## **Original Research Article**

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## Serum albumin as predictor of post-operative morbidity and mortality

# Latika Sharma, Poojan M. Purohit\*, Dharmendra Pipal, Saurabh Kothari, Harshit Srivastava, Amit Soni

Department of General Surgery, Dr. Sampurnanand Medical College, Jodhpur, Rajasthan, India

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\*Correspondence: Dr. Poojan M. Purohit,

E-mail: poojanmpurohit@gmail.com

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#### **ABSTRACT**

**Background:** Protein energy malnutrition affects every organ system. So correct assessment of nutritional status is important as malnourishment is a risk factor for morbidity and morality in surgical patients. In our study, serum albumin has been taken as parameter for nutritional assessment.

**Methods:** Study is conducted on 50 patients admitted in Department of General Surgery, Dr. Sampurnanand Medical College and associated Hospital, Jodhpur, Rajasthan, India for surgeries during January 2014-December 2015. Data was analyzed using Z-test and Fischer exact t-test and p value was calculated. P value <0.05 is considered statistically significant.

**Results:** Patients with serum albumin <3gm/dl had more complications with maximum number of complications in age group of 41-60 year group. This finding was statistically significant.

**Conclusions:** Low serum albumin patients has more post-operative complication than those with normal level and so is a good indicator of post-operative morbidity and mortality.

**Keywords:** Malnourishment, Post-operative mortality, Serum albumin

#### **INTRODUCTION**

The prevalence of protein energy malnutrition in surgical patients is high ranging from 10 to 54%. The correct assessment of the nutritional status is crucial since malnourishment is a risk factor for morbidity and mortality. Identification of patients with high risk is essential in operative indications and decisions often limited by potential morbidities and mortality related to the procedure. Hence, the clinical and laboratory parameters which may point out higher risk for postoperative complications are important. <sup>2</sup>

Malnourishment is reported in 40 -50% of hospitalized patients with higher risk factor for postoperative infections and healing complication in patients who undergo surgeries.<sup>3</sup> Protein-energy malnutrition affects

every organ system. The most obvious results are loss of body weight, adipose tissue and skeletal muscle mass and due to changes in immunological status poor wound healing occurs.<sup>4</sup>

A dietary history and physical examination (including anthropometric measurements) with relevant laboratory tests are appropriate tools needed for an accurate evaluation of a patient's pre-operative nutritional status. Serum albumin is most readily available parameter.

Albumin is a protein synthesized by liver with a long mean life (21 days), hence, variations in its concentration during a short interval can't be explained by nutrition or liver function alteration.<sup>5</sup> Some studies showed that serum albumin lower than 3 gm/dl was followed by anergia as well as by more frequent and severe postoperative

complications.<sup>6,7</sup> A serum albumin level >3.5 gm/dl suggests adequate protein stores and it confers protective effect through several biological mechanisms. It predicts peri-operative morbidity and mortality.<sup>8</sup> Serum albumin level <3.5gm/dl in a stable well hydrated patient suggests malnutrition. Trauma, sepsis and malignancy (catabolic states) lower plasma levels of albumin.

Pitfalls of using serum albumin as predictor of postoperative morbidity and mortality: It has long half-life, so assessment of mortality and morbidity over a shorter interval can't be explained, in dehydrated patients, serum albumin level is normal despite malnutrition. Aim was to study serum albumin and its correlation to postoperative morbidity and mortality.

#### **METHODS**

Prospective study was designed for study. 50 patients were included in the study. Patients admitted in Department of General Surgery, Dr. Sampurnanand Medical College and associated Hospital, Jodhpur (Rajasthan) for surgeries during period of January 2014 to December 2015.

#### Inclusion criteria

Patients who were admitted for surgery under the department of Surgery, Dr. Sampurnanand Medical College, Jodhpur, Rajasthan, India.

#### Exclusion criteria

- Children<15 year of age.
- Patients having icterus.
- Patients having anemia with haemoglobin <8gm/dl.
- Patients with Chronic liver disease and renal disease.
- Patients undergoing laparoscopic surgery.
- Patients undergoing chemotherapy and radiotherapy.

### Method of collection of data

- Details of cases was recorded including history and cinical examination,
- Investigation-Serum albumin was estimated.
- Follow up was done till patient was discharged from hospital.

Statistical analysis was done accordingly, p value < 0.05 was considered statistically significant Z-test and Fischer exact t-test were used for analysis.

#### **RESULTS**

The study was conducted on 50 patients aged between 15-75 years, who underwent any surgery in Department of General Surgery Dr. Sampurnanand Medical College

and associated hospitals, Jodhpur, from Jan 2014 to 2015. Among 50 patients 29 were males and 21 were females. 20 patients developed complication and 30 had uneventful recovery.

Table 1: Sex distribution.

Complications				
Sex	Yes	No	Total	
Female	10 (50%)	19 (63.33%)	29 (58%)	
Male	10 (50%)	11 (36.37%)	21 (42%)	
Total	20	30	50	

Above chart represents 47.62% of males in the study developed complications and 34.48% females had compications.

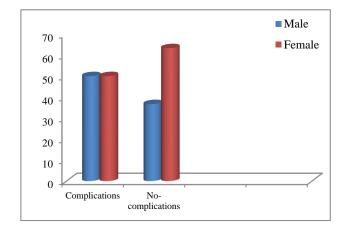


Figure 1: Sex and complication rate.

Among who developed complications 50% were males and 50% females while 36.67% males and 63.33% females had uneventful recovery.

Table 2: Age distribution.

Age (years)	Complications		Total
	Yes	No	
15-20	0	5(16.67%)	5(10%)
21-30	2(10%)	7(23.33%)	9(18%)
31-40	4(20%)	3(10%)	7(14%)
41-50	7(35%)	2 (6.67%)	9(18%)
51-60	5(25%)	6(20%)	11(22%)
61-70	1(5%)	6(20%)	7(14%)
71-75	1(5%)	1(3.33%)	2(4%)
Total	20	30	50

Of 50 patients, the age varied from 15-75yrs. The number of patients in the 41-60 year group was the highest (40%). Highest number of complications was noted in age group of 41-60 years (60%).

Among all the patients who developed complications most common complication is wound infection

13(26%). In post-operative period mortality observed was 3(6%).

**Table 3: Distribution of post-operative outcomes.** 

Postoperative outcomes	No. of patients	Percentage
Wound infection	13	26
Wound gaping	1	2
LRTI	2	4
Left pleural effusion	1	2
Mortality	3	6

Table 4: Comparison of complications and no complication with serum albumin.

Albumin (gm/dl)	Complications		Total	p value
	Yes	No		
≤3	11 (55%)	5 (16.67%)	16 (32%)	< 0.05
3.1 - 3.5	5 (25%)	11 (36.67%)	16 (32%)	>0.05
>3.5	4 (20%)	14 (46.67%)	18 (36%)	< 0.05
Total	20	30	50	

It was observed that the rate of complication was more when serum albumin level was <3.0gm/dl which is statistically significant. Serum albumin level >3.5gm/dl were associated with statistically significant lower complications using the Z test and the Fischer exact t-test.

When comparing serum albumin to the complication rate, it was found that patients with albumin<3gm/dl had complication rate of 68.75%, between 3.1-3.5gm/dl had 31.25% and those >3.5gm/dl had complication rate of 22.22%

#### **DISCUSSION**

Nutritional assessment is essential for identifying patients who are at an increased risk of developing post-operative complications. A variety of nutritional indices have been found to be valuable in predicting patient outcome. In our study preoperative serum albumin was used as nutritional assessment.

On the basis of age distribution in the present study, out of total 50 patients maximum number of complications occurred in age group of 41-60 years with 60% complication rate. This study is concordant with study conducted by Kumar A.<sup>4</sup> On the basis of sex distribution in the present study 47.62% males had complications as compared to females 34.48%. The present study is discordant with study conducted by Kumar A.<sup>4</sup>

In the present study out of 50 patients 40% had complications. In the present study, out of total 50

patients, 32 had low albumin <3.5gm/dl while 18 patients had albumin value normal >3.5gm/dl. Patients with low albumin had more number of complications as compared to patients with normal complications. This study is concordant with the study conducted by Bhagvat VN et al.<sup>9</sup>

Out of the various complications, wound infection was the most common complication. 26% patient had wound infection because of low albumin.<sup>10</sup>

The present study shows that with serum albumin <3gm/dl has more complications and patients with serum albumin >3.5gm/dl has less post-operative complications which was statistically significant. This study concludes that as the serum albumin level increases complication rate decreases.

#### **CONCLUSION**

The study was conducted on 50 patients who referred to Department of Surgery, Dr. Sampurnanand Medical College and associated hospitals, Rajasthan, India during January 2014 to December 2015. Statistical analysis was done accordingly value <0.05 was considered statistically significant. Z -test and Fischer exact t-test were used for analysis. Result shows that patients with low albumin had high complication and patients with high albumin has low complications. Hence, serum albumin is a good indicator of postoperative complications.

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institutional ethics committee

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