.000	.047	.000

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	N	100	100	100	100
Ach Day 2	Pearson Correlation	-.461**	-.777**	-.386**	-.620**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	92	92	92	92
Ach Discharge	Pearson Correlation	-.430**	-.733**	-.123	-.454**
	Sig. (2-tailed)	.000	.000	.255	.000
	N	88	88	88	88
Amylase Day 1	Pearson Correlation	.192	.490**	.008	.302**
	Sig. (2-tailed)	.056	.000	.941	.002
	N	100	100	100	100
Amylase Day 2	Pearson Correlation	.159	.426**	.343**	.435**
	Sig. (2-tailed)	.131	.000	.001	.000
	N	92	92	92	92
Amylase Discharge	Pearson Correlation	.318**	.480**	.016	.316**
	Sig. (2-tailed)	.002	.000	.882	.003
	N	88	88	88	88
Lipase Day 1	Pearson Correlation	.265**	.555**	.017	.311**
	Sig. (2-tailed)	.008	.000	.866	.002
	N	100	100	100	100
Lipase Day 2	Pearson Correlation	.118	.446**	.424**	.472**
	Sig. (2-tailed)	.264	.000	.000	.000
	N	92	92	92	92
Lipase Discharge	Pearson Correlation	.312**	.452**	.016	.287**
	Sig. (2-tailed)	.003	.000	.880	.007
	N	88	88	88	88
CK Day 1	Pearson Correlation	.328**	.529**	.161	.506**
	Sig. (2-tailed)	.001	.000	.111	.000
	N	100	100	100	100
CK Day 2	Pearson Correlation	.214*	.443**	.556**	.668**
	Sig. (2-tailed)	.041	.000	.000	.000
	N	92	92	92	92
CK	Pearson Correlation	.342**	.462**	-.007	.320**

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Discharge	Sig. (2-tailed)	.001	.000	.945	.002
	N	88	88	88	88
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

TABLE :11 Clinical severity and duration of hospital stay

			Hospital Stay Duration (Days)					Total
			10-12	4-6	7-9	<3	>12	
POP score	Mild	Count	1	5	0	23	1	30
		% within POPscore	3.3%	16.7%	.0%	76.7%	3.3%	100.0%
	Moderate	Count	0	9	6	11	1	27
		% within POPscore	.0%	33.3%	22.2%	40.7%	3.7%	100.0%
	Severe	Count	4	17	8	3	11	43
		% within POPscore	9.3%	39.5%	18.6%	7.0%	25.6%	100.0%
Total		Count	5	31	14	37	13	100
		% within POPscore	5.0%	31.0%	14.0%	37.0%	13.0%	100.0%

Pearson's Chi Square Value = 44.8 p-Value=<0.001

TABLE :12 Intermediate syndrome (IMS) and Clinical Severity

			IMS		Total
			No	Yes	
POP score	Mild	Count	30	0	30
		% within popscore	100.0%	.0%	100.0%
	Moderate	Count	25	2	27
		% within popscore	92.6%	7.4%	100.0%
	Severe	Count	24	19	43
		% within popscore	55.8%	44.2%	100.0%
Total		Count	79	21	100
		% within popscore	79.0%	21.0%	100.0%

Pearson's Chi-Square test value 24.9,p-Value = <0.001

TABLE :13 Intermediate Syndrome and Quantity of Exposure

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			IMS		Total
			No	Yes	
Quantity (ml)	26-50	Count	27	3	30
		% within Quantcate	90.0%	10.0%	100.0%
	51-75	Count	6	5	11
		% within Quantcate	54.5%	45.5%	100.0%
	76-100	Count	8	10	18
		% within Quantcate	44.4%	55.6%	100.0%
	<25	Count	27	0	27
		% within Quantcate	100.0%	.0%	100.0%
	>100	Count	11	3	14
		% within Quantcate	78.6%	21.4%	100.0%
Total		Count	79	21	100
		% within Quantcate	79.0%	21.0%	100.0%

Chi-square value = 26.2,p-value= <0.001

TABLE :14 Intermediate syndrome and duration of exposure

			IMS		Total
			No	Yes	
Duration (Days)	10-12	Count	4	1	5
		% within durcat	80.0%	20.0%	100.0%
	4-6	Count	23	8	31
		% within durcat	74.2%	25.8%	100.0%
	7-9	Count	9	5	14
		% within durcat	64.3%	35.7%	100.0%
	<3	Count	35	2	37
		% within durcat	94.6%	5.4%	100.0%
	>12	Count	8	5	13
		% within durcat	61.5%	38.5%	100.0%
Total		Count	79	1	100
		% within durcat	79.0%	21.0%	100.0%

Fisher's Exact Test value =11.210,p-value = 0.015

TABLE :15 Intermediate syndrome and Acetylcholine esterase level:

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IMS		Mean	Std. Deviation	N
Ach Day 1	No	3929.67	2569.184	67
	Yes	631.43	969.604	21
	Total	3142.59	2687.519	88
Ach Day 2	No	2960.37	1566.989	67
	Yes	630.62	843.035	21
	Total	2404.41	1738.862	88
Ach Discharge	No	4339.42	1607.861	67
	Yes	2635.14	1763.359	21
	Total	3932.72	1791.592	88

p-Value<0.001 (Repeated Measures ANOVA used)

TABLE :16 Intermediate syndrome and Serum Amylase level

	IMS	Mean	Std. Deviation	N
Amylase Day 1	No	145.66	131.108	67
	Yes	222.57	134.142	21
	Total	164.01	135.144	88
Amylase Day 2	No	146.16	157.566	67
	Yes	393.33	336.309	21
	Total	205.15	236.775	88
Amylase Discharge	No	99.94	108.138	67
	Yes	182.67	156.303	21
	Total	119.68	125.479	88

p-Value<0.001 (Repeated Measures ANOVA used)

TABLE :17 Intermediate syndrome and Lipase level

	IMS	Mean	Std. Deviation	N
Lipase Day 1	No	103.79	76.361	67
	Yes	175.43	98.647	21
	Total	120.89	87.199	88
Lipase Day 2	No	107.91	95.075	67
	Yes	314.33	275.176	21

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	Total	157.17	179.152	88
Lipase Discharge	No	90.93	86.872	67
	Yes	162.67	139.904	21
	Total	108.05	105.691	88

p-Value<0.001 (Repeated Measures ANOVA used)

TABLE :18 Intermediate syndrome and Creatine Kinase level:

	IMS	Mean	Std. Deviation	N
CK Day 1	No	106.61	100.626	67
	Yes	339.57	221.049	21
	Total	162.20	169.965	88
CK Day 2	No	144.07	237.895	67
	Yes	841.33	603.718	21
	Total	310.47	464.831	88
CK Discharge	No	117.34	205.632	67
	Yes	249.43	251.054	21
	Total	148.86	223.100	88

p-Value<0.001 (Repeated Measures ANOVA used)

TABLE :18 Serum levels of Ach, Amylase, Lipase and CK on day of admission and complications

	Complications	N	Mean	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Ach Day 1	Yes	42	508.26	516.020	79.624	
	No	58	4469.52	2363.870	310.391	<0.001**
Amylase Day 1	Yes	42	263.67	145.233	22.410	<0.001**
	No	58	128.33	122.920	16.140	
Lipase Day 1	Yes	42	211.79	139.029	21.453	<0.001**
	No	58	92.07	69.571	9.135	

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CK Day 1	Yes	42	329.88	243.764	37.614	
	No	58	81.09	52.098	6.841	<0.001**

Discussion

In organophosphorus poisoning raised serum amylase (hyperamylasemia) level is secondary to pancreatic injury because of parasympathetic overstimulaton and hypersecret. There have been studies showing that elevated serum amylase on admission day was related to the development of respiratory failure need for ventilatory support and increased mortality. 9 Peradeniya OP poisoning scale is a simple and effective system to determine the severity of organophosphorus poisoning Pop scale is a scoring system introduced by N Senanayake,HJ de Silva and L Keralliceede in 1993.[6] Common clinical manifestations of op poisoning are selected as parameters each is assessed on a three-point scale varying from 0 to 2.The score is obtained at initial presentation before doing any medical intervention and it represents the muscarinic,nicotinic and central effects of acute cholinergic manifestations of op poisoning.[7] The overall score of 0 to3 considered as mild poisoning, 4 to 7 as moderate poisoning and 8 to 11 as severe poisoning. Majority of patients were from urban area and their age ranged from 14 year to 61 year out of which majority of patient were young.and 45 out of 100 patients were in the age group of 21-30 years.95% patient ingested op compounds wih suicidal intent symptoms Salivation and vomiting were the most common symptoms and Bradycardia was the most common sign followed by constricted pupil and tachypnoea According to the severity of poisoning as per the POP Scale, 68 patients had mild poisoning, 27 had moderate poisoning and 5 had severe poisoning S.CPK and S.amylase level were recorded in mild, moderate and severe group of poisoning and it was seen that with increase in the severity of poisoning, mean value of S.CPK and S. amylase increases . Mean value of serum CPK levels in mild, moderate and severe grade of poisoning was 182.7±76, 472±165.4, 1110.4±120.8. Severity of poisoning and serum CPK showed a high degree of positive correlation (r = 0.95) and the correlation was also statistically significant (p = 0.001). Mean Amylase value in mild, moderate and severe poisoning was 56 ± 15, 101 ± 18, 188 ±17. The severity of OP poisoning in this study as per POP scale ranged from mild to severe, most of the cases 68% belonged to mild grade of poisoning with a POP score (0-3), 27% of the patients belonged to moderate grade (4-7) and only 5% of patients had severe grade(8-11) of poisoning according to paredeniya organgophosphorus poisoning scale. Serum CPK and serum Amylase levels were measured in each group of poisoning. [8] The CPK levels in mild poisoning were 198 (±76), where as in moderate severity it was 486 (±152) and in severe poison it was 1124.78 (±357.1) association between serum CPK levels and severity of organophosphorus poisoning according to POP score was statistically significant.The correlation between serum amylase and severity of poisoning was also positive with a value of (r = 0.93),and statistically significant.[9] Many biochemical alterations correlate with the severity of OP poisoning. Serum amylase was one of them may be due to excessive stimulation of pancreas by cholinergic stimulation leading to acute pancreatitis. [10]Another biochemical parameter CPK had a promising role as a prognostic indicator in OP poisoning. Serum CPK usually get elevated in OP poisoning due to rhabdomyolysis or IMS which is a common and critical complication of OP poisoning. In the present study serum CPK was raised in 36.92% of patients. It was raised in almost all cases who developed IMS or succumbed.[11] In the present study, there was strong positive correlation with POP score and serum levels of amylase, lipase, and CPK as well as strong negative correlation with AChE levels.[12] These biochemical parameters showed a declining trend as the patient followed-up and at discharge. The enzyme levels were highest in patients those who developed IMS or required ventilatory support or died which was in accordance with other observers Diagnostic accuracy of the biochemical parameters showed that serum amylase had highest diagnostic accuracy apart from AChE in comparison to lipase and CPK[13] .In our study, raised serum Amylase, Lipase and CK

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levels significantly correlated with initial clinical severity by POP scoring, increasing atropine requirement, hospital stay duration, IMS, complications like arrhythmias, renal failure, pancreatitis, coma and outcome and it more significantly correlated with the initial serum levels at admission. Raised levels of Serum Amylase, Lipase and CK levels had negative correlation with the Serum AchE levels at admission.[14]Hence, we have concluded that levels of Serum Amylase, Lipase and CK can be used as parameters for assessing the severity and Ouctome of Acute OPC poisoning replacing Serum AchE levels. Hence, it is our opinion from the study that increased Serum level of Amylase, Lipase and CK will correlate with poor clinical outcome.[15]

Conclusions

Serum CPK levels, serum amylase levels correlated well with the severity of poisoning as graded by POP scale. Increased Serum amylase, increased serum CPK had significant association with need for ventilator support with serum amylase level grade having stronger association followed by serum CPK. Increased Serum amylase and serum CPK level had significant association with mortality with serum amylase having stronger association then serum CPK level. In case of high POP score, high levels of serum amylase and serum CPK levels on admission, transferring the OP poisoning patient to a Intensive Care Unit and monitoring as he may require ventilator support. Thus it can be concluded that patient with moderate or severe grade of poisoning according to pop scale with raised serum CPK level and raised serum amylase level should be monitored in ICU setup as they may require ventilator support.

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