



COMPARISON OF LIPASE, AMYLASE AND LIPASE AMYLASE RATIO IN ALCOHOLIC AND NON-ALCOHOLIC ACUTE PANCREATITIS

S. Meghana*

Department of Biochemistry, Amrita Institute of Medical sciences and Research Centre, Amrita viswa vidyapeetham, Kochi, Kerala, India. *Corresponding Author

Reshmy GS

Department of Biochemistry, Amrita Institute of Medical sciences and Research Centre, Amrita viswa vidyapeetham, Kochi, Kerala, India.

Arundhathy Soman

Department of Biochemistry, Amrita Institute of Medical sciences and Research Centre, Amrita viswa vidyapeetham, Kochi, Kerala, India.

ABSTRACT

Background: Observations from different studies showed the use lipase, amylase and lipase /amylase ratio in distinguishing the alcoholic and non-alcoholic acute pancreatitis. So the efficacy of these parameters to predict the etiology of acute pancreatitis is assessed in our study as it may help in the need for different therapeutic approaches.

Material & method: This retrospective laboratory based study was carried out at Amrita Institute of Medical Sciences, Cochin. The study period was from November 2019 to February 2021. A total of 60 samples of clinically diagnosed acute pancreatitis patients (AP) (based on physician's progress note, amylase, lipase value >3 times the upper limit of normal value with upper abdominal pain) between ages of 18-75 years from both gender were included in the study. They were divided into 3 subgroups as alcoholic (group 1, n=20), non-alcoholic biliary (group2, n=20) and non-alcoholic miscellaneous acute pancreatitis (group3, n=20) and their serum lipase, amylase and L/A ratio level were compared.

Result & discussion: Statistically analyzed lipase, amylase and lipase/amylase ratio of all the three groups and their comparison. Serum lipase levels in alcoholic group (group1) were lower in comparison with biliary group (group2), however there was no statistical difference (p=0.310) between them. Besides this lipase levels showed a statistical difference (p=0.001) when group 1 & 3 were compared.

Serum lipase/amylase (L/A) ratio levels in alcoholic group were higher when compared to biliary group, still there was no significant difference (p=0.198) between them. Apart from this, the L/A ratio levels were significant (p=0.001) when group 1&3 were compared.

Serum amylase values were markedly (p=0.008) lower in alcoholic group in comparison with biliary group, also the amylase value between group 1&3 also showed a significant difference (p=0.015).

Conclusion: We conclude that serum amylase, lipase and L/A ratio are important in diagnosis of acute pancreatitis, however they proved to be poor in establishing the etiology or severity of acute pancreatitis.

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

INTRODUCTION

Acute pancreatitis is an acute inflammatory process of the pancreas which is commonly accompanied by necrosis of the pancreas and/or organ failure. Clinical presentation includes sudden onset of abdominal pain that radiates towards the back. Pancreatitis is always associated with acinar cell injury, which leads to the leakage of pancreatic enzymes, mainly lipase and amylase. This leaked enzyme initiates auto digestion and acute pancreatitis which leads to edema, vascular damage, hemorrhage and necrosis. The most common causes of acute pancreatitis are heavy alcohol consumption and gall stone.

The most important factors in determining acute pancreatitis are serum lipase and amylase levels regardless of whether it is of biliary or alcoholic type. Lipase is an enzyme that helps to digest fat and starts to rise within 4-8 hours after the onset of acute pancreatitis. Amylase is an enzyme that helps to digest carbohydrates and it starts to rise from 2-12 hours after the onset. Acute pancreatitis is likely to be diagnosed if lipase, amylase reaches 3 times above the upper limit of normal value. The ratio of these two enzymes may sometimes be useful in establishing the cause of acute pancreatitis.

The purpose of this study was to find out if lipase/amylase ratio could help in distinguishing alcoholic and nonalcoholic acute pancreatitis.

MATERIAL

Study design: We conducted a **retrospective laboratory based study** Data of the patients visiting Gastroenterology and Emergency medicine for Acute pancreatitis are collected from **clinical biochemistry lab**.

Study period: November 2019 to February 2021.

Sample design

Total 60 Acute pancreatitis (AP) Patients divided as alcoholic AP(Group1) & Non-alcoholic AP (Biliary -group2 & Miscellaneous -Group3)

Inclusion Criteria

Patient diagnosed with acute pancreatitis.

age between 18-75

Exclusion Criteria

Age <18 and >75
Chronic pancreatitis
Acute on chronic pancreatitis
Other abdominal condition
Incomplete data

METHOD

Lipase and amylase were analyzed in cobas c 502 system by colorimetric method and L/A ratio was calculated manually.

Statistical Analysis

Statistical analysis was performed using **IBM SPSS version 20.0** Numerical variables were represented using mean and standard deviation

Mann Whitney test was used to study the statistical significance of the difference in the mean values of all continuous variables between groups. A **p value <0.05** was considered statistically significant

Table 1: Mean and standard deviation

Variable	Group 1	Group 2	Group 3
Amylase (mg/dl)	941.40±298.423	1375.65±513.112	696.05± 417.863
Lipase (mg/dl)	2744.0±1111.75	3327.95±1782.214	1049.05± 834.485
L/A ratio	3.00500±1.076287	2.49000±0.7040484	1.576500±0.5922684

Table2: p values of different groups

Variables	Group 1&2	Group 2&3	Group 1&3
Amylase	0.008	0.001	0.015
Lipase	0.310	0.001	0.001
L/A Ratio	0.198	0.001	0.001

DISCUSSION

Serum amylase values were significantly lower in alcoholic group (1)

(941.40 ±298.423) in comparison to biliary group (2) (1375.65± 513.112) Also there was significant difference in the amylase value between alcoholic and miscellaneous group (3) (696.05± 417.863). There was significant increase in amylase values in biliary group (2) when compared with miscellaneous acute pancreatitis group (3).

Mean serum lipase values were elevated in all types of acute pancreatitis showing that lipase being more specific than amylase. The mean lipase levels were higher in biliary AP -Group 2 (3327.95± 1782.214) when compared with alcoholic AP – Group1 (2744.00± 1111.750). However, these groups (1&2) didn't show a significant difference (p = 0.3). These were similar to findings of the study by King LG et al and Tenner S M et al. Despite that the study showed lipase values were significant statistically (p=0.001) between alcoholic (Group 1) and miscellaneous group (Group3) and also between the non-alcoholic groups (Group 2&3).

Mean serum lipase/amylase ratio (L/A ratio) levels were significant (p =0.001) between the non-alcoholic AP groups (Group 2&3) and also between alcoholic and miscellaneous group (Group 1&3). Mean lipase/amylase levels were higher in alcoholic AP (3.005000± 1.0762875) (Group 1) when compared with non-alcoholic biliary AP (2.490000± 0.7040484) (Group2). This was in accordance with other studies which showed that when there is an elevation in lipase: amylase ratio, greater is the specificity of alcohol as the etiology of acute pancreatitis. However, these groups didn't show any significant difference (p = 0.19) in mean values. This was similar to the observations of Laurent-Puig et al. and Lankish et al.

In the current study alcoholic AP-Group1 (37 ± 7.85) were younger than those with Biliary AP – Group 2 (n = 20, 58 ± 12.79) and miscellaneous AP –Group 3 (n 20, 41 ± 18.25). A probable reason for younger age group in alcoholic AP patients could be due to induct of alcohol consumption and its dependence at a very young age

Our study findings were concurrent with others with respect to the alcoholic AP being predominantly seen in males (100%) as compared to females, while the biliary AP (females 60% & male 40%) and miscellaneous AP (female 65% & male 35%) was higher amongst the females as compared to males.

CONCLUSION

There is no single test to differentiate the etiology of acute pancreatitis therefore a combination of many techniques and tests like imaging, presenting with epigastric pain, lipase and/ or amylase levels are needed. So it may be concluded that lipase and amylase is important in diagnosis, however they proved to be poor in establishing the etiology or severity of acute pancreatitis.

REFERENCES

1. Devanath A, Kumari J, Joe J, Peter S, Rajan S, Sabu L, Mary J. Usefulness of lipase/amylase ratio in acute pancreatitis in South Indian population. *Indian Journal of Clinical Biochemistry*.2009Oct 1;24(4):361
2. King LG, Seelig CB, Ranney JE. The lipase to amylase ratio in acute pancreatitis. *American Journal of Gastroenterology* (Springer Nature). 1995 Jan 1;90(1).
3. Laurent-Puig P, Boutron A, Briantais MJ, Vahedi K, Fritsch J, Choury AD, Pelletier G, Buffet C. Lipase/amylase ratio in pancreatitis: An etiologic index? *Gastroenterology*. 1992 Jul 1;103(1):353-4.
4. Tenner SM, Steinberg W. The admission serum lipase: amylase ratio differentiates alcoholic from nonalcoholic acute pancreatitis. *American Journal of Gastroenterology* (Springer Nature). 1992 Dec 1;87(12).
5. Gumaste VV, Dave PB, Weissman D, Messer J. Lipase/amylase ratio: a new index that distinguishes acute episodes of alcoholic from nonalcoholic acute pancreatitis. *Gastroenterology*. 1991 Nov 1;101(5):1361-6.
6. Batra HS, Kumar A, Saha TK, Misra P, Ambade V. Comparative study of serum amylase and lipase in acute pancreatitis patients. *Indian Journal of Clinical Biochemistry*. 2015 Apr 1;30(2):230-3.
7. Treacy J, Williams A, Bais R, Willson K, Worthley C, Reece J, Bessell J, Thomas D. Evaluation of amylase and lipase in the diagnosis of acute pancreatitis. *ANZ journal of surgery*. 2001 Oct;71(10):5
8. Pezzilli R, Billi P, Miglioli M, Gullo L. Serum amylase and lipase concentrations and lipase/amylase ratio in assessment of etiology and severity of acute pancreatitis. *Digestive diseases and sciences*. 1993 Jul;38(7):1265-9.
9. Smith RC, Southwell- Keely J, Chesher D. Should serum pancreatic lipase replace serum amylase as a biomarker of acute pancreatitis? *ANZ journal of surgery*. 2005 Jun;75(6):399-404.
10. Pacheco RC, Oliveira LC. Lipase/amylase ratio in biliary acute pancreatitis and alcoholic acute/acute chronic pancreatitis. *Arquivos de gastroenterologia*.2007 Jan 1;44(1):35-8.