# **Original Research Article**

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# Operative morbidity and mortality for colorectal cancer: 10-years' experience

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#### **ABSTRACT**

**Background:** Operative outcomes for patients with colorectal cancer are heavily dependent on the quality of surgery, the quality of pre-operative staging and treatment selection. The objective of this study was to study the operative morbidity and mortality in patients with colorectal cancer.

**Methods:** The records of patients, with histologically proven colon or rectal cancer and underwent operative procedure, have been prospectively documented. A detailed analysis was made of patients who had a hospital stay of more than 15 days and who died within 30 days of surgical procedure.

**Results:** 311 patients of colorectal cancer were operated. 19 patients died within 30 days of operation, an overall OMR of 6.10%. 50.80% of patients had operative morbidity events. OMR and morbidity was higher in patients undergoing emergency surgical procedure, in elderly patients, in females, patients with poor pre-operative ASA grading and in patients with advanced stages tumour.

**Conclusions:** Adoption of various modalities of have to be considered in perspective of the age of the patient, preoperative performance status, the type, nature and urgency of operation and pathological stage of the disease which have a bearing on the operative morbidity and mortality.

Keywords: Morbidity, Mortality, Colorectal cancer, Operative mortality rate

# INTRODUCTION

Colorectal cancer (CRC) is one of the commonest types of gastrointestinal cancer. Every year, around two million new cases being diagnosed. CRC the third commonest cancer and the fourth commonest cause of cancer-related mortality. In males, CRC is the third commonest cancer, while it is the second commonest cancer in females. There is a significant rise in incidence of CRC in last two decades. In India, the incidence for colon cancer and rectal cancer in men are 4.4 and 4.1 per 100000 population, respectively while the incidence for colon cancer in women is 3.9 per 100000 population. Among the commonest cancer in India, colon cancer is

 $8^{th}$  commonest and rectal cancer is  $9^{th}$  commonest among men. For women, colon cancer is  $9^{th}$  commonest.<sup>4</sup>

Etiology of CRC is a multifactorial in nature which include, genetic factors, environmental exposures (including diet), and inflammatory conditions of the GI tract. Due to the nature and site of this disease, CRC in earlier stages – before it starts to cause symptoms – can be diagnosed only in screening practices, while CRC in more advanced cases, patients may present with iron-deficiency anaemia, bleeding from rectum, abdominal pain, change in bowel habits, and intestinal obstruction or perforation. <sup>5</sup>

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In early stages of CRC without metastasis, surgery is the mainstay curative treatment. But operative outcomes are heavily dependent on the quality of surgery, the quality of pre-operative staging and treatment selection. The surgical dissection should ensure the removal of the tumour and its principle zone of lymphatic spread with specific emphasis on circumferential surgical resection of margins of tumour. In advanced cases of CRC, neoadjuvant treatment, preoperative chemotherapy and/or radiotherapy can reduce tumour burden and/or stage, hence improve operative outcomes.

Fundamental research in understanding the molecular biology and genetics of CRC are taken place in recent years. The implementation of this knowledge is slowly making its way into the clinic set-up. It is being also employed to better categorization risk factors for CRC, discover better screening methods, better prognosis, and improve outcome with development of new anticancer medications.<sup>5</sup>

In the present study, an endeavour has been made to study the operative morbidity and mortality in patients with colorectal cancer.

#### **METHODS**

This study was prospective, non-randomized, cohort study conducted at Department of Surgery, Sher-i-Kashmir Institute of Medical Sciences Soura, Srinagar, and Government District Hospital, Rajouri, Jammu and Kashmir, during the period from January 2004 to December 2013.

# Ethical approval

The study protocol was presented to Institutional Review Board for approval and it was approved by IRB, Sher-i-Kashmir Institute of Medical Sciences Soura, Srinagar.

## Methodology

The records of patients, with histologically proven colon or rectal cancer and underwent operative procedure, have been prospectively documented at the Department of Surgery, Sher-i-Kashmir Institute of Medical Sciences Soura, Srinagar, and Government District Hospital, Rajouri, Jammu & Kashmir. The written informed consent was obtained from patients before enrolling them into the study. Thorough history taking and clinical examination was done in each patient included in the study. Patients also undergone for various laboratory investigations. Patient's also undergone radiological evaluation like, abdominal ultrasound to evaluate the abnormality of GI tract. Pre-operative fitness of patients was assessed by ASA grading. 10 A detailed analysis was made of patients who had a hospital stay of more than 15 days and who died within 30 days of surgical procedure. The patients underwent curative as well as palliative surgical procedure. Patients were studied under a proforma based on the pre-operative and post-operative risk factors and operative mortality rate (OMR) and morbidity rate were studied for each factor. There are many factors which can affect the prognosis of CRC. One of the most important prognostic factor is the stage of the tumor. The degree of bowel wall invasion, lymph node metastasis, the distant metastases adversely affects the prognosis of tumor stage. Modified Dukes staging system was used for the staging of CRC.<sup>11</sup>

# Statistical analysis

The collected data were subjected to statistical analysis using Microsoft Office Excel. Data was expressed as absolute numbers with or without percentages, as means with standard deviation or as medians with ranges. Frequency comparisons were performed by chi-square test. A probability value less than 0.05 was considered to denote statistical significance.

## **RESULTS**

During the study period, 311 patients of colorectal cancer were operated upon in the Department of Surgery, Sher-i-Kashmir Institute of Medical Sciences Soura, Srinagar, and Government District Hospital, Rajouri, Jammu and Kashmir. 274 patients underwent resection making a resectability rate of 88.17%, of these 196 patients (63.02%) underwent curative resection. A total of 19 patients died within 30 days of operation, an overall operative mortality rate of 6.10%. 158 patients (50.80%) had operative morbidity events.

Table 1: Operative mortality and morbidity rate according to age and gender of the patients.

Variables	Mortality		Morbidity	
	No. of patients	Percentage (%)	No. of patients	Percentage (%)
Age (years)				
<50 (n=201)	11	5.47	93	46.26
50–70 (n=99)	6	6.06	57	57.57
>70 (n=11)	2	18.18	8	72.72
Gender				
Male (n=197)	11	5.58	82	41.62
Female (n=114)	8	7.01	76	66.66
Total (n=311)	19	6.10	158	50.80

Table 2: Operative mortality and morbidity rate according to type of surgical procedure.

Tomas of surgeous	Mortality		Morbidity	
Types of surgery	No. of patients	Percentage (%)	No. of patients	Percentage (%)
Abdominal perineal resection (n=106)	6	5.66	61	57.54
Anterior resection (n=201)	3	6.12	33	67.34
Hartman procedure (n=12)	3	25.00	8	66.66
Total proctocolectomy (n=2)	1	50.00	1	50.00
Right hemicolectomy (n=65)	2	3.07	32	49.23
Left hemicolectomy (n=26)	1	3.84	17	65.38
Transverse colectomy (n=20)	0	0.00	4	20.00
Colostomy (n=24)	2	8.33	2	8.33
Laparotomy (n=7)	1	14.28	0	0.00
Total (n=311)	19	6.10	158	50.80

Table 3: Operative mortality and morbidity rate according ASA grading.

ACA overle	Mortality		Morbidity	
ASA grade	No. of patients	Percentage (%)	No. of patients	Percentage (%)
Grade I (n=148)	5	3.37	58	39.18
Grade II (n=73)	3	4.10	43	58.90
Grade III (n=54)	4	7.40	33	61.11
Grade IV (n=36)	7	19.44	24	66.66
Total (n=311)	19	6.10	158	50.80

Table 4: Cause of death in patients with operative mortality (n=19).

No. of patients	Percentage (%)
5	26.31
3	15.78
1	5.26
3	15.78
5	26.31
2	10.52
	patients 5 3 1 3 5

<sup>\*</sup>Including wound sepsis, intraperitoneal sepsis and septicaemia.

Table 5: Distribution of the patients according to operative morbidity (n=158).

Morbidity	No. of patients	Percentage (%)
Anastomotic leak	9	5.69
Wound dehiscence	13	8.22
Sepsis*	59	37.34
Pulmonary complications	35	22.15
Cardiac problems	9	5.69
Intestinal obstruction	2	1.26
Retention of urine	12	7.59
Urinary tract infection	19	12.02

<sup>\*</sup>Including wound sepsis, intraperitoneal sepsis and septicaemia.

The age of these patients ranged between 15 years and 82 years with mean age of 45.93 years. Table 1 shows the distribution of the patients with operative mortality and morbidity rate according to age and gender of the patients. 11 patients who died were below 50 years of age. In the present study, the highest operative mortality rate (OMR) found in the age group more than 70 years. Age was significant determinator of morbidity. Age group of more than 70 years had a significantly higher morbidity of 72.22%. Out of the total 311 patients, 197 patients (63.35%) were males and 114 patients (36.65%) were females. Out of the 19 patients who died, 11 were males and 8 were females but OMR for females was higher. Morbidity was also higher in female.

OMR for emergency procedures was significantly higher. Of 30 patients who were operated upon emergency basis, 9 patients died, contributing OMR of 30.00%. Out of total 311 patients, 196 patients (63.02%) were underwent curative surgery while 115 patients (36.97%) underwent palliative surgery. OMR of curative surgery (5.10%) was lesser than of palliative surgery (7.82%).

Table 2 shows the OMR for various surgical procedures performed. Total proctocolectomy had OMR of 50%. Morbidity for anterior resection (67.34%) was higher than other operative procedures. There were 67 patients with Dukes stage A tumour of which 3 patients died (OMR 4.47%). 75 patients belonged to Dukes stage B of which 4 patients died (OMR 5.33%). Highest OMR of 7.10% was found in patients with Dukes stage C tumour. Patients with Dukes stage C tumour also had the highest

morbidity of 59.76% as compared to stage B (42.66%) and stage A (37.31%).

Pre-operative fitness of patients was assessed by ASA grading. Of the 311 patients, 148 (47.5%) patients were of Grade I ASA with OMR of 3.37%, 73 patients (23.47%) were of Grade II ASA with OMR of 4.10%, 54 patients (17.36%) were of Grade III ASA with OMR of 7.40%, 36 patients (11.57%) were of Grade IV and V ASA with OMR of 19.44%. Morbidity was higher in patients in ASA grading of IV and V (Table 3).

There were 19 operative mortality in the present study. 5 patients (26.31%) died of myocardial infarction; 3 patients (15.78%) patients died of bronchopneumonia. There was a significant morbidity of 50.80%. Morbidity mainly because of sepsis which constituted 59 patients (37.34%) (Table 4 and 5).

#### **DISCUSSION**

Different authors have cited different OMR primarily because of lack of consensus on the definition of operative mortality for patients with colorectal cancer. <sup>12,13</sup> But an endeavour has been made to define operative mortality as death within 30 days of operation. Using this definition, the OMR of present study was comparable with many other studies. <sup>14,15</sup>

In the present study, OMR and morbidity was higher in patients undergoing emergency surgical procedure, in elderly patients, in females, patients with poor preoperative ASA grading and in patients with advanced stages tumour.

In spite of the fact that CRC is being observed in younger age groups but it predominantly continues to be disease of elderly. It is general fact that older patients do not progress well as compared to their younger counter parts after surgical procedures as demonstrated by increased mortality and morbidity rate. OMR in the present study increased with age and this has been confirmed by other studies. <sup>14,17,18</sup>

OMR for females has been shown to be higher than of males which could be attributed to the fact that growths in females were more virulent and females were presented late, though other factors cannot be ruled out. The morbidity among the females was more than males, resulting in longer post-operative hospital stay for females as compared males. Some studies have reported a shorter post-operative hospital stay for females.<sup>19</sup>

OMR in the present study was more for anterior resection than for abdominal perineal resection (APR) and more for left hemicolectomy than for right hemicolectomy. Whittaker and Goligher has reported higher mortality with APR than with anterior resection. Morbidity for anterior resection was higher than for APR and of left hemicolectomy was higher than that of right

hemicolectomy.

One of the studies had reported a longer post-operative stay for patients of anterior resection than of APR. left hemicolectomy patients had a longer postoperative stay than that of right hemicolectomy patients. <sup>19</sup> Emergency operations associated with higher mortality and morbidity as these patients were taken up for surgery when are severely and acutely ill. The higher morbidity in these patients could be attributed to high incidence of sepsis due to lack of bowel preparation and antibiotic cover, intraperitoneal fecal contamination. Anastomotic leaks are more common in these type of patients, particularly of bowel obstruction. <sup>20,21</sup>

Stage of disease had a direct bearing on OMR and morbidity, both were higher in patients with Dukes stage C than that of stage B and stage A. These findings are confirmed by other studies. 14,20

## **CONCLUSION**

Advance in surgical technique have broaden the spectrum of treatment available for patients with colorectal cancer. With advanced and improved medical care, there is improvement in survival rates in patients with CRC. Adoption of various modalities of have to be considered in perspective of the age of the patient, pre-operative performance status, the type, nature and urgency of operation and pathological stage of the disease which have a bearing on the operative morbidity and mortality.

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Institutional Ethics Committee

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