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Early Postoperative Complications and Mortality in Patients Undergoing Colorectal Cancer Surgery, Co-Relation with Nutritional Status, Stage of Disease and Presentation

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Abstract **Original Research Article**

Background: Early postoperative outcome of colorectal cancer being worsen by various factors like advanced disease stage, emergency presentation, poor nutritional status of the patient etc. To aim of this study was to evaluate the relationship between nutritional status, disease stage, its presentation with short term outcome like mortality and morbidity after colorectal cancer surgery. ***Methods:*** A total 44 number of colorectal cancer patients enrolled in this observational study. These patients underwent colorectal cancer surgery in different surgery unit of Dhaka Medical College hospital and Bangabandhu Sheikh Mujib Medical University, Dhaka were enrolled during the period of March 2014 to march 2015.Patients who developed early postoperative morbidity or mortality were compared with those who followed a healthy course after surgery in relation to nutritional status, disease stage and presentation. Total sample were divided into Group A, who developed postoperative complications and Group B, where patients had uneventful outcome. ***Results****:* Among 44 patients, in hospital death rate found nil and the overall postoperative morbidity rate was 34%. Most of the patients (33/44) was with normal BMI (17-24.9). Histopathologically found adenocarcinaoma and 56% was found TNM stage. Early postoperative outcome was significantly associated with preoperative hypoalbuminemia (16/36), medium to high risk of malnutrition (22/44), immediate surgery for acute disease state (2/15). ***Conclusion:*** In colorectal cancer, malnourished, high risk of malnutrition, hypoalbuminemia significantly contributes to postoperative mortality, morbidity and length of total hospital stay. Hypoalbuminemia serves as an excellent assessment tool and preoperative predictor of postoperative outcomes.

Keywords: Colorectal cancer, malnourished, hypoalbuminemia, nutritional status.

INTRODUCTION

Colorectal cancer (CRC) is the third most common cancer in men (746000 cases, 10% of the total) and the second in women (614000 cases, 9.2% of the total) worldwide. Mortality is lower (694,000 deaths, 8.5% of total) with more deaths (52%) in less developed regions of the world, reflecting a poorer survival in these regions. There is less variability in mortality rates worldwide (six-fold in men, four-fold in women), with the highest estimated mortality rates in both sexes in Central and Eastern Europe (20.3 per 100.000 for men, 11.7 per 100,000 for women), and the lowest in western Africa (3.5 and 3.0, respectively) [1].

Both colon and rectal cancer incidences, as well as mortality rates, have been decreasing for the last several decades, from 66.3 per 100,000 population in 1985 to 45.5 in 2006. The lifetime risk of developing a colorectal malignancy is approaximately 6% in the general US population. This decrease is due to a declining incidence and improvements in both early detection and treatment [2].

In recent decades claims have been made of numerous variables being related to survival. The extent of bowel wall penetration, lymph node metastases, distant metastases, tumor differentiation and tumor stage have been regarded as factors of the utmost

prognostic importance, and they have been the basis of most staging systems. Despite numerous attempts to detect cancer at an early stage, the overall long term outcome of patients curatively resected has not significantly changes in the last decade, the five year survival rate being approximately 60 percent [3].

In Asia, the overall cure rate of colorectal cancer has not improved dramatically in the last decade. 5 year survival remaining at approximately 60%, while the highest survival rate was found in China, the lowest rate was reported in India. The 5 year survival for persons with colorectal cancer is 64% in the United States. If the disease is detected at an early stage, the 5 year survival rate increased to 90%. However because of lack of screening program in many countries, only 39% of colorectal cancer is diagnosed at this stage [4]. There is no such a well-documented consensus of colorectal malignancy in Bangladesh.

In our country due to low income economy the people usually present to the doctors with colorectal cancer in advanced stage. Frequently, it is difficult to perform a curative surgery due to late presentation.

Adverse postoperative events are most often recorded as 30-day mortality and postoperative complications. Large studies show that colorectal cancer surgery can be considered as high risk, with reported postoperative mortality and complication rates of approximately 5% and 20–40%, respectively [5].

For the prognosis of colorectal cancer patients who undergo curative surgery, adverse postoperative events are a determining factor. Several studies showed that early complications are of prognostic importance because they can cause long term morbidity [3]. Furthermore, specific complications, such as anastomotic leaks, are associated with local recurrences and reduced survival [6].

Earlier studies have shown that 30-days mortality after surgery for colorectal cancer vastly underestimates 1-year mortality, even in young colorectal cancer patients who were operated with curative intent [7].

Due to the deep impact on physical, psychological and social functions caused by cancer, malnutrition commonly develops in these patients and is itself a risk factor for decreased immune response and postoperative complications, especially infectious, resulting in higher mortality. It is assumed that, on average, 20% of cancer deaths are secondary to malnutrition. Early diagnosis of malnutrition is of increased importance among surgical patients, especially considering that many nutritional disorders can be corrected preoperatively in an attempt to decrease post-surgical morbidity and mortality [8, 9].

Early postoperative outcome after colorectal cancer surgery predicted by acute disease stage which requires emergency surgery, late presentation, comorbidities, poor nutritional status of patients, elder age, operative setup. Perioperative nutritional support is a modifiable factor to reduce postoperative mortality and morbidity.

OBJECTIVE

General objective:
To identify early postoperative complications rate following colorectal cancer surgery.

Specific objective
To evaluate the impact of nutritional status, disease stage, its presentation on postoperative outcome for patients with colorectal cancer.

METHODOLOGY

Study design
Observational study.

Place of study
This study was carried out in different surgical units of Dhaka Medical College Hospital, Dhaka and BSMMU, Dhaka.

Period of study
08 March, 2014 to 09 March,2015

Study population
All patients with colorectal cancer admitted into surgery ward of DMCH and BSMMU, Dhaka.

Sample size
44 cases (14 from DMCH, 30 from BSMMU)

Inclusion Criteria
- All patients having colorectal cancer surgery were included in this study.

Exclusion Criteria
- Patient with colorectal cancer who are unfit for anesthesia and surgery.
- Recurrent case
- Patient who did not give consent.

Data gathering instruments
- A questionnaire was prepared and were used for data collection.

Procedures of collecting data

- Predesigned data sheet.

Procedures of data analysis and interpretation

- Socio-demographic and clinical variables: Data for socio- demographic and clinical variables were obtained from all participants by the use of a pre-designed and easily understandable questionnaire. After collection of all the data it was entered in the SPSS 16.0 statistical software.

RESULTS

Distribution of patients according to age (n=44)

The maximum patients with colorectal cancer were elderly. The age distribution of patients are depicted below, Mean age was 43.7 years.

Table-1: Distribution of patients according to age (n=44)

Age in year	No. of cases	Percentage
<25	3	6.8%
26-35	10	22.7%
36-45	11	25%
46-55	7	15.9%
>55	13	29.5%
Total	**44**	**100%**

Distribution of patients according to sex (n=44)

The male and female patients affected by colorectal cancer were 63.7% and 36.3% respectively. The female is to male ratio was 1: 1.7.

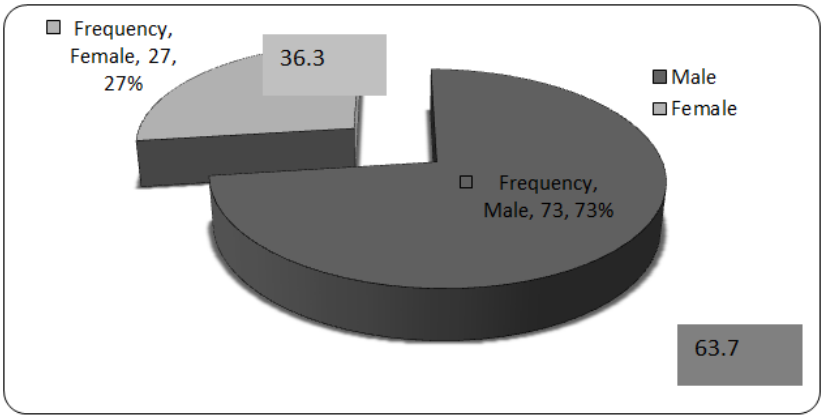

Fig-1: Distribution of patients according to sex

Distribution of patients according to morbidity (n=44)

The patients were divided into 2 groups according to the occurrence of morbidity and mortality. The patients who experienced morbidity underwent Group A and the patients whose outcome was uneventful were categorized as Group B. The distribution of patients belong to Group A and B were shown below.

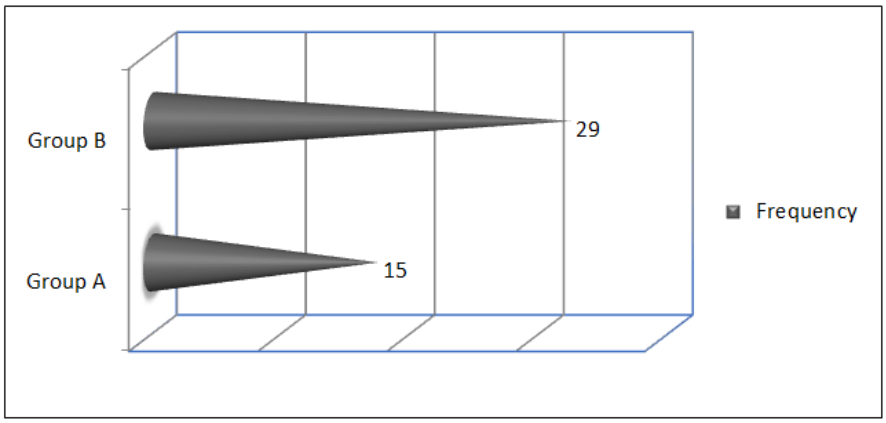

Fig-2: Distribution of patients according to morbidity

Distribution of patients according to mortality (n=44)

Out of 44 patients no patient died after operation. Out of these 44 patients 15 patients manifested short term complications and belonged to Group A.

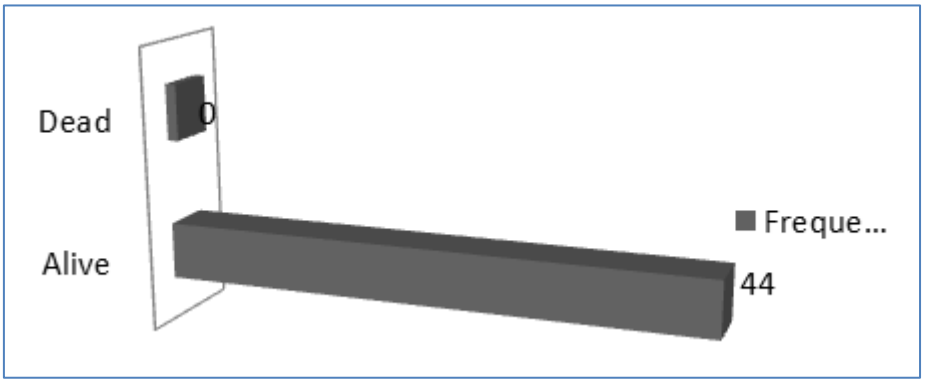

Fig-3: Distribution of patients according to mortality

Distribution of patients according to BMI (n=44)

Out of 44 patients Group A and B belong to 15% and 29% patients. Between the groups the maximum patients were from normal BMI.

Table-2: Distribution of patients according to BMI (n=44)

Body Mass Index	Group A(n=15)	Group B(n=29)
<17 (underweight)	4(26%)	3(10.76%)
17-24.9 (Normal)	11(74%)	22(75.38%)
25-29.9 (Overweight)	0	3(12.3%)
≥ 30 (Obese)	0	1(1.5%)

Distribution of patients according to Nutritional status using MUST Tool (n=44)

Out of 44 patients Group A and B belong to 15 and 29 patients. In Group A maximum 60% (9/15) were high risk of malnutrition & in Group B maximum 72.4% (21/29) were low risk of malnutrition.

Table-3: Nutritional status of Patients

MUST Score	Group A(n=15)	Group B(n=29)
0 (low risk malnutrition)	1	21
1 (Medium risk of malnutrition)	5	5
≥ 2 (Malnaurished or high risk of malnutrition)	9	3

Distribution of patients according to clinical presentation (n=44)

Among 44 patients the both group patients presented with following clinical presentation which were found statistically significant between the groups.

Table-4: Distribution of clinical presentation (n=44)

Clinical presentation	Group A	Group B	
Weight loss	4	6	10(22%)
Bleeding per rectum	9	17	26(59%)
Abdominal pain	4	8	12(27%)
Obstruction	2	0	2(4%)
Abdominal Lump	2	6	8(18%)

Distribution of co-morbidities between the groups (n=44)

The common co-morbidities observed between the groups' patients were IHD, HTN, DM. In both group maximum patients were suffered by Hypertension.

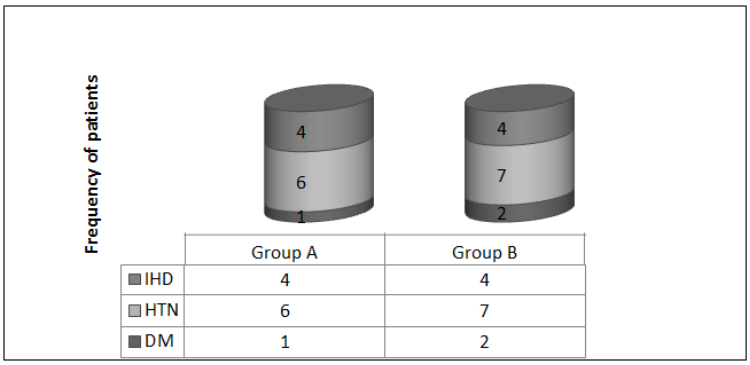

Fig-4: Distribution of co-morbidities between the groups

Table-5: Distribution of patients according to serum albumin level (n=36)

Serum albumin level	Group A (n=11)	Group B (n=25)
Within normal	3	17
Hypoalbuminemia	8	8

Out of 44 patients, we found 36 samples of serum albumin level. Serum albumin level of maximum patients was below 3.5 gm/dl in Group A whereas normal in Group B.

DISCUSSION

Patients with rectosigmoid and descending colon cancer were included among those with left-sided colonic tumors in our study. Although recent data suggests that the incidence of right-sided colonic tumors is increasing, the majority of patients (79%) in our study had a left-sided tumor (Rectosigmoid+Decending colon) [10]. Out of a total of 35 patients with left-sided tumours, 11 patients developed post operative complications, and this comprised 73% of all the cases in Group A. According to some studies, obstruction is a common presentation (8%–29%) in left-sided colorectal cancers and the most common cause of emergency surgery among these patients [11].

In this series, most of the colorectal cancer patients presented with per rectal bleeding (59%) followed by abdominal pain (26%). 9% patients presented as acute condition. Our findings are similar with studies conducted by Alves *et al*. Buchter and Kingston [12-14]. On the other hand Khan MR *et al.* reported patients presentation as 52% bleeding per rectal, 53% abdominal pain and 11.4% as acute presentation [15].

Malnutrition is a risk actor of postoperative mortality and morbidity. In our study, nutritional status measured by BMI, body weight loss, less nutritional intake, hypoalbuminemia. Patients with significant weight loss that is 5-10% in last 3-6 month or very little or no nutritional intake for last 5 days are the indicator of risk of malnutrition. In our study at Group A maximum patients 33% (5/15) had got medium risk of malnutrition and 60% (9/35) was malnourished, and these patients developed post operative complications later on. On the other hand at Group B 72.3% patients had low risk of malnutrition and found post operative outcome uneventful. Which is similar to the study conducted by Khan MR *et al*. [16].

In our study 61% patient found stage III & IV and 39% were stage I & II above. Most of the patients in this study presented with low grade adenocarcinoma (86%) and nodal involvement found 63%, No regional lymph node involvement was 41%. Although the data of other studies has suggested that worsen postoperative outcome in advanced stage of colorectal cancer,15-30% of all patients died within the first year, compared to a 0% 30 days mortality rate in our study.

The 34% incidence rate of early postoperative complications found in our study is also comparable to most of the published data [17] these included wound infection in 23% patients, RTI in 7%, postoperative ileus in 7%, anastomotic leak in 4.5%, Intra-abdominal in 2%. More than one complication was experienced by few patients. There was no significant difference in rate of complication between the different surgical procedures. This observation is similar with a study conducted by Viller J M *et al*. [18].

The commonest surgical complication encountered among our patients was surgical site infection (SSI). The SSI rate of 23% found in our study is higher than that in other studies [19, 20].

In summary, the results of our study indicate that the morbidity rates after colorectal cancer surgery are comparable to the published data, and that such

oncological surgery can be performed with a reasonable level of safety. We have identified medium to high risk of malnutrition, hypoalbuminea, rectal cancer, acute presentation as predictive factors for early postoperative outcome of colorectal cancer surgery.

CONCLUSION

In conclusion, Presence of nutritional risk, hypoalbuminemia, acute presentation was predictive for excess postoperative morbidity. These risk factors may not be easily modifiable. Moreover, identifying malnutrition status in order to administer appropriate nutrition support, effective strategies for both prevention and treatment of complications could have the potential to improve patient outcomes. The short-term outcome (30-day mortality and postoperative complications) rate greatly underestimates the long term outcome rate.

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