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A PROSPECTIVE STUDY TO CORRELATE PREOPERATIVE SERUM ALBUMIN LEVELS WITH POSTOPERATIVE OUTCOME IN EMERGENCY ABDOMINAL SURGERIES

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ABSTRACT:

BACKGROUND: Abdominal surgery is one of the most common surgeries, with substantial postoperative morbidity and difficulties despite surgical and perioperative advancements in recent decades Preoperative hypoalbuminemia is a well-known risk factor for postoperative complications in patients undergoing emergency abdominal surgery. This study was conducted to examine the association between preoperative hypoalbuminemia and surgical complications encountered in patients undergoing emergency abdominal surgery.

MATERIALS AND METHODS: This prospective observational study was conducted at a tertiary care hospital. A total of 60 patients who underwent emergency abdominal surgery were included. Hypoalbuminemia was diagnosed if serum albumin level was less than 3.5 gm/dl. Preoperatively, 30 patients had hypoalbuminemia (serum albumin <3.5 g/dl) and 30 patients had normal albumin levels (≥3.5 g/dl). Data on serum albumin levels, indications for surgery & postoperative complications were collected and analyzed.

RESULTS: Of the 60 patients studied, 63% were male and 37% were female. Most of the patients belonged to 18-30 years in the present study. The most common indication for emergency abdominal surgery was peptic ulcer perforation (42%), followed by acute intestinal obstruction (30%). patients with Hypoalbuminemia had a higher incidence of complications, including surgical site infections (40%), Wound dehiscence (17%) and longer hospital stays (9.2±5.12) compared to the patients have normal serum albumin.

CONCLUSION: Preoperative albumin is a cost-effective prognostic indicator for postoperative complications following emergency laparotomy.

KEYWORDS: Serum albumin, emergency abdominal surgery, hypoalbuminemia

INTRODUCTION:

Abdominal surgery is one of the most common surgeries, with substantial postoperative morbidity and difficulties despite surgical and perioperative advancements in recent decades. Surgical complications are a stressful and demanding component of patient care during surgery. Regardless matter how technically brilliant and capable surgeons are, they all have to cope with complications that arise following operating procedures.[1] Albumin is the main protein in human plasma. It accounts for roughly 60% of total plasma protein and has a normal serum concentration of 3.5-5.0 g/dL. Hypoalbuminemia is defined as a serum level less than 3.4 g/dL (source). Plasma albumin has three basic functions: osmotic, transportation, and nutritive, accounting for more than 75-80% of total plasma osmotic pressure (25 mmHg). During physiological stress, falls in serum albumin levels to hypoalbuminemia levels result in a drop in oncotic pressure, which leads to interstitial oedema. [2] Albumin is an essential protein that transports hormones, fatty acids, and exogenous medicines while also controlling plasma oncotic pressure. Because albumin levels fall during injuries and infections, it is known as a negative active-phase protein.[3]

Inflammatory signals rapidly reduce the levels of serum albumin, a maintenance protein. Low levels of serum albumin are mostly caused by inflammatory diseases, notably elevated levels of the cytokines interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-alpha). Hypoalbuminemia is a common finding in acute and chronic illnesses.

The mechanisms generating hypoalbuminemia in acute conditions differ from those in chronic disorders, as capillary leakage into the interstitial space as a result of inflammatory processes is the primary cause of hypoalbuminemia in acute conditions. Additionally, decreased synthesis, blood dilution due to fluid administration, renal and intestinal losses due to congestion, and enhanced catabolism all play a role.[4,5,6].

A preoperative blood albumin level in people without certain concomitant conditions is linked to postoperative infections and surgical problems. Low serum albumin levels might indicate nutritional insufficiency. [7] A blood albumin level of more than 3.5 g/dL indicates adequate protein reserves and provides protection through a variety of biological mechanisms. It predicts postoperative morbidity and mortality. Serum albumin levels <3.5 g/dL in a stable and well-hydrated patient indicate malnutrition. [8] Preoperative serum albumin is a good predictor of surgical outcomes in elective gastrointestinal procedures and many other surgeries, with the exception of cardiac surgery. [9,10]

This study was conducted to examine the association between preoperative hypoalbuminemia and surgical complications encountered in patients undergoing emergency abdominal surgery.

MATERIALS AND METHODS:

This was a prospective observational study conducted on 60 patients over a period of one year in the department of General Surgery at a tertiary care centre after getting approval from the Institutional ethics committee.

Inclusion Criteria: Patients receiving emergency abdominal surgery, Age range of 18-70 year, No substantial comorbidities, Admitted and operated within 24 hours of admission.

Exclusion Criteria: Patients with chronic comorbid illnesses, Patients who had preoperative dietary support or therapies that may have impacted serum albumin levels.

The following parameters were recorded:

1. Demographic Information like Age & sex,

2. Indications for emergency abdominal surgery
3. Preoperative Serum Albumin Level: Serum albumin levels were measured for each patient prior to surgery using standard laboratory techniques, with results recorded in grams per deciliter (g/dL). A serum albumin level of 3.5 g/dL was considered the standard baseline, and levels below 3.5 g/dL were classified as hypoalbuminemia. Serum albumin levels were measured using standard laboratory techniques, with results recorded in grams per deciliter (g/dL).
4. Postoperative Complications
Statistics: The data was presented as number and percentages for qualitative data and mean±sd for quantitative data. Data was analyzed using the chi-square test for comparing the qualitative data and students t test for quantitative data between the two groups. SPSS version 20 was used to analyse the data. A p-value of < 0.05 was considered statistically significant

RESULTS:
The study was conducted on 60 patients, aged between 18-70 yrs. Many patients fall within the 18-30 years age range, followed by the 31-50 and 51-70 age groups as shown in Table 1

TABLE 1: AGE DISTRIBUTION

Age	Frequency (n=60)	Percentage
18-30	27	45%
31-50	18	30%
51-70	15	25%

63% of the patients were male, while 37% were female as shown in Table 2

TABLE 2: GENDER DISTRIBUTION

Age	Frequency (n=60)	Percentage
Male	38	63%
Female	22	37%

Pre-operatively, 50% of the patients were having Hypoalbuminemia and 50% were having Normal albumin levels as shown in Table 3

Table 3: Level of serum albumin

Serum albumin	Frequency (n=60)	Percentage
Hypoalbuminemia (serum albumin <3.5 g/dl)	30	50%
Normal albumin levels (≥3.5 g/dl).	30	50%

Most frequent indication for Laparotomy was for Perforated peptic ulcer followed by Acute Intestinal obstruction as shown in Table 4

Table 4: Indications for emergency laparotomy

Indications	Frequency (n=60)	percentage
Perforated peptic ulcer	25	42%
Acute Intestinal obstruction	18	30%
Acute appendicitis including perforations	12	20%
Incarcerated ventral hernia	4	6%
Small intestinal perforations	1	2%

patients with Hypoalbuminemia had a higher incidence of complications, including surgical site infections, Wound dehiscence and longer hospital stays, with statistically significant differences in these outcomes as shown in Table 5

Table 5: Post-operative morbidity associated with serum albumin levels

	S. albumin < 3.5 g/dL (30)	S. albumin > 3.5 g/dL (30)	P value
Surgical site infection (%)	12 (40%)	6 (20%)	0.001*
Wound dehiscence (%)	5 (17%)	1 (3%)	0.02*
Mean length of hospital stay (days)	9.2±5.12	6.84±4.32	0.002*

*significant

DISCUSSION:

Low albumin levels indicate malnutrition and raise the risk of illness and mortality. [11] Cytokines (TNF, IL-6) released during the inflammatory response to physiologic stress (infection, surgery, trauma) can reduce serum albumin levels by increasing vascular permeability, breakdown, and synthesis. Hypoalbuminemia causes aberrant gastrointestinal malabsorption, a reduced immune response, and decreased production of albumin and other plasma proteins in the liver. [12]

The study population had a larger prevalence of males (63%) than females (37%). Sharath Kumar et al. [13] observed similar results, with 61.5% males and 38.5% females. In another study by Bhandari et al[14], 66% were men and 34% were women.

The current investigation discovered that individuals with serum albumin levels below 3.5 g/dL had a greater prevalence of surgical site infections (37.5%) than those with normal albumin levels (17.5%). This conclusion complements prior research that has shown hypoalbuminemia as a predictor of poor postoperative outcomes, particularly in terms of infection rates [15,16].

The increased prevalence of wound dehiscence in the hypoalbuminemic group (16.1%) compared to the normal albumin group (2.5%) is consistent with prior research, which suggests that dietary deficits and hypoalbuminemia contribute to poor wound healing [17, 18].

Patients with hypoalbuminemia had a considerably longer average hospital stay than those with normal serum albumin levels. This longer recovery period is consistent with data from several research, which show that hypoalbuminemia impairs immune function and delays wound healing. [19]

CONCLUSION: Preoperative albumin is a cost-effective prognostic indicator for postoperative complications following emergency laparotomy.

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congestion, and increased catabolism also play a role. [7,8,9].

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