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Body Mass Index as Predictor of Post- Operative Morbidity and Mortality

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ABSTRACT

Background: Protein energy malnutrition affects every organ system. So correct assessment of nutritional status is important as malnourishment is a risk factor for morbidity and mortality in surgical patients. In our study, body mass index(BMI) has been taken as parameter for nutritional assessment.

Methods: Study is conducted on 50 patients admitted in Department of General Surgery, Dr. Sampurnanad Medical College and associated Hospital, Jodhpur, Rajasthan, India for surgeries during January 2014- December 2015. Data was analyzed using Z-test and Fischer exact t-test and p value was calculated. P value< 0.05 is considered statistically significant.

Results: PatientswithBMI18.6-24.9 had more complications and maximum number of complications in age group of 41-60 year group. This finding was statistically non-significant.

Conclusions: Low to normal BMI has more post-operative complication than those with high level but this was not statistically significant.

Keywords: Malnourishment, post-operative mortality, body mass index

INTRODUCTION

The prevalence of protein energy malnutrition in surgical patients is high ranging from 10 to 54%. The correct assessment of the nutritional status is crucial since malnourishment is a risk factor for morbidity and mortality.[1] Identification of patients with high risk is essential in operative indications and decisions often limited by potential morbidities and mortalities related to the procedure. Hence, the critical and laboratory parameters which may point out higher risk for postoperative complications are important.[2]

Malnourishment is reported in 40-50% of hospitalized patients with higher risk factor for postoperative infection and healing complication in patients who undergo surgeries.[3] Protein- energy malnutrition affects every organ system. The most obvious results are loss of body weight, adipose tissue and skeletal muscle mass and due to changes in immunological status poor wound healing occurs.[4]

A dietary history and physical examination (including anthropometric measurements) with relevant laboratory tests are appropriate tools needed for an accurate evaluation of a patient's pre-operative nutritional status. Body mass index is most readily available parameter.

Body mass index correlates with body fat. It is a better estimate of body fat than body weight and has less advantages over the ideal body weight estimations. Unlike the ideal body weight tables that were based on mortality data alone, BMI correlates with morbidity. It is used for both men and women.[5]

Both low and high BMI correlate with morbidity and mortality. The lowest survivable levels of BMI, as suggested by observation in starvation, famine and anorexia nervosa, or by theoretical models have been estimated to be 12-13kg/m^2.

Recent studies have indicated that independently living older individuals with a BMI <22kg/m^2 are at much higher risk for all cause of mortality.[6]The goal of nutritional support in the surgical patients is to prevent or reverse the catabolic effects of disease or injury. Although several important biological parameters have been used to measure the efficacy of nutritional regimens, the ultimate validation for nutritional support in surgical patients should be improvement in clinical outcome and restoration of function.[7]

intra-abdominal abscess and anastomotic leakage and ileus, nay be decreased by the use of preoperative nutritional support. Preoperative nutritional support for patients with only mild to moderate malnutrition is nor routinely indicated.[8]

Protein calorie malnutrition produces a reduction in lean muscle mass, alteration in respiratory mechanics, impaired immune function and intestinal atrophy. These changes result in diminished wound healing predisposition to infection and increased postoperative morbidity.[9]

Pitfalls of using BMI as predictor of postoperative morbidity and mortality: It may overestimate total body fat in persons who are very muscular (athletes) or may underestimate body fat in persons who have lost muscle mass (elderly), it will also inaccurately reflect body fat in edematous states or in individuals <5 feet tall.

METHODS

Retrospective study was designed for study. 50 patients were included in the study. Patients admitted in Department of General Surgery, Dr. SampunanandMedical College and associated Hospital, Jodhpur (Rajasthan) for surgeries during period of January 2014 to December 2015.

Inclusion criteria:

patients who were admitted for surgery under the department of Surgery, Dr. Sampurnanand Medical College, Jodhpur, Rajasthan, India.

Exclusion criteria:

- Children < 15 years of age.
- Patients having icterus.
- Patients having anemia with hemoglobin< 8gm/dl.
- Patients with chronic liver diseases and renal diseases.
- Patients undergoing laparoscopic surgery.
- Patients undergoing chemotherapy and radiotherapy.

Methods of collection of data:

- Details of cases was recorded including history and clinical examinations.
- Anthropometry- Height and weight recorded.
- Follow up was done till patients were discharged from hospital.

Statistical analysis was done accordingly, p value <0.05 was considered statistically significant Z-test and Fischer exact t-test were used for analysis.

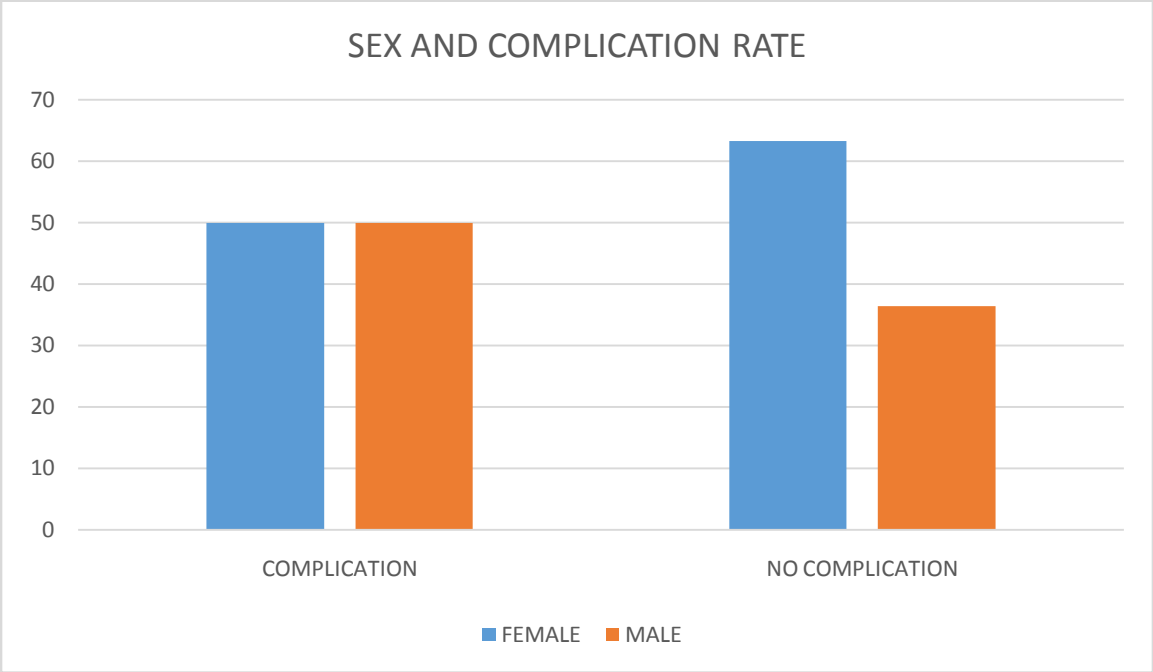
RESULTS

The study was conducted on 50 patients aged between 15-75 years, who underwent any surgery in Department of General Surgery, Dr. Sampurananand Medical College and associated hospitals, Jodhpur, from Jan 2014 to Dec 2015. Among 50 patients 29 were females and 21 were males. 20 patients developed complications and 30 had uneventful recovery.

Table 1: Sex distribution Complications

SEX	YES	NO	TOTAL
FEMALE	10(50%)	19(63.33%)	29(58%)
MALE	10(50%)	11(36.67%)	21(42%)
TOTAL	20	30	50

Above chart represents 47.62% of males in the study developed complications and 34.48% females developed complication.



Among who developed complications 50% were males and 50% females while 36.67% males and 63.33% females had uneventful recovery.

Table 2: Age distribution

Age(years)	complications		Total
	Yes	No	
15-20	0	5(16.67%)	5(10%)
21-30	2(10%)	7(23.33%)	9(18%)
31-40	4(20%)	3(10%)	7(14%)
41-50	7(35%)	2(6.67%)	9(18%)
51-60	5(25%)	6(20%)	11(22%)
61-70	1(5%)	6(20%)	7(14%)
71-75	1(5%)	1(3.33%)	2(4%)
Total	20	30	50

Of 50% patients, the age varied from 15-75yrs. The number of patients in the 41-60 year group was the highest (40%). Highest number of complications was noted in age group of 41-60 years (60%).

Among all the patients who developed complications most common complication is wound infection 13(26%). In post-operative period mortality observed was 3(6%).

Table 3: distribution of post-operative outcomes

Postoperative outcomes	No. of patients	Percentage
Wound infection	13	26
Wound gaping	1	2
LRTI	2	4
Left pleural effusion	1	2
Mortality	3	6

Table 4: Comparison of complication and no complication with BMI

BMI Group(kg/m^2)	complications		Total	p value
	Yes	No		
<16.5	1(5%)	0	1(2%)	NA
16.5-18.5	6(30%)	4(13.33%)	10(20%)	>0.05
18.6-24.9	13(65%)	23(76.67%)	36(72%)	>0.05
25-29.9	0	3(10%)	3(6%)	NA
Total	20	30	50	-

It was observed that complication rate was found to be high with BMI < 18.5 kg/m^2 but it was not statistically significant using the Z test and the Fischer exact t-test. Among complications maximum no. of complications occurred in BMI group 18.6-24.9 kg/m^2 i.e. 65%.

The complication rate with BMI < 16.5 was 100% between 16.5- 18.5 was 60% , 18.6-24.9 was 36% and no complication was found in patients with BMI > 25kg/m^2.

DISCUSSISON

Nutritional assessment is essential for identifying patients who are at increased risk of developing post-operative complications. A variety of nutritional indices have been found to be valuable in predicting patient outcome. In our study pre-operative BMI was used as nutritional assessment.

On the basis of age distribution in the present study, out of total 50 patients maximum number of complications occurred in age group of 41-60 years with 60% complication rate. This study is concordant with study conducted by Kumar A .[4]On the basis of sex distribution in the present study 47.62% males had complications as compared to females 34.48%. the present is discordant with study conducted by Kumar A.[4]

In the present study out of 50 patients 40% had complications. In the present study, when BMI was taken as predictor of complications, it was observed that patients with BMI< 16.5 kg/m^2 had 100% complication rate; with BMI <16.5-18.5kg/m^2 complication rate was 60%. In patients with normal BMI 18.5-24.9kg/m^2 complication rate as 36% while there was no complication in patients with BMI >25.

So the present study concludes that in patients with BMI low and normal, complication rate are high but these results are not statistically significant. This is in concordance with study conducted by Olubukalaet al.[10]

CONCLUSION

The study was conducted on 50 patients who referred to Department of Surgery, Dr. Sampurnanand Medical College and associated hospitals, Rajasthan, India during January 2014 to December 2015. Statistical analysis was done accordingly value 0.05 was considered statistically significant. Z test and Fischer exact t-test were used for analysis. Results shows when accessing BMI as a predictor of postoperative morbidity and mortality, BMI in a low to normal range was having more number of complications as compared to high BMI but this was not statistically significant.

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