# **Original Research Article**

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# A retrospective study of clinical efficacy of serum lipase/amylase ratio in predicting etiology of acute pancreatitis

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#### **ABSTRACT**

**Background:** The serum lipase/amylase (L/A) ratio had been proposed to distinguish the etiology of pancreatitis, the efficacy to predict the etiology of acute pancreatitis is assessed in our study as it may need different therapeutic

Methods: From January 2017 to December 2017, 54 patients with acute pancreatitis were included 48 (88.9%) men and 6 (11.1%) women with a mean age of 39.2 years, ranging from 18 to 90 years. They were divided into 2 subgroups as alcohol (n=27), nonalcoholic (n=27), and their serum L/A ratio level were compared with a mean age  $39.42\pm9.9$  years in alcoholic group versus  $39.04\pm7.7$  years in nonalcoholic group.

Results: Male predominance in alcoholic and nonalcoholic group and all female patients (100%) etiology is nonalcoholic. The elevation of serum amylase level in nonalcoholic group on average is 600 versus in alcoholic group 512 and serum lipase level average in nonalcoholic group 766 versus in alcohol group 629. Instead, the serum L/A ratio showed no significant changes among each group. In this study, the alcoholic acute pancreatitis is more severe than nonalcoholic pancreatitis. There was also no statistically significant (p=0.90) difference in serum L/A ratio in alcoholic and nonalcoholic pancreatitis.

Conclusions: The serum amylase and lipase concentrations are not able to establish etiology acute pancreatitis as assessed by imaging techniques. The L/A ratio is not a good predictive factor in distinguishing acute episode of alcoholic and non-alcoholic acute pancreatitis.

Keywords: Acute pancreatitis, Amylase, Lipase, Lipase/amylase ratio

# INTRODUCTION

Increased serum pancreatic enzyme supports clinical diagnosis of acute pancreatitis. Cherry and Crandl first described an association between pancreatic injury and elevated serum lipase levels in 1932. It was reported that patients with acute alcoholic pancreatitis had serum concentrations of amylase lower than those with nonalcoholic pancreatitis, but the serum lipase concentrations were similar in the both forms of the disease.2 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 pancreatitis.<sup>5</sup> However, the most common cause of acute pancreatitis is biliary origin in Taiwan.<sup>3</sup> Therefore, we design this retrospective study with the purpose to assess the efficacy of the L/A. Sonography (USG) and/or contrast enhanced computed tomography performed during hospital stay. The etiology of the pancreatitis was alcoholic abuse in 27 patients, biliary origin in 20 patients, idiopathic 7 patients. The serum amylase and lipase concentration were checked simultaneously after admission and thus calculating the L/A ratio. The normal ranges of the enzymes in our hospital are 0-130 IU/L for lipase and 22-124 IU/L for amylase. The relationship of L/A ratio with ultrasound findings is analyzed.

#### **METHODS**

54 patients (48 male, 6 female) with acute pancreatitis (The definition of acute pancreatitis is based on the fulfillment of '2 out of 3' of the following criteria: clinical (upper abdominal pain), laboratory (serum amylase or lipase >3 times upper limit of normal) and/or imaging (CT, ultrasonography) admitted to Victoria and Bowring and Lady Curzon Hospital attached to Bangalore medical college were enrolled in the study from January 2017 to December, Aged 18 years and above

#### Exclusion criteria

Exclusion criteria were patients aged less than 18 years; patients with chronic pancreatitis and acute on chronic pancreatitis; all patients with questionable diagnosis of other possible abdominal conditions and incomplete data collections were excluded in this study.

After obtaining clearance and approval from the institutional ethical committee and written informed consent, in-patients with acute pancreatitis fulfilling the inclusion criteria will be enrolled in the study. All patients included in the study are informed about the nature of disease and the treatment to be undertaken if any. Demographic data, the nature of the complaints, a detailed history and clinical examination, appropriate investigations to identify etiological factors and management is recorded in a predesigned Performa including the surgical intervention undertaken. The data is then tabulated and subjected to statistical analysis. Follow up investigations and management if any are also recorded in the data.

# **RESULTS**

In our study 27 patients of acute pancreatitis were related to alcohol (100% male), 27 patients were nonalcoholic acute pancreatitis (biliary pancreatitis-20 patients,

idiopathic-7 patients), in which 22.2% female and 87.8% male patients, mean age: 39 years.

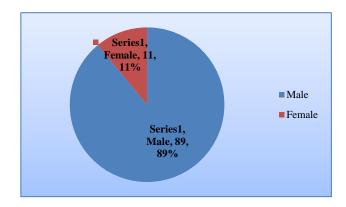


Figure 1: Sex distribution.

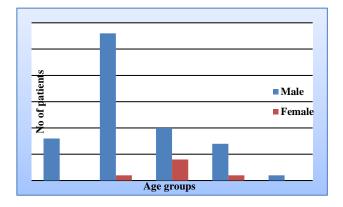


Figure 2: Age group distribution.

The mean serum lipase level in alcoholic group is 629.29 and in nonalcoholic group its 765.962.

Table 1: Etiological factors.

Etiology	No of patients	Present study
Alcoholic	27	50
Nonalcoholic	27	50
Biliary	20	37
Idiopathic	7	12.9

The mean serum amylase level in alcoholic group is 765.96 and in nonalcoholic group is 599.29. However, the L/A ratio was not significantly different among them.

Table 2: Serum lipase/ amylase ratio in alcoholic and non-alcoholic pancreatitis and p value.

	Average serum lipase	Average serum amylase	Serum lipase/serum amylase	P value
Alcoholic	629.2962963	511.7407407	1.310689793	0.90934
Nonalcoholic	765.962963	599.296296	1.382397365	

The serum lipase / amylase ratio is 1.31 in alcoholic group and is 1.38 in nonalcoholic group with a p value of 0.90 which is not statistically significant There is no significant difference in amylase, lipase and L/A ratio among them.

# **DISCUSSION**

In our study, Alcoholic AP patients were relatively younger than non- alcoholic AP patients. Alcoholic AP patients were ranging between 24 to 41 years while nonalcoholic AP ranges between 29 to 48 years. Similar findings were observed in other.<sup>7</sup> Reason for younger age group of alcoholic AP could be attributed to the initiation of alcohol consumption and its dependence at very early age.<sup>6</sup> Our study findings were concurrent with others with respect to the alcoholic AP being predominantly seen in males as compared to females while the biliary AP was higher amongst the females as compared to males.<sup>4</sup>

Probably the reason could be that the percentage of alcoholics reported is lower for females when compared to males in Indian population and the reported cases of AP in females for other causes of pancreatitis such as biliary is much higher than the alcoholic variety. According to the present study there was no significant difference in serum amylase and lipase values when alcoholic AP was compared with non-alcoholic AP. Though amylase and lipase values were lower in alcoholic AP when compared to nonalcoholic AP. However, these studies showed that raised amylase levels were significantly lower in alcoholic AP as compared to biliary AP.

Serum lipase/amylase ratio with a cut off value fixed at 4.0 can assist in differentiating alcoholic AP from non-alcoholic AP. Lipase/amylase ratio >4.0 is observed in alcoholic AP while the biliary and miscellaneous group have ratios less than 4.0 in certain studies. However in our study there is no statically significant difference between the serum lipase /amylase ratio (p=0.90). However, our results may imply that the amylase and lipase remain important tests in the diagnosis but not able to establish the etiology of acute pancreatitis. We concluded that the L/A ratio is not a good predictor factor and is useless in distinguishing acute episode of alcoholic from nonalcoholic acute pancreatitis.

Combinations of the clinical presentations of abdominal pain, serum amylase and/or lipase levels, in addition to ultrasonography and/or contrast enhanced computed tomography are still the standard in the diagnosis of acute pancreatitis.

#### CONCLUSION

This study may imply that the amylase and lipase remain important tests in the diagnosis but not able to establish the etiology of acute pancreatitis. We concluded that the L/A ratio is not a good predictor factor and is useless in distinguishing acute episode of alcoholic from nonalcoholic acute pancreatitis. Combinations of the clinical presentations of abdominal pain, serum amylase and/or lipase levels, in addition to ultrasonography and/or contrast enhanced computed tomography are still the standard in the diagnosis of acute pancreatitis.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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