e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com

International Journal of Pharmaceutical Quality Assurance 2026; 17(5); 363-369

Original Research Article

Assessment of Serum Amylase and Lipase Levels among Patients with Acute Pancreatitis: A Retrospective Analysis

Kumari Sweta[1], Yogesh Krishna Sahay[2]

[1]Senior Resident/Tutor, Department of Biochemistry, Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India

[2]Professor and HOD, Department of Biochemistry, Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India

Received: 08-03-2026 / Revised: 10-04-2026 / Accepted: 20-05-2026

Corresponding Author: Dr. Yogesh Krishna Sahay

Conflict of interest: Nil

Abstract:

Background: Acute pancreatitis is a common gastrointestinal emergency characterized by inflammation of the pancreas and elevation of pancreatic enzymes in the bloodstream. Serum amylase and lipase are widely used biochemical markers for the diagnosis of this condition.

Aim: To assess the levels of serum amylase and serum lipase among patients diagnosed with acute pancreatitis.

Methodology: This retrospective observational cross-sectional study was conducted in the Department of Biochemistry at Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Bihar. Data from 90 patients diagnosed with acute pancreatitis were collected from hospital records. Demographic details and biochemical parameters were analyzed using descriptive statistics.

Results: The majority of patients belonged to the 31–40 years age group (24.4%), followed by 41–50 years (22.2%). Male patients constituted 62.2% of the study population. Most patients had serum amylase levels between 301–600 U/L (35.6%), while the highest proportion showed serum lipase levels between 201–400 U/L (33.3%). The mean serum amylase level was 645.32 ± 215.48 U/L, whereas the mean serum lipase level was 452.67 ± 168.29 U/L.

Conclusion: Both serum amylase and serum lipase levels were markedly elevated in patients with acute pancreatitis, with serum lipase showing consistent diagnostic relevance.

Keywords: Acute Pancreatitis, Serum Amylase, Serum Lipase, Pancreatic Enzymes, Retrospective Study.

DOI: 10.25258/ijpqa.17.5.54

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0) and the Budapest Open Access Initiative (http://www.budapestopenaccessinitiative.org/read), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Acute Pancreatitis (AP) is a severe inflammation of the pancreas which is one of the most common gastrointestinal crises in the clinical practice [1]. The pancreas is very vital in both the exocrine and endocrine functions such as the secretion of digestive enzymes which help in breaking down carbohydrates, proteins, and fats. In case of inflammation inside the pancreatic tissue, the digestive enzymes are prematurely released in the pancreatic tissue, therefore auto-digesting the pancreatic cells and other tissues surrounding it. Gallstones and alcohol abuse are the most popular etiological predisposing factors that cause acute pancreatitis, but other causes of its development are hypertriglyceridemia, some medications, trauma, infections, and metabolic disorders [2]. Acute pancreatitis is regarded as one of the most significant health issues on the global level because of the growing rates of its appearance and the possibility of developing severe complications associated with its pancreatic necrosis, the syndrome of systemic inflammatory response, and the failure of multiple organs. The incidence of the disease has been reported as about 38 cases per 100,000 population per year, which indicates the heavy burden of the disease on the health care systems.

The incidence of acute pancreatitis in the world over the last few decades has been on an increasing trend. This has increased due to a number of factors which include change of lifestyle, increasing prevalence of gallstone disease, alcohol, obesity and metabolic disorders [3]. Moreover, at least the increased awareness of the diagnostic and more frequent access to the healthcare services has also resulted in the increased prevalence of the disease being detected and reported. Acute pancreatitis leads to a significant population of hospital admissions and a high economic cost on the healthcare systems since it is associated with extended hospitalizations, intensive care units, and diagnostic tests and treatment procedures. The growing trends of hospitalization in acute pancreatitis complicate the significance of early di-

agnosis and proper management in order to minimize complications and death.

The accurate and prompt diagnosis of acute pancreatitis is necessary to start the effectual treatment and avoid the advancement of the disease. The American College of Gastroenterology (ACG) clinical guidelines state that patients should meet three criteria in order to diagnose acute pancreatitis: two of three criteria must be met. These conditions are that one must have typical abdominal pain that could likely be as a result of pancreatitis, the presence of serum pancreatic enzyme like amylase or lipase at least three times the limit of normal, and radiological manifestation of pancreatic inflammation by use of abdominal radiography. Among them, abdominal pain is regarded to be one of the major clinical manifestations. Generally, the acute pancreatitis is characterized by the sudden, severe, and relentless abdominal pain, which is mainly centered in the region of the epigastrum, and tends to extend to the back [4]. Such pain can be supplemented by other symptoms like nausea, vomiting, and tenderness, and fever of the abdomen.

Nonetheless, clinical symptoms can be utilized to make a diagnosis, but results can be problematic at times. The subjectivity of the perception of pain implies that patients might report difference in the description of their symptoms according to their age, cognitive ability or tolerance to pain [5]. During the treatment of elderly patients or people with dementia or other neurological disorders, a valid clinical history can be hard to obtain. Moreover, there are unusual symptoms that might be exhibited by some patients without being a clear indication of pancreatic inflammation. Consequently, lab studies and imaging research emerge as essential elements of the diagnosis of acute pancreatitis.

Radiological imaging methods are useful in the assessment of pancreatic pathology. One of such, Contrast Enhanced Computed Tomography (CECT) of the abdomen, is generally considered the gold standard imaging modality of the diagnosis and evaluation of acute pancreatitis. CECT will offer comprehensive visualization of pancreatic tissue and adjacent organs making it possible to identify inflammation, necrosis, and fluid accumulation, as well as other complications related to the disease. Nevertheless, though having diagnostic value, CECT is not necessarily permissible at the initial stage of disease progression. Imaging performances can be normal in the early phases of acute pancreatitis in most situations. Thus, in accordance with clinical recommendations, CECT should be used in patients whose diagnosis is not certain or those who do not recover in the first 4872 hours of in-hospital treatment [6]. Moreover, CECT is also most of the time applied to assess complications instead of making the primary diagnosis.

Under such constraints, biochemical markers are important in the early diagnosis and validation of acute pancreatitis especially in emergency department where quick clinical decision-making is required. Objective laboratory indicators of pancreatic inflammation are serum pancreatic enzymes or amylase and lipase are commonly used [7]. These enzymes are synthesized mainly by pancreatic acinar cells and they are usually released into the digestive tract to help in digestions. Amylase helps in the hydrolysis of starch and complex carbohydrates into simple sugars, and lipase breaks down the dietary fats to fatty acids and glycerol. When one is under normal physiological states, these enzymes are found in low concentrations in the bloodstream. When the pancreatic cells are however, damaged either through inflammation or blockage then the enzymes will leak out into the circulation leading to high serum levels.

The levels of both serum amylase and serum lipase normally increase during acute pancreatitis and are usually used to facilitate the diagnosis of the condition [8]. These enzymes are usually raised in a few hours of the onset of the symptoms and can last at different times, based on the severity and the course of the disease. Conventionally, the most common biochemical test in the diagnosis of acute pancreatitis was measurement of serum amylase. Nevertheless, over the past years, serum lipase has acquired increased clinical significance because of its enhanced specificity to pancreatic damage and a prolonged bloodstream. Although these differences exist, both enzymes are commonly combined in a clinical practice in order to enhance the diagnostic confidence.

Research shows that pancreatic inflammation causes patients to experience simultaneous increases in their serum amylase and lipase levels although their blood test results show different levels of elevation. The extent of enzyme increase during acute pancreatitis does not show a direct relationship to the condition's intensity. The presence of extremely high enzyme levels does not always predict a more severe disease progression whereas moderate level increases continue to show links to major medical issues. The enzymes function as diagnostic confirmation tools but their ability to predict disease severity remains restricted due to this particular trait.

The Cochrane Collaboration conducted a systematic review which assessed how well serum amylase and lipase test results can detect acute pancreatitis and found that both enzymes had similar diagnostic accuracy rates. The review demonstrated sensitivities of approximately 0.72 for serum amylase and 0.79 for serum lipase, while the specificities were reported as 0.93 and 0.89 respectively. The results demonstrate that both enzymes function as trustworthy tests for pancreatic inflammation, but lipase offers slightly better ability to identify the disease. The recent clinical guidelines recommend doctors to use

serum lipase testing instead of serum amylase testing for diagnosing suspected cases of acute pancreatitis according to these study results.

Healthcare institutions still order both serum amylase and serum lipase tests when doctors suspect pancreatitis in patients despite these recommendations. The method seems complete because doctors order both tests together yet research shows that this testing method does not improve diagnostic precision. The system creates extra expenses for healthcare services while it drives up laboratory testing expenses. Healthcare organizations and hospital managers need to assess diagnostic testing methods through cost-effectiveness analysis especially in resource-limited environments that exist in developing nations.

The assessment needs to determine both the diagnostic effectiveness of laboratory tests together with their financial impact for better clinical decision making and enhanced healthcare operational efficiency. The analysis of patient records from past cases enables researchers to study how enzyme levels rise and their actual diagnostic value in everyday medical practice. The research will establish if measuring one enzyme serum lipase can serve as the only test needed to diagnose acute pancreatitis while reducing both laboratory expenses and healthcare costs.

The researchers conducted their study to evaluate the diagnostic efficiency of serum amylase and lipase measurements in acute pancreatitis patients through their retrospective study. The researchers investigated the financial consequences of conducting two enzyme tests together to find out if one test would serve as a more economical testing solution without decreasing its ability to identify medical conditions. The research team aims to enhance diagnostic methods and optimize healthcare resource management for acute pancreatitis through their examination of current clinical information.

Methodology

Study Design: This study was conducted as a retrospective observational cross-sectional study aimed at assessing serum amylase and lipase levels among patients diagnosed with acute pancreatitis. The retrospective design allowed the evaluation of previously recorded clinical and biochemical data of patients who had undergone laboratory investigations for pancreatic enzymes. The study primarily focused on analyzing the diagnostic value and distribution of serum amylase and lipase levels in confirmed cases of acute pancreatitis. Hospital records and laboratory reports were systematically reviewed to obtain relevant clinical and biochemical information of the study participants.

Study Area: The study was conducted in the Department of Biochemistry, Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India.

Study Duration: The study was carried out over a period of six months from April 2025 to September 2025.

Study Participants: The study participants included patients who had undergone laboratory testing for serum amylase and serum lipase and were diagnosed with acute pancreatitis during the study period. Data were retrieved from hospital medical records and laboratory information systems.

Inclusion Criteria

- Patients diagnosed with acute pancreatitis based on clinical findings and biochemical investigations.
- Patients whose serum amylase and serum lipase levels were recorded in the hospital laboratory database.
- Patients aged 18 years and above.
- Patients with complete medical and laboratory records available in the hospital database.

Exclusion Criteria

- Patients with incomplete or missing laboratory data related to amylase or lipase levels.
- Patients with chronic pancreatitis or pancreatic malignancy.
- Patients with other conditions known to significantly alter pancreatic enzyme levels.
- Patients whose clinical records were not accessible or inadequately documented.

Sample Size: A total of 90 patients diagnosed with acute pancreatitis and fulfilling the inclusion criteria were included in the study. The sample size was determined based on the availability of eligible patient records within the defined study duration.

Procedure: Data for the present study were collected retrospectively from hospital records, laboratory registers, and electronic medical databases maintained by the Department of Biochemistry. Patients who had undergone testing for both serum amylase and serum lipase and were clinically suspected or diagnosed with acute pancreatitis were identified. Demographic details such as age and gender, clinical presentation, and laboratory findings were recorded systematically. Blood samples of these patients had been collected during their hospital visit and analyzed in the biochemistry laboratory using standard automated biochemical analyzers following established laboratory protocols. The normal reference range for serum amylase and serum lipase was considered according to the laboratory standards. In cases where enzyme levels were elevated to three times or more than the upper limit of the normal reference range, the possibility of acute pancreatitis was considered significant. Additional clinical and radiological findings recorded in patient files,

such as ultrasonography or computed tomography reports, were also reviewed where available to confirm the diagnosis. All collected data were compiled in a structured data collection sheet to facilitate systematic analysis and interpretation.

Statistical Analysis: All collected data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics were used to summarize the demographic and clinical characteristics of the study participants. Continuous variables such as serum amylase and lipase levels were expressed as mean and standard deviation, while categorical variables were presented as frequency and percentage distributions. Appropriate statistical tests were applied wherever necessary to assess the relationship between variables.

Result

Table 1 shows the distribution of study participants according to different age groups. Out of the total 90 patients included in the study, the highest proportion belonged to the 31–40 years age group with 22 patients (24.4%). This was followed by the 41–50 years age group comprising 20 patients (22.2%). Participants aged 18–30 years accounted for 18 patients (20%). The 51–60 years age group included 17 patients (18.9%). The lowest proportion of participants was observed in the age group of more than 60 years, which included 13 patients (14.5%). Overall, the findings indicate that the majority of the study participants were concentrated in the middle adult age groups, particularly between 31 and 50 years.

Table 1: Distribution of Study Participants According to Age Group (n = 90)

Age Group (Years)	Number of Patients (n)	Percentage (%)
18–30	18	20
31–40	22	24.4
41–50	20	22.2
51–60	17	18.9
>60	13	14.5
Total	**90**	**100**

Table 2 shows the distribution of study participants according to gender. Out of the total 90 patients included in the study, the majority were males, accounting for 56 participants (62.2%). In comparison, females constituted 34 participants (37.8%). This indicates that male patients formed a larger proportion of the study population than female patients. The higher representation of males suggests that the condition or clinical presentation evaluated in the present study was more frequently observed or reported among male patients during the study period. Overall, the gender distribution demonstrates a clear predominance of male participants in the sample, while female participants represented slightly more than one-third of the total study population.

Table 2: Distribution of Study Participants According to Gender

Gender	Number of Patients (n)	Percentage (%)
Male	56	62.2
Female	34	37.8
Total	**90**	**100**

Table 3 shows the distribution of patients according to their serum amylase levels. Out of the total 90 patients included in the study, the highest proportion of patients had serum amylase levels in the range of 301–600 U/L, accounting for 32 patients (35.6%). This was followed by 24 patients (26.7%) who had serum amylase levels between 601–900 U/L. A total of 20 patients (22.2%) exhibited serum amylase levels greater than 900 U/L, indicating markedly elevated enzyme levels in a considerable proportion of the study population. Meanwhile, the lowest proportion of patients, 14 individuals (15.6%), had serum amylase levels in the range of 100–300 U/L. Overall, the findings suggest that the majority of patients presented with moderately elevated serum amylase levels, particularly within the 301–600 U/L category.

Table 3: Distribution of Patients According to Serum Amylase Levels

Serum Amylase Level (U/L)	Number of Patients (n)	Percentage (%)
100–300	14	15.6
301–600	32	35.6
601–900	24	26.7
>900	20	22.2
Total	**90**	**100**

Table 4 shows the distribution of patients according to serum lipase levels among the total 90 patients included in the study. The highest proportion of patients was observed in the serum lipase range of 201–400 U/L, comprising 30 patients (33.3%). This was followed by 25 patients (27.8%) with serum lipase levels between 401–600 U/L. A total of 19 patients (21.1%) had serum lipase levels greater than 600 U/L, indicating markedly elevated enzyme levels in a considerable proportion of the study population. Meanwhile, 16 patients (17.8%) had serum lipase levels in the 65–200 U/L range, representing the lowest proportion among the categories. Overall, the findings indicate that the majority of patients exhibited moderately to markedly elevated serum lipase levels, particularly within the 201–600 U/L range, suggesting its significant diagnostic relevance in patients with acute pancreatitis.

Table 4: Distribution of Patients According to Serum Lipase Levels

Serum Lipase Level (U/L)	Number of Patients (n)	Percentage (%)
65–200	16	17.8
201–400	30	33.3
401–600	25	27.8
>600	19	21.1
Total	**90**	**100**

Table 5 shows the comparison of mean serum amylase and lipase levels among patients. The mean serum amylase level was observed to be 645.32 U/L with a standard deviation of 215.48, indicating considerable variation in amylase levels among the patients. The minimum recorded serum amylase value was 120 U/L, while the maximum level reached 1080 U/L, reflecting a wide range of enzyme elevation in the study population. In comparison, the mean serum lipase level was 452.67 U/L with a standard deviation of 168.29, suggesting moderate variability in lipase values among the patients. The serum lipase levels ranged from a minimum of 90 U/L to a maximum of 820 U/L. Overall, the findings demonstrate that both serum amylase and lipase levels were markedly elevated among patients, with serum amylase showing a comparatively higher mean value and wider range than serum lipase.

Table 5: Comparison of Mean Serum Amylase and Lipase Levels Among Patients

Parameter	Mean	Standard Deviation (SD)	Minimum	Maximum
Serum Amylase (U/L)	645.32	215.48	120	1080
Serum Lipase (U/L)	452.67	168.29	90	820

Discussion

The present study evaluated the distribution of patients and the biochemical profile of serum amylase and lipase among individuals diagnosed with acute pancreatitis. The present study showed that most patients belong to the 31-40 years age group and the 41-50 years age group, which demonstrates that acute pancreatitis affects middle-aged adults the most. Yardan et al. (2009) [9] found that acute pancreatitis cases occurred mostly between 30 and 50 years according to their study which used emergency department data. The disease shows a pattern of affecting people during their peak working years because they encounter many risk factors such as drinking alcohol and developing gallstone disease and maintaining poor eating habits. Tenner et al. (2013) [10] established that acute pancreatitis occurs most often among middle-aged people while their study showed that lifestyle habits increase the disease risk for this particular age group. The present study found a lower number of elderly patients because different health-seeking patterns and multiple existing medical conditions create difficulties in diagnosing patients.

The study results showed that more than 60 percent of the participants were male which created an unbalanced gender ratio because females made up slightly more than one-third of the total study group. The findings of the study match the results from Gomez et al. (2012) [11] who reported that 60 to 65 percent of their analyzed acute pancreatitis patients were male. The higher rates of male pancreatic inflammation have been explained by their tendency to drink alcohol and smoke tobacco which medical experts identify as common risk factors. Ismail and Bhayana (2017) [12] found that male patients formed the majority of acute pancreatitis cases because their professional duties made them more vulnerable to life-threatening conditions. The findings of some studies showed different results from this research. Leppäniemi et al. (2019) [13] found that gender distribution in their study differed according to different pancreas disease causes because gallstone-related pancreatitis occurs more often in females. The present study found male patients to be more predominant because earlier studies showed the same pattern of male patient dominance.

The examination of serum amylase levels found that most patients in the study displayed moderate to se-

vere increases in their serum amylase levels while the most significant patient group showed serum amylase levels between 301 and 600 U/L and the next two groups included patients with levels from 601 to 900 U/L and levels above 900 U/L. The study established a mean serum amylase level of 645.32 ± 215.48 U/L which showed elevated pancreatic enzyme levels. Jasdanwala and Babyatsky (2015) [14] discovered that acute pancreatitis patients show serum amylase levels which reach three to five times the normal upper limit while most patients exceed 500 U/L. Sutton et al. (2009) [15] found that acute pancreatitis patients had mean serum amylase levels which exceeded 600 U/L which matched the current research results. Multiple research studies have shown that serum amylase cannot function as a reliable diagnostic test. Smith et al. (2005) [16] showed that serum amylase returns to its normal state during 24 to 48 hours following the start of symptoms which decreases its ability to diagnose late-stage cases. The results show that serum amylase functions as a valuable biochemical test but its diagnostic accuracy depends on when healthcare professionals collect samples for analysis.

The serum lipase analysis results from the current research showed that most patients had serum lipase levels that reached moderate to severe elevations. The highest proportion of patients had serum lipase levels that reached 201 to 400 U/L, while the second highest group showed 401 to 600 U/L levels and the third highest group demonstrated above 600 U/L levels. The present study measured mean serum lipase level at 452.67 ± 168.29 U/L which showed that patients with acute pancreatitis had high enzyme levels. The current findings match the results from Rompianesi et al. (2017) [17] who reported that patients with acute pancreatitis experienced serum lipase levels which exceeded 400 U/L for a longer period than their amylase levels. The research conducted by Ismail and Bhayana (2017) found that lipase levels stay elevated during pancreatic inflammation for a period between 7 and 14 days, which establishes lipase as a dependable test for both diagnostic and monitoring purposes. The present study found that more patients showed elevated lipase levels which demonstrates that this enzyme holds diagnostic importance for medical settings.

The study found an essential result which showed that researchers evaluated the average serum amylase and lipase levels. The researchers found that the mean serum amylase level reached 645.32 U/L while the mean serum lipase level reached 452.67 U/L, yet both enzymes showed high levels of variability according to their results. The results showed similar patterns which Gomez et al. (2012) observed in their retrospective study because both enzymes showed high levels in patients with acute pancreatitis, but lipase provided better diagnostic accuracy. The researchers Rompianesi et al. (2017) showed that serum lipase testing provides better diagnostic accuracy than amylase testing, which helps medical professionals differentiate between pancreatic inflammation and other abdominal pain sources. Sutton et al. (2009) established that health professionals should conduct enzyme tests only when they suspect acute pancreatitis, since lipase testing provides enough information for diagnosis purposes. The two opposing opinions show that medical professionals still debate which biochemical marker serves as the best diagnostic tool for acute pancreatitis identification.

The present study results still match existing literature because middle-aged men represent the most common group which acute pancreatitis affects. The study proves that serum amylase and serum lipase levels reach high levels in most acute pancreatitis patients because these two tests continue to serve as essential tests for detecting pancreatic inflammation. Previous research shows that serum lipase testing provides better diagnostic results because it stays elevated in patients for more extended periods than amylase testing does. Clinical studies show that both enzymes provide valuable medical information yet serum lipase testing serves as the better single test for diagnosing acute pancreatitis in daily medical practice.

Conclusion

The present retrospective study evaluated the biochemical profile of serum amylase and serum lipase among patients diagnosed with acute pancreatitis. The findings demonstrated that acute pancreatitis was more commonly observed in middle-aged individuals, particularly those between 31 and 50 years of age, with a clear predominance among male patients. Both serum amylase and serum lipase levels were markedly elevated in the majority of patients, confirming their importance as biochemical markers in the diagnosis of acute pancreatitis. The mean values of both enzymes indicated significant pancreatic enzyme elevation, reflecting active pancreatic inflammation. However, serum lipase showed consistent elevation across most cases, supporting its greater diagnostic reliability. Overall, the study highlights that while both enzymes remain useful diagnostic tools, serum lipase may serve as a more reliable and potentially cost-effective biomarker for the diagnosis of acute pancreatitis in routine clinical practice.

References

1. Walkowska J, Zielinska N, Tubbs RS, Podgórski M, Dłubek-Ruxer J, Olewnik Ł. Diagnosis and treatment of acute pancreatitis. Diagnostics. 2022 Aug 15;12(8):1974.
2. Weiss FU, Laemmerhirt F, Lerch MM. Etiology and risk factors of acute and chronic pancreatitis. Visceral medicine. 2019 Apr 15;35(2):73-81.

3. Yuan S, Gill D, Giovannucci EL, Larsson SC. Obesity, type 2 diabetes, lifestyle factors, and risk of gallstone disease: a Mendelian randomization investigation. Clinical gastroenterology and hepatology. 2022 Mar 1;20(3):e529-37.
4. Lacy BE, Spangler CC. Acute, Recurrent, and Chronic Abdominal Pain. Problem-Based Approach to Gastroenterology and Hepatology. 2012 Jan 17:44-63.
5. Lautenbacher S, Peters JH, Heesen M, Scheel J, Kunz M. Age changes in pain perception: A systematic-review and meta-analysis of age effects on pain and tolerance thresholds. Neuroscience & Biobehavioral Reviews. 2017 Apr 1;75:104-13.
6. Sanders SL, Rathbone J, Bell KJ, Glasziou PP, Doust JA. Systematic review of the effects of care provided with and without diagnostic clinical prediction rules. Diagnostic and Prognostic Research. 2017 Apr 26;1(1):13.
7. Madole MB, Iyer CM, Madivalar MT, Wadde SK, Howale DS. Evaluation of biochemical markers serum amylase and serum lipase for the assessment of pancreatic exocrine function in diabetes mellitus. Journal of clinical and diagnostic research: JCDR. 2016 Nov 1;10(11):BC01.
8. Ismail OZ, Bhayana V. Lipase or amylase for the diagnosis of acute pancreatitis? Clinical biochemistry. 2017 Dec 1;50(18):1275-80.
9. Yardan T, Genç S, Baydın A, Nural MS, Aydın M, Aygün D. Evaluation of patients with acute pancreatitis in the emergency department.
10. Tenner S, Baillie J, DeWitt J, Vege SS. American College of Gastroenterology guideline: management of acute pancreatitis. Official journal of the American College of Gastroenterology| ACG. 2013 Sep 1;108(9):1400-15.
11. Gomez D, Addison A, De Rosa A, Brooks A, Cameron IC. Retrospective study of patients with acute pancreatitis: is serum amylase still required? BMJ open. 2012 Jan 1;2(5):e001471.
12. Ismail OZ, Bhayana V. Lipase or amylase for the diagnosis of acute pancreatitis? Clinical biochemistry. 2017 Dec 1;50(18):1275-80.
13. Leppäniemi A, Tolonen M, Tarasconi A, Segovia-Lohse H, Gamberini E, Kirkpatrick AW, Ball CG, Parry N, Sartelli M, Wolbrink D, Van Goor H. 2019 WSES guidelines for the management of severe acute pancreatitis. World journal of emergency surgery. 2019 Dec;14(1):27.
14. Jasdanwala S, Babyatsky M. A critical evaluation of serum lipase and amylase as diagnostic tests for acute pancreatitis. Integr Mol Med. 2015;2(3):189-95.
15. Sutton PA, Humes DJ, Purcell G, Smith JK, Whiting F, Wright T, Morgan L, Lobo DN. The role of routine assays of serum amylase and lipase for the diagnosis of acute abdominal pain. The Annals of The Royal College of Surgeons of England. 2009 Jul;91(5):381-4.
16. 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.
17. Rompianesi G, Hann A, Komolafe O, Pereira SP, Davidson BR, Gurusamy KS. Serum amylase and lipase and urinary trypsinogen and amylase for diagnosis of acute pancreatitis. Cochrane Database of Systematic Reviews. 2017(4).