



Serum lipase and amylase play a vital role in the diagnosis of acute pancreatitis. An overview

Sameer Ahmad¹, Rozy Bharti², R.K Patil³, H.C. Patil⁴

¹Department of Pharmacy Practice, Adesh Institute of Pharmacy and Biomedical Sciences,
Adesh University, Bathinda, Punjab, India

Abstract

An abrupt start of pancreatic inflammation known as acute pancreatitis can lead to circumstances that are mild to severe and potentially fatal. Acute pancreatitis is often diagnosed by observing abdominal pain and elevated serum amylase and/or lipase levels. Many healthcare facilities use serum lipase, serum amylase, or both to determine if an individual patient has acute pancreatitis without considering which test could provide a more accurate diagnosis. According to several studies, serum amylase is less sensitive than serum lipase for the detection of acute pancreatitis. There are various current evidence-based guidelines that recommend using lipase rather than amylase.

Key Words: Acute pancreatitis, Serum Lipase, Serum amylase

Introduction

Acute pancreatitis, a digestive ailment that causes the pancreas to become inflamed, is fairly frequent. Although AP most usually results in epigastric discomfort, it can also result in discomfort in either the left or right upper quadrant. Additionally, the chest, flanks, or back may be impacted. [1]. Typically, it is constant. The intensity varies in strength, although it is frequently very strong. Pain may be covered up or eliminated in the early stages of organ breakdown. The only two objective diagnostic criteria are increased serum lipase and/or amylase levels and imaging characteristics that are typical with AP[2]. CECT of the abdomen is the widely acknowledged gold standard for the diagnosis of AP. More than 90% of patients with AP may be accurately diagnosed. A CT scan may be normal, especially when the illness is still in its early stages[3]. Additionally, acquiring an abdominal CT scan at the time of admission is not indicated in accordance with the ACG's practise recommendations. CECT is suggested when there is doubt regarding the diagnosis of AP or if the patient's condition doesn't improve or deteriorates after 48 hours in the hospital [4]. Amylase and/or lipase levels in the blood are thus the only objective diagnostic standards that are frequently accessible at the time of initial patient contact.

Serum Lipase

Pancreatic acinar cells are principally responsible for producing serum lipase, which they then store as granules. Over 98% of the lipase that was held in the pancreatic ductal system is released by the apical poles of the acinar cells [1,5]. Lipase is filtered by the glomerulus and subsequently reabsorbed by the tubules. The lipase enzyme is also broken down in the renal tubules. Lipase rises after 4–8 hours of the onset of acute pancreatitis, peaks at 24 hours, and then starts to diminish between 8–14 days later [6]. Lipase's half-life in plasma ranges from 6.7 to 13.7 hours. Its action is sustained over a longer amount of time than amylase because its half-life is longer. Different investigations have found varying degrees of lipase sensitivity. It has an adjustable sensitivity range of 85% to 100%.

Serum Amylase

The use of amylase in medicine dates back to the time when lipase was widely available. Amylase levels commonly start to rise 6 to 24 hours after the start of AP, reach a peak at 48 hours, and then typically return to normal over the course of the following 5 to 7 days [7,8]. Its half-life is shorter than that of lipase. As a result, the pancreatic inflammation persists even if the amylase levels often return to normal. It has a two-hour half-life and is excreted by the kidney [9]. Numerous studies have shown that serum amylase, when used in conjunction with CT or ultrasound of the abdomen, has a sensitivity of 81-95 percent for the diagnosis of AP.

Lipase and amylase's role in AP diagnosis

According to earlier investigations, the severity and prognosis of AP are not influenced by the levels of lipase or amylase [10]. For the diagnosis and management of AP, the most recent ACG practise recommendations state that patients who enter with abdominal pain should be evaluated for blood levels of amylase and/or lipase that are more than three times the upper limit of normal should be present (ULN). Lipase or amylase levels are not sufficient to establish the aetiology of AP[10,11]. Serum lipase elevation has a better diagnostic value than serum amylase due to its higher specificity. Serum amylase tests used to have the advantage of being affordable and widely available compared to lipase, which was challenging and expensive to evaluate [11,13]. But today's lipase tests are just as readily available, reasonably priced, rapid, easy, and trustworthy as amylase assays.

CONCLUSION

Following are inferences that may be made regarding serum lipase and amylase as AP diagnostic tests from the examination of recent studies [1,9]. Increased levels of either or both may be present in AP patients. The ACG practise guidelines state that abdominal pain that is 3 times higher than ULN for either lipase or amylase and that is consistent with AP. Compared to amylase, lipase has a somewhat better selectivity for AP [13,14,15]. Additionally, compared to serum amylase, it rises faster and remains longer in AP patients. Continuously high amylase or lipase levels may not necessarily signal the emergence of issues following an AP assault[16]. Lipase and amylase are routinely combined, however studies have shown that this seldom helps with diagnosis.

REFERENCES:-

- Singh, A., Shrestha, M., & Anand, C. (2016). Acute pancreatitis with normal amylase and lipase—an ED dilemma. *The American journal of emergency medicine*, 34(5).
- Yadav, D., Agarwal, N., & Pitchumoni, C. S. (2002). A critical evaluation of laboratory tests in acute pancreatitis. *The American journal of gastroenterology*, 97(6), 1309-1318.
- Vissers, R. J., Abu-Laban, R. B., & McHugh, D. F. (1999). Amylase and lipase in the emergency department evaluation of acute pancreatitis. *The Journal of emergency medicine*, 17(6), 1027-1037.

- Kazmierczak, S. C., Van Lente, F., & Hodges, E. D. (1991). Diagnostic and prognostic utility of phospholipase A activity in patients with acute pancreatitis: comparison with amylase and lipase. *Clinical chemistry*, 37(3), 356-360.
- Chang, K. C., Changchien, C. S., Kuo, C. M., Chiu, Y. C., Chuah, S. K., Chiu, K. W., & Kuo, C. H. (2005). Clinical analysis of the efficacy in Lipase/Amylase ratio for acute pancreatitis. *J Intern Med Taiwan*, 16, 113-20.
- Neki, N. S., Shergill, G. S., Singh, A., Rampal, V. K., Nizami, S., & Singh, T. (2017). Acute pancreatitis with normal amylase and lipase levels. *Journal of Postgraduate Medical Institute*, 31(2).
- Hong, W., Geng, W., Chen, B., Basharat, Z., Wu, Q., Zimmer, V., & Zhou, M. (2017). Predictors of acute pancreatitis with low elevation of serum amylase. *Therapeutics and Clinical Risk Management*, 13, 1577.
- Al-Bahrani, A. Z., & Ammori, B. J. (2005). Clinical laboratory assessment of acute pancreatitis. *Clinica Chimica Acta*, 362(1-2), 26-48.
- Clavien, P. A., Burgan, S., & Moossa, A. R. (1989). Serum enzymes and other laboratory tests in acute pancreatitis. *British journal of surgery*, 76(12), 1234-1243.
- Chatila, A. T., Bilal, M., & Guturu, P. (2019). Evaluation and management of acute pancreatitis. *World journal of clinical cases*, 7(9), 1006.
- Pieper-Bigelow, C., Strocchi, A., & Levitt, M. D. (1990). *Gastroenterology clinics of North America*, 19(4), 793-810.
- Meher, S., Mishra, T. S., Sasmal, P. K., Rath, S., Sharma, R., Rout, B., & Sahu, M. K. (2015). Role of biomarkers in diagnosis and prognostic evaluation of acute pancreatitis. *Journal of biomarkers*, 2015.
- Ventrucci, M. (1993). Update on laboratory diagnosis and prognosis of acute pancreatitis. *Digestive Diseases*, 11(3), 189-196.
- Papachristou, G. I. (2008). Prediction of severe acute pancreatitis: current knowledge and novel insights. *World journal of gastroenterology: WJG*, 14(41), 6273.
- Muzahim, Y. E., Parish, D. C., & Goyal, H. (2021). Insights into Acute Pancreatitis Associated COVID-19: Literature Review. *Journal of Clinical Medicine*, 10(24), 5902.
- Liu, P., Xia, L., Zhang, W. L., Ke, H. J., Su, T., Deng, L. B., ... & Lv, N. H. (2014). Identification of serum microRNAs as diagnostic and prognostic biomarkers for acute pancreatitis. *Pancreatology*, 14(3), 159-166.