



ROLE OF SERUM LDH AND ALBUMIN IN PREDICTING SEVERITY OF ACUTE PANCREATITIS

General Medicine

Dr. Rahul

Postgraduate, Department of General Medicine, MR Medical College Kalaburagi.

Dr. Suresh Harsoor

Professor & Head of the department Department of General Medicine, MR Medical College Kalaburagi.

Dr Sharanabasappa Andagi

Postgraduate, Department of General Medicine, MR Medical College Kalaburagi.

ABSTRACT

Background: Acute pancreatitis (AP) is an inflammatory disease with varied presentations, ranging from mild self-limiting episodes to severe, life-threatening conditions. Timely identification of severe cases is crucial. **Objective:** This study aimed to determine the significance of serum lactate dehydrogenase (LDH) and albumin levels in assessing the severity of acute pancreatitis. **Methods:** A prospective observational study was conducted on 66 patients diagnosed with AP based on the Revised Atlanta Criteria (2012). Serum LDH and albumin levels were measured within 24 hours of admission and correlated with severity indicators such as BISAP, Ranson's, and APACHE II scores. **Results:** Elevated LDH (>250 U/L) and hypoalbuminemia (<3.5 g/dL) were significantly associated with severe AP. Among patients with LDH >500 U/L, 100% had severe disease. Patients with serum albumin <3.0 g/dL were predominantly in the severe category. These findings highlight the predictive value of these markers. **Conclusion:** Serum LDH and albumin are simple, accessible biomarkers that provide valuable early insights into the severity of acute pancreatitis. Incorporating them into routine clinical practice can improve outcomes, especially in resource-constrained settings.

KEYWORDS

INTRODUCTION

Acute pancreatitis (AP) is a common emergency disease with widely varying severity. Its wide clinical variations make the diagnosis complex. Acute pancreatitis is now one of the most common reasons for hospitalization with gastro intestinal condition and its worldwide incidence in the range of 20 to 40 for 100000 population. AP is best defined physiologically as an acute inflammatory process of the pancreas with variable involvement of other regional tissues or remote organ systems. According to Revised Atlanta Criteria 2012 Severe Acute Pancreatitis (SAP) is defined as acute pancreatitis with persistent organ failure (Include either single organ or multiorgan) lasting for more than 48hours¹.

In India, the incidence of acute pancreatitis has been reported at between 114 and 210 per 100,000 people.² Early assessment of severity allows the triage of patients to improve outcomes. Multiple clinical scoring systems, like the Bedside Index of Severity in Acute Pancreatitis (BISAP), have been developed but remain underutilized owing to their complexity.³

Simple laboratory markers have shown promise in predicting the prognosis of acute pancreatitis. Serum lactate dehydrogenase (LDH), in spite of its poor organ specificity, can effectively reflect the pancreatitis caused damage to other organs, and, accordingly, should be served as an indicator evaluating the progression and severity of AP. Serum albumin reflects nutritional status; its decline indicates greater severity. The mechanisms of hypoalbuminemia in acute pancreatitis are diverse such as reduced amino acid supply and action of inflammatory cytokines³. Serum LDH, and Albumin obtained within the first 24 hours of hospital admission are useful predictors of severity in Acute Pancreatitis.^{4,5}

So easily availability of these laboratory investigation can be used for early assessment and treatment of severe Acute Pancreatitis (SAP) and helps in reducing mortality due to Acute pancreatitis.

Therefore, this study on serum LDH, and albumin level in predicting the severity of Acute pancreatitis has been undertaken. The findings of this study could have significant clinical implications, particularly in resource-limited settings where advanced diagnostic tools are not readily available.

OBJECTIVES OF THE STUDY

- 1) To study Serum LDH, and Albumin Levels in Acute Pancreatitis.
- 2) To correlate Serum LDH, and Albumin levels with severity of Acute Pancreatitis

MATERIALS AND METHODS

- The observational Cross sectional study in Department of General Medicine, at Basaveshwar Teaching & General Hospital, attached to Mahadevappa Rampure Medical College, Kalaburagi
- A total of 66 patients who met inclusion and exclusion criteria were selected from medicine wards and ICU from general medicine department
- A detailed history obtained from qualifying patients using a pre-designed, structured proforma. Further, a detailed systemic examination, followed by relevant investigations will be conducted and the results will be noted.
- Investigations will be done using following methods ,LDH using UV enzymatic ,CRP using enzymatic calorimetric, Albumin using BCG methods.
- Data analyzed by using IBM SPSS 25.0 version software. Qualitative data by chi square and Quantitative data by T-test and ANOVA test, mean, median, standard deviation for correlation will be applied for significance . p value <0.05 is considered as significant.

Inclusion and exclusion criteria

Inclusion Criteria:

1. Patient above the age of 18 years of any gender.
2. All cases of Acute Pancreatitis diagnosed based on Revised Atlanta Criteria 2012.

Exclusion Criteria:

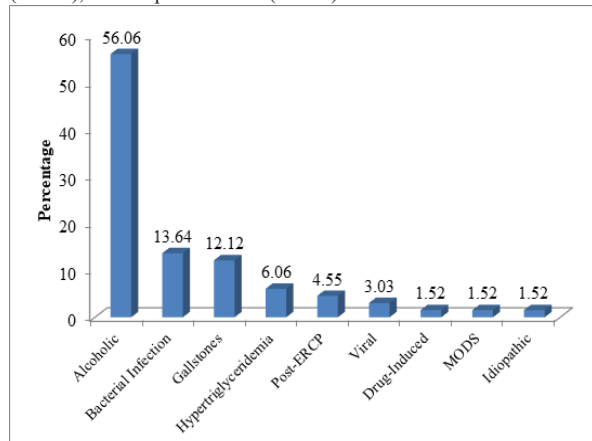
1. Patients with other causes of Hypoalbuminemia (malnutrition ,chronic renal disease etc.)
2. Patients with liver cirrhosis, autoimmune liver diseases and hepatobiliary malignancies ,myocardial infarction, hemolytic anemia etc.)
3. Patients with chronic diseases (Tuberculosis, Rheumatoid arthritis etc.)
4. Pancreatitis induced by trauma or pregnancy.

RESULTS

Table 1: Etiology Distribution Of Patients With Acute Pancreatitis

Etiology	Number of Patients	Percentage (%)
Alcoholic	37	56.06
Bacterial Infection	9	13.64
Gallstones	8	12.12
Hypertriglyceridemia	4	6.06
Post-ERCP	3	4.55
Viral	2	3.03
Drug-Induced	1	1.52
MODS	1	1.52
Idiopathic	1	1.52
Total	66	100.00

The table shows the etiology distribution. Alcohol consumption was the most common cause (56.06%) of acute pancreatitis in the study population, with 37 out of 66 patients having alcoholic pancreatitis. Bacterial infection was the second most common cause (13.64%), followed closely by gallstones (12.12%). Other less common etiologies included hypertriglyceridemia (6.06%), post-ERCP (4.55%), viral infection (3.03%), drug-induced (1.52%), MODS (1.52%), and idiopathic causes (1.52%).

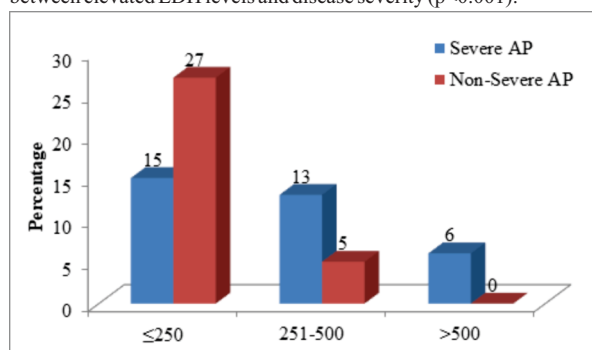


Graph 1: Etiology Distribution Of Patients With Acute Pancreatitis

Table No 2 : Relationship Between Serum LDH And Acute Pancreatitis Severity

Serum LDH (U/L)	Severe AP	Non-Severe AP	Total	Chi-Square	p-value
≤250	15	27	42	12.67	<0.001
251-500	13	5	18		
>500	6	0	6		
Total	34	32	66		

The table shows the relationship between serum LDH levels and acute pancreatitis severity. Among patients with LDH levels ≤250 U/L, 15 had severe AP while 27 had non-severe AP. Among those with LDH levels 251-500 U/L, 13 had severe AP and 5 had non-severe AP. All 6 patients with LDH levels >500 U/L had severe AP. The chi-square value was 12.67, indicating a statistically significant association between elevated LDH levels and disease severity ($p < 0.001$).



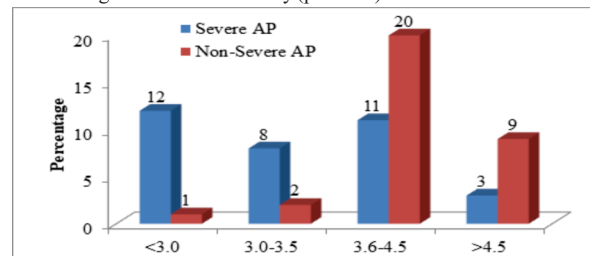
Graph 2: Relationship Between Serum LDH And Acute Pancreatitis Severity

Table No 3: Relationship Between Serum Albumin And Acute Pancreatitis Severity

Serum Albumin (g/dL)	Severe AP	Non-Severe AP	Total	Chi-Square	p-value
<3.0	12	1	13	19.43	<0.001
3.0-3.5	8	2	10		
3.6-4.5	11	20	31		
>4.5	3	9	12		
Total	34	32	66		

The table shows the relationship between serum albumin levels and acute pancreatitis severity. Among patients with albumin levels <3.0 g/dL, 12 had severe AP while only 1 had non-severe AP. Among those with albumin levels 3.0-3.5 g/dL, 8 had severe AP and 2 had non-severe AP. For albumin levels 3.6-4.5 g/dL, 11 had severe AP and 20

had non-severe AP. Among those with albumin levels >4.5 g/dL, 3 had severe AP and 9 had non-severe AP. The chi-square value was 19.43, indicating a statistically significant association between lower albumin levels and greater disease severity ($p < 0.001$).



Graph 3: Relationship Between Serum Albumin And Acute Pancreatitis Severity

DISCUSSION

Alcohol was the most common cause (56.06%), followed by infection and gallstones. Though etiology did not significantly influence severity (Table 24, $p = 0.553$), alcohol-induced cases often present with recurrent or chronic symptoms. Understanding etiology is essential for guiding preventive counseling and long-term management.

LDH enhances early risk stratification when combined with clinical scores. The high specificity of LDH supports its inclusion in early diagnostic panels, especially in resource-limited settings where imaging may be delayed.

Dr Edwin TKV et al. reported that 65.9% of patients had LDH levels below 400 IU/L, which is considered within the normal range.⁷

According to the researches the phenomenon of low-level serum albumin in these diseases due to abnormal metabolism of albumin led by inflammatory response, as well as a low intake of albumin⁶. albumin obtained within the first 24 hours of hospital admission are useful predictors of severity in Acute Pancreatitis and have specificity, sensitivity and predictive values that are comparable with other routinely used prognostic scales Akshay et al. reported serum albumin levels below 3.2 g/dL were associated with severe acute pancreatitis. This finding is consistent with the study by Shoukang Li et al., who identified hypoalbuminemia as a predictor of persistent organ failure.^{8,6}

CONCLUSION

This study demonstrates that serum LDH and albumin levels measured within the first 24 hours of admission serve as reliable and cost-effective biomarkers for predicting the severity of acute pancreatitis. A statistically significant association was found between elevated LDH levels—particularly those exceeding 500 U/L—and severe acute pancreatitis. Similarly, hypoalbuminemia, especially levels below 3.0 g/dL, strongly correlated with increased disease severity.

These findings underscore the utility of LDH and albumin as early, accessible prognostic indicators, especially valuable in resource-limited settings where advanced imaging and complex scoring systems may not be readily available. Routine incorporation of these parameters into initial clinical assessments can enhance triage decisions, optimize resource utilization, and potentially improve patient outcomes.

REFERENCES

- 1) Vege SS. Acute pancreatitis. In: Feldman M, Friedman LS, Brandt LJ, editors. Sleisenger and Fordtran's Gastrointestinal and Liver Disease. Philadelphia, PA: Elsevier; 2020. p. 893–916.
- 2) Yadav D, Lowenfels AB. The epidemiology of pancreatitis and pancreatic cancer. Gastroenterology. 2013;144:1252–1261.
- 3) Mederos MA, Reber HA, Gargis MD. Acute pancreatitis: a review. JAMA. 2021;325:382–390.
- 4) Yin X, Xu J, Zhang Q, Yang L, Duan Y. Quantification analysis of lactate dehydrogenase and C-reactive protein in evaluation of the severity and prognosis of the acute pancreatitis. Cell Mol Biol. 2020;66(1):122–5.
- 5) Hong W, Lin S, Zippi M, Geng W, Stock S, Basharat Z, et al. Serum albumin is independently associated with persistent organ failure in acute pancreatitis. Can J Gastroenterol Hepatol. 2017;2017:1–10.
- 6) Shoukang Li, Yushun Zhang, Mengjiao, Chao Xie and Heshui Wu. Serum albumin, a good indicator of persistent organ failure in Acute Pancreatitis. BMC Gastroenterology 201;17(1):59.
- 7) Dr Edwin TKV. Assessment of Severity of Acute Pancreatitis Using Inflammatory Markers C Reactive Protein and Lactate Dehydrogenase A Crosssectional Study in A Tertiary Care Centre. International Journal Dental and Medical Sciences Research.2023;5(2):787-814.
- 8) Akshay, Dr. Basavaraj RP, Dr. Vinod VS. A study of serum calcium and serum albumin levels in predicting severity of acute pancreatitis. Int. J. Adv. Res.2023;11(01):1598-1608