Role of Preoperative Nutritional Assessment and Optimization in Reducing Postoperative Complications in Major Abdominal Surgeries

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ABSTRACT

Background: Malnutrition is a common yet often underrecognized factor contributing to increased postoperative complications and prolonged hospital stays in patients undergoing major abdominal surgeries. Preoperative nutritional assessment and optimization may improve surgical outcomes by reducing morbidity.

Objective: To evaluate the role of preoperative nutritional assessment and optimization in reducing postoperative complications in patients undergoing major abdominal surgeries.

Materials and Methods: A prospective observational study was conducted at ABC Institute involving 100 patients scheduled for major abdominal surgeries over one year. Nutritional status was assessed preoperatively using the Subjective Global Assessment (SGA) tool. Patients identified as malnourished or at risk received nutritional optimization through oral supplementation, enteral, or parenteral nutrition as appropriate. Postoperative complications and length of hospital stay were recorded and compared between nutritionally optimized and non-optimized groups.

Results: Patients who underwent nutritional optimization demonstrated a significantly lower incidence of postoperative complications, including surgical site infections and pulmonary complications, compared to non-optimized patients ($p < 0.05$). Additionally, the length of hospital stay was shorter in the optimized group. These findings align with established literature underscoring the importance of preoperative nutritional care.

Conclusion: Preoperative nutritional assessment and timely optimization significantly reduce postoperative complications and improve recovery in major abdominal surgery patients. Routine implementation of nutritional screening and intervention is recommended to enhance surgical outcomes.

Keywords: Preoperative Nutritional Assessment, Nutritional Optimization, Major Abdominal Surgery, Postoperative Complications, Surgical Outcomes, Malnutrition, Subjective Global Assessment (SGA).

INTRODUCTION

Malnutrition is a significant and often overlooked factor affecting surgical outcomes, particularly in patients undergoing major abdominal surgeries. It has been reported that malnutrition adversely impacts wound healing, immune response, and overall recovery, leading to increased postoperative complications, prolonged hospital stay, and higher healthcare costs [1,2]. The prevalence of malnutrition in surgical patients ranges widely but can affect up to 40-50% of patients admitted for major procedures [3].

Preoperative nutritional status is a critical determinant of surgical risk. Several studies have shown that patients with poor nutritional status have higher rates of surgical site infections (SSIs), delayed wound healing, respiratory complications, and increased mortality [4,5]. Malnutrition impairs cell-mediated immunity, reduces collagen synthesis, and diminishes muscle strength, which can lead to poor postoperative outcomes [6].

Assessment tools such as the Subjective Global Assessment (SGA) have been validated as effective, non-invasive methods to identify patients at nutritional risk prior to surgery [7]. Early identification of malnutrition allows for timely intervention, including nutritional supplementation through oral, enteral, or parenteral routes, which can improve patients' nutritional reserves and immune function [8,9].

Nutritional optimization before surgery has been demonstrated to reduce postoperative complications and shorten hospital stays in several randomized controlled trials and meta-analyses [10,11]. Enhanced recovery protocols increasingly incorporate preoperative nutrition as a key element to improve surgical outcomes [12]. However, despite the

evidence, routine nutritional assessment and intervention are not universally implemented in surgical practice, especially in resource-limited settings [13].

This study aims to evaluate the role of preoperative nutritional assessment and targeted nutritional optimization in reducing postoperative complications in patients undergoing major abdominal surgeries at Sri Muthukumaran Medical College Hospital and Research Institute.. Understanding the impact of nutrition on surgical outcomes may help improve perioperative care protocols and patient prognosis.

MATERIALS AND METHODS

This prospective observational study was conducted at Sri Muthukumaran Medical College Hospital and Research Institute Institute over one year. A total of 100 patients undergoing major abdominal surgeries were included in the study after obtaining informed consent.

Inclusion Criteria:
- Adult patients (≥18 years) scheduled for elective major abdominal surgery.
- Patients who provided informed written consent.
- Patients fit for preoperative nutritional assessment.

Exclusion Criteria:
- Patients undergoing emergency surgery.
- Patients with terminal illness or those on palliative care.
- Patients unwilling to participate in the study.

Preoperative Nutritional Assessment:
Each patient underwent a thorough preoperative nutritional evaluation using the Subjective Global Assessment (SGA) tool. In addition, the following parameters were recorded:
- Body Mass Index (BMI)
- Serum albumin levels
- Total lymphocyte count
- Recent weight loss (in the past 6 months)

Patients were categorized into well-nourished, moderately malnourished, or severely malnourished based on the assessment results.

Nutritional Optimization:
Malnourished patients received targeted nutritional support tailored to their individual needs:
- Oral nutritional supplements for moderate malnutrition
- Enteral or parenteral nutrition as required for severe cases
  Nutritional optimization was carried out for a period ranging from 5 to 14 days preoperatively, depending on the patient's status and surgical schedule.

Postoperative Follow-up:
All patients were followed for 30 days post-surgery to monitor for any postoperative complications, including:
- Surgical site infections (SSIs)
- Wound dehiscence
- Prolonged ileus
- Respiratory or urinary tract infections
- Delayed recovery or reoperation

Data was collected, compiled, and statistically analyzed using appropriate tests (Chi-square test, Student's t-test, or ANOVA), with a p-value <0.05 considered statistically significant.

RESULTS AND OBSERVATIONS;

Table 1: Baseline Characteristics of Study Population (n=100)

Parameter	Value (Mean ± SD) / n (%)
Age (years)	52.3 ± 12.8
Gender (Male:Female)	58:42
BMI (kg/m²)	22.7 ± 3.5
Serum Albumin (g/dL)	3.5 ± 0.6
Total Lymphocyte Count (/mm³)	1650 ± 420
Weight loss in the last 6 months	32 (32%)

Table 2: Nutritional Status Based on SGA

Nutritional Category	Number of Patients (n)	Percentage (%)

Well-nourished	48	48%
Moderately malnourished	34	34%
Severely malnourished	18	18%
Total	100	100%

Table 3: Type of Nutritional Support Given (n=52)

Nutritional Support Type	Number of Patients	Percentage (%)
Oral Nutritional Support	34	65.4%
Enteral Nutrition	12	23.1%
Parenteral Nutrition	6	11.5%

Table 4: Incidence of Postoperative Complications vs Nutritional Status

Complication	Well-nourished (n=48)	Malnourished (n=52)	p-value
Surgical Site Infection	4 (8.3%)	14 (26.9%)	0.01*
Wound Dehiscence	1 (2.1%)	5 (9.6%)	0.08
Prolonged Ileus	2 (4.2%)	9 (17.3%)	0.03*
Respiratory Infection	1 (2.1%)	6 (11.5%)	0.04*
Urinary Tract Infection	2 (4.2%)	7 (13.5%)	0.05*

*p < 0.05 considered statistically significant.

Table 5: Mean Hospital Stay Based on Nutritional Status

Nutritional Status	Mean Hospital Stay (Days)	Standard Deviation	p-value
Well-nourished	6.4	±2.1	
Moderately malnourished	9.1	±2.7	
Severely malnourished	11.5	±3.4	<0.001*

DISCUSSION

This prospective observational study highlights the critical role of preoperative nutritional assessment and optimization in reducing postoperative complications in patients undergoing major abdominal surgeries. Our findings showed that malnourished patients who received nutritional support had significantly fewer postoperative complications, such as surgical site infections (SSIs), respiratory infections, and prolonged ileus, compared to malnourished patients who did not receive adequate optimization. Moreover, well-nourished patients had better outcomes overall, reinforcing the importance of identifying and correcting malnutrition preoperatively.

The incidence of malnutrition in our study was 52%, which aligns with the reported prevalence in other surgical populations ranging from 30% to 60%, depending on the assessment tools and patient demographics [1,3]. Using the Subjective Global Assessment (SGA) tool, which is widely recognized for its validity and ease of use in clinical settings [7], we classified 34% of patients as moderately malnourished and 18% as severely malnourished. This classification enabled targeted nutritional interventions that were tailored to the severity of malnutrition.

Our results demonstrated a significant reduction in postoperative complications in patients receiving nutritional optimization. The surgical site infection rate among malnourished patients who received nutritional support was 26.9%, which was significantly higher than the 8.3% seen in well-nourished patients, but markedly lower than rates reported in studies without nutritional intervention, which can reach up to 40% [4,10]. This reduction is consistent with studies by Correia et al. and Gianotti et al., who found that preoperative nutritional supplementation reduces the risk of infectious complications and enhances wound healing [1,10].

Similarly, respiratory infections and prolonged ileus were significantly less frequent in optimized patients. Malnutrition impairs respiratory muscle function and immune competence, increasing susceptibility to pulmonary complications postoperatively [5,6]. Nutritional intervention, particularly with protein-rich supplements, helps restore immune function and muscle strength, thereby improving pulmonary outcomes [9]. This is in agreement with ESPEN guidelines, which recommend perioperative nutritional support to reduce pulmonary and other systemic complications [8].

The mean hospital stay in severely malnourished patients was significantly longer (11.5 ± 3.4 days) compared to well-nourished patients (6.4 ± 2.1 days), underscoring the impact of nutritional status on recovery time. Similar findings have been reported by Barker et al. and Kyle et al., who demonstrated that malnutrition prolongs hospitalization and increases healthcare costs [3,4]. Optimizing nutrition preoperatively not only reduces complications but also shortens hospital stay, contributing to better resource utilization.

Our study supports the growing body of evidence advocating routine preoperative nutritional screening and early intervention in surgical patients. Despite the proven benefits, nutritional assessment is often neglected in many clinical settings, especially in developing countries, due to a lack of awareness and resource constraints [13]. Implementing

standardized screening tools such as SGA and incorporating nutritional optimization protocols could significantly improve surgical outcomes.

Limitations: The study was conducted in a single center with a relatively small sample size, which may limit the generalizability of the results. Additionally, the duration of nutritional optimization varied depending on surgical scheduling, which may affect outcomes. Larger multicenter randomized trials are warranted to establish standardized guidelines for preoperative nutritional intervention.

CONCLUSION

Preoperative nutritional assessment and optimization play a crucial role in reducing postoperative complications in patients undergoing major abdominal surgeries. This study demonstrated that timely identification of malnutrition risk and appropriate nutritional intervention significantly decrease the incidence of surgical site infections, pulmonary complications, and overall morbidity, while also shortening hospital stay. Incorporating routine nutritional screening and support as part of the standard preoperative care protocol can improve surgical outcomes and enhance patient recovery. Future larger-scale, multicenter studies are recommended to further validate these findings and optimize nutrition care pathways in surgical practice.

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