



A RETROSPECTIVE STUDY TO EVALUATE THE EFFECT OF HYPOPROTEINEMIA IN THE OUTCOME OF EMERGENCY ABDOMINAL SURGERIES

General Surgery

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ABSTRACT

Background: Hypoproteinemia reflects the nutritional status of the patient which is best reflected by albumin. Albumin is one of the most important proteins used in the body. This essential protein makes up approximately 60 % of protein in blood plasma. Preoperative hypoalbuminemia is an independent risk factor for several adverse outcomes postoperatively.

Methods: A retrospective study was carried out in Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, Uttarakhand to evaluate the effect of hypoalbuminemia in the outcome of emergency abdominal surgeries.

Results: A total of 88 patients, who underwent emergency laparotomy surgery were included in the study. Of the 88 patients, 64 were males and 24 females. The mean age of the patients in the study was 42.2 years. The number of females remained more or less consistent in all age groups but the males showed a preponderance in the 15-45yrs group. There was a significantly higher mortality among females, however the morbidity remained quite similar for both men and women. Of the 88 patients included in the study, 36 were found to be hypoalbuminemic. 67% of the females were hypoalbuminemic and 50% of these expired. On the other hand, 31% of males were hypoalbuminemic with 20% of them expired. In our study there was a significant association between low albumin, pulmonary edema, ileus, sepsis and mortality. We did not find any association between hypoalbuminemia, pleural effusion, surgical site infection and anastomotic leak.

Conclusion: Hypoalbuminemia is an important independent risk factor for the perioperative and post operative morbidity and mortality

KEYWORDS

Hypoalbuminemia, laparotomy, perioperative, postoperative, morbidity

INTRODUCTION

The determinants of surgical outcome, defined by the morbidity and mortality of the patient, are related to an interplay between the health and fitness of the patient, the number and severity of various comorbidities present, patient's age and surgery related factors. Surgery related factors include whether it is emergency or planned, mode, type and duration.

Hypoproteinemia reflects the nutritional status of the patient which is best reflected by albumin. Albumin is one of the most important proteins used in the body. This essential protein makes up approximately 60 % of protein in blood plasma, where it acts as a carrier molecule for other molecules that are transported in blood.

Blood albumin levels are regulated by several processes. These include the production of protein in the liver, the amount of protein secreted by the liver, the amount of proteins in body fluids other than blood and the rate at which the protein is degraded. Dysfunction in one or more of these processes can result in hypoalbuminemia.

Hypoalbuminemia generally is not considered a medical condition in itself, but a possible side effect of other health problems like liver disease as albumin is synthesized in liver, kidney disease as kidneys normally filter albumin from the blood, diseases such as tuberculosis and inflammatory bowel disease which can reduce the level of albumin in the blood as a result of chronic inflammation.

Possible hypoalbuminemic symptoms include full body swelling or swelling in one or more parts of the body such as the legs, hands and face. People with this condition might have a poor appetite, muscle weakness, muscle cramps or fatigue. Other symptoms depend on the underlying cause of low blood albumin levels.

Low blood albumin cannot be corrected by simply prescribing an albumin supplement to raise the blood level of the protein. In fact, some studies indicated that it might be harmful to administer albumin as a part of the treatment. The optimum treatment for people with hypoalbuminemia is dependent on cause of the condition. Low blood levels of albumin are managed by treating the cause. Therefore a patient getting treated for this condition might consult a surgeon, nephrologist, cardiologist or anyone else depending on the cause. (1-5)

Peritonitis, obstruction and trauma are the most common surgical emergencies, and have relatively high morbidity and mortality rates. Mortality rates remain high despite advances in surgical techniques, antimicrobial therapy, and intensive care support.

Numerous studies have tried to identify prognostic biomarkers in critically ill patients. Of those identified, lactate clearance, base excess, and serum pro-calcitonin are used most often in clinical practice. In addition, many scoring systems, such as the Acute Physiology and Chronic Health Evaluation II (APACHE II) score, the Simplified Acute Physiology Score II (SAPS II), the Sequential Organ Failure Assessment (SOFA), and the Mannheim Peritonitis Index (MPI) systems, have been introduced to estimate disease severity and prognosis in critically ill patients.

However, with the exception of the MPI system, none of the scoring systems mentioned above is specific for peritonitis. Furthermore, these scoring systems are difficult to implement and are of little help in deciding the correct treatment by itself. Studies have evaluated risk factors in critically ill surgical patients coming to the emergency. It is important that these risk factors be identified to stratify risks and optimize perioperative care.

METHODS

The present is a retrospective study to evaluate the effect of hypoproteinemia in the outcome of emergency abdominal surgeries, carried out in Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, Uttarakhand

Case Selection

All the patients admitted to the emergency surgical ward and undergoing emergency abdominal surgery.

Inclusion criteria-

- all patients who underwent emergency laparotomy in SGRIM&HS hospital

Exclusion criteria-

- Patient of age >70yrs and <15 yrs
- Patient with significant preoperative acute blood loss.
- Patients with various co-morbidities like diabetes, hypertension, cardiac disease, severe anaemia etc.

Methodology

Demographic data and information regarding the presenting ailment was collected. The presence of septic shock, and various comorbidities associated were analyzed. Sepsis was defined as more than two features out of tachycardia (heart rate > 90 beats/min), tachypnea (respiratory rate > 20 breaths/min or PaCO₂ < 32 mmHg), hypo-

hyperthermia (temperature > 38°C or < 36°C), and total leukocyte count < 4000/cumm or > 12000/cumm or band forms > 10%.

Preoperative biochemical parameters, such as haemoglobin (Hb) , renal function test , electrolytes, serum albumin levels were measured immediately after emergency admission. Postoperative biochemical parameters were measured immediately after surgery.

Patients were divided into study groups for hypoalbuminemia by taking the cut off value of serum albumin as 3 gm/dl.

Data was collected and analyzed regarding various postoperative complications like mortality, surgical site complications (serous or purulent discharge, dehiscence, necrosis, burst abdomen and faecal fistula), cardio-respiratory complications (chest pain, breathlessness, dyspnea, plueral effusion, pneumonia), sepsis, prolonged post-operative ileus, length of hospital stay and anastomotic leak.

Septic shock was defined by a systolic arterial pressure <90 mm Hg, a mean arterial pressure <60mm Hg, or in case of using vasopressors

Statistical Analysis

The various complications mentioned above were statistically compared between two groups i.e. those with hypoproteinemia and those without hypoproteinemia to look for a possible causative association using chi square test. This was further analysed by odd's ratio to determine the strength of association.

RESULTS

A total of 88 patients, who underwent emergency laparotomy surgery in tertiary hospital , were included in the study.

Patients under study underwent emergency procedures for perforation, obstructions, volvulus, ruptured liver abcess and blunt trauma abdomen. Of the 88 patients, 64 were males and 24 females i.e. 72% were males and 28% were females.(Figure1) Patients were broadly divided into the four age groups . The number of females remained more or less consistent in all age groups but the males showed a preponderance in the 15-45yrs group. (Table 1) The mean age of the patients in the study was 42.2 years.

The mortality was compared between males and females.. There was a significantly higher mortality among females, however the morbidity remained quite similar for both men and women.(Table 2) Of the 88 patients included in the study, 36 were found to be hypoalbuminemic i.e having an albumin level of <3 gm/dl. That makes about 41% of the patients as hypoalbuminemic and 59% normal 67% of the females were hypoalbuminemic and 50% of these expired. On the other hand, 31% of males were hypoalbuminemic with 20% of them expired.(Figure 2) In our study there was a significant association between low albumin , pulmonary odema, ileus , sepsis and mortality.(Figure3) We didnot find any association between hypoalbuminemia, pleural effusion, surgical site infection and anastomotic leak The mean length of post operative stay of the patient with low albumin is 9.7 days , which is less than 10.5 days for the entire cohort.

DISCUSSION

In this study the effect of hypoalbuminemia was studied on various post operative complications and mortality.

The study included a total of 88 subjects of which 64 were males and 24 females. There was a significant association between females and mortality, however the morbidity remaining quite similar for both men and women. This is in agreement with a study conducted by Lunn and Elwood and Wu Wc et al which showed a significantly higher mortality in women as compared to men.(6,7)

We included subjects with age between 15-70 yrs of age to minimize the confounding effect of the different physiologic responses in these extreme groups of ages. Studies have shown that the results of elective surgery in elderly patients seem largely favourable, while those of emergency surgery are not.

Perforation was the most common indication for surgery in the subjects. Maximum cases were those of duodenal perforations followed by small bowel. Similar pattern was observed in study by Singh R et al where 51% of the cases were that of duodenal perforations.(8)

In our study, out of 88 subjects 36 i.e. 41 % of the patients were hypoalbuminemic. We found that hypoalbuminemia was significantly associated with prolonged ileus.. Scheidegger et al arrived at the same association for the condition. Lohsiriwat et al found that decreased albumin levels was associated with increased post operative complications, time to first bowel movement and time to resume a normal diet. Hypoproteinemia probably leads to odema of intestinal wall causing prolonged hypomotility.(9,10)

In our study, decreased albumin was also significantly associated with pulmonary odema similar to the results of the study by Moghadamyeghaneh et al.(11)

Decreased albumin was also found to be significantly associated with sepsis and increased mortality. This is corroborated by works of Gibbs et al whose study showed a decrease in albumin from 4.6 to 2.1gm/dl with an exponential increase in mortality rate from less than 1% to 29% and in morbidity rates from 10% to 65%. Similar relation to increased mortality is shown by Rodriguez MD et al and Kudsk et al and other authors. (12- 14)

Hypoalbuminemia was not found to be associated with plueral effusion, surgical site complications and anastomotic leak. The mean length of hospital stay at our centre for hypoalbuminemics was 9.7 days which was less than that of overall patients. This was probably because of increased mortality in these patients.

CONCLUSION

Hypoalbuminemia is an important independent risk factor for the perioperative and post operative morbidity and mortality in the patients undergoing emergency abdominal surgeries.

DECLARATIONS

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Conflict of interest: None declared
Ethical approval: Not required

Table 1: Gender distribution according to age

GROUP	INTERVAL	MALE	FEMALE	TOTAL
A	15-30	20	4	24
B	31-45	26	8	34
C	46-60	12	6	18
D	>60	06	6	12
		64	24	88

Table 2: Mortality and gender

	expired	Discharged
Males	4	60
Females	10	14

Figure 1: Gender distribution

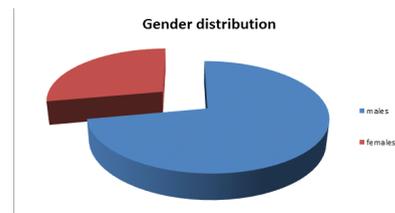


Figure 2: Prevalence of hypoalbuminemia and mortality according to gender

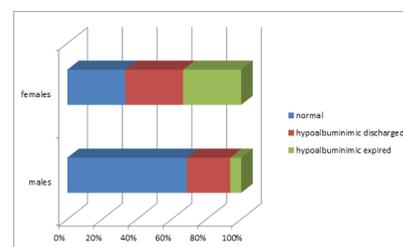
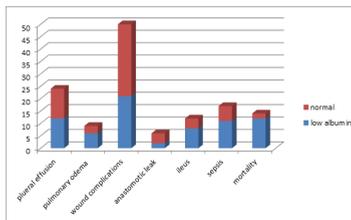


Figure 3 : Association between hypoalbuminemia and complications



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