Section: General Surgery

Original Research Article

PRE-OPERATIVE SERUM PROTEINS AND THE QUETELET'S INDEX AS PREDICTORS OF POST OPERATIVE COMPLICATIONS OF ELECTIVE MAJOR SURGERIES IN A TERTIARY CARE CENTRE

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ABSTRACT

Background: Aim: To validate Serum proteins and Quetelet's index as predictors of postoperative complications in elective major surgeries in Tertiary care centre.

Objective:

- By using serum proteins to predict the postoperative complications in elective major surgeries.
- By calculating the Quetelet's index/ BMI to predict the postoperative outcomes in elective major surgeries.
- To assess the postoperative complications due to decrease in serum proteins and above and below average range of BMI

Materials and Methods: From December 2019 to December 2021, this prospective observational study was carried out at the government Villupuram medical college's department of general surgery. Total 100 patients were included in the study. The study includes all patients above the age of 12 and those who have been admitted for any major elective surgery through the department of surgery. Children younger than 12 years old, patients with diabetes mellitus, chronic renal illness, icterus, severe anaemia less than 7 gm/dl, chronic liver disease, and patients receiving steroids or chemotherapy are all disqualified from participating in the study. On admission, the eligible adult patients will undergo screening for enrolment in the trial. Case details, including the history and clinical examination, were recorded. Anthropometry: Measurements of height and weight. Serum proteins (Albumin and Globulin) were estimated during the investigation. Case details, including the history and clinical examination, were recorded. Follow up was done and discharged from the hospital. The collected information was analysed by using SPSS 23. **Result:** 100 patients in total were enrolled. There were 28 women and 72 men among these patients. Most incidents affected people between the ages of 40 and 59 (35 percent). Out of 100 cases, 13 were determined to be cancerous. Complications were present in 38 out of 100 patients. Among the 38 cases with complication, 28 were male and 10 were female. Most instances have BMIs that are within the normal range. But complications are more common in the overweight population. The majority of the individuals with serum albumin levels between 2.5 and 3.0 g/dl had complications (25 cases). **Conclusion:** Many other preoperative patient parameters fall short when compared to serum albumin concentration in terms of predicting surgical outcomes. This affordable test should be used more frequently to identify malnutrition and the possibility of adverse surgical outcomes.

INTRODUCTION

Hippocrates was the first to discuss the harmful consequences of malnutrition on the morbidity and mortality of patients. It is widespread and affects 30% of surgical patients with gastrointestinal disorders. There is strong evidence that patients who exhibit signs of malnutrition are more likely to have complications and increased risk of death. To ascertain a patient's preoperative nutritional condition, the appropriate lab tests, physical examination (including anthropometric measurements), and diet-related clinical history are required. The most crucial laboratory test for identifying protein-calorie deficiency is serum albumin. Serum albumin levels above 3.5 g% indicate adequate protein reserves and give protection via a number of biological processes. It forecasts morbidity and mortality during surgery.

Protein energy malnutrition develops when there is a relative or absolute lack of both protein and energy. Primary PEM continues to rank among the most serious health issues in the majority of developing countries. Loss of body weight, fatty tissue, and skeletal muscle mass are the most noticeable effects. Low quantities of circulating proteins are seen, and hepatic production of serum proteins declines. Wound healing is inadequate due to alterations in immunological function.

Objective: By using serum proteins and Body Mass Index to predict the postoperative complication in elective major surgery.

MATERIALS AND METHODS

This Prospective observational study was conducted at department of general surgery, government Villupuram medical college, Villupuram from December 2019 to December 2021.The study consisted of 100 [4pq/d*d] patients overall. Informed consent is got from all patients who are willing to participate in study. All patients above the age of twelve must meet the inclusion criteria before being accepted for any major elective operation under the department of surgery. Children under the age of 12 constitute an exclusion. Additionally, individuals with icterus, severe anaemia (less than 7 g/dL), diabetes mellitus, chronic renal disease, chronic liver disease, or those taking steroids. At the time of admission, the adult patients who met the study's eligibility requirements would be screened. History and clinical examination were included in the details of the cases. Anthropometry: Measurement of height and weight Examination: Globulin and albumin concentrations in serum were estimated. Afterward, the patient was released from the hospital after follow-up. The collected information was analyzed by using SPSS 23 software.

RESULTS

The study included approximately 100 patients aged 13 to 71 who underwent elective major surgery at Government Villupuram Medical College between December 2019 and December 2021. Out of 100 individuals that were monitored during the study, 28 were female and 72 were male. The age range from 40 to 59 years had the most cases (35%), while the age range under 20 years had the fewest cases (only 10%).

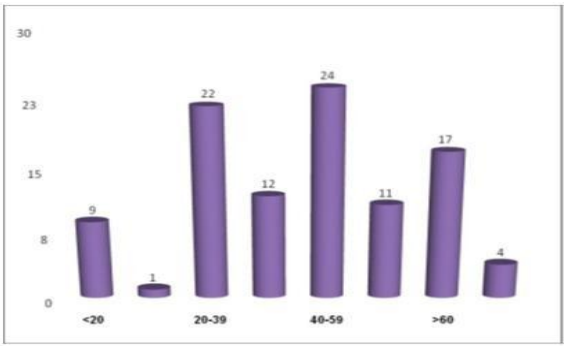

Figure 1: Age Wise Distribution of the Patients

In the study, thirteen of the 100 cases were found to have malignant origins. In that, 9 of the 13 malignant cases were female, while the majority of non-malignant cases were male.

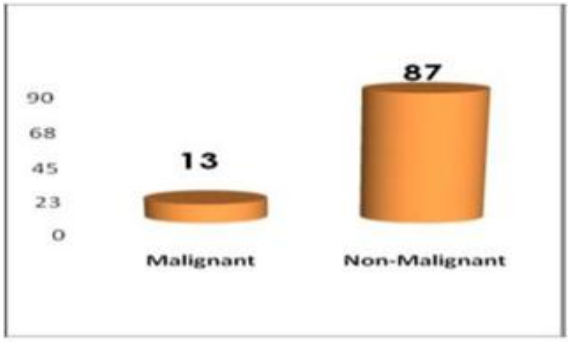

Figure 2: Malignant and Non-Malignant Distribution in Patients

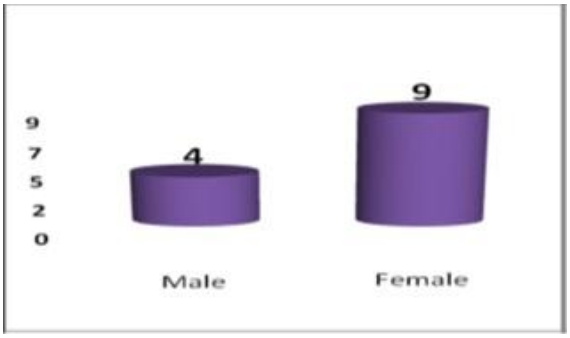

Figure 3: Sex Wise Distribution in Patients with Malignant Origin.

Complications were present in 38 out of 100 patients. Among the 38 cases with complication, 28 were male and 10 Were females. Among the study population,

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62 cases have normal serum albumin levels. Complications were predominant in the patients having serum albumin level 2.5-3.0g/dl (25 cases) which is statistically significant.

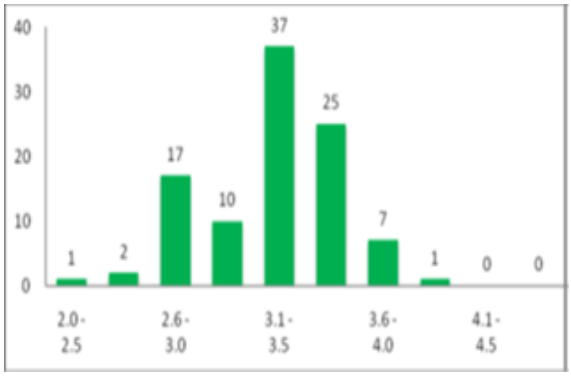

Figure 4: Distribution of Serum Albumin in Patients

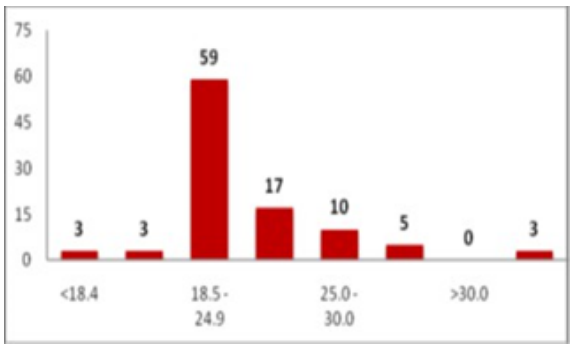

Figure 5: BMI Distribution Among Patients

The majority of the cases in the study group have BMIs in the normal range. However, people who are overweight have a higher complication rate than people who have a normal BMI which is statistically significant. [Table 1]

Table 1: Complications in Study Participants

COMPLICATIONS	
Fistula	0
Burst Abdomen	1
LRTI + Pleural Effusion	2
Seroma	16
Mortality	1
Wound Infection	18
TOTAL	38

DISCUSSION

Gibbs et al investigated estimates of the association between preoperative serum albumin concentration and surgical outcome's. 54,215 noncardiac major cases in total were examined. An exponential rise in death rates from 1% to 29% and morbidity rates from 10% to 65% was linked to a decline in serum albumin content from 46gm/dl to less than 21gm/dl. Particularly sepsis and severe infection, albumin levels were a greater predictor of some types of morbidity than others. More accurately than many other preoperative patient parameters, serum albumin predicts the results of surgery. This inexpensive test should be used more frequently to identify malnutrition and the possibility of unfavorable surgical results.

A serum albumin level less than 3 gm/dl correlated greatly with complications, length of staying in the hospital, and mortality in a retrospective study of 520 patients undergoing surgery who had preoperative serum albumin levels measured and were undergoing elective pancreaticoduodenal, gastric, esophageal, or colon surgery, according to Kudsk et al.

A prospective study of blood albumin and cholesterol levels as a predictive marker for death in patients undergoing general surgery was published by Palma et al.[22] Multivariate analysis revealed significant negative trends for serum albumin, total cholesterol, and HDL-C; a lower level was associated with a higher risk of death for each variable. Patients with blood albumin levels less than or equal to 3.4 g/dl and those with higher levels total cholesterol and its fraction levels that were comparable. The results demonstrate that low serum levels of albumin, total cholesterol, and HDL-C are associated with a higher risk of death for up to two years following general surgery. Badia et al,[25] found that in a study of 158 individuals, preoperative hypoalbuminemia was substantially linked to increased morbidity and a longer hospital stay.

Vincent et al,[23] found that hypoalbuminemia in acute illness is a powerful dose-dependent, independent predictor of poor outcome in a meta-analysis of cohort studies and controlled studies. There is a 137 percent increase in mortality risk, an 89 percent increase in morbidity, and a 28 percent increase in ICU and hospital stays for every 10 gm/dl drop in blood albumin content.

Woods et al,[25] hypothesized in a prospective randomized clinical study that Patients with albumin levels below 3.5 gm/dl would have a longer postoperative hospital course due to a delay in the recovery of bowel function, according to research on the impact of serum albumin concentration on the duration of postoperative sickness.

Brown et al,[24] found an increased incidence of pneumonia, wound infection, and septicemia in patients with serum albumin levels less than 3g/dl. Golub et al,[27] looked into how patients who were brought to the surgical ICU for gastrointestinal bleeding, hip fractures, vascular insufficiency, malignancy, perforated viscus, intra- abdominal infection, or bowel obstruction were affected by hypoalbuminemia (serum albumin values of 3g/dl). Complications were more common in

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hypoalbuminemia patients (36.9%), as was mortality (5.8%).

BMI and serum albumin were studied by Engelman et al,[33] in relation to mortality and morbidity after heart surgery. Serum albumin levels of 2.5g/dl were linked to risk, and BMIs of 30kg/m^2 and greater were linked to higher rates of infection.

Patients who have lost more than 10% of their body weight in the six months preceding surgery are at a higher risk of pneumonia and respiratory failure. Daniel et al found that a study of 183,069 patients undergoing general and vascular surgery found an association between cardiac problems and serum albumin levels of 3.5g/dl and weight loss of more than 10% with a significant p value (0.0001).

In a study conducted by Varut et al,[37] 244 patients undergoing rectal cancer surgery were evaluated for the significance of serum albumin levels prior to surgery as a predictor of postoperative prognosis. An independent risk factor for surgical complications was determined to be preoperative hypoalbuminemia (3.5gm/dl)., including mortality, following rectal cancer surgery. Complications, postoperative stay, time to bowel movement, time to defecation, time to resume normal diet.

In our study, complications such as wound infection, lower respiratory tract infection, pleural effusion, seroma, and mortality are seen. This complication affects 38 patients, the majority of whom have a serum albumin level less than 3 g/dL. Wound infection (18 cases) was the most common complication that occurred in the patients, followed by seroma formation (16 cases). The majority of patients who developed complications had low serum albumin levels.

CONCLUSION

Serum albumin is thus validated as a crucial marker indicative of post-operative complications, depicting the patient's nutritional status and being highly predictive of morbidity and mortality. In our study of 100 patients, the complication risk was statistically significantly greater when serum albumin levels were less than 3 g/dl. As serum albumin levels increased above 3.1g/dl, the rate of complications decreased. Regardless of disease pathology, patients with serum albumin levels higher than 3.5 g/dl had fewer problems, which was statistically significant. In contrast to many other preoperative patient variables, serum albumin is therefore a stronger predictor of surgical outcomes. It is a commonly used, low-cost test with great value that ought to be used more regularly as a prognostic tool to identify malnutrition and the possibility of worse surgical outcomes. Furthermore, statistically significant post-operative problems are associated with an underweight BMI. Gender-specific differences in complication rates were not statistically significant. The disease process also contributes to post-operative complications.

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