

## Nutritional Support Improves Outcome in Surgical Patients

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### ABSTRACT

**Aim:** To identify outcome of preoperative and post-operative nutritional support on incisional wound healing in malnourished patients undergoing gastrointestinal surgery.

**Methods:** It was a descriptive case series of 120 patients spanning over 6 months duration. Patients were admitted through OPD according to inclusion criteria and screened for malnutrition using BMI, SGA. Preoperative nutrition according to calories calculated for 3-7 days was given. Postoperative nutrition continues during the hospital stay and day of wound healing along with length of hospital stay was noted according to the criteria.

**Results:** Total numbers of patients were 120, according to SGA rating 51.7% patients were mildly malnourished and 48.3% patients were severely malnourished. The average days of wound healing were 11.28. Average Hospital stay for the patients was 20.61 days.

**Conclusion:** Nutritional assessment of the critically ill patient anticipating a major operation is crucial as there is strong association between malnutrition and impaired wound healing. Adequate nutritional replacement can improve surgical recovery, shorten hospital stay, lowers readmission rates.

**Keywords:** Malnutrition, Incisional wound healing, surgical nutrition

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### INTRODUCTION

Nutritional status is important in determining the outcome of surgical patients this is particularly more important in patients undergoing gastrointestinal surgical procedures. Since 1930 the clinical and experimental studies have demonstrated the dependence of occurrence of postoperative complications on the nutritional status of patients<sup>1</sup>. Gastrointestinal surgical patients are at risk of nutritional deficit because of inadequate nutritional intake, surgical stress and increase in basal metabolic rate up to 40%<sup>2</sup>. Poor nutritional status can compromise the function of many organ system including heart, lungs, kidneys and gastrointestinal tract. Wound healing is delayed, as is progress in patient mobility, thus prolonging the patient's surgical recovery. All these factors contribute to longer hospital stay, higher readmission rates and markedly increased health care costs.

It is important to recognize and treat malnutrition as a problem often equal to primary diagnosis. On admission 33-65% of all the hospital patients are somewhat malnourished and 75% lost further weight during hospitalization<sup>3</sup>. In a review of 13 randomized controlled trials of patients with GI cancers pooled data suggested that preoperative nutritional support of adequate calorie and protein given for at least 5 days resulted in 10% reduction in postoperative complications<sup>4</sup>.

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The rationale of this study is to recognize the malnutrition and optimize the patients by nutritional support for incisional wound to heal in short period of time. A prospective study of 500 patients admitted to an acute care hospital determined that 40 percent of patients were undernourished on presentation, and patients lost an average of 5.4% of their body weight during their hospital stay<sup>5</sup>. According to different studies, prevalence is between 30% and 50%<sup>6</sup>. In one of these studies, 75% of malnourished patients deteriorated in their nutrition state during hospitalization. Numerous studies have confirmed the relationship between malnutrition and risk of complication postoperatively, specifically wound dehiscence, abscess and wound infection<sup>7</sup>.

**Body Mass Index (BMI):** A seemingly more optimal nutritional indicator is body mass index (BMI) (body weight in kilograms divided by the square of the height in meters). BMI of less than 15 kg/m<sup>2</sup> is associated with a significant increase in morbidity. In hospitalized patients, a BMI less than 18.5 kg/m<sup>2</sup> is associated with a longer stay in the intensive care unit, increased frequency in postoperative complications, higher readmission rates, and delays in resumption of oral intake<sup>8</sup>.

**Malnourishment Assessment and screening** using Body mass index BMI,  
Severe malnutrition BMI < 16kg/m<sup>2</sup>.  
Moderate malnutrition BMI 16-17kg/m<sup>2</sup>.  
Mild malnutrition BMI 17-18.5kg/m<sup>2</sup>

### SUBJECTIVE GLOBAL ASSESSMENT SGA

A clinical method that incorporates history, physical examination, and subjective analysis is the

subjective global assessment (SGA)<sup>(9)</sup> which uses 5 guidelines:

- **Class A** indicates less than a 5% weight loss or greater than a 5% weight loss but recent evidence of weight gain and improved appetite (well nourished).
- **Class B** indicates a 5% to 10% weight loss without recent weight gain, poor dietary intake, and mild (1+) loss of subcutaneous fat (moderately nourished).
- **Class C** indicates weight loss of greater than 10% with severe loss of subcutaneous fat and muscle wasting, often with edema (severely malnourished).

Elective surgery involving resection of a portion of the upper GI tract, patients with weight loss alone >10% fared no worse than control subjects without weight loss. However those patients with >10% weight loss with some evidence of physiologic impairment (defined by abnormal serum protein levels, maximal inspiratory pressure, and hand grip dynamometry or body composition) sustained a significantly higher incidence of major complications<sup>10</sup>.

Nutritional requirement of each patient was calculated according to a standard formula  
 $AEE = BEE \times (MAF + 1)$ .

AEE-- Actual energy expenditure

BEE--Basal energy expenditure. Approx. 25- 30 kcal/kg/day

MAF—Metabolic activity factor=Activity factor + injury factor+ fever factor+ growth factor

## METHODOLOGY

This is a descriptive case series, conducted during a 6 months period. Non-probability purposive sampling technique was used to identify sample size of cases. This study was conducted at surgical Unit IV-Services Hospital Lahore. Patients with age above 20 years, BMI <20kg/m<sup>2</sup>, recent weight loss of more than 10-15% and those falling in SGA rating B & C were included in the study. Patients with known end stage liver disease, comatose patients were excluded from the study. Patients were admitted through OPD of Surgical IV according to inclusion criteria. Patients

were screened for malnutrition using BMI, SGA. After informed consent the demographic profile of patient was obtained. Preoperative nutrition according to calories calculated for 3-7 days was given. Postoperative nutrition continues during the hospital stay and day of wound healing along with length of hospital stay was noted according to the criteria. Demographic variables were calculated. Wound outcome and hospital stay were compared using chi-square test as a test of significance. Data was analyzed on SPSS statistical analysis software.

## RESULTS

A total of 120 patients were included in this study with mean age of 42.55 years. Malnourished female patient were more common (55.8%) than male patients. According to Subjective Global Assessment (SGA) rating almost half 62(51.7%) were mildly malnourished while remaining half were severely malnourished. As regard to body mass index (BMI) about 69(57.5%) patients were mildly malnourished while, 16(13.3%) were moderately malnourished and 35(29.2%) were severely malnourished. As regard to outcome and stay of the patients, average days of wound healing were 11.28, with minimum of 8 and maximum of 20 days. Average hospital stay from day of admission to day of discharge was 20.61 with minimum duration of 7 and maximum of 45 days. There were many different types of incisions which were conveniently divided into midline incisions 55(45.8%), upper abdominal incisions 36(30%) and other incisions 29(24.2%). Pre and post operatively all patients were provided with nutrition referred to table 1. Calorie requirement and its relationship with wound healing and hospital stay (Table 2).

Table 1: Type of nutritional replacement

Route of nutrition	Preoperatively	Postoperatively
Enteral	36(30%)	37(30.8%)
Parenteral	47(39.2%)	Nil
Enteral &parenteral	37(30.8%)	83(69.2%)

Table 2: Calorie requirement, replacement and its relationship with patient morbidity.

Calorie requirement of the patient. (Kcal)	Preoperative (n=120)	Postoperative (n=120)	Hospital stay Days (Mean)	Duration of wound healing.(Mean)
1500-2000	0.83 %	3.3%	18.50	10.5
2000-2500	46.66%	50%	19.55	10.63
2500-3000	51.66%	43.33%	21.71	11.96
> 3000	0.83%	3.33%	24.50	13.00

Table 3: BMI and its relationship with hospital stay and wound healing.

	Mild malnutrition	Moderate malnutrition	Severe malnutrition
BMI	57.5 %	13.33%	29.16%
Mean hospital stay	20.71%	18.75%	21.28%
Wound healing days	11.10%	10.81%	11.85%

Table 3: BMI and its relationship with hospital stay and wound healing.

	Mild malnutrition	Moderate malnutrition	Severe malnutrition
BMI	57.5 %	13.33%	29.16%
Mean hospital stay	20.71%	18.75%	21.28%
Wound healing days	11.10%	10.81%	11.85%

Table 4: SGA and its relationship with hospital stay and wound outcome.

	Mildly malnourished	Severely malnourished
SGA	51.66%	18.34%
Mean hospital stay	20.20%	21.05%
Wound healing days	10.87%	11.72%

## DISCUSSION

Malnutrition is highly prevalent in hospitalized patients, it ranges from 30% to 70% of all hospitalized patients<sup>11,12</sup>. Pre-existing malnutrition has been shown to be a major clinical problem in surgical patients. A study published in 2011 showed that almost 27% of patients undergoing abdominal surgery were malnourished, malnourishment was more common in patients having any malignancy<sup>13</sup>. In our study female surgical patients were more common than male patients.

Average hospital stay in severely malnourished patients is longer than mildly malnourished patients. Tamer showed that malnutrition is associated with longer hospital stay and malnourished patients are at high risk of readmission<sup>14</sup>. A study published by Pronio, showed that nutritional replacement in malnourished patients undergoing major abdominal surgery reduces morbidity and shortens hospital stay duration<sup>15</sup>.

The patients falling in severe malnutrition according to SGA had delayed wound healing and longer duration of hospital stay compared to moderately malnourished patients. This means abdominal surgery outcome is inversely proportional to degree of malnutrition. Similar trend of abdominal surgical outcome was reported by Sungurtekin<sup>16</sup>.

In my study the severe malnourished patients according to subjective global assessment SGA and BMI had prolonged days of healing and longer hospital stay.

Our study showed that patient with better nutritional status has good outcome. Both BMI and SGA status is good indicator of wound healing. A study showed that improving nutritional status in surgical patient improve wound healing<sup>17</sup>. A case study published in 2011 showed that early diagnosis and treatment of malnourished elderly patients improve wound healing<sup>18</sup>. Another study showed that wound healing in undernourished and malnourished patients can be very challenging<sup>19</sup>.

A recent study showed that malnourished patient should receive at least 7-14 days nutritional supplementation preferably enteral route to improve

outcome of surgery<sup>20</sup>. Another study recommend that patients undergoing major abdominal surgery should receive nutritional supplementation for at least five days<sup>(21)</sup>. Another study published showed that early resumption of enteral fiber diet decrease risk of infection as compared to parenteral nutrition after major abdominal surgery<sup>(22)</sup>. From the above discussion it is clear that malnourished patient should receive nutritional supplementation, the only thing unsettled is the duration of pre-operative nutrition? In the light of above discussion we recommend that malnourished patients undergoing major abdominal surgery should receive nutritional supplementation for a minimum of 5 days to a maximum of 14 days pre-operatively, this will improve the outcome of patient.

## CONCLUSION

It is concluded from our study that nutritional status is important in determining the outcome of surgical patient. Nutritional assessment of the patient anticipating a major operation is crucial as there is strong association between malnutrition and impaired wound healing. In this way patient's surgical recovery is prolonged contributing to a longer hospital stay, higher readmission rates and increased health care cost.

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