ORIGINAL RESEARCH PAPER

General Surgery

PREOPERATIVE SERUM ALBUMIN AS A PREDICTOR OF POST OPERATIVE MORBIDITY AND MORTALITY IN PERFORATION PERITONITIS

KEY WORDS:

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ABSTRACT

Introduction: Peritonitis due to perforation of the gastrointestinal tract is one of the most common surgical emergencies all over the world. Wound healing requires energy and is a catabolic process. Patients who are severely malnourished demonstrate impaired wound healing and predisposition to infection. In humans, albumin is the most abundant plasma protein, accounting for 55-60% of the measured serum protein. The association between hypoalbuminemia and poor outcomes has long motivated clinicians in administering exogenous albumin to hypoalbuminemic patients. Hence there is a need for such a study which would assess risk factors contributing to adverse post-operative outcomes and hence assess whether early correction of albumin levels can prevent complications. **Aim And Objectives:** To study and evaluate the correlation between the preoperative serum albumin levels and postoperative morbidity and mortality in diagnosed cases of perforation peritonitis. **Material And Methods :** All the patients undergoing Exploratory Laparotomy due to the any cause of Perforation Peritonitis will be included in the study. Assessment and repair of perforation was done. Patient will be observed for minimum 7 days for post-operative period to observe any morbidity or mortality for the study. Exlusion and inclusion criteria were made accordingly. **Results:** The serum albumin was significantly decreased in patients between the age of 41 to 60 years, whereas serum albumin was significantly increased in the patients of younger age group. Patients living in the rural area had serum albumin < 3.5 g/dl, whereas those living in the urban area had serum albumin more >3.5 g/dl. The findings were statistically significant. (p=0.006). Wound complications were significantly more in patients in which serum albumin was less than 3.5 g/dl. (p=0.001). Duration of stay in the hospital was found to be more than 7 days if serum albumin was less than 3.5 g/dl. **Conclusion:** Preoperative Albumin levels can be used as single indicator to predict the mortality and morbidity in patients of Perforation peritonitis and can help in early prediction of complications and managing them accordingly.

INTRODUCTION:

The peritoneum is a continuous, glistening and slippery transparent serous membranes. It lines the abdominopelvic cavity and invests the viscera. Peritonitis due to perforation of the gastrointestinal tract is one of the most common surgical emergencies all over the world [1]. There is paucity of data from India regarding its etiology, prognostic indicators, morbidity, and mortality patterns[2]. Each year peptic ulcer disease (PUD) affects 4 million people around the world. Despite advances in surgical techniques, antimicrobial therapy, and intensive care support, management of peritonitis continues to be highly demanding, difficult, and complex. Wound healing requires energy and is a catabolic process. Patients who are severely malnourished demonstrate impaired wound healing and predisposition to infection. In humans, albumin is the most abundant plasma protein, accounting for 55-60% of the measured serum protein.[3]

A recent review suggests that serum albumin could be an independent predictor of mortality in a wide range of clinical and research settings. The association between hypoalbuminemia and poor outcomes has long motivated clinicians in administering exogenous albumin to hypoalbuminemic patients.[4]

Adverse post-operative outcomes after laparotomy are wound infections, wound dehiscence, post-operative fever, pulmonary complications DVT and mortality. Hence there is a need for such a study which would assess risk factors contributing to adverse post-operative outcomes and hence assess whether early correction of albumin levels can prevent complications. This study tries to evaluate the effects of albumin levels on wound strength, postoperative bowel function, general nutritional status and hospital stay of the patient.

AIMS AND OBJECTIVES:

To study and evaluate the correlation between the preoperative serum albumin levels and postoperative morbidity and mortality in diagnosed cases of perforation peritonitis.

MATERIAL AND METHODS

The present study was undertaken on a group of patients presenting to the Department of Surgery, Indira Gandhi Medical College, Shimla. The study group comprised of patients of perforation peritonitis were recruited into the study after taking the informed consent.

All the patients undergoing Exploratory Laparatomy due to the any cause of Perforation Peritonitis were included in the study. Patient were observed for minimum 7 days for post operative period to observe any morbidity or mortality for the study.

Inclusion Criteria :
1. Age groups 16-60 years.
2. All the patients undergoing exploratory laparotomy electively or emergency cause being perforation peritonitis from july 2021 to july 2022.

Exclusion Criteria
1. The subjects suffering from other diseases such as thyroid disorders, liver disease, genetic disorders of protein metabolism and malignancies will be excluded from the study.

2. Patients who are lost in follow up before 1 month.
3. Patients not consenting for study.

OBSERVATION AND RESULTS
Age distribution
We enrolled 150 patients for the study. The mean age of the patients was 39.61(SD=12.27)years. Table no 1shows age distribution of patients

Table 1:Age distribution of patients (n=150)

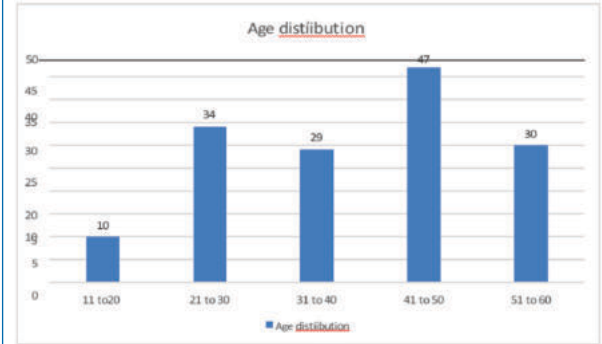| Age	NoofCases	Percentage
Mean±SD(years)	39.61±12.27	
AgeInterval(years)		
11-20	10	6.7
21-30	34	22.7
31-40	29	19.3
41-50	47	31.3
51-60	30	20.0
Total	150	100.0

Figure 1:Age distribution of patients(n=150)
The serum albumin was significantly decreased in patients between the age of 41 to 60 years, whereas serum albumin was significantly increased in the patients of younger age group. (p<0.001).

Table 02: Association of age with serum albumin levels

Age Interval	Special Investigations		P-value
	Serum Albumin (>3.5 g/dl)	Serum Albumin (<3.5 g/dl)	
11-20 Year	8(11.8)	2(2.4)	0.001
21-30 Year	27(39.7)	7(8.5)	
31-40 Year	16(23.5)	13(15.9)	
41-50 Year	7(10.3)	40(48.8)	
51-60 Year	10(14.7)	20(24.4)	
Total	68(100)	82(100)	
Mean ± SD	33.25±12.32	44.89±9.46	0.001

Association of area with albumin levels
Used Chi-Square Test
Patients living in the rural are had serum albumin < 3.5 g/dL, whereas those living in the urban area had serum albumin more >3.5 g/dL. The findings were statistically significant. (p=0.006). Table no 6 shows association of residence with serum albumin levels.

Table 06: Association of residence with serum albumin levels

AREA	Special Investigations		P-value
	Serum Albumin (>3.5 g/dl)	Serum Albumin (<3.5 g/dl)	
Rural	25(36.8)	49(59.8)	0.006
Urban	43(63.2)	33(40.2)	
Total	68(100)	82(100)	

Wound Complications

Table 14:Postoperativecomplicationsinthe patients

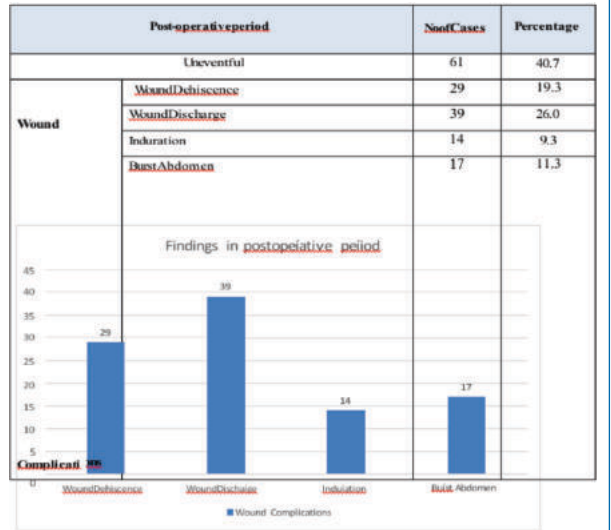| Post-operativeperiod		NoofCases	Percentage
	Uneventful	61	40.7
Wound	WoundDehiscence	29	19.3
	WoundDischarge	39	26.0
	Induration	14	9.3
	BurstAbdomen	17	11.3

Figure 9:Postoperative complications in the patients

Association between wound Complications and serum albumin levels.
Wound complications were significantly more in patients in which serum albumin was less than 3.5 g/dL. (p=0.001). Table no 15 shows the association.

Table 15:Association of complications in postoperative period with serum albumin levels

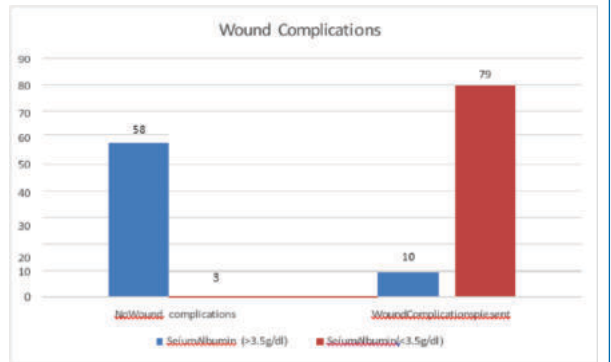| Post-operativeperiod	Special Investigations		P-value
	Serum Albumin (>3.5g/dl)	Serum Albumin (<3.5 g/dl)	
No Wound complications	58(85.3)	3(3.7)	0.001
Wound Complications present	10(14.7)	79(96.3)	

Used Chi-Square Test**

Figure 10:Wound complications based on the levels of serum albumin in patients

Mortality and Morbidity
Table 16:Morbidity and mortality among the patients

Morbidity/Mortality		No of Cases	Percentage
No		66	44.0
Mortality		16	10.7
Morbidity	Fever	49	32.7
	Pulmonary	32	21.3
	Renal	13	8.6

Association between morbidity/ mortality with serum albumin levels
Used Chi-Square Test

Mortality was significantly greater in the patients having

serum albumin <3.5g/dl. Similarly, morbidity was also greater in those patients who had serum albumin <3.5g/dl (p=0.001) .Table no 17 shows the association.

Table 17: Association of morbidity and mortality with serum albumin levels

	Special Investigations		P-value
	Serum Albumin(>3.5 g/dl)	Serum Albumin (<3.5g/dl)	
Mortality	5(7.4)	11(13.4)	0.001
Morbidity	2(2.9)	71(86.6)	

Duration of Stay in Hospital
Table18:Duration of stay in the hospital

Hospital Stay	No of Cases	Percentage
Lessthan7days	106	70.7
Morethan7 days	44	29.3
Total	150	100.0

Duration of stay in the hospital was found to be more than 7 days if serum albumin was less than 3.5 g/dL. Similarly, the duration of stay in the hospital was less than 7 days if serum albumin was more than 3.5 g/dL. This association was found to be statistically significant. (p=0.001). Table no 19 shows the association.

Table 19: Association of duration of stay with serum albumin levels

Hospital Stay	Special Investigations		P-value
	Serum Albumin (>3.5g/dl)	Serum Albumin (<3.5g/dl)	
Less than 7days	64(94.1)	42(51.2)	0.001
More than7 days	4(5.9)	40(48.8)	
Total	68(100)	82(100)	

DISCUSSION

There were 150 patients enrolled for the study. The mean age of the patients was 39.61 (SD=12.27) years and it was comaparable to various studies. Maximum patients in the present study belonged to the age group of 40-50yrs, there were 10 patients in the age group of 11 to 20 years, 34 patients in 21 to 30 years, 29 patients in 31 to 40 years and similar findings were found in the study conducted by Singh R et al , whereas in study conducted by Issagnya C et al[5] and Akirov A[6] it was found that maximum patient belonged to the age group more than 50 yrs plus.

In our study the serum albumin was significantly decreased in patients between the age of 41 to 60 years, whereas serum albumin was significantly increased in the patients of younger age group. (p<0.001). and similar to our study a study conducted by Akirov A et al the patients in the cohort were classified according to the following age groups: <40 (n=4,036), 40-50 (n=2,078), 50-60 (n=2,597), 60-70 (n=3,334), 70-80 (n=2,994) and >80 (n=2,891) years of age.

Mean±SD serum albumin levels were lower with increased age: 4.3±0.6, 4.2±0.6, 4.0±0.6, 3.9±0.6, 3.8±0.6 and 3.7±0.6, respectively (p<0.001 for all comparisons).

There were 123 male and 27 female patients in the study i.e. majority of patients were male in our study and it was comparable to various studies. Similar to our study Kumar J et al[7] and Issangya C conducted a study and found that majority of patients were male. Majority of patients were males 89(80.9%), females were 21(19.1%) whereas 65.6% males and34.4% females were present respectively.Mortality was significantly greater in the patients having serum albumin <3.5g/dl. Similarly, morbidity was also greater in those patients who had serum albumin <3.5g/dl (p=0.001) and similar findings were found in study conducted by Praksh B et al[8], Kumar J et al and Akirov A et al. Mortality was 12% and morbidity was 52% in Prakash B et al Akirov A whereas mortality was 20% in Kumar J et al.

In our study duration of stay in hospital was less than 7 days in 106 patients, whereas the duration of stay in the hospital for more than 7 days was found in 44 patients. Duration of stay in the hospital was found to be more than 7 days if serum albumin was less than 3.5 g/dL. Similarly, the duration of stay in the hospital was less than 7 days if serum albumin was more than 3.5 g/d and similar findings were found in study conducted by Singh R .

CONCLUSION

Preoperative Albumin levels were a significant predictor of Postoperative morbidity and mortality in patients of perforation peritonitis due to any cause. Patients having less preoperative albumin levels were having significant increased risk of wound complications(79 %), most common being wound discharge and wound dehiscence along with increased risk of morbidity(86 %) (Fever, Pulmonary and Renal complications) with increased risk of mortality (13.4 %). Decreased Preoperative Albumin levels were also associated with increased duration of hospital stay (48.8%).Though multiple factors are responsible for affecting the morbidity and mortality of a patient of perforation peritonitis, Preoperative Albumin levels can be used as single indicator to predict the mortality and morbidity in patients of Perforation peritonitis and can help in early prediction of complications and managing them accordingly.

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