



General Surgery

“A CLINICAL STUDY TO DETERMINE THE ROLE OF PREOPERATIVE SERUM ALBUMIN AND BODY MASS INDEX AS PREDICTORS OF POSTOPERATIVE MORBIDITY AND MORTALITY IN ELECTIVE ABDOMINAL SURGERIES”

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ABSTRACT **Aims and objectives:** To determine the role of preoperative serum albumin and body mass index as the predictors of post operative morbidity and mortality in elective abdominal surgeries. **Materials and methods:** All patients admitted in the department of general surgery undergoing elective abdominal surgeries at PES HOSPITAL, KUPPAM from JAN 2021 to JAN 2022 were included in this study. 120 patients were studied during this period. **Inclusion criteria:** All patients >18 and < 60years of age indicated for open elective abdominal surgeries

Exclusion criteria:

- Patients with albumin less than 2gm/dl
- Patients with Hb<7 gm/dl
- All Laparoscopic surgeries,
- Patients with ongoing chemotherapy/radiotherapy
- Chronic liver and kidney diseases

Results: Even though BMI was associated with postoperative complications serum albumin was better prognostic indicator than BMI. Albumin level was the strongest predictor of mortality and morbidity for surgery as a whole and within several sub specialities selected for further analysis. Albumin level was a better predictor of some types of morbidity, particularly sepsis and major infections and other types. Pre-operative serum albumin is associated with greater overall survival **Conclusion:** The study shows that serum albumin is a good indicator and predictor of postoperative complications. The maximum number of patients were noted with serum albumin ≥ 3.5 gm/dl. Serum albumin level <3.5 gm/dl was associated with more complications and a longer duration of hospital stay. The rate of postoperative complications is increased with BMI>25 kg/m². BMI is not associated with the duration of postoperative hospital stay. However, it was observed to be associated with people above 60 years. The mortality rate was 1.7% (2 patients) in this present study. There was no association between serum albumin and BMI with mortality in this study

KEYWORDS : Aibumin, BMI, Mortality, Morbidity

INTRODUCTION:

- It is well established that malnutrition is an independent negative factor associated with post-surgical complications, morbidity, prolonged hospital stay, mortality and higher healthcare costs. In addition, malnutrition is commonly related to pathologic conditions such as chronic inflammation, cancer or organ dysfunction that increases the risks for performing surgery.1
- The objectives of perioperative nutritional support are 'To decrease the negative protein balance, by which malnutrition is avoided; to maintain normal immunological function, which improves postoperative recovery and To enhance intestinal function recovery time and to reduce hospital stay.2
- In recent times, many changes have been proposed for the preoperative management of surgical patients to enhance faster recovery. The most revolutionary idea has probably been to "fast-track surgery", which means that the classical indications for nutritional support are being restricted to an ever-smaller group of postsurgical patients.3
- The present study is conducted with the objective to determine the role of preoperative serum albumin and body mass index as predictors of post operative morbidity and mortality in elective abdominal surgeries in PES hospital, kuppam

AIMS AND OBJECTIVES:

To determine the role of preoperative serum albumin and body mass index as the predictors of post operative morbidity and mortality in elective abdominal surgeries

MATERIALS AND METHODS:

- This will be prospective observational study was conducted in the Department of Surgery, PES Hospital Kuppam.
- The study included 120 patients undergoing elective abdominal surgeries from January 2021 to January 2022.

Inclusion criteria:

All patients >18 and < 60years of age indicated for open elective abdominal surgeries

Exclusion criteria:

- Patients with albumin less than 2gm/dl
- Patients with Hb<7 gm/dl
- All Laparoscopic surgeries,
- Patients with ongoing chemotherapy/radiotherapy
- Chronic liver and kidney diseases
- Obstetrics and Gynaecology surgeries

Observations:**Age distribution.**

In the present study, the mean age of the study population was 39.67 ± 11.60 years. 25.8% belong to the 18-30 years age group, 30% belong to 31-40 years, 25.8% belong to 41-50 years age group, 18.3% belong to 51-60 years age group.

Gender distribution

In the present study, 54.2% were male, 45.8% were female

BMI (kg/m²) In the present study, the mean BMI was 23.41 ± 4.42 . 12.5% belong to underweight, 50% belong to normal weight, 29.2% are overweight, and 8.3% are obese.

Distribution based on Preoperative serum albumin

The mean preoperative serum albumin in the present study was 3.65 ± 0.84 g/dL. 37.5% had serum albumin levels of <3.5, 62.5% had albumin levels of 3.5 – 5.5.

Table 1 : Preoperative serum albumin and Postoperative mortality

Preoperative serum albumin (g/dL)	Postoperative mortality				Total	
	Survived		Dead			
	N	%	N	%	N	%
< 3.5	43	36.4%	2	100%	45	37.5%
> 3.5	75	63.6%	0	0%	75	62.5%
Total	118	100%	2	100.0%	120	100%
	Survived		Dead		t-test (p-value)	
Mean ± SD	3.67 ±0.83		2.30 ±0.28		2.30 (0.02*)	
*(p<0.05 is Statistically significant)						

Based on preoperative albumin and postoperative mortality, 100% of those who survived had preoperative albumin of >3.5. Patients who died had serum albumin of <3.5. The mean serum albumin in the survived group was 3.67 $\pm$ 0.83 and in the dead group was 2.30 $\pm$ 0.28. A statistically significant association was observed with relation to preoperative serum albumin and postoperative mortality as the p-value was calculated to be <0.05.

Preoperative BMI and postoperative mortality

The mean BMI in the survived group was 23.30 $\pm$ 4.3 kg/m², and in the died group was higher, i.e., 30 $\pm$ 0.2 kg/m². This difference of preoperative BMI with postoperative mortality was statistically significant (p<0.05).

Preoperative serum albumin and Postoperative morbidity

The mean preoperative serum albumin in those with post-operative morbidity was 3.01

$\pm$ 0.8 g/dL, and those without postoperative morbidity was higher with 3.92 $\pm$ 0.6 g/dL. This difference of preoperative serum albumin with postoperative morbidity was statistically significant (p<0.05).

Preoperative BMI and postoperative morbidity

The mean preoperative BMI in both with and without post-operative morbidity was comparable, i.e., 23.66 $\pm$ 4.4 kg/m² and 23.31 $\pm$ 4.4 respectively. This difference of preoperative BMI with postoperative morbidity was not statistically significant (p>0.05).

DISCUSSION:

Malnutrition leads to a significant increase in operative mortality and a threefold increase in the postoperative rate of infection.

Preoperative serum albumin⁷⁰

The prevalence of protein-energy malnutrition in surgical patients ranges from 10% to 54%. The serum albumin is the most readily available and clinically helpful parameter. The present study's total mean preoperative serum albumin was 3.65 $\pm$ 0.84 g/dL. 37.5% had serum albumin of <3.5, 62.5% had albumin levels of between 3.5 – 5.5 g/dL.

Post-operative morbidity/ complications^{71,20}

The complication rates decrease as the serum albumin level increases. Serum albumin level >3.5 gm/dl suggests adequate protein stores, and it has a protective effect through several biological mechanisms. It predicts perioperative morbidity and mortality. Patients with low serum albumin levels had BMI (18.5–22.9 kg/m²), overweight (23.0–24.9 kg/m²), and obese (25 kg/m²).^{79,80} The mean BMI in the survived group was 23.30 $\pm$ 4.37, and in the mortality group was 30 $\pm$ 0.21. This finding was statistically significant as the p-value was calculated to be 82 <0.05. **Mullen et al.¹⁹** studied the relation of BMI on preoperative outcome in patients undergoing major intra-abdominal surgery. Being underweight was linked to increased mortality, and wound infection was more common in the obese.

Mean serum albumin in association with mortality:

The mean serum albumin in the survived group was 3.67 $\pm$ 0.83 and in the dead group was 2.30 $\pm$ 0.28. A statistically significant association was observed in relation to preoperative serum albumin and postoperative mortality as the p-value was calculated to be <0.05.

Gibbs et al.²⁴ observed that low serum albumin was found to be associated with an exponential increase in morbidity and mortality and to be a good prognostic predictor. In contrast, anthropometric measures were unable to predict the postoperative outcome.

Mean BMI with morbidity and mortality:

The mean BMI in the survived group was 23.30 $\pm$ 4.37, and in the mortality group was 30 $\pm$ 0.21. This finding was statistically significant

as the p-value was calculated to be <0.05. In the study conducted by **Kumar et al.⁷⁶**, it was observed that patients with a BMI of 18.6 to 24.9 kg/m² had a greater complication risk (85 per cent), while those with a BMI of more than 25 kg/m² had a lower complication rate (25 per cent). The conclusions reached were in complete agreement with the present study's findings.

CONCLUSION:

The study shows that serum albumin is a good indicator and predictor of postoperative complications. The maximum number of patients were noted with serum albumin $\geq$ 3.5 gm/dl. Serum albumin level <3.5 gm/dl was associated with more complications and a longer duration of hospital stay. The rate of postoperative complications is increased with BMI > 25 kg/m². BMI is not associated with the duration of postoperative hospital stay. Wound infection is the most common complication associated with serum albumin < 3.5 gm/dl and BMI > 25 kg/m². Neither serum albumin nor BMI was shown to be linked with malignancy. However, it was observed to be associated with people above 60 years. The mortality rate was 1.7% (2 patients) in this present study. There was no association between serum albumin and BMI with mortality in this study.

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