

A Cross Sectional Study of Assessment of Clinical and Biochemical Parameters in Acute Pancreatitis

Dr. Balram Jha¹, Dr. Reena Jha^{2*}

¹ Associate Professor, Department of General Medicine, M.G.M Medical College, Jamshedpur, Jharkhand.

^{2*} Medical Officer, East Singhbhum, Jharkhand.

Corresponding Author: Dr. Reena Jha

Abstract: Introduction: Acute pancreatitis is a common disease with wide clinical variation and its incidence is increasing. The average mortality rate in severe acute pancreatitis approaches 2–10 %.¹ Severe acute pancreatitis (SAP) develops in about 25% of patients with acute pancreatitis. Severe acute pancreatitis is a two-phase systemic disease. The first phase is characterized by extensive pancreatic inflammation and/or necrosis and is followed by a systemic inflammatory response syndrome (SIRS) that may lead to multiple organ dysfunction syndrome (MODS) within the first week

Materials and Methods: We have conducted a study on 60 cases of pancreatitis, out of which 50 cases comprised of acute pancreatitis and rest of chronic pancreatitis, admitted at department of medicine, M.G.M. Medical College, Jamshedpur in various wards. Diagnosis of acute pancreatitis/chronic pancreatitis was based on clinical findings and biochemical markers. This diagnosis was confirmed by ultra-sonographic examination and CT Scan (computed tomography scan) abdomen. Thorough physical examination of all the patients was done. All the patients were thoroughly investigated, which included routine investigations (Hb, TLC, and DLC), blood sugar, blood urea, S. creatinine, X-ray chest PA view, ECG, plain X-ray abdomen and special investigations like liver function test, serum calcium, serum LDH, serum protein, lipid profile, serum alkaline phosphatase and serum electrolytes. Apart from these serum amylase and serum lipase levels were measured. All patients were under gone USG and CT scanning.

Results: In present study total 60 cases were enrolled out of them 50 cases were of acute pancreatitis and rest were chronic. Out of 50 cases of acute pancreatitis Maximum cases were of age group 30 - 39 years (32.5%). Followed by 25% in the age group of 50 -59. None of patients was below 18 years of age and only one being above 70 years. In chronic pancreatitis group, maximum (40%) patient was of age group 40 - 49 years and 30% in the 30-39 years group. Male female ratio in acute pancreatitis was 1.7:1 (25 males, 15 females) and chronic pancreatitis 4: 1 (8 males, 2 females).

Conclusion: In the present study, most common cause of acute pancreatitis is biliary disease (50%) followed by alcoholism (37.5%) and in chronic pancreatitis is alcoholism (80%). Acute pancreatitis was more common in males (62.5%, 25 males) whereas chronic pancreatitis in males (80%, 8 male). Abdominal pain is the most common symptom (97.5%) followed by nausea-vomiting (92.5%) in acute pancreatitis.

Key Words: Acute pancreatitis, SIRS, MODS

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I. Introduction

Acute pancreatitis is a common disease with wide clinical variation and its incidence is increasing. The average mortality rate in severe acute pancreatitis approaches 2–10 %.¹ Severe acute pancreatitis (SAP) develops in about 25% of patients with acute pancreatitis. Severe acute pancreatitis is a two-phase systemic disease. The first phase is characterised by extensive pancreatic inflammation and/or necrosis and is followed by a systemic inflammatory response syndrome (SIRS) that may lead to multiple organ dysfunction syndrome (MODS) within the first week. About 50% of deaths occur within the first week of the attack, mostly from MODS. The formation of infected pancreatic necrosis or fluid collection occurs usually in the second week. The factors which cause death in most patients with acute pancreatitis seem to be related specifically to multiple organ dysfunction syndrome and these deaths account for 40-60% of in-hospital deaths in all age groups. The mortality figures associated with MODS vary between 30–100 %. Infection is not a feature of the early phase. Pro-inflammatory cytokines contribute to respiratory, renal, and hepatic failure. The “second or late phase” which starts 14 days after the onset of the disease, is marked by infection of the gland, necrosis and systemic complications causing a significant increase in mortality. The association between increasing age and death from acute pancreatitis is well documented. Respiratory failure is the most common type of organ failure in acute pancreatitis.²

According to the severity, acute pancreatitis is divided into mild acute pancreatitis (Absence of organ failure and local or systemic complications, moderately severe acute pancreatitis (No organ failure or transient organ failure less than 48 hours with or without local complications) and severe acute pancreatitis (Persistent organ failure more than 48 hours that may involve one or multiple organs).³

The present study was conducted to study the clinical presentation of acute pancreatitis among the suspected cases admitted to department of general medicine in tertiary case institute.

II. Materials And Methods

We have conducted a study on 60 cases of pancreatitis, out of which 50 cases comprised of acute pancreatitis and rest of chronic pancreatitis, admitted at department of medicine, M.G.M. Medical College, Jamshedpur in various wards. Diagnosis of acute pancreatitis/chronic pancreatitis was based on clinical findings and biochemical markers. This diagnosis was confirmed by ultra-sonographic examination and CT Scan (computed tomography scan) abdomen.

Thorough physical examination of all the patients was done. All the patients were thoroughly investigated, which included routine investigations (Hb, TLC, and DLC), blood sugar, blood urea, S. creatinine, X-ray chest PA view, ECG, plain X-ray abdomen and special investigations like liver function test, serum calcium, serum LDH, serum protein, lipid profile, serum alkaline phosphatase and serum electrolytes. Apart from these serum amylase and serum lipase levels were measured. All patients were under gone USG and CT scanning.

Each case was analyzed and divided into mild or severe depending upon the clinical, biochemical data (according prognostic criteria) and CT severity index findings. A severe attack of acute pancreatitis was defined, when an attack is accompanied or followed by any of following clinical finding. Attack followed by shock, pseudo pancreatic cyst, pancreatic abscess and death. (Michael J. Mc Mohan et al.) Rest of the cases were defined as mild.⁴

All of these studies, included clinical exam were done at the time of admission and follow-up studies were not performed in any case. On the basis of factor scoring system the severity of acute pancreatitis was predicted as described by modified glasgow prognostic criteria. These factors are age, WBC counts, serum blood glucose, serum albumin, serum calcium, arterial pO₂ and blood urea. (Garelick FS).⁵

Those having < 3 prognostic criteria were considered as mild and those > 3 prognostic criteria were treated as severe attack. The CT scan severity index 3 to 6 is mild and more than (Greenberger NJ).⁶ Inclusion criteria: patients presenting with history and clinical features suggestive of acute or chronic pancreatitis, and later proved by serology and imaging were included in study group.

Test for amylase

This test is based on the principle that amylase hydrolyses the α -1,4-glucan link in polysaccharides of three or more α -1, 4-linked D - glucose units. The procedure we employed uses substrate P-nitrophenol- α -D-maltoheptaoside, in which the terminal glucose unit has been blocked by an ethylidene group to protect the substrate from cleavage by the auxiliary enzyme α -glucosidase. The hydrolytic action of amylase on substrate (P-nitrophenol- α -D-maltoheptaoside) results in release of smaller oligosaccharides bound to P-nitrophenol. The rate of increase in the colour at 405 nm from the liberated P-nitrophenol is proportional to the amylase activity in the sample. The reference range is 60 - 180 IU/L at 37°C.

Test for lipase

This test is based on the principle that lipase catalyzes the hydrolysis of triglycerides sequentially to monoglyceride and two fatty acids. The most commonly used assay for lipase involves measuring the clearing of substrate emulsion by the action of lipase. Measurement can be made by either nephelometry or turbimetry. Triolein + Lipase > Monoglyceride + 2 Oleic acids.

(Cloudy solution) (clear solution)

The optimum pH for this reaction is 8.8. In this assay both lipase and lipoprotein lipase are measured however, if colipase and a bile salt such as sodium deoxy cholate are included, the reaction rate and analytical sensitivity of pancreatic lipase is increased, while that of lipoprotein lipase is eliminated.

Colipase, aided by the addition of bile salts binds to lipase to form a complex. This association produces a conformational change in lipase, such that latter can now more efficiently bind to the substrate, the reference range for lipase depends on the substrate and whether or not colipase is used the upper reference limit is 0 - 160 IU/L at 37°C, when triolein is used as substrate in the presence of colipase and bile salts.

III. Results

In present study total 60 cases were enrolled out of them 50 cases were of acute pancreatitis and rest were chronic. Out of 50 cases of acute pancreatitis Maximum cases were of age group 30 - 39 years (32.5%).

Followed by 25% in the age group of 50 -59. None of patients was below 18 years of age and only one being above 70 years. In chronic pancreatitis group, maximum (40%) patient was of age group 40 - 49 years and 30% in the 30-39 years group. Male female ratio in acute pancreatitis was 1.7:1 (25 males, 15 females) and chronic pancreatitis 4: 1 (8 males, 2 females).

Most common clinical presentation in acute pancreatitis, was epigastric pain (97.5%) followed by nausea-vomiting (92.5%), pain radiating to the back (60%), abdominal tenderness (60%) and previous history of abdominal pain (30%) of cases. Some of the cases of acute pancreatitis showed fever (25%), tachycardia (20%), abdominal lump (7.5%), pulmonary rales (7.5%) and hypotension in (5%) of cases (Table 4). While in chronic pancreatitis was previous history of abdominal pain in all cases, followed by epigastric pain (90%), nausea-vomiting (80%), weight loss (60%), fever (30%), diarrhoea (30%) and diabetes (20%) of cases. 92.5% (37) of cases were mild and 7.5% (3) were severe acute pancreatitis.

In mild cases mean value of serum amylase was 1338.0 IU/L (range 105-9150 IU/L), while in severe cases it was 948.6 IU/L (range 78-1664 IU/L). Serum lipase in mild cases had mean value of 649.7 IU/L (ranges 100-1794 IU/L) and in severe cases 795.0 IU/L (range 379-1205 IU/L). Statistical analysis of these data show that serum amylase and lipase levels were not significant enough to differentiate between mild and severe pancreatitis (P>0.05).

Aetiology	Acute Pancreatitis				Chronic Pancreatitis			
	Male	Female	Total	%	Male	Female	Total	%
Gall stones	7	17	24	48	0	0	0	0
Alcoholism	16	0	16	32	0	0	8	0
Post operative	0	0	0	0	0	0	0	0
Traumatic	4	0	4	8	0	0	0	0
Idiopathic	6	0	6	12	0	2	2	0

Table 1: Aetiological correlation of acute and chronic pancreatitis

Symptoms/Sign	Acute Pancreatitis		Chronic Pancreatitis	
	Total	%	Total	%
Epigastric pain	40	98.2	9	90
Nausea vomiting	37	92	7	80
Pain radiating back	37	60	2	10
Previous history of acute abdominal pain	24	30	10	100
Weight loss	0	0	6	60
Diarrhea	0	0	3	30
Diabetes	2	5	2	20
Trauma	1	2.5	2	20
Fever	10	25	3	30
Tachycardia	8	20	0	0
Abdominal tenderness	23	60	0	0
Abdominal lump	3	7.5	0	0
Pulmonary rales	3	7.5	0	0
hypertension	2	5	0	0

Table 2: Clinical presentation of cases of acute and chronic pancreatitis

Enzyme	Total No	%	Mean value		SD	
			Mild	Severe	Mild	Severe
Serum amylase	46	90	1386.6	952.7	643.2	961.2
Serum Lipase	46	90	648.3	784.2	793.7	501.4

Table 3: Serum enzyme levels in pancreatitis

IV. Discussion

In chronic pancreatitis, the mean age of the patients were 45.4 years (range 30-69 years) which differs from the study by Balaji LN and Tandon RK where the mean age was 23.9 years.⁸ In acute pancreatitis case sex ratio was 1.7:1 (25 males, 15 females). This was slightly higher than the study by S.R. Thomson et al., where sex ratio was 1.05:1. But almost similar to the study by Gillespie WJ et al where it was 2:1.9,¹⁰ In chronic pancreatitis male: female ratio was 4: 1 (8 males, 2 females) which was contrary to the study by Balaji LN and

Tandon RK (where the sex-ratio was 1:1.8.8 The difference is probably due to small number of patient in present study group.⁸

In acute pancreatitis, gall stones were the major aetiological factor in 50% of cases, whereas alcoholism comprised 37.5% of cases and idiopathic aetiology in 10% of cases. These observations were almost similar to those in the study by Imrie CW and Whyte AS where the biliary disease was found in (51 %) of cases, alcoholism in (26%) of cases and idiopathic in (13%) of cases as aetiological factors.⁹

Statistical analysis of these dates show that serum amylase and lipase levels were not significant enough to differentiate between mild and severe pancreatitis ($P > 0.05$) hence are not counted as prognostic factors. Serum amylase and lipase were higher than normal in 90% of cases. The findings of this study were quite similar to the study by Reffaele et al who found serum amylase to be elevated in 97% of cases and lipase in 100% of cases. Another study by Lifton LJ et al showed that serum amylase to be high in only 70% of cases and lipase in 63% of cases. In one study by Patt H et al 97% of cases had higher levels of either serum amylase or lipase while 84% of the cases had elevated serum amylase levels.¹⁰

V. Conclusion

In the present study, most common cause of acute pancreatitis is biliary disease (50%) followed by alcoholism (37.5%) and in chronic pancreatitis is alcoholism (80%). Acute pancreatitis was more common in males (62.5%, 25 males) whereas chronic pancreatitis in males (80%, 8 male). Abdominal pain is the most common symptom (97.5%) followed by nausea-vomiting (92.5%) in acute pancreatitis.

The history of previous abdominal pain in 100% of cases followed by epigastria pain in 90% of cases, in chronic pancreatitis. The amylase and lipase were elevated in 90% of cases. The amylase and lipase levels did not correlate with the severity. 66.6% of patients had severe pancreatitis with a positive predictive value of 66.6%. The ultrasonography imaging of pancreas was helpful in 70% and 100% in acute and chronic pancreatitis respectively. The computed tomography scan was a better imaging modality as compared to ultrasonography in acute pancreatitis, where as it scored over ultrasonography imaging in chronic pancreatitis with complications.

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