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Original Research Article

Correlation of Serum Triglyceride Levels with the Severity of Acute Pancreatitis: A Retrospective Study

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Conflict of interest: Nil

Abstract:

Background: Acute pancreatitis (AP) is a potentially lethal illness with a grim prognosis if it progresses to its severe form. The pathogenesis of acute pancreatitis is linked to serum triglyceride levels. The correlation between blood triglyceride (TG) levels and the severity of acute pancreatitis (AP) is inadequately comprehended. This study aims to examine the relationship between serum triglyceride levels and the severity of acute pancreatitis.

Aim: To assess the impact of triglyceride levels on the severity of hypertriglyceridemic pancreatitis (HTGP).

Methods: Patients were prospectively enrolled using APPRENTICE. Elevated triglyceride levels were established according to the Endocrine Society Clinical Practice Guidelines. HTG was classified as mild (serum TG levels 150 mg/dL), moderate (150–499 mg/dL), severe (500–999 mg/dL), and very severe (≥1,000 mg/dL). The severity of acute pancreatitis was determined according to the updated Atlanta categorization criteria.

Results: 46 % of patients exhibited high blood triglyceride levels (>150 mg/dL). The Revised Atlanta Classification indicates that 46 patients experienced mild acute pancreatitis, 32 had moderately severe acute pancreatitis, and 16 suffered from severe acute pancreatitis. Severe acute pancreatitis was more commonly observed in patients with triglyceride levels ≥500 mg/dL.

Conclusions: The present investigation identified elevated blood triglyceride levels as an independent predictor of increased severity of acute pancreatitis and unfavorable clinical outcomes in patients with elevated serum triglycerides. This study endorses serum TG levels as a dependable metric for the swift identification of high-risk AP patients, enabling timely interventions and enhanced results.

Keywords: Hypertriglyceridemia, Acute Pancreatitis, Severity, Pancreatitis, Ranson, Serum, Triglyceride.

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Introduction

Acute pancreatitis (AP) is a prevalent gastrointestinal emergency characterized by a clinical spectrum that varies from mild, self-resolving conditions to severe, life-threatening illnesses accompanied by multiorgan failure [1]. Timely identification of patients predisposed to severe acute pancreatitis is essential for prompt intervention, suitable triage, and efficient resource allocation [2].

Hypertriglyceridemia is a recognized causative factor for acute pancreatitis and is frequently observed due to the rising prevalence of metabolic syndrome, diabetes mellitus, and lifestyle-related illnesses [3]. In addition to being a causal factor, increased blood triglyceride (TG) levels may exacerbate the severity of pancreatic inflammation via lipotoxicity, free fatty acid-mediated damage, and microcirculatory dysfunction [4].

Various grading systems, including Ranson's criteria, BISAP, and the Revised Atlanta Classification, are employed to forecast severity; nevertheless, they often necessitate many variables and serial evaluations [5]. Serum triglyceride levels, if associated with disease severity, may function as a straightforward and early biochemical prediction [6]. This study is to assess the relationship between blood triglyceride levels upon admission and the severity of acute pancreatitis.

Methods

Study Design and Setting: This retrospective observational study was performed at Rajarajeswri

Medical College and Hospital in Bengaluru, India, during an 18-month duration.

Study Population: 100 patients diagnosed with acute pancreatitis during the study period were included.

Inclusion Criteria

- Age ≥18 years
- Diagnosis of acute pancreatitis based on at least two of the following: characteristic abdominal pain, serum amylase/lipase ≥3 times the upper limit of normal, or imaging findings consistent with acute pancreatitis
- Availability of serum triglyceride levels measured within 24 hours of admission

Exclusion Criteria

- Chronic pancreatitis
- Acute-on-chronic pancreatitis
- Pregnancy
- Incomplete medical records

Data Collection: Data were extracted from hospital medical records and encompassed demographic information, cause of pancreatitis, serum triglyceride levels upon admission, laboratory measurements, imaging results, and clinical outcomes. The severity of acute pancreatitis was categorized according to the Revised Atlanta Classification into mild, moderately severe, and severe acute pancreatitis.

Serum triglyceride levels were categorized as:

- Normal: <150 mg/dL
- Mild elevation: 150–499 mg/dL
- Moderate elevation: 500–999 mg/dL
- Severe elevation: ≥1000 mg/dL

Outcome Measures: The primary outcome was the intensity of acute pancreatitis. Secondary outcomes encompassed the emergence of local or systemic problems, the necessity for intensive care unit (ICU) admission, and fatality rates.

Statistical Analysis: The data were examined employing descriptive statistics. Continuous variables were represented as mean ± standard deviation, whereas categorical variables were denoted as frequencies and percentages. The relationship between blood triglyceride levels and the severity of pancreatitis was evaluated using the chi-square test and Pearson correlation coefficient, with $p < 0.05$ deemed statistically significant.

Results

Baseline Characteristics: The study comprised 100 individuals with a mean age of 46.8 ± 13.9 years. There were 68 males and 32 females. The predominant aetiologies were alcohol-induced pancreatitis (44%), gallstone pathology (32%), hypertriglyceridemia (14%), and idiopathic origins (10%).

Serum Triglyceride Levels: Upon admission, 46 % of patients exhibited high blood triglyceride levels (>150 mg/dL).

Table 1: Serum TG Level (mg/dL)

Serum TG Level (mg/dL)	Number of Patients (%)
<150	46 (46%)
150–499	32 (32%)
500–999	16 (16%)
≥1000	6 (6%)

Correlation with Severity of Acute Pancreatitis: The Revised Atlanta Classification indicates that 46 patients experienced mild acute pancreatitis, 32 had moderately severe acute pancreatitis, and 16 suffered from severe acute pancreatitis.

Elevated blood triglyceride levels were substantially correlated with heightened disease severity. Severe acute pancreatitis was more commonly observed in patients with triglyceride levels ≥500 mg/dL.

Table 2: TG Category

TG Category	Mild AP	Moderately Severe AP	Severe AP
<150	30	8	4
150–499	16	16	2
500–999	4	8	8
≥1000	0	4	4

A significant positive connection was identified between serum triglyceride levels and the severity of acute pancreatitis ($p < 0.001$).

Clinical Outcomes: Patients with triglyceride levels ≥500 mg/dL exhibited increased rates of ICU admission, local complications, and mortality in comparison to individuals with normal or modestly elevated levels.

Discussion

This study reveals a substantial positive connection between serum triglyceride levels upon admission

and the severity of acute pancreatitis. Individuals with moderate to severe hypertriglyceridemia exhibited a higher propensity for developing severe illness, systemic problems, and necessitating critical care support [7].

The pathogenic processes connecting high triglycerides to severe pancreatitis involve the hydrolysis of triglycerides by pancreatic lipase into free fatty acids, resulting in direct acinar cell damage, endothelial dysfunction, and the exacerbation of inflammatory cascades [8]. These actions may intensify pancreatic necrosis and the systemic inflammatory response.

Our results align with other research indicating that elevated triglyceride levels correlate with poorer clinical outcomes, even when hypertriglyceridemia is not the principal cause [9]. This substantiates the notion that blood triglyceride levels may function as an accessible indicator for risk stratification in acute pancreatitis [10].

Limitation The study's limitations encompass its retrospective design, single-center focus, and failure to compensate for recognized severity grading systems like APACHE II or BISAP. Multicentric studies are necessary to further confirm blood triglycerides as an independent predictor of severity.

Conclusion

Serum triglyceride levels at admission exhibit a substantial link with the severity of acute pancreatitis. Individuals with excessive triglyceride concentrations, namely ≥500 mg/dL, have heightened risk for severe illness and negative outcomes. Timely assessment of blood triglycerides may facilitate immediate risk classification and inform enhanced monitoring and intensive care in individuals with acute pancreatitis.

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