

Study of lipase/amylase index to distinguish acute episodes of alcoholic from non-alcoholic acute pancreatitis among patients of district government head-quarters hospital in Chittoor

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Abstract

Background: Nearly 60%–80% of all cases of acute pancreatitis were attributable to either gallstone disease or alcohol abuse. Alcohol abuse is the more common cause in men and gallstones is the more common cause in women. A rise in incidence of acute pancreatitis noted. We aimed to study serum amylase, lipase, amylase/lipase in differentiating alcoholic from non-alcoholic acute pancreatitis in our tertiary care hospital. **Material and Methods:** Present study was a hospital-based, prospective, observational study, conducted in patients attending the OPD and casualty with signs and symptoms suggestive of acute pancreatitis. **Results:** After applying inclusion and exclusion criteria, total 100 patients were considered for present study, alcoholic and non-alcoholic acute pancreatitis patients were 54 and 46 respectively. Alcoholic acute pancreatitis patients had 43±6.4 years mean age, with only 1 female participant. While mean age of non-alcoholic acute pancreatitis patients was 49.2±10.9 years, with male to female ratio of 0.7:1. Statistically significant difference was noted for serum lipase/amylase ratio between alcoholic and non-alcoholic acute pancreatitis patients. With serum lipase / amylase ratio > 4, the sensitivity and specificity for predicting acute alcoholic pancreatitis was 58.7% and 53.2 % respectively while the positive and negative predictive values were 36.5% and 78.2 % respectively. **Conclusion:** Serum lipase/amylase ratio can be used to distinguish alcoholic and non-alcoholic causes in acute pancreatitis patients in periphery where limited radiological services are available.

Key Words: Acute pancreatitis, serum amylase, serum lipase, serum lipase/amylase ratio

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INTRODUCTION

Acute pancreatitis is an inflammatory condition of the pancreas which is usually reversible and resolves without causing any structural disruption. But the severity of the disease varies from a mild self-limiting illness to a

catastrophic event causing multi-organ failure, sepsis leading to death¹. Nearly 60%–80% of all cases of acute pancreatitis were attributable to either gallstone disease or alcohol abuse. The incidence is similar in both sexes, although alcohol abuse is the more common cause in men and gallstones is the more common cause in women. A rise in incidence of acute pancreatitis noted, which may either be due to increased incidence of gallstone disease or improvement in diagnostic modalities^{2,3}. The course and severity of acute pancreatitis can fluctuate rapidly and unpredictably. The overall mortality of acute pancreatitis is about 10–15% but reaches up to 30%–40% in patients with severe disease. Mortality within first week of acute episode is mainly due to massive inflammatory responses leading to multiorgan failure. Septic complications related to infected pancreatic necrosis leading to multiorgan failure are the prime cause

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of death in later periods^{4,5}. Diagnosis of acute pancreatitis (AP) is heavily relied upon the clinical picture and elevated pancreatic enzymes. Serum amylase and lipase levels are the most commonly requested investigations for the diagnosis of acute pancreatitis. Laboratory testing of serum amylase and/or lipase levels are central to the diagnosis of acute pancreatitis as direct indication of its manifestation⁶. By using serum amylase and lipase determinations together, clinical sensitivity for the diagnosis of pancreatitis increases to 94%⁷. The serum lipase/amylase (L/A) ratio was significantly higher in alcoholic acute pancreatitis than in the nonalcoholic form of the disease. On the basis of these findings Gumaste *et al.* proposed that this index (L/A ratio >2) could differentiate acute episodes of alcoholic from those nonalcoholic acute pancreatitis⁸. We aimed to study serum amylase, lipase, amylase/lipase in differentiating alcoholic from non-alcoholic acute pancreatitis in our tertiary care hospital.

MATERIAL AND METHODS

Present study was a hospital-based, prospective, observational study, conducted in a tertiary care center at Chittoor. Duration of study was 1 year (from January 2018 to December 2018). Local institutional ethical committee clearance was taken for present study. The American College of Gastroenterology (ACG) practice guidelines for the diagnosis and management of acute pancreatitis recommend that the diagnosis of acute pancreatitis be established by the presence of 2 of the following 3 criteria:

1. Abdominal pain consistent with
2. Serum lipase and/or amylase greater than 3 times the upper limit of normal.
3. characteristic findings from abdominal imaging (Contrast Enhanced CT or MRI)

Patients attending the OPD and casualty with signs and symptoms suggestive of acute pancreatitis, from 19-60 years age-group were considered for present study. The majority of patients had history of varying degree of abdominal pain from 2 to 3 days.

Exclusion criteria

1. Patients aged less than 18 years and more than 60 years;

2. Patients with chronic pancreatitis and acute on chronic pancreatitis;
3. Patients with questionable diagnosis of other possible abdominal conditions.

Demographic data, a detailed history of complaints, previous medical/surgical history, history of alcoholism was collected. Thorough clinical examination, appropriate investigations to identify etiological factors, management and any surgical intervention was recorded in a Microsoft excel proforma.

Samples for serum amylase and lipase were collected within 12 to 36 hours of onset of abdominal pain. A serum amylase level 2 or 3 time above normal is considered to be acute pancreatitis. concentration were analyzed at admission. The serum lipase and amylase were analyzed on automated analyzer with its dedicated reagents. The lipase / amylase ratio was calculated. Other relevant laboratory and radiological investigations were noted. Statistical analysis was performed using ANOVA tests, Non parametric test and Z test with help of SPSS. The p value< 0.05 was considered as statistically significant.

RESULTS

After applying inclusion and exclusion criteria, total 100 patients were considered for present study. After confirmation of diagnosis as acute pancreatitis, patients were divided into alcoholic (average alcohol consumption more than 75 g/day) and non-alcoholic acute pancreatitis based on history and available medical records. Out of 100 patients, alcoholic and non-alcoholic acute pancreatitis patients were 54 and 46 respectively. Alcoholic acute pancreatitis patients had 43±6.4 years mean age, with only 1 female participant. While mean age of non-alcoholic acute pancreatitis patients was 49.2±10.9 years, with male to female ratio of 0.7:1. Mean Serum Amylase values (U/L) were 821.1±491.2 and 1324.1±522 for alcoholic and non-alcoholic acute pancreatitis respectively. Mean Serum Lipase values (U/L) were 3521.1±1121.9 and 5972.8±1319.4 for alcoholic and non-alcoholic acute pancreatitis respectively.

Table 1: General characteristics

	Alcoholic acute pancreatitis	Non-alcoholic acute pancreatitis
Number Of Patients	54	46
Mean age (Years)	43±6.4	49.2±10.9
Male/Female distribution	53/1	19/27
Mean Serum Amylase values (U/L)	821.1±491.2	1324.1±522
Mean Serum Lipase values (U/L)	3521.1±1121.9	5972.8±1319.4

Statistically significant difference was noted for serum lipase/amylase ratio between alcoholic and non-alcoholic acute pancreatitis patients.

Table 2: Serum Lipase/Amylase Ratio analysis

	Alcoholic acute pancreatitis	Non-alcoholic acute pancreatitis	Statistical significance
Mean Serum Lipase/Amylase ratio	4.21±1.93	1.3±0.62	Significant

(p<0.05 is statistically significant)

When serum lipase / amylase ratio was > 2, the sensitivity and specificity for predicting acute alcoholic pancreatitis was 92.9% and 49.5 % respectively while the positive and negative predictive values were 41.3% and 85.8 % respectively. Similarly, when serum lipase / amylase ratio was > 4, the sensitivity and specificity for predicting acute alcoholic pancreatitis was 58.7% and 53.2 % respectively while the positive and negative predictive values were 36.5% and 78.2 % respectively.

Table 3: Statistical analysis of lipase/amylase ratio in acute pancreatitis

Serum Lipase/Amylase Ratio	>2	>4
Sensitivity	92.9	58.7
Specificity	49.5	53.2
Positive Predictive Value	41.3	36.5
Negative Predictive Value	85.8	78.2

(all values in percentages)\

DISCUSSION

Pancreatitis defined as the inflammation of the pancreas and is always, associated with acinar cell injury. The most common causes of acute pancreatitis are biliary tract obstruction by gallstone and alcohol abuse. Apart from routine care, specific treatment can be according to cause. Etiology-wise identification of gallstones as the etiology should prompt referral for cholecystectomy to prevent recurrent attacks and potential biliary sepsis. However, alcohol-induced pancreatitis often manifests as a spectrum ranging from discrete episodes of acute pancreatitis to chronic irreversible silent changes, requires rest and supportive treatment^{9,10}. The pancreatic enzymes derived from pancreatic acinar cells [amylase, lipase, and the proenzyme trypsinogen] are the cornerstone in the laboratory diagnosis of acute pancreatitis. In acute attacks of pancreatitis, due to the destruction of acinar cells, the levels of the enzymes that they contain (e.g., amylase, lipase, trypsinogen, and elastase) are found elevated in the serum of most patients. Serum amylase concentration increases almost immediately with the onset of disease and peaks within several hours. However, there are several conditions (i.e. pathologic processes in salivary glands, fallopian tubes, bowel obstruction, cholecystitis, hepatic trauma, perforative duodenal ulcer, hyperamylasemia on familial basis, etc) that may result in elevation of serum amylase. It remains elevated for 3 to 5 days before returning to normal. There is no significant correlation between the magnitude of serum amylase elevation and severity of pancreatitis. Lipase is more specific for pancreatitis. Serum lipase has a longer half life than amylase and therefore tends to remain elevated for longer^{11,12}. We noted acute alcoholic pancreatitis predominantly in males, with only one female patient against 53 male patients. In Indian population alcohol consumption is not popular among females and rarely

upto that extent to cause acute pancreatitis. While female patients were more in acute non-alcoholic pancreatitis group. Other Indian and foreign studies noted similar findings^{2,13}. It was reported that patients with acute alcoholic pancreatitis had serum concentrations of amylase lower than those with non-alcoholic pancreatitis, but the serum lipase concentrations were similar in the both forms of the disease. The serum lipase/ amylase (L/A) ratio was significantly higher in alcoholic acute pancreatitis than in the non-alcoholic form of the disease¹⁴. Serum lipase amylase ratio can be a useful marker for predicting aetiology of acute pancreatitis. Devanath *et al.* (2009) showed that the sensitivity and specificity to predict alcoholic acute pancreatitis with lipase-amylase ratio at >4 was 84% and 59% respectively. This study concluded that the serum L/A ratio greater than 3 can be used to differentiate alcoholic from non-alcoholic pancreatitis. We also noted a statistically significant difference in serum lipase/amylase ratio between alcoholic and non-alcoholic acute pancreatitis patients¹⁵. Contrast-enhanced CT scan (and in particular a contrast enhanced thin-section multidetector-row CT scan) is the best imaging technique to exclude conditions that masquerade as acute pancreatitis, to diagnose the severity of acute pancreatitis and to identify complications of pancreatitis. Contrast Enhanced CT (CECT) of the abdomen is conventionally considered the gold standard for the diagnosis of acute pancreatitis. It is more than 90% sensitive and specific for the diagnosis of acute pancreatitis. Along with USG and CECT, endo ultrasound, MRCP and MRI can be used with better specificity and sensitivity¹⁶. The diagnosis of acute pancreatitis should not solely be based on the arbitrary value of three or four times greater than normal of pancreatic enzymes, but interpreted together with other

clinical presentation, which are typical abdominal pain and computed tomography.

CONCLUSION

Serum lipase/amylase ratio can be used to distinguish alcoholic and non-alcoholic causes in acute pancreatitis patients in periphery where limited radiological services are available. Clinical presentations, serum amylase and/or lipase levels, with USG and/or CECT remains the standards in the diagnosis of acute pancreatitis.

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