

## Study of Lipase Amylase Ratio in Acute Pancreatitis

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### Abstract

**Aim:** The aim of our study was to estimate serum Amylase and serum Lipase levels and to establish a correlation between Lipase/Amylase Ratio in Acute Pancreatitis using lipase and Amylase as enzymatic markers.

**Study Design:** A hospital based cross sectional study was conducted on patients attending the Out patient department of Medicine and those visiting the emergency of SGRRIM & HS Dehradun Uttarakhand for a period of 6 months from April 2017 to September 2017. A total of 130 cases (70 Male & 60 Female) and an equal no. of controls (130) (70 Male & 60 Female) in the age group 20-80 years were selected randomly for the study.

Exclusion criteria was age less than 20 years & more than 80 years, acute trauma, Diabetes mellitus,

dyslipidaemia, End stage Renal disease etc.

**Methodology:** 5 ml blood was collected in sterile containers from all the 260 subjects and was analyzed for serum Amylase and serum Lipase on fully automated Biochemical Analyzer 5600 of Orthodiagnosics.

**Results:** The mean values of Lipase levels were found to be much higher in male cases ( $834.83 \pm 407.37 \pm 47.70$ ) as compared to male controls ( $97.34 \pm 51.71 \pm 5.98$ ). Similarly, the mean values of serum Amylase were higher in male cases ( $233.73 \pm 116.69 \pm 13.66$ ) than male controls ( $65.81 \pm 24.63 \pm 2.85$ ).

The Lipase/ Amylase ration in male cases was ( $6.92 \pm 3.16 \pm 0.37$ ), whereas in male controls it was ( $1.53 \pm 0.71 \pm 0.08$ ). Thus the level of Lipase/ Amylase ratio is higher in male cases than controls.

**Keywords:** Pancreatitis; Lipase; Amylase.

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### Introduction

Acute Pancreatitis is a very common G.I disorder, causing inflammation of the Pancreas. When pancreatic enzymes are prematurely activated in the pancreas they attack the pancreas itself instead of digesting food and cause pancreatitis. Acute pancreatitis is a potentially life threatening disease with varying severity of presentation [1,2].

Nearly 60-80% of all cases of Acute Pancreatitis in developed countries are attributable to either gallstone disease or alcohol abuse [3,4]. The incidence is similar in both sexes, although alcohol abuse is more common in men and gallstones is one of the major cause in women [5,6].

According to revised Atlanta classification, diagnosis of Acute Pancreatitis requires two of the following three criteria [1,7]:

1. Abdominal pain characteristic of Acute Pancreatitis (acute onset of a persistent severe, epigastric pain often radiating to back).
2. Serum Lipase (Or amylase) activity at least three times greater than the upper limit of the reference interval.
3. Characteristic imaging findings of Acute Pancreatitis on contrast Enhanced Computed Tomography and less commonly MRI or Trans abdominal Ultrasonography.

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The pancreatic enzymes derived from pancreatic acinar cells (Amylase and Lipase) are the cornerstone in the laboratory diagnosis of acute pancreatitis [8]. Serum lipase is a more sensitive and specific biochemical marker of Acute Pancreatitis than serum amylase.

Serum Amylase and lipase levels are widely used as markers of pancreatic inflammation & irritation [9]. A diagnosis of Acute Pancreatitis is based on a combination of clinical presentation, laboratory and radiological findings. Serum Lipase estimation gives greater Specificity than Amylase, and the simultaneous determination of both these parameters increases the sensitivity and specificity for detecting Acute Pancreatitis of around 90% to 95% [10,11].

Lipase and Amylase ratio of greater than 3 can be used to diagnose Acute Pancreatitis. This ratio can also be used to differentiate severe Acute Pancreatitis from mild and moderate forms.

### Materials and Methods

A hospital based cross sectional study was conducted on patients attending the Emergency and the Out patient Department of Medicine of SGRRIM & HS (Dehradun, Uttarakhand) for a period of 6 months from April 2017 to September

2017. A total no. of 130 cases (70 males & 60 females) in the age group 20-80 years were selected randomly for the study.

*Exclusion criteria* was age less than 20 years and more than 80 years, acute trauma, Diabetes mellitus, dyslipidemia, end stage Renal disease etc.

All the subjects both cases and controls were analyzed for serum lipase [12] and serum amylase [13]. Fasting samples were collected and processed on a fully automated analyzer of Ortho Clinical Diagnostics 5600.

### Results

The mean values of Lipase levels were found to be much higher in male cases ( $834.83 \pm 407.37 \pm 47.70$  mg/dl) as compared to male controls ( $97.34 \pm 51.71 \pm 5.98$  mg/dl). Similarly, the mean values of serum Amylase were higher in male cases ( $233.73 \pm 116.69 \pm 13.66$  mg/dl) than male controls ( $65.81 \pm 24.63 \pm 2.85$  mg/dl).

The Lipase/Amylase ration in male cases was ( $6.92 \pm 3.16 \pm 0.37$ ), whereas in male controls it was ( $1.53 \pm 0.71 \pm 0.08$ ). Thus the level of Lipase/Amylase ratio is higher in male cases than controls. The results are tabulated in Table 1 and depicted graphically in Figure 1.

Table 1:

Parameter	Acute Pancreatitis		p-value
	Male cases (n=70) mean $\pm$ SD $\pm$ SE	Male controls (n=70) mean $\pm$ SD $\pm$ SE	
Serum Lipase	$834.83 \pm 407.37 \pm 47.70$	$97.34 \pm 51.71 \pm 5.98$	<0.0001
Serum Amylase	$233.73 \pm 116.69 \pm 13.66$	$65.81 \pm 24.63 \pm 2.85$	<0.0001
L/A ratio	$6.92 \pm 3.16 \pm 0.37$	$1.53 \pm 0.71 \pm 0.08$	<0.0001

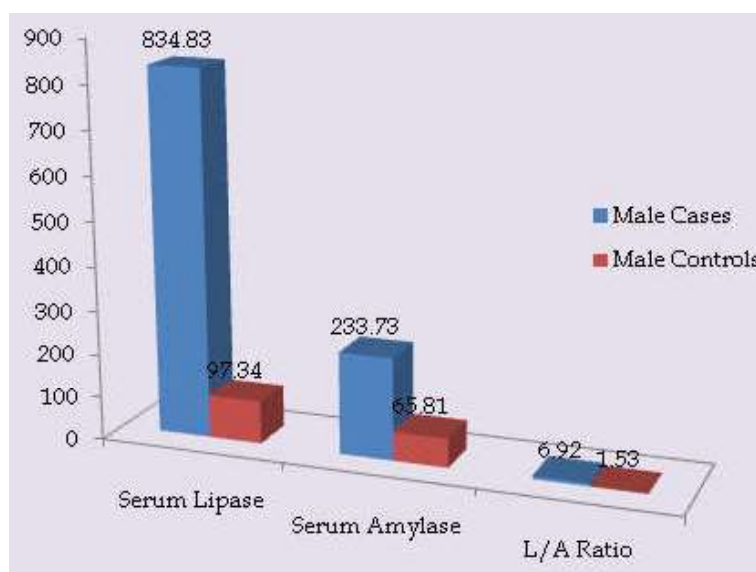


Fig. 1:

Table 2:

Parameter	Acute Pancreatitis		p-value
	Female cases (n=60) mean $\pm$ SD $\pm$ SE	Female controls (n=60) mean $\pm$ SD $\pm$ SE	
Serum Lipase	806.75 $\pm$ 390.20 $\pm$ 49.77	102.73 $\pm$ 40.79 $\pm$ 5.20	<0.0001
Serum Amylase	144.78 $\pm$ 32.39 $\pm$ 4.13	63.88 $\pm$ 21.41 $\pm$ 2.73	<0.0001
L/A ratio	5.50 $\pm$ 2.47 $\pm$ 0.31	1.67 $\pm$ 0.50 $\pm$ 0.06	<0.0001

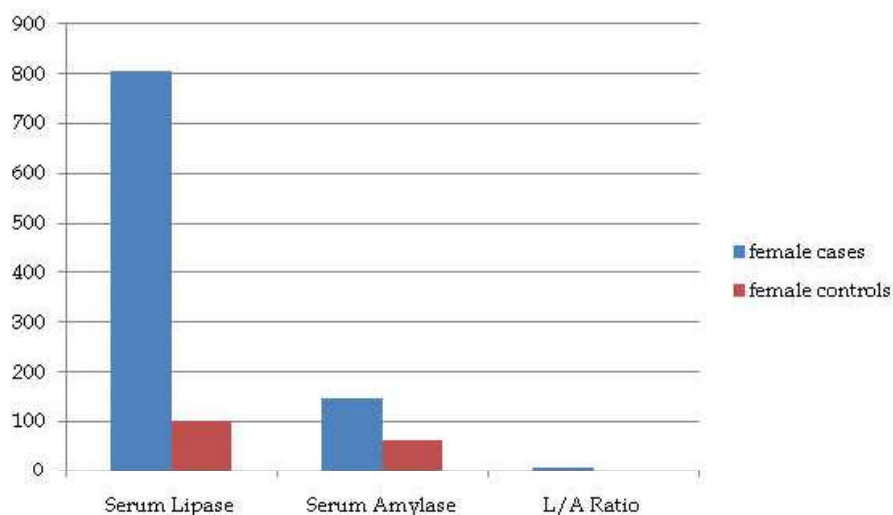


Fig. 2:

In female cases the mean values of serum Lipase was (806.75  $\pm$  390.20  $\pm$  49.77 mg/dl) whereas in control group it was (102.73  $\pm$  40.79  $\pm$  5.20 mg/dl). The mean values of serum amylase in female cases was (144.78  $\pm$  32.39  $\pm$  4.13 mg/dl) and in the control group was (63.88  $\pm$  21.41  $\pm$  2.73 mg/dl). Thus both the serum amylase & lipase levels were found to be much higher in female cases than controls.

Similarly the L/A ratio was found to be higher in female cases (5.50  $\pm$  2.47  $\pm$  0.31) than the controls (1.67  $\pm$  0.50  $\pm$  0.06). These results are tabulated in Table 2 and depicted graphically in Figure 2.

## Discussion

The main objective of our study was to study the Lipase/Amylase ratio in Acute Pancreatitis according to British Society of Gastroenterology Guide-lines, for the management of Acute Pancreatitis; Lipase is the main focus towards the diagnosis of Acute Pancreatitis [14]. Several studies show that serum Lipase in a case of Acute Pancreatitis is a better diagnostic marker than serum Amylase [15].

In a study by HS Batra et al. 84% of patients of Acute Pancreatitis had both Amylase & lipase levels raised & 100% of Acute Pancreatitis patients had

lipase raised, irrespective of etiology? In a similar study by Dhanwant Gomes et al. [16], majority of patients with Acute Pancreatitis had raised levels of both Amylase & Lipase (97%), however, raised lipase levels were seen between 95 and 100% of patients based on the etiology.

A study by Anitha Devanath et al. reveals that, L/A ratio >4.0 is observed in Alcoholic Acute Pancreatitis while biliary & miscellaneous group have ratios less than 4.0 [17]. These results are similar to another study by Matull concluded that serum lipase amylase ratio is useful in diagnosing Acute pancreatitis and fixed a cut off value of 4.2. Gumaste et al. [18] suggested that an L/A ratio > 2 had a sensitivity & specificity for diagnosing the acute alcoholic Pancreatitis of 91% and 78% respectively.

In our study L/A ratio was higher in males than females. This data signifies that males are more prone to Acute Pancreatitis because of consumption of alcohol which is the major cause of Acute Pancreatitis in males.

We would like to conclude that Serum L/A ratio > 3.0 signifies that the patient is having severe Acute Pancreatitis, similarly L/A ratio of 1 and 2 shows that Acute Pancreatitis is mild & moderate respectively. Hence Serum L/A ratio are important

for evaluation of Pancreatitis and for the assessment of severity of Acute Pancreatitis.

### Conclusion

Acute Pancreatitis is a serious disease with high mortality rate, but early detection and treatment results in better survival rate with good quality of life. Overall, successful management of Acute Pancreatitis requires a multi disciplinary approach including diagnostic and interventional radiology, gastroenterology and surgery. Hence serum Lipase and Amylase are important for evaluation of Pancreatitis & for the assessment of severity of Acute Pancreatitis.

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