

# Carcinoma of the Colon in Old Age

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THE decision whether or not to operate on older patients who have carcinoma of the colon is often unduly complicated by incidental disease. Chronic cardiac or pulmonary disease, diabetes mellitus, urinary tract infections, and senile dementia are common.

The following questions are typical of those which must be answered regarding older patients with colonic cancer:

- 1) What chance has the patient of surviving operation?
- 2) Should operation be postponed until the onset of acute symptoms?
- 3) What is the optimum surgical extent of operation? Should the total operation be undertaken at more than one session?
- 4) What is the prognosis?
- 5) How long will the patient survive without operation?—and what will this entail, particularly regarding intestinal function, pain, and general health?

To throw some light on this problem, we reviewed records of a series of patients over 70 years of age who had carcinoma of the colon. Studies of series of older patients undergoing operations for many conditions have previously been reported, Clagett,<sup>5</sup> Parsons *et al.*,<sup>18</sup> Amdrup *et al.*,<sup>1</sup> Wilkins *et al.*,<sup>20</sup> Herron *et al.*,<sup>12</sup> Peyster *et al.*,<sup>19</sup> Lassen<sup>14</sup> and Wulff *et al.*<sup>21</sup>

We found it of special interest to study a single condition—carcinoma of the colon, treatment of which is one of the most extensive of abdominal surgical procedures.

## Materials

In the 15 years from 1950–1964 at the Kommunehospital (Dept. I) in Copenhagen, 554 patients with carcinoma of the colon were treated. Of these 225 (41%) were 70 or more years of age. Table 1 shows the ages and distribution of sexes. There were slightly more women, which corresponds to the population proportions of this age group. The average age was 76 years.

Figure 1 shows the anatomical positions of the tumors. Eighty-six (38%) were on the right side; 26 (12%) in the transverse colon, and 113 (50%) were in the left side of the colon. One patient had carcinomas of both transverse and sigmoid colons. Fifty-four patients (24%) presented with ileus. Tumors above the sacral promontory were designated carcinomas of the colon, and carcinoma of the rectum was excluded from the review.

## Symptoms and Signs

**Symptoms.** Abdominal pain, the most common symptom was experienced by 171 patients (76%). Change of bowel habit and diarrhea (more often than constipation), was next (68%). Fifty per cent complained of weight loss, loss of appetite and

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Submitted for publication April 7, 1969.

Supported by a grant from Københavns Hospitalsvaesens Videnskabelige Sekretariat.

TABLE 1. *Age and Sex Incidence—225 Patients over 70 Years Old with Carcinoma of the Colon*

Age	Female	Male	Total
70-79	92	85	177
>80	24	24	48
Totals	116	109	225

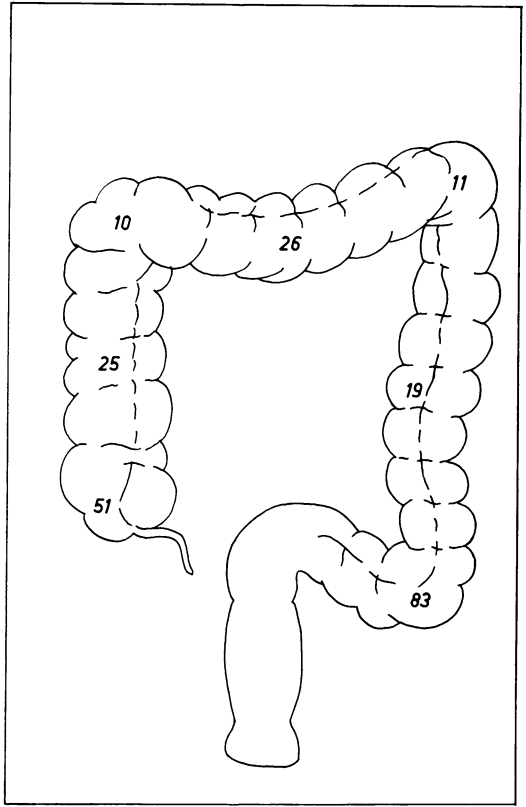
TABLE 2. *Treatment of 225 Patients over 70-years-old with Carcinoma of the Colon*

Treatment	Total		Total	Percentage of 225 Patients
	Right Side	Left Side		
No operation	14	12	26	12
Explorative laparotomy	4	6	10	
Colostomy	0	31	31	21
Ileotransverse colostomy	8	0	8	
Right hemicolectomy	59	0	59	
Left hemicolectomy	0	20	20	67
Resection	1	70	71	
Totals	86	139	225	

general tiredness; 18% observed fresh blood in their stools.

**Signs.** In 90 patients (40%), an abdominal mass could be palpated (71% on the right side). Seventy-five per cent of patients with carcinoma in the left side of the colon had normal hemoglobin values, but only 33% of those with right colonic tumors. Erythrocyte sedimentation rate was normal in 30%. The benzidine for blood in the stool was constantly positive in 80%, and constantly negative in 10%. Eleven of 86 patients with carcinomas of the ascending colon were admitted with ileus (13%), whereas 43 of 139 patients with carcinomas of transverse or descending colon had ileus (31%).

In 20 of 83 patients with sigmoid carcinoma the diagnosis was confirmed by

FIG. 1. *Specific site of tumors in 225 patients over 70 years old with carcinoma of the colon.*

proctoscopy and biopsy. Forty-eight patients had cardiac disease; ten had bronchiectasis with emphysema; eight were undergoing treatment for diabetes mellitus and nine had urinary tract disease.

### Radiography of the Colon

Two hundred and fourteen patients were examined by barium enema x-rays. In 186 patients (86%), the tumors were demonstrated at the first examination, and the sites of these tumors seemed not to be significant. In 16 patients (7%) results of x-ray examination were inconclusive. Repeated x-rays confirmed the presence of a tumor in three.

Of the remaining 12 patients, two x-ray examinations were failures and in ten, in

TABLE 3. *Operative Contraindications in 26 Patients over 70-years-old with Carcinoma of the Colon*

Reasons	Total	Died in Hospital
Refused operation	3	3
Inoperable	3	3
Poor conditions	11	9
Senility	3	2
Obesity	1	1
Hemiplegia	1	1
Cardiac failure	2	2
Uraemia	1	1
Thrombophlebitis	1	1
Totals	26	23

spite of satisfactory conditions for x-ray examination, seven instances of carcinoma of the descending colon, and three of ascending colonic carcinoma were not found by x-ray (5%).

### Treatment

Table 2 shows the treatment of all 225 patients. Twenty-six (12%) did not undergo operation for various reasons (Table 3), most were extremely debilitated on admission. Only three refused consent for operation. All died within months.

Forty-nine (21%) underwent palliative operations, colostomy or ileo-transversostomy. In 26 of 31 patients on whom transversostomy or cecostomy were performed the tumors were not resected because of either distant metastases,<sup>1</sup> or poorly compensated cardiac disease or senile dementia. Two patients with perforations of the colon died within days after cecostomy. Three patients died from post-cecostomy complications: subphrenic abscess and empyema; gangrene of the abdominal wall; and sepsis.

In 150 patients the tumors were excised with either hemicolectomy or other resections. The frequency of resections was the same in both sexes and was not influenced by the site of the tumor. The mesocolon

was widely excised together with regional lymph node glands, and with margins of at least 5 cm. of bowel on either side of the tumor.

All elective operations were performed after bowel sterilization. Early in the series phthalysulphathiazol and streptomycin or bacitracin per os were used, but in the last 13 years Nebacetin (Neomycin and Bacitracin) was given. The bowel was emptied with enemata and laxatives.

### Postoperative Mortality and Complications

The primary operative mortality in 150 patients undergoing resection was 13%. In 49 patients having only laparotomy or palliative operations, the mortality was predictably high (54%).

Sixty-three patients (43%) had complications after resections or hemicolectomies. Twenty patients died (Table 4), nine from cardiac or pulmonary complications and one from cerebral apoplexy. One 80-year-old patient had massive hemorrhage from a gastric ulcer 14 days after right sided hemicolectomy. Partial gastrectomy was

TABLE 4. *Postoperative Complications in 150 Patients over 70-years-old after Resection or Hemicolectomy for Carcinoma of the Colon*

	Total	Fatal
Cardiac failure	6	4
Myocardial infarction	2	0
Pulmonary embolus	7	3
Pneumonia	13	2
Apoplexy	1	1
Thrombophlebitis	6	0
Bleeding ulcer	1	1
Anastomotic dehiscence	7	4
Intra abdominal abscess	2	1
Mesenteric vascular occlusion	1	1
Ligation of ureter	1	1
Pancreatic necrosis	1	1
Intraperitoneal bleeding	1	1
Ileus	3	0
Wound disruption	1	0
Wound infection	10	0
Totals	63	20

TABLE 5. *Complications after Resection of the Colon in 48 Patients with Cardiac Disease*

	Total	Fatal Complications	Total	Nonfatal Complications	Total
Heart failure (Long term digitalization)	11	Pulmonary embolus	1	Pneumonia, atelectasis	1
		Cardiac failure	1		
		Intraperitoneal bleeding	1		
Congestive heart failure (Pre operative digitalization)	7	Pulmonary embolus	1	Intraperitoneal abscess	1
		Cardiac failure	1		
		Anastomotic dehiscence	1		
		Pneumonia	1		
Myocardial degeneration (No digitalization)	28	Pulmonary embolus	1	Pneumonia	1
		Cardiac failure	2		
		Anastomotic dehiscence	1		
		Bleeding gastric ulcer	1		
Calcification of the aortic valve	1	Apoplexy	1	—	0
Cardiac arrest	1	—	0	—	0

performed, but the patient died 4 days later. Operative complications were responsible for nine further deaths: of seven patients with anastomotic leaks, four died; of two patients who developed subphrenic abscesses without anastomotic leaks, one died; four fatalities occurred as results of a) ligature of the superior mesenteric vein, b) ligature of the left ureter, c) pancreatic fatty necrosis with diffuse peritonitis after resection of the transverse colon, and d) intraperitoneal bleeding. Postoperative coronary occlusion, deep vein thrombosis, ileus,

wound dehiscence and infection caused not a single fatality.

Table 5 shows details of 48 patients undergoing resections whose complications were caused by cardiac disease. Eleven had been digitalized for heart failure for long periods before admission; seven were digitalized preoperatively on the same grounds; 28 had electrocardiographic signs of myocardial degeneration but were well compensated and not digitalized; chest x-rays showed calcification of the aortic ostium in one patient; and one had a cardiac arrest 7 days before resection, which was treated by external cardiac massage. Table 5 shows the postoperative courses in the different groups. Thirteen patients died—eight of cardiovascular complications.

There were ten patients who had associated bronchiectasis and emphysema, of whom seven also had cardiac disease (Table 6). Three died, one of pneumonia. Of nine patients with renal or urinary tract disease, one died after anastomotic leakage. There were eight diabetic patients, of whom three also had cardiac disease. Two died of cardiovascular complications. Non-fatal complications were frequent (33%).

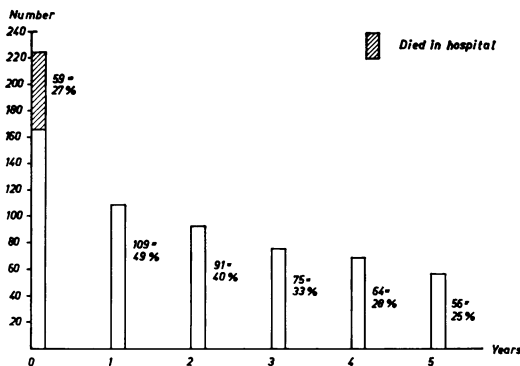


FIG. 2. Survival of 225 patients over 70 years old with carcinoma of the colon.

TABLE 6. *Complications after Resection of the Colon in 27 Patients with Bronchiectasis, Urinary Tract Disease or Diabetes*

	Total	Fatal Complications	Total	Nonfatal Complications	Total
Bronchiectasis	7	Pulmonary embolus	1	Anastomotic dehiscence	1
Emphysema and cardiac failure		Intraperitoneal bleeding	1	Wound infection	1
Bronchiectasis and emphysema	3	Pneumonia-atelectasis	1	—	—
Uraemia	4	Anastomotic dehiscence	1	Wound infection	2
Urinary tract disease	5	—		Pneumonia	1
Diabetes and cardiac failure	3	Cardiac failure	1	—	—
		Apoplexy	1		
Diabetes	5	—		Anastomotic dehiscence	2
				Wound infection	1
				Wound disruption	1

**Survival Periods**

Figure 2 shows details of the outcome in all 225 patients. Twenty-seven per cent died in the hospital and 51% within the first year. All patients not operated upon (26), and all who underwent palliative operations (49), died within one year with the exceptions of one patient who had malignant argentaffinoma of the appendix, and one who had inoperable carcinoma of the cecum. Three of these patients still live for periods of 4 and 5 years.

Figure 3 shows details of the outcome in 150 patients upon whom bowel resections were performed. Primary operative mortality was 13%. Five-year survival rate was 37%, and 15% died from conditions unassociated with carcinoma of the colon.

Death rates must be considered in relation to the normal death rates for the comparable Danish sex and age population groups. Of 130 patients discharged from the hospital after bowel resections for carcinoma, which included those with type C and D Dukes Classification tumors, 56 (43.1%) were alive 5 years later.

Comparative percentage 5-year survivals

of 236 patients aged less than 70 years was 53.8%. National statistics show that 5-year survival (1956-60) of the Danish population over 70 years of age was 62.3% and 90.6% of those less than 70 years of age. Correction of statistics to correlate with 5-year survival expectancy, gives the following: for patients over 70 years old 69.2% ± 7.0 and for patients less than 70 years old 59.4% ± 3.6. These differences are not statistically significant ( $U = 1.25, p > 0.1$ ).

Table 7 relates 5-year survivals to the microscopic types of the tumors. Patients with adenocarcinoma had the best prog-

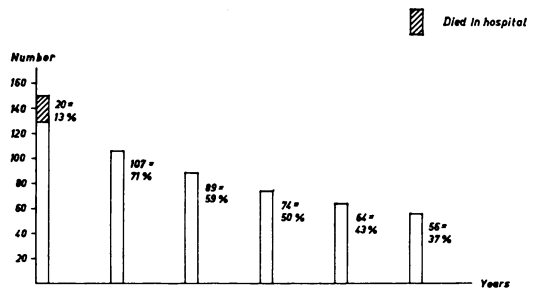


FIG. 3. Survival of 150 patients over 70 years old with carcinoma of the colon after resection or hemicolectomy.

TABLE 7. One Hundred Fifty Patients over 70-years-old—  
Five-year Survival Rate after Resection in Relation  
to the Histology

	Number of Cases	5-year Survivals No.	5-year Survival Per cent
Adenocarcinoma	112	46	41
Colloidal carcinoma	34	10	29
Anaplastic carcinoma	3	0	0
Argentaffin carcinoma	1	0	0

nosis—41% and those with colloidal carcinoma—29%. None of three patients with anaplastic carcinoma survived 5 years.

Figure 4 relates the survival of 150 patients to Dukes Classification of the tumors. In Type A the tumor is confined to the intestinal wall: In Type B the serosa is involved: in Type C there are local lymph node metastases: and in Type D, distant metastases. Forty-two patients were classified Type A—25 (60%) survived 5 years. Seventy were classified Type B—30 (43%) survived 5 years. Type C and D groups were essentially smaller, hence the extreme of the curve is based on small numbers. Five-year survival in these latter two groups was four and none. Operative mortality was highest in patients who had distant metastases. The frequency of regional lymph node metastases among the 150 patients undergoing bowel resections was 15% while 10% had distant metastases. Comparable percentages for 256 patients aged under 70 years undergoing resections were: regional lymph node metastases 23%; distant metastases 15%. However the frequency of resection in this group was 78% compared with 67% in the older group.

### Ileus

Fifty-four of the 225 patients presented with ileus. Eleven had right sided tumors, and 43 tumors of the transverse or the left

colon. The overall average age was 76 years. Table 8 shows treatments, early course, and survival. Ten patients did not come to operation, and nine of these died within days of admission. In one, bowel function was spontaneously restored. One patient on whom laparotomy only was performed had carcinomatosis. Four patients on whom ileotransversostomies were performed had right sided carcinomatous stricture. One died in the hospital, the other three within a year. In 33 patients relieving colostomies were performed, the only procedure in 18. Thirteen of these died while in the hospital and the other five between 3 and 9 months later.

In 21 patients with ileus (40%) bowel resections or hemicolectomies were per-

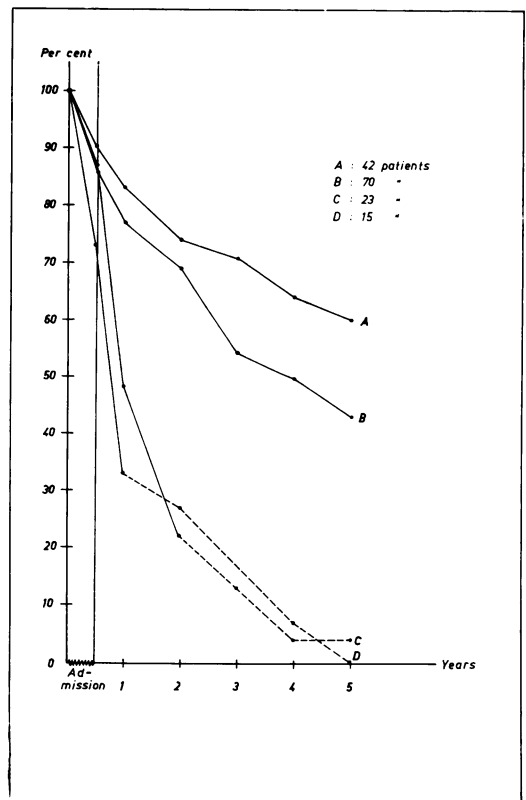


FIG. 4. Survival of 150 patients over 70 years old with carcinoma of the colon related to Dukes Classification.

formed; in 16 after primary decompressing operations. There was one postoperative death. On follow-up 12 died within five years, nine from carcinoma. And so ultimately, only eight of 54 patients presenting with ileus were alive 5 years later.

### Discussion

Inherent in a study such as this is the disadvantage that the basic parameter must be calendar age. The ideal, if capable of expression, would be physiological age. Further difficulty lies in the diagnosis of additional illnesses incident to the main disease. Such illnesses obscure the results of operative treatment and makes comparisons between series difficult.

Age itself is rarely contraindication to operation. Estimate of operative risk depends rather on the tumor, on the type of contemplated operation, and emphatically on the weight attached to incidental illnesses, particularly pulmonary and cardiac diseases.

Some answers may now be offered to the questions posed. 1) What chance has the patient of surviving the immediate operation? There was a primary operative mortality of 13%. This figure corresponds with that in comparable studies by Clagett,<sup>5</sup> Wilkins *et al.*<sup>20</sup> and Heron *et al.*<sup>12</sup> It is 50-100% higher than that in most series of carcinomas of the colon in all ages, e.g., Noring,<sup>17</sup> Botsford *et al.*<sup>4</sup>

Half of the primary mortality resulted from surgical complications. Older patients tolerate such intra-abdominal complications badly. Only seven patients of 17 survived.

Of 48 patients with cardiac disease undergoing bowel resections 13 (27%) died, eight from cardiovascular complications (Table 5). Of the remaining 102 patients eight (8%) died, three from pneumonia, and five from surgical complications. Allowing for the fact that cause of death on occasion may not be directly related to

TABLE 8. *Fifty-four Patients with Acute Obstruction—Treatment and Course*

Treatment	No.	Died in Hospital	Died within 5 Years
No operation	10	9	1
Explorative laparotomy	1	1	0
Ileotransverse colostomy	4	1	3
Cecostomy	18	13	5
Cecostomy and resection	15	0	10
Transverse colostomy and resection	1	0	1
Bloch-Mikulicz-resection	1	0	1
Hemicolectomy	4	1	0
Totals	54	25	21

pre-existent cardiac disease, the figures nonetheless indicate that operative risk in patients with cardiac disease is nearly four times greater than in those without. Of 17 patients with incidental renal/urinary tract disease, emphysema or diabetes, but without cardiac disease, two died, and only one of these deaths could be accounted for by the incidental disease.

Results of treatment of patients who have ileus, agree with those of Loeffler *et al.*,<sup>15</sup> Hickey *et al.*,<sup>13</sup> and Floyd *et al.*,<sup>8</sup> and perhaps give an answer to question 2, concerning postponement of operation. Ten of 54 patients were not operable, and more than half of those who did come to operation could not be treated other than with palliative procedures. Only 15% survived 5 years. Such a bad prognosis seems associated with ileus. Sixty-five per cent of patients who had ileus had carcinomas later classified as Dukes Types C and D. Frequency of resection is lower in these patients. The incidence of cardiopulmonary disease, renal failure and diabetes is twice that in patients without ileus. Ileus then is a late symptom of carcinoma of the colon,

and treatment should not be delayed. If a primary palliative operation can be followed by bowel resection the prognosis is no worse than with other patients.

Question 3) concerned with the optimum extent of the operative procedure related to postoperative complications and prognosis cannot be answered from results of this review. Surgical procedures have been much the same over the 15 years under consideration. There is nothing in the previous literature to suggest that a less extensive procedure reduces mortality in older patients. Two stage procedures described by Bloch<sup>8</sup> in 1894 and by Mikulicz<sup>16</sup> in 1903, reduced operative mortality at that time by about one third. These procedures have been abandoned because of inadequate node extirpation, risk of recurrence in the incision, and the necessity for another operation within a short period. These points have been emphasized by Goligher.<sup>11</sup>

In our experience, as with Galante *et al.*<sup>9</sup> and Glashan *et al.*<sup>10</sup> older patients tolerate one large operation better than several small ones.

In regard to prognosis—question 4) follow-up has proved encouraging. Fifty-six of 150 patients (37%) were alive 5 years later, and 15% of those who died did so from causes unconnected with carcinoma or operation. Corrected survival rates, taking into account comparable age and sex population groups as a whole, indicate that older patients have a better relative prognosis than do younger. Though this difference cannot be shown to be statistically significant, it is important. For instance, a further correction should allow for that proportion of the general population both under and over 70, which would die from carcinoma of the colon. These figures are unobtainable. Our results are supported by the work of Cutler and Lourie.<sup>6</sup>

The fifth question cannot be directly answered but 73 of 75 patients who were either considered inoperable, or who had

such extensive carcinomas that only colostomy was feasible, were dead within one year. The overall death rate from untreated carcinoma of the colon is unknown but 29 patients may serve as a guide. They were chosen for the following reasons: 1) bowel resection was not performed, 2) cause of death was not related to operation, 3) there was no significant incidental disease. Average survival from onset of symptoms to death in these 29 patients was 10 months. Length of life without operation, dependent as it is on tumor site, invasive potential, ulceration, etc. cannot be predicted, but pain, change of bowel habits, poor general health—*anemia, hypoproteinemia*—are all likely to affect the quality of life.

Furthermore it is widely held, that where at all practical, bowel resection should be performed, even if there are widespread metastases. Resection may not influence length of survival, but the quality of life is better if the tumor is excised; Galante *et al.*,<sup>9</sup> Bacon *et al.*,<sup>2</sup> and Botsford *et al.*<sup>4</sup>

### Conclusion

Carcinoma of the colon in older patients should be treated on the same principles as in younger patients with resection or hemicolectomy and wide excision of the mesocolon. Mortality is not higher in the aged, though if there is incidental cardiac disease, this makes the prognosis worse. Bronchiectasis with emphysema, renal tract disease and diabetes, seem not to influence mortality, though these diseases often predispose to local complications, and surgical abdominal complications are often fatal.

Five-year survival rates are of the same order in the aged as in the young. Operation should not be delayed until the onset of acute symptoms.

### Summary

From 1950–1964 225 patients over 70 years of age were treated for carcinoma of the colon. Frequency of resection was 67%. Primary mortality was 13%.



Abdominal complications following operation were often fatal. Incidental cardiac disease betokens a bad prognosis—mortality approaches four times that in other age groups, whereas other incidental diseases were not so significant.

Corrected survival rates, taking into account death rates of the population as a whole, indicate that older patients have a better prognosis than younger, providing they survive the immediate stress of operation.

Ileus is a late symptom of carcinoma of the colon, and only 15% of those with ileus survived 5 years. Patients untreated had an average survival time of 10 months from the onset of symptoms. It is concluded that principles of treatment for the older, should be the same as for the younger.

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