



EVALUATING SERUM ALBUMIN AND CRP LEVEL IN ACUTE ISCHEMIC STROKE :THEIR ROLE IN DISEASE SEVERITY

General Medicine

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ABSTRACT

This study examines the correlation between serum albumin and high-sensitivity C-reactive protein (hs-CRP) levels with the severity of acute ischemic stroke (AIS) at the time of admission. Conducted at AIMS&RC, Rajsamand this cross-sectional observational study included 90 AIS patients. Results indicate a significant association between hypoalbuminemia and increased stroke severity ($p < 0.001$) and between elevated hs-CRP levels and stroke severity ($p < 0.05$). The study underscores the prognostic value of these biomarkers in AIS, suggesting their potential role in risk stratification and guiding treatment decisions for improved patient outcomes.

KEYWORDS

INTRODUCTION

Stroke, a cerebrovascular disease, is a leading cause of mortality and morbidity worldwide, including in India. Albumin possesses immunomodulatory and neuroprotective properties, potentially reversing thrombosis, improving microvascular perfusion, and reducing cerebral edema. Studies have established a link between hypoalbuminemia and severe stroke, poor outcomes, and increased mortality.

C-reactive protein (CRP) is an acute-phase protein synthesized by hepatocytes, playing a key role in immune modulation and inflammation regulation. CRP is associated with atherosclerosis and systemic inflammation post-stroke. Elevated hs-CRP levels indicate a heightened inflammatory response and correlate with stroke severity.

Aim And Objectives

- To investigate the correlation between serum albumin and hs-CRP levels with the severity of acute ischemic stroke at admission.

MATERIAL AND METHODS

Aim: To study the correlation between serum albumin and hs-CRP levels with stroke severity.

Objective: Measurement of serum albumin and hs-CRP levels in AIS patients at admission.

Study Place: Department of Medicine AIMS & RC RAJSAMAND

Study Design: Cross-sectional observational study.

Study Period: 1st JANUARY 2023 – 29th NOVEMBER 2023.

Sample Size: Based on prior studies, the minimum required sample size was calculated as 81 patients, with a total of 90 patients enrolled. The NIHSS score at admission categorized stroke severity into mild (1-4), moderate (5-15), moderate-severe (16-20), and severe (21-42).

Serum albumin and hs-CRP levels were measured at admission. Hypoalbuminemia was defined as serum albumin < 3.5 g/dL. Patients were categorized into low-risk (< 1 mg/L), average-risk (1-3 mg/L), and high-risk (> 3 mg/L) groups based on hs-CRP levels.

Inclusion Criteria

- Patients aged 18-70 years diagnosed with first-time AIS and admitted within 24 hours of symptom onset.
- Informed written consent was obtained from all participants.

Exclusion Criteria

- Patients with chronic liver or kidney disease.
- Patients with chronic inflammatory conditions (e.g., tuberculosis, SLE, rheumatoid arthritis).
- Recent history of myocardial ischemia.
- BMI < 18.5 kg/m².
- Use of steroids, anti-platelet agents, or oral contraceptive pills.

RESULTS

- Prevalence of hypoalbuminemia in AIS patients:** 60%
- Association of hypoalbuminemia with stroke severity on NIHSS score:**
- There was a statistically significant correlation between hypoalbuminemia and stroke severity ($p < 0.001$).

Stroke severity on NIHSS score	Hypoalbuminemia		p-value
	Present	Absent	
Mild	5 (13.88%)	32 (59.25%)	$< 0.001^{\dagger}$
Moderate	15 (41.66%)	15 (27.77%)	
Moderate-severe	5 (13.88%)	4 (7.4%)	
Severe	11 (30.55%)	3 (5.55%)	

Distribution of cases according to hs-CRP levels. (N = 90)

Distribution of cases based on hs-CRP levels (N = 90):

- Low-risk (< 1.0 mg/L) - 1%
- Average-risk (1.0 – 3.0 mg/L) - 82%
- High-risk (> 3.0 mg/L) - 17%

Correlation between hs-CRP levels and stroke severity on NIHSS score:

- A statistically significant correlation was found between hs-CRP levels and stroke severity ($p < 0.05$).

Stroke severity on NIHSS score	Hs-CRP		p-value
	Low/Average risk	High risk	
Mild	12 (75%)	25 (33.78%)	0.013 [†]
Moderate	4 (25%)	26 (35.13%)	
Moderate-severe	0 (0%)	9 (12.16%)	
Severe	0 (0%)	14 (18.91%)	

CONCLUSION

This study highlights a high prevalence of hypoalbuminemia in AIS patients and establishes a significant association between serum albumin, hs-CRP levels, and stroke severity. These findings emphasize the prognostic value of these biomarkers in assessing stroke severity and guiding clinical management. Incorporating serum albumin and hs-CRP measurements into stroke evaluation protocols may enhance risk stratification and inform treatment strategies.

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