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Corresponding Author:

Dr. Prayush Vijay

Department of General Surgery,
Government Medical College
and Associated Group of
Hospitals, Kota, Rajasthan, India

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Pre-operative Serum Albumin as a Predictor of Postoperative Outcomes in Patients Undergoing Emergency Laparotomy: A Prospective Observational Study

Dr. Prayush Vijay¹, Dr. Anju Nagar², Dr. Nikhil¹, Dr. Chirag¹

¹Resident, Department of General Surgery, Government Medical College and Associated Group of Hospitals, Kota, Rajasthan, India

²Professor, Department of General Surgery, Government Medical College and Associated Group of Hospitals, Kota, Rajasthan, India.

ABSTRACT

Background: Emergency laparotomy is associated with substantial postoperative morbidity and mortality. Serum albumin is an inexpensive marker influenced by nutritional reserve, inflammation, and illness severity.

Aim: To evaluate the association between preoperative serum albumin and postoperative outcomes after emergency laparotomy.

Methods: This prospective observational study included adult patients undergoing emergency laparotomy at Government Medical College and Associated Group of Hospitals, Kota. Serum albumin was categorized as normal (≥ 3.5 g/dL) or low (< 3.5 g/dL). Outcomes included postoperative complications, Clavien–Dindo grade, ICU admission, length of stay, reoperation, and mortality. Confirm recruitment dates, ethics approval, methods, and results against the original records.

Results: In the supplied aggregate dataset of 100 patients, 62 had preoperative hypoalbuminemia (< 3.5 g/dL) and 38 had albumin ≥ 3.5 g/dL. Postoperative complications were recorded in 46/62 (74.2%) patients with hypoalbuminemia and 12/38 (31.6%) patients with normal albumin. ICU admission occurred in 34/62 (54.8%) and 10/38 (26.3%), respectively. Reoperation was recorded in 14/62 (22.6%) and 2/38 (5.3%), and mortality in 7/62 (11.3%) and 1/38 (2.6%), respectively. These are descriptive calculations from the supplied summary; statistical significance has not been established.

Conclusion: Preoperative serum albumin may complement clinical risk assessment in emergency laparotomy. Final conclusions must reflect the verified statistical analysis.

Keywords: Emergency laparotomy; serum albumin; hypoalbuminemia; postoperative complications; mortality.

INTRODUCTION

Emergency laparotomy is performed for potentially life-threatening conditions such as perforation peritonitis, intestinal obstruction, bowel ischemia, strangulated hernia, and abdominal trauma. Patients may present with sepsis, dehydration,

metabolic abnormalities, or hemodynamic compromise, with limited opportunity for preoperative optimization. Postoperative complications can prolong hospitalization, require intensive care, or result in death. Serum albumin is widely available and inexpensive. Although traditionally viewed as a nutritional marker, it is also a negative acute-phase reactant influenced by inflammation, capillary permeability, hepatic synthesis, and illness severity. Low serum albumin has been associated with adverse outcomes in surgical and critically ill populations. This study evaluates its association with outcomes after emergency laparotomy at a tertiary-care hospital in Kota, Rajasthan.

MATERIALS AND METHODS

Study design and setting: A prospective observational study was conducted/planned in the Department of General Surgery, Government Medical College and Associated Group of Hospitals, Kota, Rajasthan. Insert the exact recruitment dates and ensure they match the approved protocol and source records.

Participants: Adult patients undergoing emergency laparotomy for acute intra-abdominal pathology were eligible. Indications listed in the thesis protocol include perforation peritonitis, intestinal obstruction, ischemic bowel, strangulated hernia, intra-abdominal sepsis, and traumatic abdominal injuries. The protocol lists exclusions including elective surgery, chronic liver disease, nephrotic syndrome, protein-losing enteropathy, pregnancy, long-term albumin supplementation, and death before surgery. Confirm the criteria actually applied.

Exposure: Preoperative serum albumin was measured during initial assessment before surgery and categorized as normal (≥ 3.5 g/dL) or hypoalbuminemia (< 3.5 g/dL). State the assay method only after checking laboratory records.

Outcomes: The primary outcome was postoperative complications. Secondary outcomes included surgical-site infection, wound dehiscence, anastomotic leak, respiratory complications, sepsis, acute kidney injury, Clavien–Dindo grade, ICU admission and duration, hospital stay, reoperation, and mortality. Confirm the follow-up period.

Statistical analysis: Summarize continuous variables as mean $\pm$ SD or median (IQR), as appropriate, and categorical variables as counts and percentages. Use appropriate tests for group comparisons and report effect estimates, 95% confidence intervals, and exact p-values. Do not describe associations as statistically significant unless supported by the actual analysis.

Ethics

Insert the Institutional Ethics Committee name, approval number, and date from the official approval letter. Confirm the actual informed-consent process. These details must not be assumed.

RESULTS

The following descriptive results are calculated from the aggregate counts previously supplied for 100 patients. They must be checked against the original patient-level dataset before submission. No p-values or claims of statistical significance are reported because a verified statistical analysis was not available.

Baseline characteristics

The supplied dataset included 100 patients: 68 (68%) male and 32 (32%) female. Age distribution was 18–30 years in 18 patients, 31–40 years in 22, 41–60 years in 38, and > 60 years in 22. Preoperative albumin was < 3.5 g/dL in 62 patients (62%) and ≥ 3.5 g/dL in 38 (38%).

The recorded indications for emergency laparotomy were perforation peritonitis in 42 patients (42%), intestinal obstruction in 28 (28%), ischemic bowel in 12 (12%), strangulated hernia in 10 (10%), and trauma in 8 (8%).

Table 1. Postoperative outcomes by preoperative albumin group

Outcome	Albumin < 3.5 g/dL (n=62)	Albumin ≥ 3.5 g/dL (n=38)	Overall (n=100)
Any postoperative complication	46 (74.2%)	12 (31.6%)	58 (58.0%)
No recorded complication	16 (25.8%)	26 (68.4%)	42 (42.0%)
ICU admission	34 (54.8%)	10 (26.3%)	44 (44.0%)
No ICU admission	28 (45.2%)	28 (73.7%)	56 (56.0%)
Reoperation	14 (22.6%)	2 (5.3%)	16 (16.0%)
Mortality	7 (11.3%)	1 (2.6%)	8 (8.0%)
Survived	55 (88.7%)	37 (97.4%)	92 (92.0%)

Hospital stay was ≤ 7 days in 28 patients (28%), 8–14 days in 36 (36%), and >14 days in 36 (36%). In the hypoalbuminemia group, the corresponding counts were 10, 20, and 32; in the normal-albumin group, they were 18, 16, and 4.

The supplied summary recorded 44 ICU admissions; among these, ICU stay was 1–3 days in 14 patients, 4–7 days in 18, and >7 days in 12. The listed postoperative events were surgical-site infection (24), wound dehiscence (14), anastomotic leak (10), respiratory complications (18), sepsis (16), and acute kidney injury (12). These event categories may overlap and should not be summed as unique patients unless confirmed from the case records

DISCUSSION

The main findings should be stated only after analysis of the verified dataset. Distinguish an observed association from independent prediction: the latter requires suitable adjustment for potential confounders, including age, comorbidities, sepsis, physiological derangement, and operative indication.

A plausible relationship exists between low albumin and postoperative complications. Albumin is influenced by nutritional status, inflammation, capillary leak, and acute illness severity. Hypoalbuminemia may therefore identify patients with reduced physiological reserve, but it is not a pure measure of malnutrition and does not prove that albumin infusion improves outcomes.

If verified data show higher complication rates in the low-albumin group, compare the magnitude and precision of the association with prior studies in emergency abdominal surgery and broader surgical populations. Discuss differences in case mix, albumin thresholds, outcome definitions, follow-up, and adjustment for illness severity. Serum albumin may complement clinical assessment but should not delay life-saving surgery or be used as a stand-alone decision rule.

Limitations

Potential limitations include single-centre design, sample size, heterogeneity of emergency indications, and confounding by inflammation and illness severity. Retain only limitations that accurately reflect the study. If no multivariable analysis was performed, describe the findings as associations rather than independent prediction..

CONCLUSION

Preoperative serum albumin is a readily available marker that may help characterize risk among patients undergoing emergency laparotomy. Its association with complications, ICU admission, length of stay, reoperation, and mortality must be reported using verified patient-level data and appropriate statistical analysis. Serum albumin should be interpreted alongside clinical status and disease severity.

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