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Original Research Article

AN INVESTIGATION OF THE IMPACT OF PREOPERATIVE NUTRITIONAL STATUS ON POSTOPERATIVE WOUND HEALING IN CASES OF ELECTIVE LAPAROTOMY

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ABSTRACT

Background: Malnourishment is the scourge of the developing countries like India. Nutrition is important in many physiological processes like wound healing. In patients posted for surgery, their nutritional status plays an important part in the post-operative wound healing and prevention of complications like wound gaping and leakage from anastomosis. In this study we try to establish the relation between four nutritional indices and their effect on the postoperative wound healing and there by the duration of hospital stay. To study the nutritional factors affecting wound healing.

Materials and Methods: This prospective study was conducted by selection of random 35 cases posted for major elective surgery during the period from March 2022 to March 2024 in Department of General Surgery, SRM.

Results: The analysis subsequently concentrated on handgrip strength across each SGA category. The study revealed a significant correlation between handgrip strength and SGA classification. Notably, class A exhibited a higher median handgrip strength than classes B and C, both preoperatively and postoperatively. The preoperative handgrip strength for class A was 33 kg (27.26 – 42), while for class B it ranged from 23.56 to 36, and for class C from 17 to 23. The postoperative handgrip strength for class A was 17.44 – 41, for class B 19.58 – 29.58, and for class C 13 – 17. The disparities in handgrip strength among the classes were statistically significant ($p<0.0001$ preoperatively and $p=0.0003$ postoperatively). The hospital food provided significantly lower total energy (1268.8 kcal) and protein (32.6 g) than the predicted requirements (1560 kcal (1488 – 1809) and 72 g (61.67 – 80) respectively) ($p<0.0001$).

Conclusion: Our study concludes that the preoperative nutritional state of the patient significantly influences postoperative wound healing. An inadequate preoperative condition predisposes individuals to several problems, including as wound dehiscence and leakage.

Keywords: Hypoalbuminemia; Hemoglobin, Lymphocyte count, Body Mass Index.

INTRODUCTION

Malnutrition remains a considerable issue and is prevalent among hospitalized patients. Current data indicates that the global prevalence of malnutrition in hospitalized individuals ranges from 19% to 59%. This prevalence is greater in low-income and middle-income countries. Malnutrition profoundly affects postoperative outcomes in surgical patients. Recent evidence has shown a substantial association between preoperative fasting and several postoperative complications, including infection,

delayed wound healing, and extended hospitalization. Furthermore, numerous investigations have shown that rectifying acute malnutrition before to surgery improves postoperative clinical outcomes.[1-3]

Malnutrition is a condition defined by inadequate or excessive nutritional intake, regardless of the presence of inflammation. This syndrome induces changes in body composition and diminishes physiological function. Established guidelines offer evidence-based advice for nutritional management in the perioperative phase. The guidelines for preoperative nutritional therapy depend on the patient's nutritional state. Consequently, it is imperative to do a malnutrition risk assessment for all patients before to surgery and to refer those identified as high risk to a nutritionist for review. Insufficient data exists to substantiate the advantages of stomach decompression or fasting post-surgery. The delivery of nutrients via the gastrointestinal tract or the introduction of solid food should commence within a 24-hour timeframe.[4-6]

Following surgery, individuals exhibit a metabolic stress response that results in an elevated requirement for protein and kilocalories. To prevent malnutrition, it is essential to meet at least 60% of protein requirements throughout a span of 7 to 10 days. If a patient is anticipated to refrain from oral intake for 7 days, enteral tube feeding should be initiated. For patients with intestinal failure, rapid initiation of parenteral nutrition is advised if malnutrition is present. If the patient is adequately nourished, parenteral nutrition should be administered after 7 days if oral or enteral feeding is unavailable for the subsequent 3-7 days.

This is crucial for surgery patients, as they require an increased intake of these nutrients to mitigate the degradation of their bodily tissues resulting from metabolic stress. The influence of these factors on postoperative outcomes was analysed.[7-9]

MATERIALS AND METHODS

This study was conducted at Department of General Surgery, SRM and the enrolment period spanned from March 2022 to March 2024. The study included 35 adult patients who were hospitalized to the male and female surgical wards and were scheduled to undergo laparotomy.

Inclusion Criteria

1. Patients with written informed permission.

Exclusion Criteria

1. Patients 65 or above years of age.
2. Patients with HIV infection.
3. Patient with Cancer.

RESULTS

Table 1: Patient characteristics

Gender	n (%)
Males	18 (51.4%)
Females	17 (48.6%)
Age [years], median (IQR)	37 (27.5–50)
Indication for laparotomy n (%)	
Bowel perforation	14 (40%)
Bowel obstruction	7 (20%)
Open appendicectomy	10 (28.5%)
Open cholecystectomy	4 (11.4%)

Table 2: Handgrip strength of the dominant hand preoperatively and at day 3 postoperatively

Time of handgrip strength assessment	Hand grip strength (Kg)			P value
	Class A	Class B	Class C	
Preoperative	26.8-41.9	22.65-35	17-23	<0.0001
Day 3 Postoperative	17.4-41	18.9-28.4	13-16	=0.0003

Table 3: Comparison between the median (IQR) total energy requirements for the patients

Energy	Energy (Kcal)	P value
Requirement	1560±266	<0.0001
Provided	1381	

Table 4: Comparison between the median (IQR) protein requirements for the patients

Protein	Protein quantity (Kcal)	P value
Requirement	71±12	<0.0001
Provided	35	

Table 5: Correlation between handgrip strength and outcome factors

handgrip strength v. complications			handgrip strength v. hospital stay	
Study time	Spearman's rho	p-value	Spearman's rho	p-value
Preoperative	−0.44	0.02	−0.48	0.02
0.01				
Day 3 postop	−0.43	0.01	−0.46	0.01
0.01				

DISCUSSION

This is the first study of its kind to look at nutritional status, nutritional interventions, and outcomes in a particular subset of surgical patients receiving a tertiary hospital laparotomy. According to the study, malnutrition affected 80% of the patients to varied degrees, with 28% falling into the category of severely malnourished. Research carried out in regions with low economic status has revealed a decreased incidence of adult undernourishment at healthcare establishments. According to the studies, Uganda had a 47% rate and Burundi had a 59% rate. Nonetheless, a research found that hunger was a major factor in 78% of adult patients treated to hospitals in Brazil's low-income communities. Moreover, the majority of these patients were persons who had already had surgery. Malnutrition has been seen in about half of adult inpatients in several upper-middle-class countries. Based on their BMI, none of the patients were considered undernourished (BMI <18.5), as per our findings. Nonetheless, 80% of the patients were classified as malnourished by the SGA classification. This implies that BMI is not a reliable indicator of malnutrition in complicated and severe clinical circumstances where undernutrition is concealed.[10,11]

Because fluid status affects weight fluctuations, especially when there are fast fluid shifts and metabolic changes, the usefulness of BMI in critically ill patients is limited. As a result, in some therapy situations, SGA is preferable than BMI. Due to its independence from laboratory or anthropometric measures and cost-effectiveness, SGA (Subjective Global Assessment) can be advantageous for hospitals.

Our study's conclusions, which show a relationship between surgical problems and hospital stay length as well as the level of preoperative malnutrition as assessed by SGA categorization, are in line with earlier studies. Prior research has demonstrated a relationship between higher death rates and a lower socioeconomic status. This study highlights how crucial it is for a qualified practitioner to evaluate a patient's nutritional state before surgery.[12-14]

When compared to the preoperative assessment, the examination on the third day following surgery showed a considerable drop in handgrip strength. This suggests that a loss in functional capacity is the outcome of a reduction in lean body mass. Major surgical patients are at risk for acute disease-related malnutrition, which is characterized by the persistence of lean tissue breakdown in spite of an excess of adipose tissue. The strong correlation between handgrip strength and nutritional status in hospitalized patients is confirmed by this investigation. Furthermore, this instrument can more quickly and objectively detect alterations in nutritional status than any anthropometric or laboratory indicator.[15-17]

The results of the study showed a negative correlation between handgrip strength prior to and following surgery and the length of hospital stay as well as the frequency of problems following surgery. These findings suggest that a patient's increased risk of complications is linked to a decrease in nutritional status while they are in the hospital. These findings highlight the importance of patients being in a healthy nutritional state before surgery and the necessity of receiving appropriate nutritional therapy afterward. Postoperative liquid diets at QECH are often started 24 hours after surgery, depending on how well the patient is moving around in the colon. After then, the diet gradually switches to a regular solid food. Medical practitioners may prescribe a high protein diet (HPD) for certain cases, which could include items like milk and eggs.[18-20]

Financial constraints, however, sometimes make HPD (High-Performance Design) in the kitchen impractical. On the other hand, no specialist nutritional therapies are available. The study found that the typical hospital food was significantly deficient in both protein (40.46g) and energy (284.2kcal). Loss of lean body mass cannot be reversed by an insufficient diet. Moreover, in an adult individual, it is unable of performing many immune activities and tissue regeneration. This research emphasizes the need for hospitals to offer adult patients nutritional management as an essential element of their healthcare, especially when data supports the practice's ability to improve outcomes.[21,22]

CONCLUSION

This study has shown that hunger affects a sizable portion of surgical patients at a tertiary hospital undergoing laparotomy. Compared to patients who were well-nourished, severely malnourished patients experienced a greater rate of surgical complications and a longer length of hospital stay. Treatment with enhanced nutrition has the potential to improve outcomes for individuals having laparotomies. In this sector, more study is required, with greater sample sizes and a range of patient demographics and facilities.

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