COMPARISON OF DIETARY INTAKE AND DIETARY REQUIREMENT IN POST OPERATIVE ADULT CARDIAC SURGICAL PATIENTS IN ICU

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ABSTRACT

Objectives: To estimate optimum energy and protein intake and to examine the differences in actual intake versus optimum protein and energy requirement during first three days of patients at surgical ITC of AFIC.

Patients and Methods: A descriptive, cross sectional study was conducted by using purposive sampling technique. One hundred patients admitted in adult ITC of Armed Forces Institute of Cardiology and National Institute of Cardiovascular Diseases between periods of 10th July to 10th December 2013, fulfilling study criteria were included in study sample. Data was collected from hospital records (bedside charts) and food frequency questionnaire (FFQ). Protein and energy intake on 1st, 2nd and 3rd post operative day was calculated and compared with pre- calculated optimum protein and caloric requirement.

Results: Mean caloric intake on 1st post operative day was 583 k/cal, on 2nd post operative day 679 kcal and on 3rd post operative day was 820 k/cal which were 70%, 65% and 68% respectively less than the optimum requirement. Whereas mean protein intake was 13 grams on the 1st post operative day and 13.2 and 22.3 grams on the 2nd and 3rd day respectively which was 85%, 83% and 72% less respectively on first, second and third post operative day.

Conclusion: The results suggest that the energy and protein intake of patients was below estimated requirements. Attention must be paid to malnutrition and nutrition in general in the hospital wards.

Keywords: Post operative patients in Adult Intensive Care, Protein and Energy intake, Optimum Caloric and protein intake, Food frequency questionnaire (FFQ).

INTRODUCTION

Feeding in post operative patients is an important process in support of nutritional requirement of patient. The purpose of nutrition care after surgical procedures is twofold. First, adequate energy and nutrients are required to support tissue healing after surgery and to support the preservation of lean body mass during catabolic phase of surgical stress[1]. To make proper plans for the nutritional support of patients undergoing surgery, it is essential to understand the basic changes in body metabolism that occur as a result of injury[2]. Surgery, like any injury to the body elicits a series of reactions including release of stress hormones and inflammatory mediators like cytokines. This release of mediators to the circulation has a major impact on body metabolism. They cause catabolism of glycogen, fat and protein with release of glucose, free fatty acids and amino acids into the circulation, so that substrates are diverted from their normal purposes like physical activity, to the task of healing and immune response. For optimal rehabilitation and wound healing, the body needs to be in an anabolic state[3]. The body requires extra nutrients to heal, so focusing on nutrition can mean the difference between bouncing back and a lengthy recovery. After surgery, drugs, fatigue, and complications can make eating unappealing. The mouth and throat can be soar or dry, medicines can make food taste metallic, and even sense of smell can be diminished[4]. On average, a person can expect to lose 5 to 10 percent of total body weight after surgery. To infuse the body with calories and nutrition, consider protein first. Protein is needed to repair tissue, slow muscle catabolism and decrease the inflammatory phase. Post operative requirement range from 1.2 to 1.5 grams of protein per kilogram of body weight. For elective surgery, the low end of the range is sufficient, for

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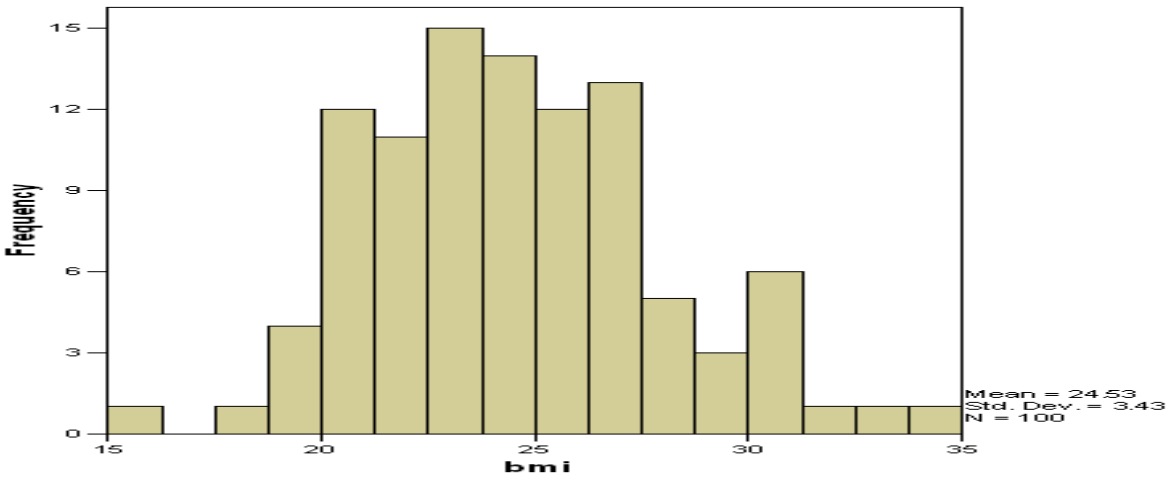
major surgery, the higher end of the spectrum is more appropriate. Surgery has been associated with energy requirements of 1.0-1.15 x BMR whilst complicated surgery requires 1.25-1.4 x BMR in order to meet the patient's needs[5].

Figure-1: Distribution of BMI in the study sample.



The role of nutrition education and medical nutrition therapy in bariatric surgery will continue to grow as tools to enhance surgical outcome and long-term weight loss maintenance are explored further and identified. To enhance the transition to life after surgery and to prevent nutritional complications, all patients should receive care from a multidisciplinary team including a comprehensive program for nutrition. Future research should address the effectiveness of intensive postoperative nutritional care in reducing morbidity and mortality in post operative patients[6].

A study was planned to see the gap in optimum caloric and protein requirement and the actual intake in post operative patients in cardiac ITC as very little data describing nutritional intake among hospitalized patients is available in Pakistan.

MATERIAL AND METHODS

A descriptive cross sectional study was conducted on 100 post operative patients admitted in Adult ITC at Armed Forces Institute of Cardiology and National Institute of Heart Diseases after open heart surgery between 10th July 10th December 2013. Demographic, nutritional and clinical data was collected from hospital records, bed side charts and administering food frequency questionnaire (FFQ) to the study subjects. Inclusion criteria: all post operative patients who started oral dietary intake from day 1.

Exclusion criteria: Post operative patients who did not start oral intake from day 1, those patients who did not survive till 3rd post operative day, patient with history of renal or metabolic illness.

Optimum protein requirement was calculated by the formula 1.2 grams x kg body weight and energy requirement for post operative patients was calculated by using formula 1.2 x BMR. The protein and caloric intake of the patients was calculated by using the food frequency questionnaire (FFQ). Data was entered into SPSS version 17 for analysis.

RESULTS

This study was conducted on a total of 100 patients. The study population consisted of 94 (94%) male patients and 6 (6%) female patients. Mean age of the sample population was 53.3 ± 11.35 years whereas mean age of female patients was 55.3 ± 7 years and the mean age of male patients was 51 ± 15 years.

The histogram shows that the distribution of BMI in study population was normal (Figure 1).

Table-1: Protein intake and requirement of post operative patients for first 3 post operative day.

Post operative day	Protein intake in grams		Calculated mean optimum protein requirement in grams	*p** value
	Mean	S.D.		
1	13.19	7.96	77.05	0.00
2	13.36	10.14		0.00
3	22.38	13.12		0.00

*t- test applied

Table-2: Energy intake and requirement of post operative patients for first 3 post operative days.

Post operative day	Caloric intake (kcal)		Calculated mean optimum caloric requirement	*p** value
	Mean	S.D		
1	583.72	275	1922	0.00
2	679	275		0.00
3	820	244		0.00

*t- test applied

The mean BMI of the sample was 24.5 ± 3.4 S.D. with minimum being 15 and maximum 35.

Data was collected to compare the actual protein and caloric intake on first 3 post operative days versus optimal protein and caloric requirement. The protein consumption by the sample on three post operative days are given in table-1. The protein intake of the patients was compared with the optimum protein requirement by using t-test. The difference on all the 3 days was found highly significant.

The mean caloric intake of the patients on three post operative days is given in table 2. Caloric intake of the patients was compared with the optimum caloric requirement by using t-test. The difference on all the 3 days was found highly significant.

DISCUSSION

There are only a small number of studies that have attempted to measure energy requirements in various surgical patient groups. There were very few female patients (6%) who had open heart surgery. It is well established that prevalence of cardiovascular disease is greater in men than women[7,8] the difference however is not fully under stood however factors like, visceral adipose tissues[9] and female sex hormone are likely to be the protective factors in female before menoupause[7].

In our study the caloric intake ranged from 120-1325 kcal. On first day the mean caloric intake was 70%, on second day 65% and on third 58% less than the optimum energy intake. Protein intake ranged from 2-80 grams which was 85%, 83% 72% less respectively on first, second and third post operative day. This reflects a very grave situation as adequate energy and protein is required to support tissue healing after surgery and to support the preservation of lean body mass during this period of high catabolism.

In a study done at the department of cardiothoracic surgery, Landspítali - the National University Hospital of Iceland. Protein intake was on average 0.9 ± 0.3 g/kg/day. The average energy intake was 19 ± 5.8 kcal/kg/day. Most patients (>80%) had an energy and protein intake below the lower limit of estimated energy and protein needs, even on the fifth day after surgery. According to the nutritional assessment 14 patients (23%) were defined as either malnourished or at risk for malnutrition[4]. In

another study done on energy and protein intakes of acute stroke patients at department of Physical Medicine and Rehabilitation, Park Wood Hospital, St. Joseph's Health Care London the average energy intakes of the entire study group ranged from 19.4-22.3 kcals/kg/day over five observation points, representing 80.3-90.9% intake of measured requirements; protein intake ranged from 0.81-0.90 g/kg/day yielding adequacy of intake of 81-90% of requirement. There were significant differences in energy intakes and/or adequacy of intake of patients ($p < 0.05$)[10]. Malnutrition remains a problem in surgical and critically-ill patients. In surgical patients the incidence of malnutrition ranges from 9 to 44%. Despite this variability there is a consensus that malnutrition worsens during hospital stay. In ICU, 43% of the patients are malnourished[5]. Although poor nutrition during hospitalization may be attributable to many factors, not least inadequacies in hospital catering services, there must also be the question of whether those patients who receive nutritional support are being fed appropriately. Patients sometimes feels nauseated or have other side effects from medications as appetite may be slow in returning[7]. Patient should be encouraged to take frequent small meals. If a patient can just not eat enough, dietician may recommend a nutritional supplement.

CONCLUSION

Role of optimum nutrition is a vital component especially in the immediate postoperative period that affects overall clinical outcome. Recovery in postoperative patients can not alone be ascribed to nutritional component but the current research and expert opinion emphasizes important elements of the nutritional care of post operative patient. Adequate energy and nutrients are required to support tissue healing after surgery. Attention must be paid to malnutrition and nutrition in general in hospital wards especially in intensive care units. Moreover, future research is required to see the effectiveness of intensive postoperative nutritional care in reducing morbidity and mortality in patients.

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