



SERUM ALBUMIN AS A PROGNOSTIC MARKER IN SEPSIS: A CLINICAL STUDY

General Medicine

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ABSTRACT

Sepsis is a life-threatening condition characterized by organ dysfunction resulting from a dysregulated host response to infection. Despite advances in critical care, sepsis continues to account for high morbidity and mortality worldwide, with an estimated 48.9 million cases and 11 million deaths annually. Prognostic tools such as Sequential Organ Failure Assessment (SOFA) and Acute Physiology and Chronic Health Evaluation (APACHE II) are widely used but remain resource-intensive, particularly in low- and middle-income countries. Therefore, identifying simple, cost-effective biomarkers is crucial for improving clinical outcomes. Serum albumin, a vital plasma protein with roles in colloid osmotic pressure, transport, anti-inflammatory, and antioxidant activities, has emerged as a potential predictor of sepsis severity and prognosis. Hypoalbuminemia is frequently observed in septic patients, resulting from capillary leakage, impaired synthesis, and increased catabolism. Several studies suggest that decreased serum albumin levels are associated with higher mortality, increased vasopressor requirements, renal replacement therapy, and prolonged intensive care unit (ICU) stay. Clinical trials such as the SAFE and ALBIOS studies demonstrated the safety of albumin administration but failed to establish clear survival benefits, though subgroup analyses indicate potential advantages in septic shock patients. Recent observational studies also support serum albumin as an independent prognostic factor, with lower levels correlating with worse outcomes. This paper aims to evaluate the prognostic significance of serum albumin in sepsis, particularly its role in predicting severity and mortality in ICU patients. While controversies remain regarding therapeutic supplementation, serum albumin measurement represents a practical tool for early risk stratification and outcome prediction in sepsis management.

KEYWORDS

Sepsis, Serum Albumin, Prognosis, Mortality

INTRODUCTION

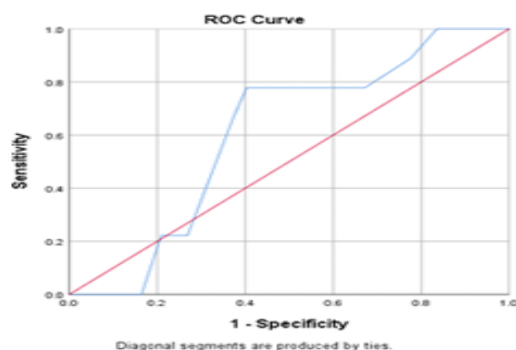
Sepsis is defined as a life-threatening organ dysfunction caused by a dysregulated host response to infection [1]. It is a major public health problem, contributing to approximately 20% of global deaths annually [2]. Despite advances in diagnosis and therapy, sepsis remains associated with high morbidity and mortality. Conventional prognostic scoring systems such as SOFA and APACHE II are widely used but are limited by their complexity and cost [3]. Therefore, simple and reliable biomarkers are needed. Serum albumin, an abundant plasma protein, has been proposed as a prognostic marker due to its role in maintaining vascular integrity, oncotic pressure, and its anti-inflammatory properties [4,5].

MATERIALS AND METHODS

This review is based on an analysis of existing literature evaluating the association between serum albumin levels and sepsis prognosis. Relevant studies include large randomized controlled trials (SAFE, ALBIOS), observational studies, and meta-analyses assessing serum albumin trends, mortality, and outcomes in septic patients [4,7,8,9,10]. The objective was to summarize evidence regarding serum albumin as a prognostic biomarker and its clinical implications.

RESULTS

Table 1. ROC Curve Showing 78% Sensitivity And 60% Specificity.



Multiple studies consistently demonstrated that hypoalbuminemia is common among septic patients and is associated with worse outcomes. A meta-analysis indicated that for every 10 g/L decrease in serum albumin, in-hospital mortality increased by 137% [6]. The ALBIOS trial reported no overall mortality reduction with albumin supplementation but noted faster vasopressor weaning and improved hemodynamic stability in albumin-treated patients [7]. Observational studies from India and Japan confirmed that hypoalbuminemia significantly increases mortality and vasopressor use [8,9].

Longitudinal studies further highlighted that declining serum albumin trends predict higher ICU mortality [10,11].

Table 2. Area Under The Curve (0.603) Is Not Found To Be Significant

Test Result Variable(s): albumin				
Area	Std. Error	Asymptotic Sig.	Asymptotic 95% Confidence Interval	
			Lower Bound	Upper Bound
.603	.083	.319	.440	.766

Table 3: Coordinates Of The Curve

Coordinates of the Curve		
Test Result Variable(s): albumin		
Positive if Greater Than or Equal To	Sensitivity	1 - Specificity
1.500	1.000	1.000
2.600	1.000	.896
2.750	1.000	.836
2.850	.889	.776
2.950	.778	.672
3.050	.778	.403
3.150	.667	.373
3.250	.222	.269
3.350	.222	.239
3.450	.222	.209
3.550	.000	.164
3.650	.000	.045
3.750	.000	.030
3.850	.000	.015
4.900	.000	.000

DISCUSSION

Serum albumin serves both as a prognostic marker and as a potential therapeutic target in sepsis. While hypoalbuminemia correlates with poor outcomes, the benefit of exogenous albumin replacement remains controversial. The SAFE trial established safety but no superiority over crystalloids [4]. The ALBIOS study suggested possible hemodynamic benefits but failed to show survival advantage [7]. Observational data reinforce albumin's prognostic value, particularly in identifying high-risk patients early [8,9,10]. Importantly, serum albumin measurement is cost-effective and feasible in resource-limited settings, making it a valuable adjunct to existing prognostic tools.

CONCLUSION

Serum albumin is a strong predictor of severity and outcome in sepsis. Hypoalbuminemia is associated with higher mortality, increased vasopressor support, and prolonged ICU stays. Although therapeutic albumin replacement remains debatable, its prognostic role is well established. Routine measurement of serum albumin can facilitate early risk stratification, guide management, and potentially improve outcomes in septic patients.

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