

# Mortality, Morbidity, and Patterns of Recurrence After Abdominoperineal Resection for Cancer of the Rectum\*

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Records of 230 patients who underwent abdominoperineal resection between 1963 and 1976 were reviewed. The median age of the patients was 62 years. The mortality rate was 1.7 per cent, and the morbidity rate was 61 per cent. One hundred eighty patients were followed for five to 13 years to identify patterns of recurrence. Ten-year survival for Dukes' A, B, and C lesions was 83 per cent, 57 per cent, and 31 per cent, respectively. Seventy-eight patients (43 per cent) had recurrent cancer; 10 per cent had local lesions, and 33 per cent had distant lesions. Dukes' B lesions had a greater latency for local recurrence than Dukes' C lesions. Dukes' A lesions with distant recurrence had a greater latency than Dukes' B or C lesions. Once recurrence was established, the survival rate was not significantly different, regardless of Dukes' stage or local or distant site. Radiation therapy for established local recurrence or chemotherapy for established distant recurrence did not seem to alter survival rates. [Key words: Rectum; Cancer, rectal; Resection, abdominoperineal; Recurrence; Dukes' classification]

IN THE PAST quarter century, mortality and morbidity rates have only modestly decreased after abdominoperineal resection for cancer of the rectum. Recurrent cancer to local and distant sites remains the limiting factor to improved survival rates. Analysis of patterns of recurrence by second-look procedures<sup>1</sup> or dissection of cadavers has enabled construction of follow-up systems with additional radiation therapy or chemotherapy. Survival curves with respect to Dukes' classification and their subsequent sites of initial recurrence may provide additional data relative to the efficacy of present therapy as well as serve as a comparative model for new modes of treatment. A retrospective analysis was performed to determine

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the pattern of recurrence of 180 patients followed for a five- to 13-year period.

## Materials and Methods

Records of 230 patients who underwent abdominoperineal resection between 1963 and 1976 were studied. One hundred sixty were men, and 70 were women. Ages ranged from 31 to 85 years, with a median age of 62 years. Eight patients were lost to follow-up, three died from unrelated causes, three underwent abdominoperineal resection after fulguration of rectal tumor, and 12 underwent abdominoperineal resection after sigmoid or low-anterior resection. Four operative deaths resulted in a mortality rate of 1.7 per cent. Twenty patients had palliative resection for Dukes' D lesions. These 50 patients were excluded from follow-up for recurrence, and therefore 180 patients were followed for five to 13 years. Forty-five patients had Dukes' A lesions, 75 had Dukes' B lesions, and 60 had Dukes' C lesions.

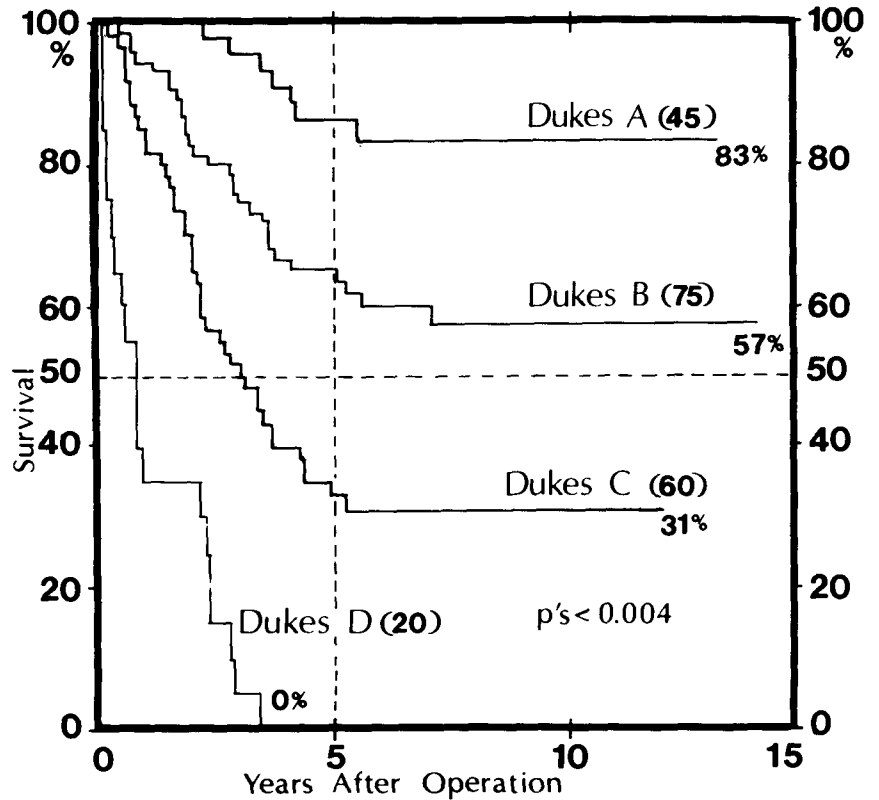
## Results

The uncorrected five-year survival rate is shown in Table 1. Ten-year survival rates in patients followed

TABLE 1. *Survival versus Dukes' Class*

Dukes' Lesion	Number of Patients	Uncorrected Five-year Survival (Per Cent)
A	45	86.4
B	75	65.3
C	60	33.3
D	20	0

FIG. 1. Survival after abdominoperineal resection.



for five to 13 years are shown in Figure 1: patients with Duke's A lesions had an 83.3 per cent cure rate, those with Duke's B had a 57.3 per cent cure rate, and those with Duke's C had a 31 per cent cure rate. There was no significant difference between the five- and ten-year survival rates. The morbidity rate for the 230 patients who underwent operation was 61 per

cent. These were subdivided into urologic complications (21 per cent), perineal complications (16.5 per cent), complications relating to stoma (14.8 per cent), and miscellaneous complications (12.5 per cent), as shown in Table 2.

The authors were able to evaluate 180 patients; 78 of 180 patients (43 per cent) followed for five to 13

FIG. 2. Recurrent cancer in 78 of 180 patients (43 per cent).

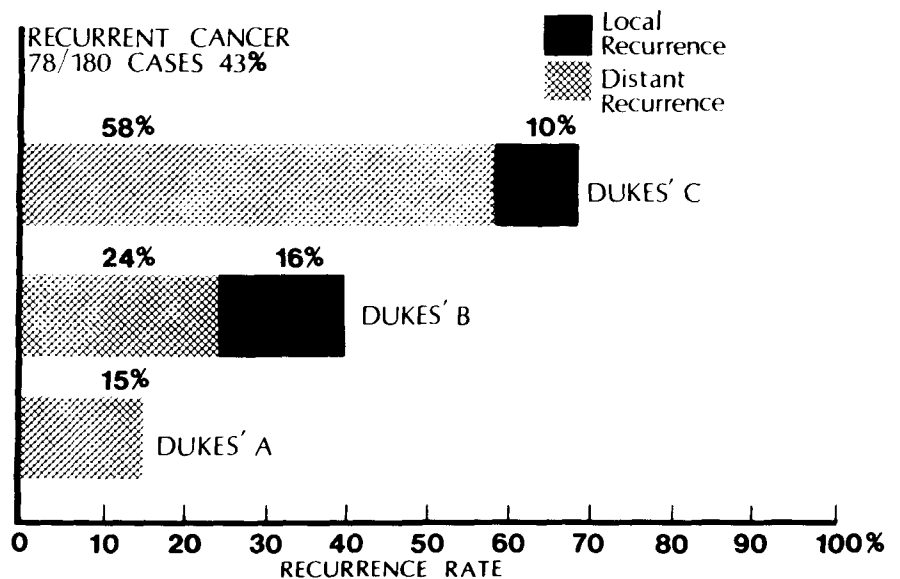


TABLE 2. Complications

Complication	Number of Patients	Per Cent
Urologic		
Benign prostatic hypertrophy requiring transurethral prostatectomy	13/160	8.1
Urinary tract infection	13/230	5.6
Neurogenic bladder	8/230	3.5
Orchitis	2/160	1.2
Urethral stricture	1/230	0.4
Fistula		
Vesicovaginal	1/70	1.4
Vesicoperineal	1/230	0.4
Ureteroperineal	1/230	0.4
Perineal		
Abscess	26/230	11.3
Hemorrhage	10/230	4.3
Hernia	2/230	0.9
Stomal operation		
Stenosis, retraction, or prolapse	25/230	10.9
Hernia	7/230	3.0
Abscess	2/230	0.9
Miscellaneous		
Abdominal wound infection	6/230	2.6
Wound evisceration	7/230	3.0
Small-bowel obstruction	10/230	4.3
Myocardial infarction	1/230	2.6
Atrial fibrillation	1/230	
Hepatitis	1/230	
Pulmonary embolism	1/230	
Iliac vein injury	1/230	
Pelvic abscess	1/230	

years developed recurrent cancer (Fig. 2). In 18 of 78 patients, recurrence was initially local, and in 60 of 78 patients, the initial manifestation of recurrence was in a distant location. Survival with respect to the initial site of recurrence is illustrated in Table 3. A significant difference ( $P = 0.02$ ) was seen in the time of appearance of perineal recurrence between Dukes' B

and C lesions (Fig. 3). The median survival after perineal recurrence in Dukes' B and C lesions was 17 months versus 10.5 months, but these differences were not statistically significant (Table 3). These patients had no significant statistical difference in survival when compared with patients having Dukes' B and C disease with distant metastases as the initial presentation (Table 4).

The overall survival rate from operation to death for patients who initially had distant metastases is statistically significant ( $P = 0.03$ ) when one compares Dukes' A with Dukes' C lesions only (Fig. 4). However, the times of recurrence to death were not significantly different for patients who had distant recurrence in Dukes' A, B, or C lesions (Fig. 5).

Distant recurrence developed in 35 patients with Dukes' C lesions. Thirteen were untreated, and 22 were treated with chemotherapy after recurrence had developed. Median survival rates were not significantly different (Table 5). Although it appears that the treated group seemed to fare better than the untreated group, when their late survival curves are compared, logrank analysis of the lower portion of the curve indicates a residual  $P$  value of 0.24, which is not statistically significant (Fig. 6).

### Discussion

In the past 20 years, many reports have demonstrated that abdominoperineal resection can be performed with a 2 to 6.5 per cent mortality rate (Table 6). Morbidity rates remain high<sup>13,16</sup> and are similar to the overall rate of 61 per cent in this study. Urologic complications remain the most troublesome, largely because of technical considerations. Fifteen per cent of patients are still not able to micturate effectively after operation.<sup>17</sup> Gersternberg *et al.*<sup>18</sup> recommend that spontaneous urinary flow measurement and cystometry should be instituted as a postoperative screening procedure for patients without obvious bladder dysfunction to detect problems at an early

TABLE 3. Survival with Respect to Initial Site of Recurrence

Site	Dukes' Stage	Number of Patients	Median Time from Operation to Recurrence (Months)	Median Time from Recurrence to Death (Months)	Overall Median Survival (Months)
Local (23 per cent)	A	0	—	—	—
	B	12	21.5	17	38.5
	C	6	6	10.5	16.5
Distant (77 per cent)	A	7	20	18	44
	B	18	12	11.5	22.5
	C	35	12	9	24

FIG. 3. Appearance of perineal recurrence. MT = median time of recurrence. \*\* =  $P < 0.05$ .

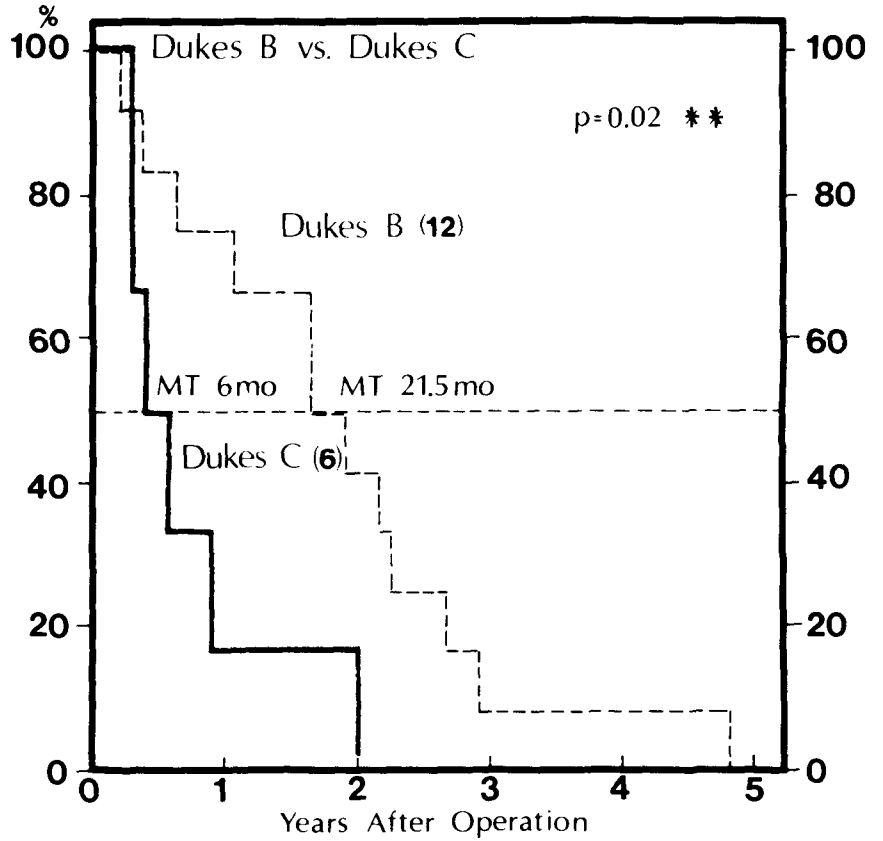
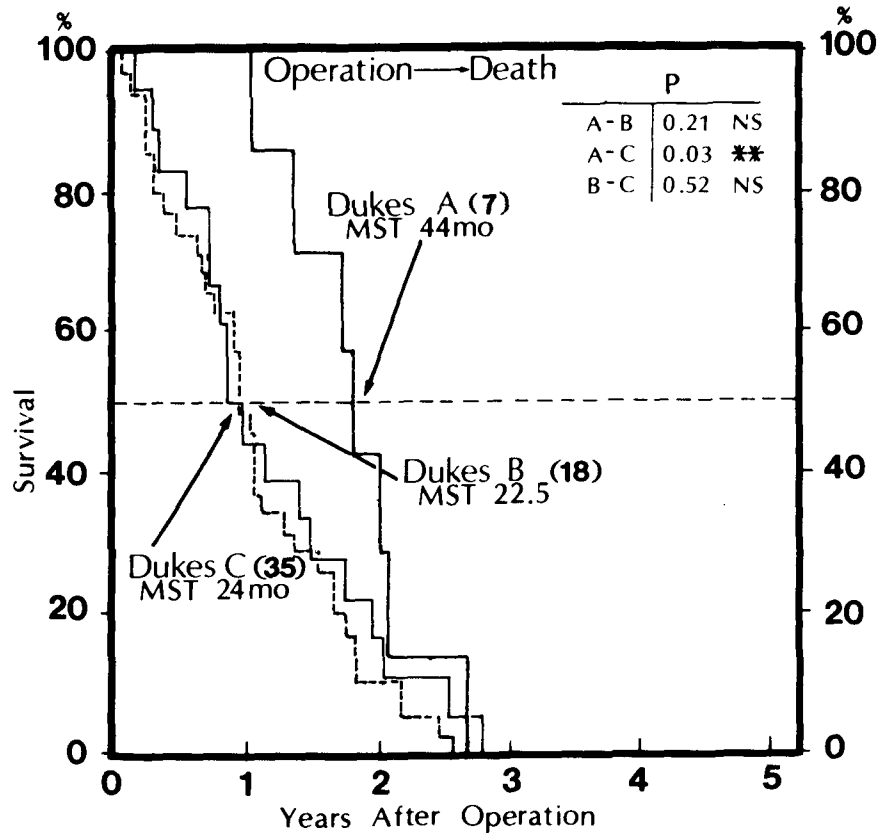


FIG. 4. Survival after operation with distant recurrence. MST = median survival time. \*\* =  $P < 0.05$ .



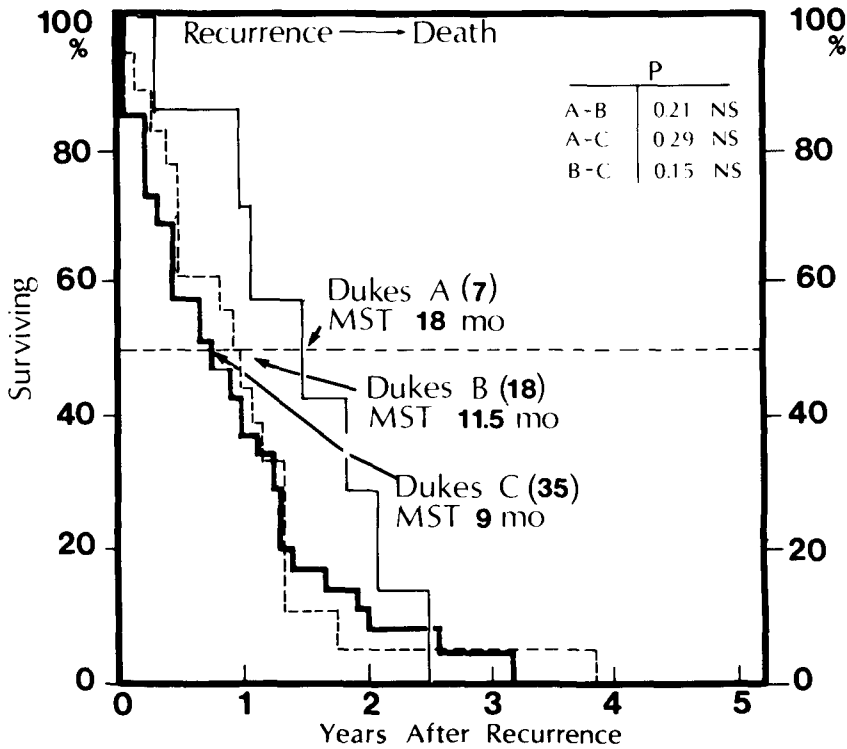


FIG. 5. Survival after distant recurrence. MST = median survival time.

stage. Certainly, preoperative intravenous pyelography remains the best way to avoid intraoperative errors.

Five-year survival rates have not changed appreciably since Duke's original publication in 1940<sup>19</sup> (Table 7). Recurrent cancer in local and distant locations remains the most significant factor in failure of survival. Morson *et al.*<sup>21</sup> state that local recurrence is more frequent with rectal tumors located in the lower third of the rectum with a higher grade, with mucin production, and with greater invasiveness. Moossa *et al.*<sup>22</sup> concur with these findings but found no relation with the grade of tumor. Malcolm *et al.*<sup>23</sup> agree that intestinal penetration is a significant factor for the development of local recurrence. This is supported in

the present study by a high incidence of local recurrence with Duke's B lesions.

Gunderson and Sosin<sup>1</sup> noted a 23.3 per cent recurrence rate with C1 lesions and an 82.5 per cent recurrence with C2 and C3 lesions. The significance of local recurrence led to the recommendation of adju-

TABLE 4. Survival with Duke's B and Duke's C Lesions After Recurrence

Initial Recurrence	Median Time from Recurrence to Death (Months)*	Median Time from Operation to Death (Months)*
Perineum (Duke's B + C): 18 patients	14.5	35
Distant (Duke's B + C): 60 patients	10	24

\* Differences not statistically significant.

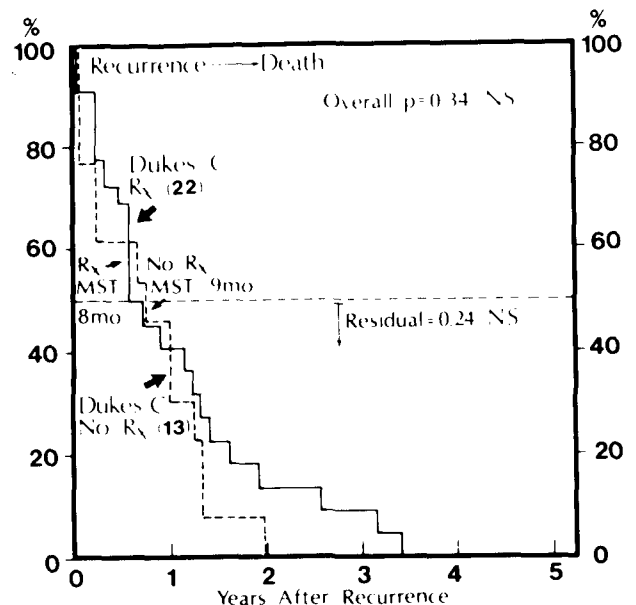


FIG. 6. Chemotherapy of patients with Duke's C recurrence. MST = median survival time.

vant radiotherapy in rectal cancer. Roswit *et al.*<sup>24</sup> reported a 40.8 per cent five-year survival rate with radiation therapy and abdominoperineal resection compared with 28 per cent with operation only. Walz *et al.*<sup>9</sup> support preoperative therapy and recommend doses of 4500 to 5000 rads in 180-rad fractions.

Therapeutic radiation for locally recurrent tumor does not seem to increase survival time. Polk and Spratt<sup>25</sup> reported that patients treated by resection alone fared as well as patients treated by resection and radiotherapy. Moossa *et al.*<sup>22</sup> reported a median survival of 15 months after the development of local recurrence. This is similar to the present authors' experience, although 89 per cent of these patients received radiation therapy (Table 3). However, most therapists support radiation treatment as palliation for pain in such patients.

In the present series, local recurrence appeared much earlier in patients with Dukes' C lesions than in patients with Dukes' B lesions. However, once recurrence appears, differences in survival time from recurrence to death are not significant (median survival time 17 months versus 10.5 months,  $P = 0.11$ ). The importance of these local recurrences is apparent with patients with Dukes' B and C lesions who initially presented with local recurrence and had no statistically significant difference in survival time from recurrence to death when compared with patients who initially presented with distant recurrences ( $P = 0.18$ ).

Distant metastases remain the major cause of death in patients with recurrent cancer. A recent report<sup>26</sup> states that a lower stage at presentation (Dukes' A or Dukes' B) signifies biologically less aggressive disease with a longer survival even after metastasis has been identified than for a comparable stage C lesion after metastasis. In the present series, although patients with Dukes' A recurrences seemed to have a longer overall median survival, no significant difference was seen in time duration from recurrence to death (Fig. 4).

TABLE 5. *Chemotherapy with Distant Recurrence in Dukes' C Lesions*

Variable	Untreated	Treated
Number of patients	13	22
Median age (years)	62	62
Poorly differentiated (per cent)	50	40
Median time from operation to recurrence (months)	12	12
Median time from recurrence to death (months)	9	8
Median survival (months)	24	25

TABLE 6. *Mortality*

Author, Year	Per Cent
Lockhart-Mummery <i>et al.</i> , 1976 <sup>2</sup>	2.1
Localio <i>et al.</i> , 1978 <sup>3</sup>	2.3
Deddish and Stearns, 1961 <sup>4</sup>	2.0
Bordos <i>et al.</i> , 1974 <sup>5</sup>	2.9
Williams <i>et al.</i> , 1966 <sup>6</sup>	4.3
Palumbo and Sharpe, 1968 <sup>7</sup>	4.4
Glenn and McSherry, 1966 <sup>8</sup>	4.7
Walz <i>et al.</i> , 1977 <sup>9</sup>	3.2
MacLennan <i>et al.</i> , 1976 <sup>10</sup>	3.2
Stearns, 1974 <sup>11</sup>	3.5
Strauss <i>et al.</i> , 1978 <sup>12</sup>	3.5
Slanetz <i>et al.</i> , 1972 <sup>13</sup>	5.4
Enker <i>et al.</i> , 1979 <sup>14</sup>	6.4
Zollinger and Sheppard, 1971 <sup>15</sup>	6.5

The ideal chemotherapeutic agent for recurrent colonic cancer is still unavailable. In this series of 35 patients who had recurrence with Dukes' C lesions, no appreciable improvement was seen in survival in the treated group. Although improved survival is suggested by the late life-table curve of treated patients, these figures are not statistically significant by logrank analysis in the small residuum of patients (Fig. 6). Whether certain individual patients will or will not respond to chemotherapy cannot be predicted at the present time. Currently, studies<sup>27</sup> to improve survival are centering on adjuvant postoperative chemotherapy in Dukes' B2 and C lesions.

### Summary

Despite lowered operative mortality rates, morbidity and five-year survival rates have remained unchanged in the past 40 years. Patients with Dukes' B lesions have a greater latency period for the appearance of local recurrence than patients with Dukes' C lesions. Once established, the median survival from recurrence to death is not significantly different. When Dukes' B and C local recurrences are estab-

TABLE 7. *Five-year Survival Rate*

	Dukes' Lesion		
	A	B	C
Dukes, 1940 <sup>19</sup>	93	65	23
Gilbertsen, 1960 <sup>20</sup>	80	50	23
Slanetz <i>et al.</i> , 1972 <sup>13</sup>	81	52	33
MacLennan <i>et al.</i> , 1976 <sup>10</sup>	91	59	25
Strauss <i>et al.</i> , 1978 <sup>12</sup>	82	40	15
Walz <i>et al.</i> , 1977 <sup>9</sup>	78	45	22

lished, the median survival rate is the same as that for patients who develop distant metastases as the initial recurrence in Dukes' B or C lesions.

Radiation therapy of patients with established local recurrence is of limited value in prolonging survival. Patients with Dukes' C lesions who were treated for distant recurrence had no significant increase in survival time compared with untreated patients.

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