

Carcinoma of the Distal Large Bowel:

32-Year Review of 1,026 Cases

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SEVENTY-FIVE per cent of cancers of the large bowel occur within or distal to the sigmoid colon. These are one of the most common causes of death due to malignant disease. The widespread interest and vast literature on carcinoma of the distal colon and rectum indicate that there is dissatisfaction with results of current therapy. Although 5- and 10-year cures following surgical excision are frequent there is a consensus that cure rates are not increasing. A review of an experience extending over three decades is presented that tests the validity of this statement and possibly suggests approaches for improving results.

Historical Review

The evolution of current surgical treatment of this disease is pertinent to this objective. In 1826, Lisfranc⁷ performed the first successful extirpation of a carcinoma of the rectum. Excision of the tumor was accomplished through a perianal incision. This technic was later modified and improved by Verneuil and by Kraske⁵ who excised the coccyx and lower sacrum, respectively, to permit better exposure. Gerota,² in 1895, demonstrated the lymphatic drainage of the rectum and consequently established the basis for more radical procedures that were to be devised. Success in the early part of the 19th century was frequently measured in terms of operative survival. Postoperative sepsis and hemorrhage

resulted in death for many patients. Little consideration was given to long-term survivals until the latter part of the century.

Perhaps the best results of that era were those reported at the Berlin Surgical Congress in 1900. Kronlein⁶ collected a series of 881 patients operated upon by such eminent surgeons as Kocher, Czerny, Hochenegg, von Mickulicz and others. The operative mortality was 19.7 per cent. Of the 640 patients followed, the 5-year survival was 14.8 per cent. It was in this setting that W. E. Miles⁸ of New Castle began his investigations. These culminated in 1908 with his classical description of the abdominoperineal resection that bears his name and is considered by many to this day to be the procedure of choice for rectal cancer. Immediate acceptance of this procedure was withheld because of the high operative mortality rate of 40 per cent. This, however, has gradually been reduced by many measures including improvements in blood replacement, anesthesia and antimicrobial therapy. Currently, the operative mortality is in the range of 5 per cent. It is the contention of some that improvements in 5-year survival rates over the past 57 years are a reflection of this decreased operative mortality, rather than better surgical extirpation provided by the original Miles procedure.

Clinical Material

The present study extends over a 32-year period and is concerned with 1,026 patients.

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TABLE 1. *Treatment of Carcinoma of the Distal Large Bowel (1932-1964)*

Curative procedures	666 (64.9%)
Palliative procedures (colostomy)	187
Miscellaneous operative procedures	94
Patients not subjected to operation	79* (7.7%)
Total	1,026

* 44 considered inoperable; 35 refused operation.

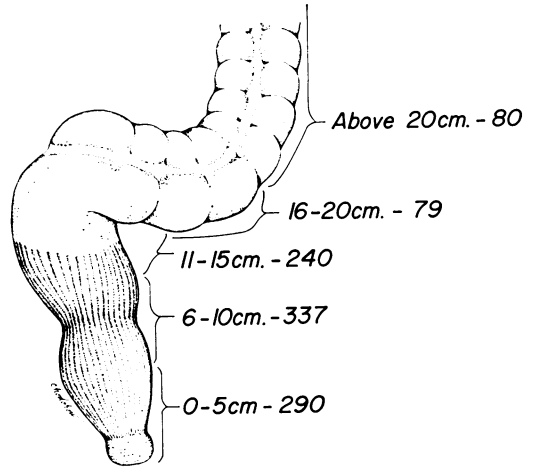


FIG. 1. Location of carcinoma in 1,026 patients, as determined by proctoscopic examination.

The records of the patients with cancer of the distal large bowel who were admitted to the pavilion service of The New York Hospital-Cornell Medical Center from 1932 through 1964 were reviewed. In each instance the carcinoma was located distal to the origin of the sigmoid colon. The location of the neoplasm has been selected (Fig. 1) as that determined by proctoscopic examination. This method was chosen because the distance from the anus to the lesion can be determined in patients who are not subjected to resection as well as in those in whom removal is accomplished. Only those patients in whom a histologic diagnosis was made were included. Patients who had received prior definitive therapy or in whom a histologic diagnosis was not established were excluded.

The follow-up data in 97.6 per cent of patients were obtained by evaluation in the surgical follow-up clinic. Patients who were lost to follow up or died from any cause were considered to have succumbed to carcinoma in calculation of 5-year survival rates.

The patients were grouped according to therapy employed (Table 1), indicating quite consistently the extent of the disease at the time they presented themselves. Nine hundred and forty-seven (92.3%) of the patients were operated upon. Of the 1,026 patients, 666 (64.9%) underwent a curative procedure. Seventy-nine patients (7.7%) were not subjected to any surgical procedure. Forty-four of these were considered far advanced in their disease and inoperable, and 35 refused operation, several because they would not accept a colostomy.

Six hundred and twenty-three (623) patients were male and 403 female, a ratio of 1.5:1. This is a somewhat greater proportion of men than is usually reported.⁹ The patients were Caucasians, except for 45 Negroes and one Chinese. Over two thirds of the patients were between 50 and 69 years of age. Only eight patients (0.8%) were under 30 years (Table 2).

TABLE 2. *Carcinoma of the Distal Large Bowel: Age Distribution (1932-1964)*

Age	No. Patients
Over 80 years	37
70-79 years	167
60-69 years	365
50-59 years	295
40-49 years	109
30-39 years	45
20-29 years	8
Total	1,026

Symptomatology

Change in bowel habits, rectal bleeding and weight loss are the cardinal complaints of patients with carcinoma of the distal colon. Six hundred and fifty-four patients

TABLE 3. *Carcinoma of the Distal Large Bowel: Symptoms (1932-1964)*

Change in bowel habits	654
Rectal bleeding	593
Weight loss	300

TABLE 4. *Curative Procedures for Carcinoma of the Distal Large Bowel (1932-1964)*

Abdominal-perineal coloproctectomy	422
Anterior resection	163
Perineal resection	74
Other operations	7
Total	666

TABLE 5. *Abdomino-Perineal Resection for Carcinoma of the Distal Large Bowel (1932-1959)*

Location and Classification of Lesion	No. Patients	Survival Rates (5-year)
<10 cm. above anus		
Dukes A	100	54%
Dukes B	75	30.7%
Dukes C	83	25.3%
>10 cm. above anus		
Dukes A	41	63.4%
Dukes B	38	44.7%
Dukes C	31	22.6%
Total	368	40.2%

were recorded as having change in bowel habits, 593 rectal bleeding and 300 weight loss (Table 3). Many patients had noted all of these symptoms prior to admission.

The duration of symptoms varied widely and an accurate correlation between the duration of symptoms and the type of operation employed or long-term survival was not feasible. Some asymptomatic patients were found to be inoperable and others who had symptoms of more than one year's duration were without evident spread of the neoplasm beyond the bowel wall.

TABLE 6. *Complications Following Abdominal-Perineal Resection in 422 Patients with Carcinoma of the Distal Large Bowel (1932-1964)*

Complication	
Genitourinary	100
Wound	63
Cardiopulmonary	49
Small bowel	39
Colon	12
Rectum and perineum	6
Miscellaneous	28
Total	297

TABLE 7. *Anterior Resection for Carcinoma of the Distal Large Bowel (1937-1959)*

Location and Classification of Lesion	No. Patients	Survival Rates (5-year)
<10 cm. above anus		
Dukes A	12	66.7%
Dukes B	6	—
Dukes C	10	—
>10 cm. above anus		
Dukes A	33	78.8%
Dukes B	33	33.3%
Dukes C	29	31%
Total	123	43.9%

Curative Procedures

Operations performed in anticipation of cure were accomplished in 666 patients (64.9%) (Table 4). Of the 565 patients operated upon prior to 1960, 22 (40.5%) were alive 5 years later. Abdomino-perineal coloproctectomy was the most commonly employed procedure. Anterior resection has been employed with increasing frequency in recent years. Perineal resections were abandoned in 1946.

Abdominal-perineal Resection. Abdominal-perineal resection was performed (Fig. 2) on 422 patients from 1932 through 1964. Twenty patients (4.7%) died in the immediate postoperative period. Three hun-

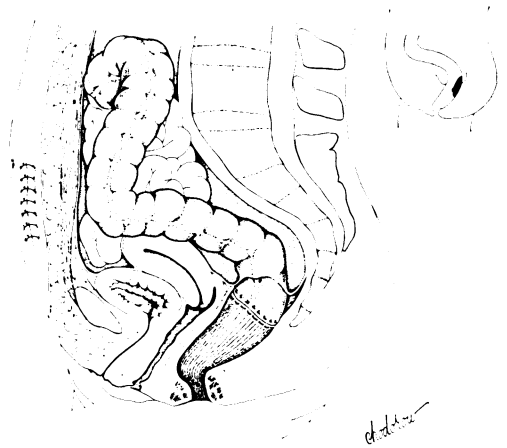
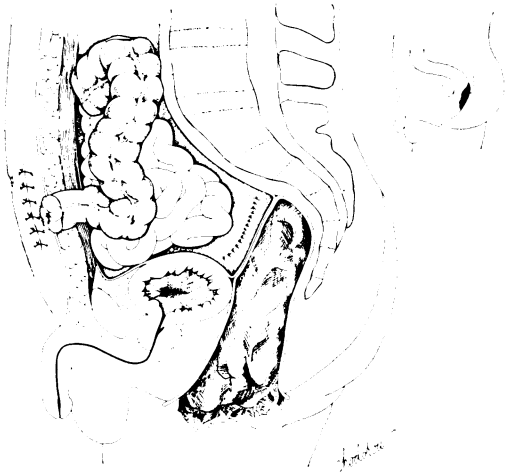


FIG. 2. Abdominal-perineal resection (Miles procedure) for carcinoma of the distal large bowel. Insert depicts neoplasm at the level of the peritoneal reflection.

FIG. 3. Anterior resection for a carcinoma at the level of the peritoneal reflection. The location of the lesion is illustrated by the insert.

dred and sixty-eight patients were operated upon through 1959 and of this group 148 (40.2%) were alive 5 years following operation.

Table 5 lists the location of the carcinoma with respect to the anus as well as the Dukes classification for this group of 368 patients.

Irrespective of the location of the tumor, patients with Dukes¹ A lesions, i.e., carcinomas confined to the bowel wall, had a 5-year survival rate of 56.7 per cent. Those classified as Dukes B, wherein the carcinoma had extended through the bowel wall, had a 5-year survival rate of 35.4 per cent. The 5-year survival rate was only 24.6 per cent for those patients with Dukes C lesions, i.e., carcinomas that had metastasized to lymph nodes.

Extending the scope of abdomino-perineal resection to include other pelvic or abdominal organs was done in 38 patients. The organs most frequently removed in conjunction with coloproctectomy were the uterus, fallopian tubes and ovaries. Of 17 patients in whom the carcinoma had invaded these adjacent organs, only two sur-

vived more than five years. One patient had involvement of the prostate and the other, the terminal ileum.

Complications following abdomino-perineal resection were frequent (Table 6). Two hundred and twenty-five of the 422 patients experienced one or more nonfatal complications. The largest number of complications were related to the urinary tract. The necessity of an indwelling catheter and division of pelvic autonomic nerves results in a high incidence of infection and urinary retention. Wound infection, intestinal obstruction, pulmonary complications and colostomy problems constituted the other major postoperative complications. Perineal recurrence of carcinoma was documented in 88 of the 422 patients (20.9%).

Anterior Resection. Anterior resection for carcinoma of the distal colon was first done at this hospital in 1937 (Fig. 3). Since then a total of 163 such operations have been performed. The great majority of anterior resections were performed after 1945. Of the 163 patients who underwent anterior resection, 123 were operated upon through 1959. Fifty-four patients (43.9%)

TABLE 8. *Complications following Anterior Resection in 163 Patients with Carcinoma of the Distal Large Bowel (1937-1964)*

Complication	
Wound	21
Cardiopulmonary	16
Genitourinary	14
Small bowel	8
Rectum and perineum	5
Colon	2
Miscellaneous	8
Total	74

of 123 survived at least 5 years. Those patients with Dukes A lesions had a 5-year survival rate of 75.6 per cent, Dukes B, 28.2 per cent and Dukes C, 23.1 per cent. The location of the carcinoma with respect to survival is illustrated in Table 7.

The majority of patients undergoing this operation had lesions located between 11 and 15 cm. above the anus. Only one anterior resection was performed for a very low-lying carcinoma. Remarkably there was only one postoperative death in this group of 163 patients. This fatality occurred from peritonitis secondary to disruption of the bowel anastomosis. Forty-eight patients experienced a total of 74 complications (Table 8). Wound infection was the principal cause of morbidity following anterior resection. To date perineal recurrence has been documented in 21 of the 163 patients (12.9%).

Perineal Resection. This group comprises 74 patients who underwent perineal resection. These patients were operated (Fig. 4) on between 1932 and 1946. No perineal resections were done after 1946. Table 9 illustrates the 5-year survival rate as correlated with the level of the lesion and the Dukes Classification. Patients with Dukes A carcinomas had a 5-year survival of 43.3 per cent, Dukes B, 37.5 per cent, and Dukes C, 16.7 per cent.

There were 11 postoperative deaths, a mortality rate of 14.9 per cent. Infection

TABLE 9. *Perineal Resection for Carcinoma of the Distal Large Bowel (1932-1946)*

Location and Classification of Lesion	No. Patients	Survival Rates (5-year)
<10 cm. above anus		
Dukes A	24	50%
Dukes B	28	39.3%
Dukes C	10	10%
>10 cm. above anus		
Dukes A	6	16.7%
Dukes B	4	25%
Dukes C	2	50%
Total	74	36.5%

accounted for half of these deaths and was also the most frequent complication (Table 10). A total of 82 complications were experienced in this group of patients. One third of the complications were related to the anal anastomosis: fecal fistulae, rectal prolapse, incontinence, stricture. Recurrent carcinoma in the perineum was present in 23 patients (31.1%).

The high incidence of locally recurrent cancer, the frequent complications and the lack of satisfactory anal sphincter control were the reasons why this procedure was abandoned in 1946.

Other Operations. Three patients underwent total colectomy with ileostomy and three subtotal colectomy. These patients had carcinoma of the distal large bowel in addition to ulcerative colitis, multiple polyps or multiple coexistent carcinomas of the colon. In one additional patient an abdomino-perineal pull-through procedure was performed for carcinoma. There were no postoperative deaths or 5-year survivors.

In summary, this experience with curative operations for carcinoma of the distal large bowel demonstrates that the best results are achieved with lesions that are confined to the bowel wall. Until those factors which influence the host-tumor relationship are known, early diagnosis and undelayed treatment will continue to be

TABLE 10. *Complications following Perineal Resection in 74 Patients with Carcinoma of the Distal Large Bowel (1932-1946)*

Complication	
Rectum and perineum	27
Wound	22
Genitourinary	15
Cardiopulmonary	6
Colon	3
Small bowel	2
Miscellaneous	7
Total	82

our most important determinants of survival.

Palliative Procedures

A palliative colostomy was performed in 187 patients who were deemed inoperable. In 27 patients, the tumor was palpable on physical examination. Twenty-five of these patients were found to have hepatomegaly. Symptoms of more than one year's duration were reported by 49 patients. There were five patients without symptoms referable to the lower intestinal tract. Twenty patients died in the immediate postoperative period, an operative mortality of 10.7 per cent. The average survival in this group was 9.4 months after the colostomy was performed. Three patients survived 5 years, one patient 7 years and one patient 10 years following "palliative" colostomy. There is one additional patient still living 10 years following this operation.

Miscellaneous Operative Procedures

Exploratory laparotomy and biopsy of distant metastases were performed in 45 patients. Colostomy was not performed because evidence of obstruction was absent. There was an operative mortality of 15.6 per cent. The average duration of survival in those who recovered from operation was 8.6 months. Four patients survived more than 5 years.

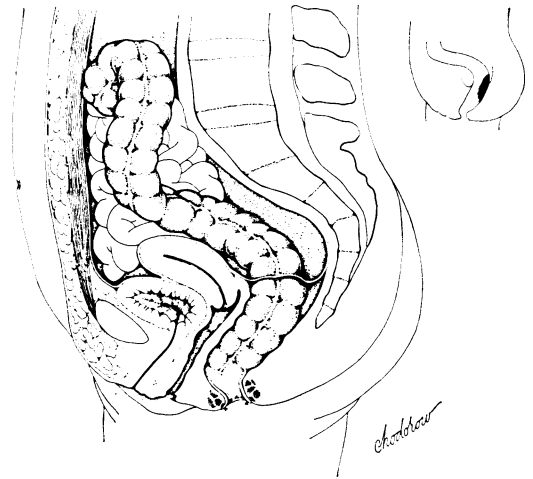


FIG. 4. Perineal resection for a carcinoma of the rectosigmoid colon. The insert outlines the site of the tumor.

Celiotomy was obviated in 16 patients by biopsy of extra-abdominal metastases such as cervical lymph nodes.

Thirty-three patients had rectal neoplasms diagnosed as adenoma malignum. This diagnosis has fallen into disrepute in recent years. It was used by Ewing to denote an adenoma showing poor differentiation, many mitoses and all the stigmata of adenocarcinoma without, however, exhibiting any tendency to invade the pedicle. The diagnosis is made only by microscopic examination of the tumor, as it is grossly indistinguishable from an adenoma. Twenty-seven of these patients were treated by local excision and six by bowel resection. Twenty-four patients survived 5 years. The remaining nine nonsurvivors died from causes unrelated to the colon neoplasm.

Patients Not Subjected to Operation

In 44 patients, operation was considered to be contraindicated because of obvious gross extension of the neoplasm or severe coexisting systemic disease. The diagnosis was established by proctoscopic biopsy.

An additional 35 patients refused to submit to operation, usually because of their aversion to a permanent colostomy.

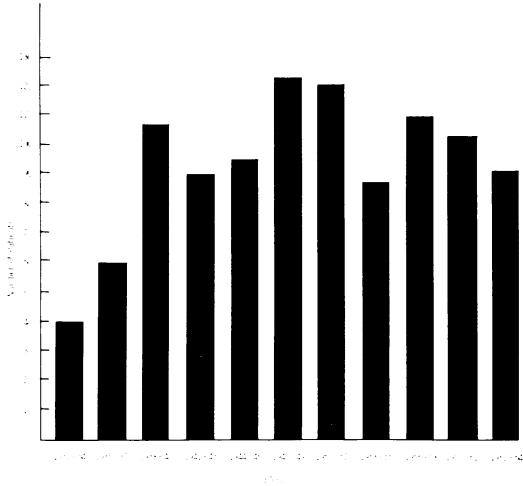


FIG. 5. Patients admitted with carcinoma of the distal large bowel (1932-1964).

Discussion

Because this study encompassed a long period of time, 32 years, it was possible to evaluate several interesting features of the natural history of carcinoma of the distal large bowel.

Unlike the incidence of carcinoma of the lung which is increasing and carcinoma of the stomach which is decreasing, the incidence of carcinoma of the distal large bowel has remained relatively constant over the past 25 years (Fig. 5). The relatively few patients admitted during the 1930's is accounted for by the fact that the institution, in its present location, opened in September 1932.

Gilbertsen⁴ and others have suggested that improved 5-year survival rates for patients operated upon in recent years is a reflection of decreased operative mortality. Our experience confirms this concept (Fig. 6). Operative mortality in this series steadily declined from 15.4 per cent to 2.4 per cent. This 13-per cent decline in mortality rate has been associated with a 10.4-per cent improvement in 5-year survivals. Advances in anesthesia, blood replacement and antimicrobial therapy are without doubt the major factors in decreasing oper-

ative mortality and improved 5-year cure rates.

Although operative mortality can and no doubt will be reduced further, existing cure rates may not be improved significantly by this approach. It is most discouraging to realize that our present surgical technics are followed by 5-year survivals in only 40 per cent of the patients undergoing operation. Broadening the scope of resection to include adjacent pelvic and abdominal organs does not appear to offer a solution. Occasionally however it is indicated in carefully selected patients. Any program to improve survival rates should encompass methods to alert the public to seek prompt medical attention for symptoms suggestive of rectal cancer. Proctoscopy should be included in all physical examinations for persons 40 years of age and older.

Other primary carcinomas of the bowel occurred in 59 (5.8%) of this series of 1,026 patients. In 31 patients the additional lesion was located in the left colon, in 17 in the right colon and in 11 in the transverse colon. In 22 patients the other primary carcinoma was recognized at the same time as the tumor in the distal colon. Resection for an additional carcinoma of the colon was necessary in 19 patients some time

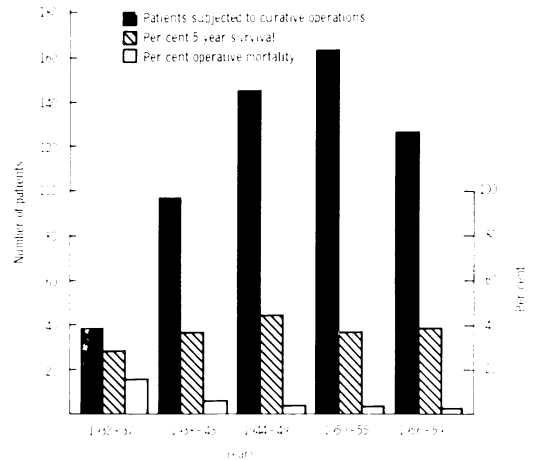


FIG. 6. Patients admitted with carcinoma of the distal large bowel (1932-1959).

after, and in 15 before treatment of the presenting lesion in the distal large bowel.

The propensity of individuals with carcinoma in one organ to develop primary cancers elsewhere in the body is also illustrated by this study. Sixty-one patients (5.9%) had a history of previous tumor or subsequently developed other primary cancers. Twenty-four had carcinoma of the genitourinary tract, ten each of the breast and skin, six of the gastrointestinal tract, five of the lung, and six of various other parts of the body.

The relationship of polyps to cancer of the colon is a subject of considerable interest and there is much diversity of opinion. Many surgeons, noting the frequent occurrence of polyps in segments of colon resected for carcinoma, have tended to view polyps as premalignant tumors. Others do not share this concern. In this group of 1,026 patients with carcinoma of the distal colon, 181 (17.5%) were found to have polyps at the time they were examined for their carcinoma. Only 17 patients had a history of prior colon polypectomy. Twenty-three patients were discovered to have polyps in the remaining segments of the colon at follow-up visits. This frequent association of polyps and carcinoma has encouraged us to continue to advise surgical excision of all polypoid lesions of the bowel.

Diversity of opinion also exists with reference to the operation of choice for carcinoma of the rectosigmoid area. Most patients with lesions in this area have been treated by abdominal-perineal resection. Perineal resection has been abandoned and anterior resection has been performed less frequently. Statistical comparison with those patients treated by abdominal-perineal resection is not possible. However, we concur with Gilbertsen³ that patients with Dukes A carcinomas can be treated successfully by any of these operations but patients with Dukes B and C lesions are best treated by abdominal-perineal resection. Because it is difficult to determine the

presence or absence of lymph node metastases without microscopic examination of the specimen, abdominal-perineal resection will continue to be recommended to patients with carcinoma at the 6–10 cm. level. Certainly, abdominal-perineal resection will continue to be the operation of choice for lesions below the 6 cm. level. Anterior resection appears to offer the best results for patients with carcinoma above 10 cm.

Summary

Experience with 1,026 patients admitted to The New York Hospital-Cornell Medical Center with carcinoma of the distal large bowel has been presented. Of these patients 92.3 per cent were considered operable and in 64.9 per cent a curative operation was attempted. Abdominal-perineal resection has been the procedure most commonly employed. The 5-year survival rate for all patients undergoing curative operations during the years 1932–1959 was 40.5 per cent. Operative mortality has progressively declined to 2.4 per cent. Data concerning other carcinomas and polyps of the colon have been presented.

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