Original Article

Serum Amylase Sensitivity in Diagnosed Cases of Acute Pancreatitis

Yasir Ali Bhatti[1], Sadia Zia[2], Ali Iftikhar[1] and Hamna Naeem Butt[3]

ABSTRACT

Objective: The main objective of the study is to analyze the serum amylase sensitivity in diagnosed cases of acute pancreatitis.

Study Design: Cross sectional Study

Place and Duration of Study: This study was conducted at the Department of Biochemistry Avicenna Medical College, Lahore with the collaboration of University of Lahore during June 2019 to December 2019.

Materials and Methods: After taking permission from ethical committee of hospital, data was collected from 100 patients of acute pancreatitis. The serum amylase level was measured in all diagnosed patients. Demographic values and history of all the selected patients were collected.

Results: The data was collected from 100 patients of acute pancreatitis. The mean age was 55.67 ± 5.55 years. There were 57 female and 43 male patients. The value of serum amylase was found to be normal in 42 patients (59.52% female; 40.47% male), while mildly elevated in 50 patients (50% male; 50% female).

Conclusion: It is concluded that that serum amylase has a lower sensitivity and misses the diagnosis of about two thirds of the diagnosis.

Key Words: Serum Amylase Sensitivity, Diagnosed Cases, Acute Pancreatitis

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INTRODUCTION

The incidence of acute pancreatitis in the United Kingdom has been estimated at 100 to 250 per million populations per year. Men and women are affected at a similar rate, although the aetiology differs between the sexes, with gallstones and biliary sludge (echogenic, gravitating material composed of cholesterol crystals, calcium bilirubinate granules, and muco-glycoproteins) being more frequent in women, and alcohol more common in men. Iatrogenic causes include endoscopic retrograde cholangiopancreatography (ERCP) and drugs (for example, azathioprine, frusemide (furosemide), and salicylates) [1].

Hypertriglyceridaemia, hypercalcaemia, hypothermia, and pancreatic neoplasia are less common causes, as are viral infections and hereditary acute pancreatitis.

1. Department of Biochemistry / Pathology[2], Avicenna Medical College, Lahore.
3. Department of Medicine, Central Park Medical College, Lahore.

Correspondence: Dr. Yasir Ali Bhatti, Associate Professor of Biochemistry Avicenna Medical College, Lahore.
Contact No: 0300 9473131
Email: yasiralibhatti@gmail.com

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In more than 80% of patients, acute pancreatitis is mild and resolves without serious morbidity, but in up to 20% it can be severe and complicated by major morbidity and mortality [2].

Acute pancreatitis is a disease which has a wide range of clinical presentation which includes mild symptoms needing conservative treatment and a severe form requiring a more aggressive approach to treat the disease as it can progress to multiple organ failure rapidly. Obstruction by gallstones has been recognized as the most common cause of acute pancreatitis, while other causes such as alcohol, trauma and idiopathic causes are also responsible for this condition [3].

The disease is clinically classified into mild and severe acute pancreatitis. The mild form has no associated complications such as abscess formation, necrosis, hypocalcemia while the severe form is commonly associated with these complications resulting in multi organ failure. Elevated levels of pancreatic enzymes remain the key to diagnosing acute pancreatitis however, a normal level does not rule out a person having the disease either [4].

A raised level of serum amylase activity, at least three times the upper limit of normal, supports the diagnosis of acute pancreatitis. Its activity rises quickly within the first 12 hours after the onset of symptoms and returns to normal within three to five days. Serum amylase activities may be normal in 19–32% of cases at the time of hospital admission, as a result of delayed presentation or exocrine pancreatic insufficiency for example, secondary to chronic alcohol abuse [5].

Hypertriglyceridaemia competitively interferes with the amylase assay and can produce falsely low results, although this is variable and can be modulated by the use of lipid clearing agents. Conversely, serum amylase activities can be increased in other intra-abdominal inflammatory conditions and salivary gland pathologies, and also where there is decreased renal clearance because of renal impairment or macroamylasaemia[6].

MATERIALS AND METHODS

This cross sectional study was conducted in Department of Biochemistry Avicenna Medical College, Lahore with the collaboration of University of Lahore during June 2019 to December 2019.

Inclusion criteria

- All the patients diagnosed with acute pancreatitis.
- Age 18 to 60 years.
- All those patients who are willing to participate in the study.

Exclusion criteria

- Pregnant women.
- All those patients whose enzymes level were increased due to any other abnormality.

Data Collection: After taking permission from ethical committee of hospital, data was collected from 100 patients of acute pancreatitis. The serum amylase level was measured in all diagnosed patients. Demographic values and history of all the selected patients were collected. All the patients with moderately raised serum amylase and lipase levels or symptoms pointing towards acute pancreatitis were subjected to further investigations, only the diagnosed cases were included in the study.

Statistical Analysis: We will use SPSS version 21.0 for the analysis of data. The whole statistical analysis will plan with a 5% significance level and 80% statistical power.

RESULTS

The data was collected from 100 patients of acute pancreatitis. The mean age was 55.67 ± 5.55 years. There were 57 female and 43 male patients.

Table No.1: Serum amylase activity in selected patients

Serum amylase activity				
		Normal	Moderate	High levels
Gender	Female	25 (59.52%)	25 (50%)	7(87.5%)
	Male	17 (40.47%)	25 (50%)	1(12.5%)
		42	50	8

The value of serum amylase was found to be normal in 42 patients (59.52% female; 40.47% male), while mildly elevated in 50 patients (50% male; 50% female). Serum amylase was found to be raised three times the normal value in 33.33% of the patients who were diagnosed as having acute pancreatitis. The sensitivity of serum amylase in recognizing acute pancreatitis was found to be 33%, in both the genders.

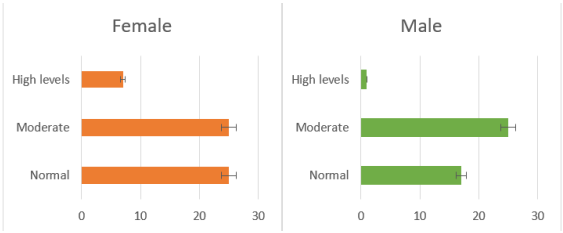

Figure No.1: Comparison of Male and Female patients according to serum anaylase levels.

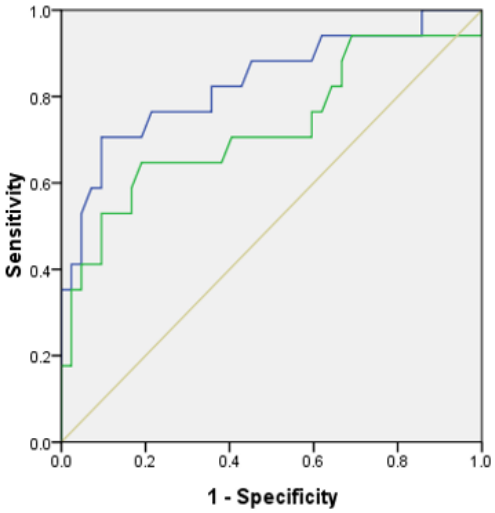

Figure No.2: ROC curve showing the specificity and sensitivity of serum amylase in acute pancreatitis patients

DISCUSSION

Both amylase and lipase are released from acinar cells during acute pancreatitis, and their concentration in the serum is used to confirm diagnosis. Be that as it may, the determination of pancreatitis ought to not exclusively be founded on the self-assertive estimation of three or multiple times more noteworthy than typical of pancreatic catalysts, however deciphered along with the clinical introduction. Amylase levels for the most part ascend inside a couple of hours after the beginning of indications and recover to ordinary qualities inside 3–5 days, as it has a more limited half-life than lipase. Nonetheless, amylase levels may stay inside ordinary reach in 19% of patients conceded with intense pancreatitis [7]. Intense pancreatitis is unexpected irritation of the pancreas, which can prompt harm of the heart, lungs, and kidneys and cause them to fizzle. Intense pancreatitis normally shows as upper stomach torment emanating to the back. In any case, there are a few possible reasons for upper stomach torment. It is imperative to decide whether somebody with stomach

torment has intense pancreatitis or another sickness to begin suitable therapy [8]. Blood tests like serum amylase and serum lipase, just as pee tests, for example, urinary trypsinogen-2 and urinary amylase, can be utilized to decide whether somebody with stomach torment has intense pancreatitis. It is generally the situation that a patient is considered to have intense pancreatitis just when amylase or lipase levels are multiple times the maximum furthest reaches of ordinary [9]. With respect to urinary trypsinogen-2, a degree of in excess of 50 ng/mL of trypsinogen-2 in the pee is viewed as a sign of intense pancreatitis. As to urinary amylase, there is no clear-cut level past which somebody with stomach torment is considered to have intense pancreatitis [10].

As opposed to serum amylase, serum lipase fixation is viewed as a more important analytic apparatus, in light of the fact that unusually raised qualities continue for a more extended span, which is a benefit in patients with a postponed introduction [11]. What's more, serum lipase is more touchy as far as identifying the presence of intense liquor incited pancreatitis. The current investigation showed that raised lipase levels were seen in 95–100% of patients relying upon etiology [12]. Seven (22%) extra patients were determined to have intense liquor incited pancreatitis dependent on raised lipase levels with a related typical amylase level [13]. Besides, the current UK and Japanese rules for the administration of intense pancreatitis have accentuated the more noteworthy demonstrative exactness of serum lipase contrasted with amylase [14].

CONCLUSION

It is concluded that that serum amylase has a lower sensitivity and misses the diagnosis of about two thirds of the diagnosis. Hence it is a poor screening test and health care providers should not rely solely on it and order more sensitive tests.

Author's Contribution:

Concept & Design of Study:	Yasir Ali Bhatti
Drafting:	Sadia Zia
Data Analysis:	Ali Iftikhar, Hamna Naeem Butt
Revisiting Critically:	Yasir Ali Bhatti, Sadia Zia
Final Approval of version:	Yasir Ali Bhatti

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Spechler SJ, Dalton JW, Robbins AH, et al. Prevalence of normal serum amylase levels in patients with acute alcoholic pancreatitis. Dig Dis Sci 1983;2(8):865–869.
2. Yadav D, Agarwal N, Pitchumoni CS. A critical evaluation of laboratory tests in acute pancreatitis. Am J Gastroenterol 2002;9(7):1309–1318.
3. Tietz NW, Shuey DF. Lipase in serum: the elusive enzyme: an overview. Clin Chem 1993;3(9):746–756.
4. Werner J, Feuerbach S, Uhl W, et al. Management of acute pancreatitis: from surgery to interventional intensive care. Gut 2005;5(4):426–436.
5. Kylänpää-Bäck M L, Kemppainen E, Puolakkainen P, et al. Comparison of urine trypsinogen-2 test strip with serum lipase in the diagnosis of acute pancreatitis. Hepato-gastroenterol 2002;4 9(1): 130–1134.
6. Petersson U, Appelros S, Borgstrom A. Different patterns in immunoreactive anionic and cationic trypsinogen in urine and serum in acute pancreatitis. Int J Pancreatol 1999;2(5):165–170.
7. Kemppainen E, Hedstrom J, Puolakkainen P, et al. Increased serum trypsinogen 2 and trypsin-α1 antitrypsin complex values identify endoscopic retrograde cholangiopancreatography induced pancreatitis with high accuracy. GUT 1997; 4(1):690–695.
8. Kemppainen E A, Hedstrom J, Puolakkainen P.et al. Rapid measurement of urinary trypsinogen-2 as a screening test for acute pancreatitis. N Engl J Med 1997;33(6):1788–1793.
9. Bradley EL. A clinically based classification system for acute pancreatitis. Summary of the International Symposium on Acute Pancreatitis, Atlanta, Georgia, September 11 through 13, 1992. Arch Surg 1993;12(8):586–590.
10. Qureshi JN, Memon AS, Memon S, Memon AH. Pattern of acute pancreatitis: The Liaquat University Hospital experience. J Liaquat Univ Med Heal Sci 2006;5(1):28–32.
11. Batra HS, Kumar A, Saha TK, Misra P, Ambade V. Comparative study of serum amylase and lipase in acute pancreatitis patients. Ind J Clin Biochem 2015;30(2):230–3.
12. Shah AP, Mourad MM, Bramhall SR. Acute pancreatitis: current perspectives on diagnosis and management. J Inflamm Res 2018;11:77–85.
13. Wang GJ, Gao CF, Wei D, Wang C, Ding SQ. Acute pancreatitis: etiology and common pathogenesis. World J Gastroenterol 2009;15 (12):1427–30.
14. Kylanpaa-Back ML, Kemppainen E, Puolakkainen P, Hedstrom J, Haapiainen R, et al. Comparison of urine trypsinogen-2 test strip with serum lipase in the diagnosis of acute pancreatitis. Hepato-gastroenterol 2002;49:1130–4.