

## EVALUATION OF THE ROLE OF SERUM ALBUMIN LEVELS AS PROGNOSTIC MARKER IN CRITICALLY ILL PATIENTS

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### Abstract

**Background:** Critical care involves the management of patients facing life-threatening illnesses or those at significant risk of such conditions. Albumin constitutes the predominant circulating protein in plasma, accounting for approximately 50% of the total protein content. Hence, the present study was conducted to evaluate the role of serum albumin levels as prognostic marker in critically ill patients. **Materials and Methods:** 200 critically ill patients were evaluated. Only those patients were enrolled which were admitted to ICUs. Patients with serum albumin measurements conducted at the first recorded ICU admission were included in the study. The primary outcome was ICU mortality, defined as death for any reason before ICU discharge. Complete demographic and clinical details of all the patients were obtained. All data were systematically recorded in a Microsoft Excel spreadsheet and subsequently analyzed using SPSS software. All data were systematically recorded in a Microsoft Excel spreadsheet and subsequently analyzed using SPSS software. **Results:** Mean age of the patients was 49.2 years/ majority proportion of patients were males. Mortality occurred in 32 percent of the patients. At day 1, the mean serum albumin levels among survivors and mortality cases were 3.8 g/dl and 3.5 g/dl respectively. At day 5, mean serum albumin levels among survivors and mortality cases was 3.9 g/dl and 2.8 g/dl respectively. Mean serum albumin levels were significantly lower among mortality cases in comparison to survivors at day 3. Serum albumin can be used as a prognostic indicator among critically ill patients.

## INTRODUCTION

Critical care involves the management of patients facing life-threatening illnesses or those at significant risk of such conditions. The intensive care unit (ICU) serves as a specialized environment where enhanced staffing levels, sophisticated monitoring, and organ support are provided to mitigate patient morbidity and mortality. Nevertheless, the provision of effective intensive care necessitates a holistic strategy that extends beyond the confines of the ICU.<sup>[1,2]</sup> This approach includes preventive measures, early detection and intervention systems, a collaborative multidisciplinary framework both prior to and during the ICU admission, along with thorough post-discharge follow-up or high-quality palliative care.<sup>[3,4]</sup>

Albumin constitutes the predominant circulating protein in plasma, accounting for approximately 50% of the total protein content, which ranges from 3.5 g/dL to 5 g/dL in healthy individuals. This protein is synthesized by liver hepatocytes, which release it into the bloodstream at a rate of approximately 10g to 15g

daily. The liver does not store significant amounts of albumin; rather, it is quickly secreted into circulation. In humans, serum albumin plays a crucial role in modulating plasma oncotic pressure and serves as a transporter for both endogenous substances and exogenous compounds, such as pharmaceuticals. In the realm of clinical medicine, serum albumin levels can be assessed through routine serum laboratory tests, and this measurement is often utilized as an indicator of a patient's nutritional status.<sup>[5-7]</sup> Hence; the present study was conducted to evaluate the role of serum albumin levels as prognostic marker in critically ill patients.

## MATERIALS AND METHODS

Present study was conducted to evaluate the role of serum albumin levels as prognostic marker in critically ill patients. A total of 200 critically ill patients were evaluated. Only those patients were enrolled which were admitted to ICUs. Patients with serum albumin measurements conducted at the first recorded ICU admission were included in the study.

The primary outcome was ICU mortality, defined as death for any reason before ICU discharge. Complete demographic and clinical details of all the patients were obtained. All data were systematically recorded in a Microsoft Excel spreadsheet and subsequently analyzed using SPSS software.

## RESULTS

The mean age of the patients was 49.2 years/ majority proportion of patients were males. Mortality occurred in 32 percent of the patients. At day 1, the mean serum albumin levels among survivors and mortality cases were 3.8 g/dl and 3.5 g/dl respectively. At day 5, mean serum albumin levels among survivors and mortality cases was 3.9 g/dl and 2.8 g/dl respectively. Mean serum albumin levels were significantly lower among mortality cases in comparison to survivors at day 3.

**Table 1: Demographic profile.**

Demographic details	Number	Percentage
Mean age (years)	49.2	
Males	128	64
Females	52	26

**Table 2: Comparison of serum albumin levels among mortality cases and survivors**

Mean serum albumin levels (g/dL)	Survivors	Mortality cases
Day 1	3.8	3.5
Day 3	3.9	2.8

## DISCUSSION

The management of critically ill patients has traditionally centered on addressing the primary medical conditions necessitating intensive care unit (ICU) admission. Frequently encountered conditions in this context include respiratory failure, acute myocardial infarction, cerebral infarction or intracranial hemorrhage, and sepsis. Despite the diversity of underlying issues, certain interventions are routinely employed, such as sedation, mechanical ventilation, and artificial nutrition. Until recently, there was a lack of comprehensive evidence regarding the selection of sedatives, the promotion of patient mobility, and the duration of mechanical ventilation. However, over time, clinical practice guidelines for the care of critically ill patients have expanded significantly, evolving from a focus on sedative and analgesic options to include broader elements of supportive care, such as the prevention and management of delirium, nutritional support, and strategies to enhance mobility.<sup>[7-9]</sup> Albumin constitutes over fifty percent of the total protein found in serum. It is estimated that approximately 30 to 40 percent of the body's total albumin reservoir resides within the intravascular compartment. The remaining albumin is located in the extravascular space, primarily within the interstitial areas of muscles and skin. Additionally, albumin is present in minor quantities in various bodily fluids, including sweat, tears, gastric juice, and bile. Due to its size, albumin does not easily diffuse across intact vascular endothelium. Consequently, it serves as the principal protein responsible for generating the essential colloid osmotic or oncotic pressure, which is crucial for regulating the movement of water and diffusible solutes across capillary membranes.<sup>[10,11]</sup>

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## CONCLUSION

Serum albumin can be used as a prognostic indicator among critically ill patients.

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