Outcome Of Patients With Acute Intestinal Obstruction Due To Colorectal Carcinoma
A Rasool, S Bari, S Rashid, A Wani, R Wani, G Peer

Citation

Abstract
Background: Understanding of the biology of colorectal cancer and improvement in surgical techniques have led to significant improvements in the management of colorectal cancers and reduction of morbidity associated with it.Aim and Objective: Aim of the study was to know the effect of various factors like age, sex, physiological status, stage of disease, and type of resection on the outcome of intestinal obstruction due to colorectal cancer.Material and Methods: This study was conducted at Sher-i-Kashmir Institute of Medical Sciences Srinagar, Kashmir, India, both retrospectively and prospectively upon the patients who presented with intestinal obstruction due to colorectal cancer. A retrospective study was carried out from June 1989 to December 1999, while a prospective study was carried out from January 2000 to December 2001, with further follow-up for a period of 5 years.Results: A total of 97 patients of obstructing colorectal cancer were studied. The mean age of the patients was 48 years with a male female ratio of 1.3:1. Abdominal pain was the commonest symptom (92%) while abdominal distension was seen in 100% of patients. Sigmoid colon was the commonest site of lesion (26.80%) follow by splenic flexure (9.27%); 4.12% of our patients presented in Dukes stage A while 35.05% presented in stage D. Primary resection was done in 38 (39.20%) patients while staged resection was done in 25 (25.77%) patients; 24 patients died in the postoperative period during hospital stay giving an overall mortality of 24.74%. Only 56 patients could be followed for 5 complete years. Five-year survival was 23.12% as only 13 patients survived a period of 5 years. Survival was better among patients who underwent staged resection rather than primary resection.

INTRODUCTION
Colorectal carcinoma is one of the major health problems. About 57000 patients die of this disease in the United States every year (1). It is the third commonest cause of death in the United States and the second most common malignancy in the western countries. Although distributed worldwide, incidence is higher in industrialized and western countries, suggesting the possible influence of environment and genetics. Dietary factors are found to be statistically associated with the risk of colorectal carcinoma. Alcohol intake has also been linked with its development (2). Various predisposing factors for colorectal carcinoma include adenomatous polyps, familial adenomatous polyposis coli and hereditary non-polyposis coli cancer.

Clinical presentation of colorectal carcinoma is influenced by size and location of tumors. Lesions of the right side tend to be bulky, ulcerating and present usually as anaemia, dull aching pain in the right lower quadrant and palpable mass in the same area. Lesions of the transverse colon usually present as obstruction or pain locally. A left side lesion is usually scirrhus, annular and presents as obstruction, alteration in the bowel habits and passage of blood or mucous mixed with bowel movement (3).

Management of colorectal carcinoma depends upon the site of obstruction, state of disease and general condition of the patients. Right-side lesions are treated by resection and primary anastomosis without any diversion procedure (4). Left-side colonic lesions have been traditionally treated by a staged procedure which includes proximal decompression by stoma formation, resection and anastomosis followed by the closure of stoma. Nowadays, such staged procedure can be converted into a less staged procedure by the use of on-table colonic lavage. Re-establishment of lumen through the tumor using laser ablation or a stent placement allows decompression of bowel which can be followed by routine bowel preparation and then definitive resection. Lesions of sigmoid colon can also be managed by either Hartmann’s procedure or resection with end colostomy and mucous fistula or sigmoid resection with primary anastomosis with
or without stoma. Obstructing carcinomas of the rectum are managed by preliminary decompression colostomy followed by external beam radiotherapy and resection of tumor (1,2).

MATERIAL AND METHODS

The present study was carried out on patients who presented to the Department of General Surgery, Sher-i-Kashmir Institute of Medical Sciences, Srinagar, Kashmir, India, with the history of intestinal obstruction due to colorectal carcinoma over a period of 13 years. A total of 97 patients were studied. The study was conducted both retrospectively and prospectively. A retrospective study was carried out from June 1989 to December 1999 from the case records provided to us by the medical records section of the institute. The case records of these patients were studied and completely analyzed. The analysis included clinical history and presentation of these patients, investigations done, surgical management performed, outcome of patients and the follow-up for any complication and long-term survival.

A prospective study was carried out from January 2000 to December 2001 and included patients who presented to us in complete obstruction. The criteria for complete obstruction in our study included (1) clinical evidence of obstruction i.e., history of abdominal pain, constipation and abdominal distension and presence of obstructing stenosing growth on digital rectal examination (DRE) if present; (2) radiological evidence including plain x-ray of the abdomen showing gaseous distension of large bowel or/and small bowel with or without air-fluid levels; (3) surgical finding of large-bowel obstruction with bowel proximal to the lesion dilated and distally being collapsed; and (4) pathological evidence of obstructing stenosing growth.

Before operative intervention was done, the patients were subjected to relevant investigations and during this period the patients were managed with nasogastric aspiration, intravenous fluid therapy, electrolyte replacement, rectal enema and broad spectrum antibiotic therapy. The investigations which were performed preoperatively included complete haemogram, kidney function test, serum electrolyte estimation, plain x-ray of the chest, ECG, plain x-ray of the abdomen both standing and lying down, liver function test, procto-sigmoidoscopy and colonoscopy in a selected number of patients and barium enema in a selected number of cases with complete cut-off taken as a positive result. Patients were classified for their physiological status as per American Society of Anesthesiologists (ASA) into ASA Class I-V.

Various surgical procedures were performed depending upon the general condition of the patient, presence of associated systemic illness, condition of the bowel, site of lesion and competence of the surgeon. The patients with resectable growth were subjected to either a single resection with anastomosis or to a two-stage operation of resection with covering colostomy or Hartmann’s procedure or a classical three-stage operation. In patients with unresectable growth, only palliative procedures were done: either exploration only, colostomy only or a bypass decompression (ileo-transverse or ileo-sigmoid colostomy) No procedure was done in patients who were inoperable due to overall poor general condition. The patients were then followed during hospital stay and also after discharge on out-patient basis. Both gross and microscopic pathological features of the resected specimens were studied and all carcinomas were then staged as per Dukes clinicopathological classification. Further treatment was given as per grade and stage of the tumor.

RESULTS AND OBSERVATIONS

A total of 97 patients of obstructing colorectal carcinoma were studied; 27.83% of patients were in the age group of 51 to 60 years. The mean age of our patients was 48 years. It was 49.10 years for males and 46.56 years for females (Table 1) Male to female ratio in our study was 1.36:1 (Table 2). Abdominal pain was present in 92% of cases followed by constipation in 80% and bleeding per rectum in 11% cases. Abdominal distension was seen in 92% of cases followed by constipation in 80% and bleeding per rectum in 11% cases. Abdominal distension was seen in 100% of patients and an abdominal lump in 6.18% (Table 3).

Figure 1
Table 1: Age-wise distribution of cases

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-20</td>
<td>3</td>
<td>3.09</td>
</tr>
<tr>
<td>21-30</td>
<td>10</td>
<td>10.30</td>
</tr>
<tr>
<td>31-40</td>
<td>23</td>
<td>23.71</td>
</tr>
<tr>
<td>41-50</td>
<td>25</td>
<td>25.77</td>
</tr>
<tr>
<td>51-60</td>
<td>27</td>
<td>27.83</td>
</tr>
<tr>
<td>61-70</td>
<td>7</td>
<td>7.23</td>
</tr>
<tr>
<td>71-80</td>
<td>3</td>
<td>3.05</td>
</tr>
<tr>
<td>81-90</td>
<td>1</td>
<td>1.03</td>
</tr>
</tbody>
</table>

Figure 2
Table 2: Demographic and sex-wise distribution of cases

<table>
<thead>
<tr>
<th>Total No. of patients</th>
<th>Male</th>
<th>Female</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>56</td>
<td>41</td>
<td>63</td>
<td>34</td>
</tr>
</tbody>
</table>
Digital rectal examination was done in all patients with positive results in 7.1% of cases. Proctoscopic examination was positive in 16.98% with sigmoidoscopic examination positive in 43.90%. Plain x-ray of the abdomen revealed multiple air-fluid levels in all the cases (Table 4); colonoscopy was needed in only 4 patients with positive results in 3 (75%) cases. The sigmoid colon was the commonest site of lesion (26.80%) followed by splenic flexure (17.51%), rectum (12.36%), descending colon (9.27%) and transverse colon (7.21%) (Table 5). Four patients of our series presented in Dukes stage A (4.12%) while 34 patients presented in stage D (34.05%). Stage B and stage C constituted 34.02% and 26.80%, respectively (Table 6). Most of the patients in our study belonged to ASA class III (57.70%) with 4.12% belonging to ASA class I (Table 7).

No intervention was done in 4 (4.1%) patients as they were found clinically unfit for surgery while only exploratory laparotomy was done in 3 (3.3%). Colostomy alone was done in 9.27% of patients, internal decompression in the form of ileosigmoid bypass or ileotransverse bypass in 18 (18.55) patients. Primary resection with covering stoma was done in 20 (20.61) patients and primary resection without covering stoma was done in 18 (18.55) patients. While staged resection, i.e. colostomy in the first stage and resection and anastomosis in the next stage after a gap of 3 months, was done in 25 (25.77%) patients (Table 8).
During the post-operative period, various complications were encountered; these included wound infection in 26 (26.80%) patients, wound dehiscence in 13 (13.40%), atelectasis in 49.48%, intraabdominal sepsis in 7.21% and anastomotic leak in 10.30%. More than one complication was present in several patients; 24 of our patients died in the post-operative period during hospital stay giving an overall mortality of 24.74% (Table 9, 10). This included 13 male and 11 females. The percentage of mortality increased with increasing age (Table 10). Mortality was 77.77% in patients with ASA-V physiological status, 47.36% in patients with ASA-II, with no mortality in patients with ASA-I. Mortality was highest in patients who underwent decompression only (36%), whether performed internally or externally and was lowest in those who underwent staged resection (12%) (Table 10).

Only 56 patients could be followed for complete 5 years as the remaining 17 patients were lost in the follow-up. Out of these 56 patients, only 13 patients survived a period of 5 years. These included 9 males (26.47%) and 4 (18.18%) females. Maximum survival (42%) was found among patients in the 3rd decade of life while it was lowest (0%) at the extremes of age. With respect to physiological status, maximum survival was seen among patients with ASA-III status. In our study, none of the patients with right colonic lesions survived for 5 years, while 13 patients out of 44 patients with left colonic lesions survived for a period of 5 years. Survival was better (33.33%) among patients who underwent staged resection rather than primary resection (Table 11). Survival rate was 100% in patients with Dukes stage A disease, 33% with stage B and 23.53% with stage C disease. None of the patients with stage D survived for 5 years.
Outcome of patients with colorectal carcinoma is determined by a number of prognostic factors, which include stage of tumor, degree of tumor differentiation, tumor cell DNA content, lymphatic and blood vessel invasion, age of patients, number of blood transfusions given and complications of colorectal cancer like obstruction or perforation (2). The most commonly used staging system is the Dukes classification. Dukes A cancer is a tumor with invasion of the mucosa and submucosa, Dukes B cancer is a transmural invasion of the bowel wall, Dukes C cancer is any degree of invasion with nodal metastasis and Dukes D is cancer with a distant metastasis. Well differentiated tumors have better survival than less differentiated tumors (2). Cells with diploid DNA content have better survival and less recurrence than aneuploid tumor cells. Young individuals with colorectal cancer have poor prognosis.

When colon cancer is suspected, colonoscopy is the diagnostic study of choice. It provides access to examine the entire colon, allows polypectomy for therapeutic purposes and permits biopsy of a colonic lesion. Alternative diagnostic procedures are double-contrast barium enema and proctosigmoidoscopy. A recent development in diagnostic tools utilizes radiolabeled antibodies to target tumors for imaging or detection (2). When there is no incidence of cancer invasion into surrounding organs or metastasis, a segmental colonic resection is the main treatment. Tumor-free margins are easily achievable for colon cancer because mucosal spread of the disease rarely exceeds 4 cm (1). Resection of adjacent organs for locally invasive colorectal cancer is necessary in approximately 10% of cases (1).

### Table 11: Comparison of 5-year survival with respect to different variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Patients</th>
<th>5-Yr. Survival (%)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≤40 years</td>
<td>22</td>
<td>6 (27.27%)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Age &gt;40 years</td>
<td>34</td>
<td>7 (20.58%)</td>
<td></td>
</tr>
<tr>
<td>ASA ≤3</td>
<td>42</td>
<td>12 (28.57%)</td>
<td>&lt;0.05 (Sig.)</td>
</tr>
<tr>
<td>ASA &gt;3</td>
<td>14</td>
<td>1 (7.14%)</td>
<td></td>
</tr>
<tr>
<td>Site Right Colon</td>
<td>4</td>
<td>0 (0%)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Site Left Colon</td>
<td>44</td>
<td>13 (29.54%)</td>
<td></td>
</tr>
<tr>
<td>Procedure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operative decompression</td>
<td>11</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>Primary resection</td>
<td>26</td>
<td>8 (30.76%)</td>
<td>&lt;0.05 (Sig.)</td>
</tr>
<tr>
<td>Staged resection</td>
<td>15</td>
<td>5 (33.33%)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Stage of disease A+B</td>
<td>23</td>
<td>9 (39.3%)</td>
<td></td>
</tr>
<tr>
<td>Stage of disease C+D</td>
<td>22</td>
<td>4 (12.12%)</td>
<td></td>
</tr>
</tbody>
</table>

### DISCUSSION

Outcome of patients with colorectal carcinoma is determined by a number of prognostic factors, which include stage of tumor, degree of tumor differentiation, tumor cell DNA content, lymphatic and blood vessel invasion, age of patients, number of blood transfusions given and complications of colorectal cancer like obstruction or perforation (2). The most commonly used staging system is the Dukes classification. Dukes A cancer is a tumor with invasion of the mucosa and submucosa, Dukes B cancer is a transmural invasion of the bowel wall, Dukes C cancer is any degree of invasion with nodal metastasis and Dukes D is cancer with a distant metastasis. Well differentiated tumors have better survival than less differentiated tumors (2). Cells with diploid DNA content have better survival and less recurrence than aneuploid tumor cells. Young individuals with colorectal cancer have poor prognosis.
Patients presenting with malignant obstruction of the colon deserve special attention. Emergency surgery is needed for patients with complete obstruction and pending rupture. Minimal surgery such as proximal colostomy is advised for patients with extreme age and poor physiological status. Primary resection in the form of segmental and subtotal colectomy is preferred for patients in stable condition. Segmental resection is more appropriate in elderly patients and those who may not tolerate lengthy resection. A protective ileostomy or colostomy is made when primary anastomosis is performed in the unprepared bowel.

Perforation is often a result of obstructing cancer of the colon. The combination of these two conditions occurs in approximately 2% of colorectal cancer cases. Free perforation is a life-threatening condition requiring emergency surgery. Thorough exploration is required along with resection of the tumor-bearing colon. Primary anastomosis is to be avoided when generalized peritonitis and haemodynamic instability are present \( (1, 2) \). Obstructing colorectal cancer is a disease with poorer immediate and long-term outcome than its non-obstructive counterpart. Several studies have been carried out on various aspects of obstructing colorectal cancer.

The youngest patient in our series was a 16-year-old unmarried girl with a sigmoid growth while the oldest one was a 90-year-old male with carcinoma of the rectum. The mean age in our series was 48 years, while the mean age reported by Buchter et al. \((3)\) was 64 and that reported by Bat et al. \((4)\) was 66.1 years; 37.11% of our patients presented before the age of 40 years while only 25% in Buchter’s series presented before 40 years of age; 57.73% of our patients were male and 42.27% were female. These findings correlate well with the male predominance reported by Regland et al. \((5)\) and Buchter et al. \((6)\) while studies conducted by Nickel (1948) \((7)\) and Loeﬂer (1967) \((10)\) reported female predominance. The most common symptom in our series was abdominal pain (91.75%) followed by constipation (80.41%). Our findings are at par with studies conducted by Buchter \((11)\) and Kingston \((12)\).

The majority of our patients presented with left-sided growth which is in agreement with other studies \((13, 10)\). In our series the maximum of patients had a growth in the sigmoid colon followed by splenic flexure. Regland et al. (1971) \((5)\) reported the maximum of growths in the rectum followed by sigmoid colon, Buchter et al. \((11)\) reported the majority of growths in the sigmoid colon followed by descending colon. Higher involvement of sigmoid colon could be due to the length of the sigmoid colon in relation to the rest of the colon, presence of more formed stools and therefore more chances of obstruction; 28.86% of our patients presented with Dukes stage B, 21.64% with stage C and only 4.12% with stage A disease while 35% presented with stage D disease. Barillari et al. \((9)\) observed no patients in stage A and only 31.7% with stage D disease. The results of our study are in agreement with other studies \((14, 15)\).

Complications were found in 64 patients in our series. Among these, 27% had wound infection, 12.37% had post-operative paralytic ileus and pulmonary atelectasis was found in 50%. Complications were more frequent in the elderly age group, as expected by their more moribund condition due to their poor pulmonary cardiac and overall nutritional status. Regland et al. \((5)\) also observed increased complication rates with rise in age. Scott, Conner and Scher \((11)\) also reported higher complication rates in the elderly age group. Complication rate was higher in patients with higher ASA class. Wound complications were thrice, pulmonary complications four times and intra-abdominal complications 8 times more frequent in patients with ASA ≤3 as compared to patients with ASA >3. Scott, Conner and Scher \((11)\) reported a higher complication rate in higher ASA classes. Anastomotic leak was 5.42 times more frequent with primary resection as compared to staged resection. The increased rate of anastomotic leakage can be explained by the unpreparedness of gut in primary resection whether the anastomosis was made with or without covering stoma. Our findings correlate well with that of Philips et al. \((16)\).

However, Barillari P et al. \((9)\) have reported a higher complication rate in the staged than in the primary resection group.

**Mortality**

Overall mortality in our series was 24.74% which is in agreement with other studies \((16, 10)\). The mortality reported by some other series \((14, 15)\) is higher than our series. On the other hand, Thomas et al. (42) reported significantly lower mortality. Patients above 40 years of age had an almost three times higher likelihood of mortality than those ≤40 years of age. Mortality rate was twice in patients with right colonic lesions as compared to that of left colonic lesions. This is in agreement with the results of other studies \((15, 17)\). However, no significant difference was seen between these two groups by Serpele et al. \((18)\). The mortality rate of the resection group in our series was 20.6%. Mortality was almost twice higher with primary resection (26.3%) than with staged
resection (12%). This is because the gut is well prepared and the overall general condition of the patients improves before resection is done. Our findings correlate well with other studies (11,12). The results of some studies (13) are in contrast to ours as they reported higher motility in the staged resection group.

SURVIVAL

Overall survival rate of our series was 23.2%. This survival rate correlates well with the 25% survival rate of Ohman’s series (18) and the 28% survival rate of Welch and Donaldson’s series (17). However, most of the other series have reported lower survival rates than ours (8,7,18,5) and few (9,12) have reported better survival as compared to ours. The likelihood of survival is better for the age group below 40 years. The better survival trend in the younger age group can be attributed to decreased initial hospital mortality which does have an effect on overall survival. No patient of a right colonic lesion survived five years in our series and all the survivors were from the left colonic group. This is in agreement with Ohman’s series (18), where only one out of ten patients of right-sided obstructive lesions survived over five years. This better survival in left-sided growths could be due to their early presentation. All the patients where no resection or only decompression was done died within a period of one and half year. All the thirteen patients in our series who survived for five years had undergone resection. The type of resection had no effect on the overall survival in our study. This is in agreement to other studies (11). Some reported higher survival for the primary resection group, while others (17,18) have reported better survival in the staged resection group.

References

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