Research Article

Study of serial serum albumin level in critically ill patients

Amol R Shinde[1*], K S Ghorpade[2], A M Siddiqui[3], Pritee Pendkar[4]

[1]Assistant Professor, [3]Assistant Professor, [4]P.G. Student, Department of Biochemistry, Dr.Shankarrao Chavan Government Medical College, Nanded, Maharashtra, INDIA.
[2]Professor and HOD, Department of Biochemistry, Government Medical College, Akola, Maharashtra, INDIA.
Email: amol.shinde2002@gmail.com

Abstract

Serial Serum albumin measurement was done on Day one, Day four, Day seven and Day ten in total 60 critically ill Adult patients who needed mechanical ventilation for 4 days or more and their outcome was recorded either as discharge of the patient from the hospital as survivor or patient's death in hospital as non-survivor. Here mean value of serum Albumin were significantly low in Non survivor group as compared to Survivor groups on all different days. In both groups level of serum albumin decline from day one today ten but fall in Albumin in non survivors is more steep than survivors. Thus serial serum albumin estimation may be used as prognostic marker in critically ill patients.
Keyword: albumin, critically ill patient.

[*]**Address for Correspondence:**
Dr. Amol R Shinde, Flat No. 106, Gurusai Apartment, Vajirabad, Nanded-431601, Maharashtra, INDIA.
Email: amol.shinde2002@gmail.com
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INTRODUCTION

Patients who are admitted in Intensive Care Unit (I.C.U.) are at an increased risk of mortality due to the severity of their illness. It is thus important to identify these patients, so that such patients can be managed aggressively[1]. Human serum albumin is the most abundant protein in human plasma. It is produced in the liver. Albumin constitutes about half of the serum protein. It is soluble and monomeric. Serum albumin has been the subject of extensive studies as a prognostic marker in various contexts[2]. In view of such observations, the present study was conducted to find out changes in the serum albumin concentrations that occur in critically ill patients.

MATERIAL AND METHODS

A present observational study was conducted in Department of Biochemistry, Dr. Shankarrao Chavan Government Medical College, Nanded on total 60 critically ill adult patients of different etiologies, who needed mechanical ventilation for four days or more. Any patient who dies within four days or weaned from ventilatory support within four days were excluded from the study. Patients associated with liver or renal diseases also excluded from the study. Serial serum albumin estimation was done on these patients on day one when they were put on mechanical ventilator and subsequently on day four, day seven and day ten of their hospital stay. Serum albumin was estimated by Bromocresol green (BCG) method on Accustar semi-autoanalyzer and the outcome of the patient was recorded either as discharge of the patient from the hospital as survivor or patient's death in hospital as non-survivor.

Statistical Methods

Student's unpaired 't' test has been used to find significance of association of albumin between Survivor and Non Survivor on different days.

RESULTS

Total 60 patients were included in our study, out of which 36 (60%) patients were discharged from the hospital (survivors) and 24 (40%) patient died in the hospital (non

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survivors). This Division of the patients based on outcome at the end of the study are presented in Table I.

Table 1: Division of the patients based on outcome at the end of the study

Outcome	Number	Percentages
Survivors	36	60%
Non Survivor	24	40%
Total	**60**	**100%**

Table 2: Comparative levels of mean serum albumin on different days between Survivors and Non Survivor

Days of Albumin Estimation	Mean Serum albumin levels in g/dl		Student's unpaired 't' test. (p Values)
	Survivors	Non Survivors	
Day 1	3.45 ± 0.25	3.03 ± 0.31	<0.001
Day 4	3.13 ± 0.28	2.62 ± 0.29	<0.001
Day 7	2.87 ± 0.21	2.40 ± 0.25	<0.001
Day 10	2.69 ± 0.23	2.11 ± 0.17	<0.001

The comparison of serum albumin on different days between Survivors and Non Survivor are presented in Table II. The mean level of serum Albumin in Survivors group on Day one, Day four, Day seven and Day ten were 3.45 ± 0.25, 3.13 ± 0.28, 2.84 ± 0.54 and 2.69 ± 0.23 respectively, while the mean level of serum Albumin in Non Survivors group on Day one, Day four, Day seven and Day ten were 3.03 ± 0.31, 2.62 ± 0.29, 2.41 ± 0.30 and 2.11 ± 0.17 respectively. Here mean value of serum Albumin were significantly low in Non survivor group as compared to Survivor groups on all different days. Along with this the total decline in serum albumin from day one to day ten in the survivors was 0.76 g/dl. and In non survivors was 0.92 g/dl respectively. This indicate that the fall in Albumin in non survivors is more steep than survivors which summarised in line diagram I and II.

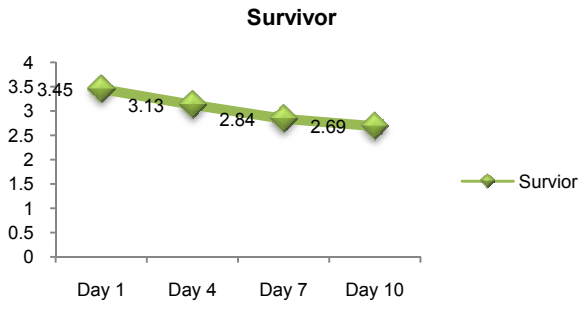

Figure 1: Line diagram I: Decline in serum albumin in the survivors

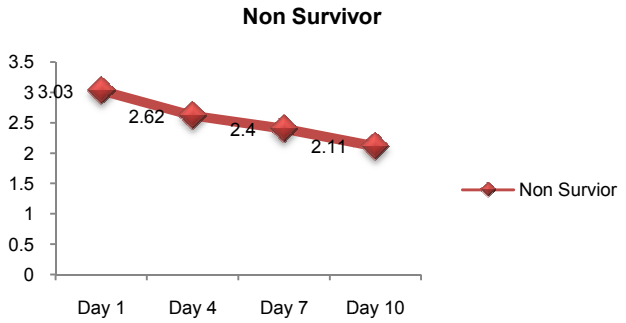

Figure 2: Line diagram II: Decline in serum albumin in Non Survivors

DISCUSSION

The results of the present study show that in both groups level of serum albumin falls after admission. This could be possibly explained by the fact that in the study, both survivors and non survivors had very aggressive fluid resuscitation after ICU admission, this might drop their albumin level[3]. Decrease in Albumin level in critically ill patient might be due to altered distribution of albumin between the intravascular and extravascular compartments. This altered distribution of Albumin in critical illness is related to an increase in capillary leakage associated with inflamation[4]. Another possible reason for decrease in albumin might be due to changes in the rates of synthesis and degradation related to decreases in the transcription rate of albumin mRNA and the synthesis of albumin[5]. Our study shows that the serum albumin levels decreased more rapidly in non survivors as compared to survivors. This finding correlates the finding of McCluskey A *et al*[3].This indicate that the rapidity with which serum albumin level falls may have an effect on the prognosis of the patient in terms of mortality.

CONCLUSION

From above discussion, study concludes that serial serum albumin level estimation might be one of the major factor determining the outcome of critically ill patients who require mechanical ventilation. Serum albumin is routinely measured in all critically ill patients, but it's serial estimation provides idea in the prognosis of the patient. Here steep decline in serum albumin can be considered as an indicator for poor prognosis. Thus serial serum albumin estimation may be used as prognostic marker in critically ill patients but further studies may need in this regard considering large sample size and nullifying the effect of aggressive fluid resuscitation on level of albumin.

REFRENCES

1. Khilnani GC, Banga A, Sharma SK. Predictors of mortality of patients with acute respiratory failure secondary to chronic obstructive pulmonary disease admitted to an intensive care unit. A one year study. BMC Pulm Med 2004; 4: 12 doi: 10.11 86/1471-2466-4-12.
2. Goldwasser P, Feldman J. Association of serum albumin and mortality risk. J ClinEpidemiol 1997; 50: 693–703
3. McCluskey A, Thomas AN, Bowles BJM, Kishen R. The prognostic value of serial measurements of serum albumin in patients admitted to an intensive care unit. Anaesthesia 1996; 51: 724–7.
4. Fleck A, Raines G, Hawker F, Ledingham IM. Synthesis of albumin by patients in septic shock [abstract]. Arch Emergency Med 1984; 1: 177
5. Foley EF, Borlase BC, Dzik WH, Bistrian BR, Benotti PN. Albumin supplementation in the critically ill: a prospective randomised trial. Arch Surg 1990; 125: 739–42

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