Role of Paraaortic Lymph Node Dissection for Cancer of the Rectum and Sigmoid

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ABSTRACT. To clarify whether paraaortic lymph node dissection (distant dissected group, DDG) for cancer of the rectum and sigmoid actually confers any significant 5-year survival advantage on patients over non DDG, the outcome of 761 patients (Dukes A : 215, B : 205, C : 204, D : 137) was reviewed. We studied 217 cases with sigmoid (S) cancer (Dukes A : 66, B : 64, C : 41, D : 46), 86 cases with rectosigmoid (Rs) cancer (Dukes A : 17, B : 30, C : 19, D : 20), 228 cases with middle rectal (Ra) cancer (Dukes A : 51, B : 58, C : 80, D : 39), and 230 cases with lower rectal (Rb) cancer (Dukes A : 81, B : 53, C : 64, D : 32). The one-, three-, and five-year survival rates of all these patients were as follows, respectively ; Dukes A : 96.2%, 93.9%, and 89.3%, B : 96.0%, 84.6%, and 78.2%, C : 90.1%, 63.0%, and 51.4%, and D : 51.7%, 15.0%, and 7.6%. There were significant differences ($p<0.01$) in their survival rates between each stage. Between DDG and non DDG, statistical differences were found in S, Rs, and Ra of Dukes B, and also in the rectum (Ra+Rb) of Dukes D. These results revealed that prophylactic distant node dissection for advanced cancer of the rectum and sigmoid and aggressive DDG for Dukes D stage contributed to improvement of the survival rates.

Key words : cancer of the rectum and sigmoid — paraaortic lymph node dissection — Dukes classification

Attempts at distant lymph node dissection, such as at the paraaorta, may centribute to improvement of the cure rate of colorectal cancer and to reduction of its postoperative recurrence, especially, since the flow of lymph vessels from the rectum and sigmoid colon streams into the cisterna chyli through the inferior mesenteric artery. For more than 20 years we have been dissecting the lymph nodes around the root of inferior mesenteric vessels including the paraaorta for selected patients with cancer of the rectum and sigmoid, but only a few reports have indicated the importance of distant lymph node dissection for colorectal cancer.

The purpose of this paper is to clarify retrospectively whether or not such dissections of distant lymph nodes actually contribute to better results.

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METHODS

During 21 years between January 1974 and December 1994, a total of 761 patients underwent colorectal cancer surgery in the Department of Surgery at Kawasaki Medical School Hospital. From among them we studied 217 cases with sigmoid(S) cancer (Dukes A : 66, B : 64, C : 41, D : 46), 86 cases with rectosigmoid (Rs) cancer (Dukes A : 17, B : 30, C : 19, D : 20), 228 cases with middle rectal (Ra) cancer (Dukes A : 51, B : 58, C : 80, D : 39), and 230 cases with lower rectal (Rb) cancer (Dukes A : 81, B : 53, C : 64, D : 32). These cases were further classified as to two sites of cancer (S+Rs vs. Ra+Rb) and as to whether distant lymph nodes were dissected (distant dissected group, DDG) or not (non DDG). The lymph nodes of the paraaorta and inferior mesenteric root were defined as "distant" in this study. Distant dissection included sampling removal of the lymph node.

Furthermore, we made a statistical study of one-year, three-year, and five-year survival rates with regard to each Dukes stage and both types of lymph node dissection. We calculated the cumulative survival rate by the Kaplan-Meier method and evaluated any significant differences by the Cox-Mantel method.

RESULTS

The one-, three-, and five-year survival rates of a total of 761 patients with cancer of the rectum and sigmoid were as follows, respectively ; Dukes A : 96.2%, 93.9%, and 89.3%, B : 96.0%, 84.6%, and 78.2%, C : 90.1%, 63.0%, and 51.4%, D : 51.7%, 15.0%, and 7.6%. There were significant differences ($p<0.01$) in the survival rates between each stage (Fig 1).

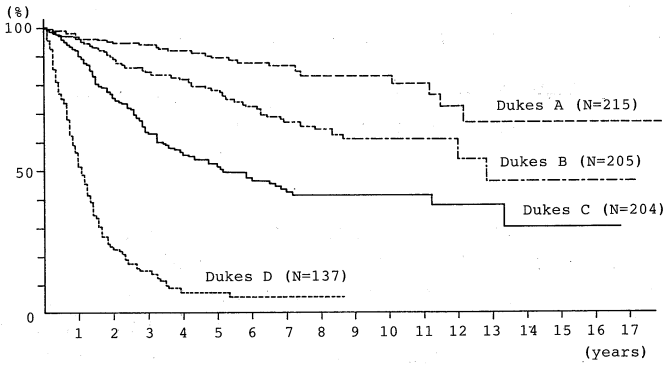

Fig 1. Survival rates of 761 patients with cancer of the rectum and sigmoid There were significant differences ($p<0.01$) in the survival rates between each stage.

The dissection rates of distant lymph nodes showed a higher ratio in Dukes B (65.4%) and C (56.4%) than in A (28.4%) and D (20.4%). Comparisons between DDG and non DDG of all the patients of each stage were made. The former group of Dukes D revealed better survival rates ($p<0.01$) than the latter of D stage. Although there was no significant difference, each DDG group had better results than each non DDG group (Table 1). Pathological findings concerning 338 cases of DDG disclosed 13

TABLE 1. Overall comparison of survival rates following distant lymph node dissection

Dukes Classification	Distant dissection (n)	1-Year (%)	3-Year (%)	5-Year (%)	
A	No (154)	96.7	94.2	89.7	
	Yes (61)	95.0	93.2	88.2	
B	No (71)	92.9	80.8	70.6	
	Yes(134)	97.7	86.6	82.3	
C	No (89)	89.3	50.3	46.6	
	Yes(115)	90.4	71.9	54.8	
D	No (109)	46.8	10.4	3.1	*
	Yes (28)	70.6	32.3	25.8	*

*p<0.01

(3.8%) cases with lymph node involvements. Macroscopic lymph node metastases were diagnosed intraoperatively in 16 (14.7%) cases out of 109 non DDG cases with Dukes D.

The one-, three-, and five-year survival rates between DDG and non DDG were compared according to the sites of the cancer. Statistical differences were found in the sigmoid (S), rectosigmoid (Rs), and middle rectum (Ra) of each Dukes B but not in the lower rectum (Rb) (Tables 2, 3, 4, 5). On the contrary, non DDG at the sites of Rs with Dukes A and C, Ra with D, and Rb with A and B showed longer survival time than each DDG at these sites, but no statistical differences could be found between the two groups. The other DDG showed better results compared to non DDG without statistical differences.

When the sites of cancer were divided into two regions; that is, the lower colon (S+Rs) and the rectum (Ra+Rb), the five-year survival rates of DDG were better than those of non DDG except for the rectum (Ra+Rb) of Dukes

TABLE 2. Survival rates for sigmoid cancer (S) following distant lymph node dissection

Dukes Classification	Distant dissection (n)	1-Year (%)	3-Year (%)	5-Year (%)	
A	No (52)	94.1	89.7	83.1	
	Yes (14)	100.0	100.0	100.0	
B	No (20)	95.0	95.0	79.2	**
	Yes (44)	100.0	92.3	89.1	**
C	No (24)	95.8	71.7	61.5	
	Yes (17)	100.0	87.1	62.2	
D	No (35)	56.1	12.5	0	
	Yes (11)	70.0	37.5	37.5	

**p<0.05

TABLE 3. Survival rates for rectosigmoid cancer (Rs) following distant lymph node dissection

Dukes Classification	Distant dissection (n)	1-Year (%)	3-Year (%)	5-Year (%)	
A	No (12)	100.0	100.0	100.0	
	Yes (5)	100.0	100.0	66.7	
B	No (3)	66.7	33.3	0	*
	Yes (27)	100.0	89.7	83.7	*
C	No (4)	100.0	100.0	100.0	
	Yes (15)	100.0	82.5	61.9	
D	No (15)	29.3	0	0	
	Yes (5)	80.0	0	0	

* $p < 0.01$

TABLE 4. Survival rates for middle rectal cancer (Ra) following distant lymph node dissection

Dukes Classification	Distant dissection (n)	1-Year (%)	3-Year (%)	5-Year (%)	
A	No (34)	97.1	97.1	85.1	
	Yes (17)	94.1	87.8	87.8	
B	No (21)	85.7	65.6	58.3	**
	Yes (37)	97.2	86.1	79.5	**
C	No (27)	81.5	45.0	39.4	
	Yes (53)	88.7	66.4	54.0	
D	No (33)	54.4	13.1	8.7	
	Yes (6)	66.7	44.4	0	

** $p < 0.05$

TABLE 5. Survival rates for lower rectal cancer (Rb) following distant lymph node dissection

Dukes Classification	Distant dissection (n)	1-Year (%)	3-Year (%)	5-Year (%)
A	No (56)	98.2	95.7	95.7
	Yes (25)	92.0	92.0	85.4
B	No (27)	100.0	88.5	79.1
	Yes (26)	92.3	74.4	74.4
C	No (34)	90.7	36.7	36.7
	Yes (30)	83.1	69.1	49.4
D	No (26)	34.6	11.5	0
	Yes (6)	66.7	50.0	25.0

A and the lower colon (S+Rs) of C. There were statistical differences in Dukes B: DDG (S+Rs) vs. non DDG (Ra+Rb), in C: DDG (S+Rs) vs. non DDG (Ra+Rb) and non DDG (S+Rs) vs. non DDG (Ra+Rb), and in D: DDG (Ra+Rb) vs. non DDG (S+Rs). A significant difference ($p<0.05$) was also found between DDG and non DDG for D stage in the same site of the rectum (Ra+Rb) (Table 6).

TABLE 6. Overall comparison of survival rates for the lower colon (S+Rs) and rectum (Ra+Rb) cancer following distant lymph node dissection

Dukes Classification	Sites	Distant dissection (n)	1-Year (%)	3-Year (%)	5-Year (%)	
A	S+Rs	No (64)	95.2	91.5	85.9	
		Yes (19)	100.0	100.0	92.3	
	Ra+Rb	No (90)	97.8	96.2	92.4	
		Yes (42)	92.9	90.2	86.4	
B	S+Rs	No (23)	91.3	85.9	71.6	
		Yes (71)	100.0	91.4	87.0	**
	Ra+Rb	No (48)	93.8	78.5	70.0	
		Yes (63)	95.2	81.6	77.5	
C	S+Rs	No (28)	96.4	75.1	66.7	
		Yes (32)	100.0	84.7	59.8	** *
	Ra+Rb	No (61)	86.7	40.1	37.9	
		Yes (82)	86.7	67.3	52.5	
D	S+Rs	No (39)	48.2	9.3	0	
		Yes (16)	73.3	21.3	21.3	
	Ra+Rb	No (59)	45.2	12.2	6.1	** **
		Yes (12)	66.7	47.6	31.7	

*$p<0.01$ **$p<0.05$

DISCUSSION

A comparison of the survival rates of 761 patients with rectal and sigmoid cancer revealed significant differences ($p<0.01$) between each Dukes stage, which seemed a useful classification for colorectal cancer (Fig 1).

In an attempt to determine whether distant lymph node dissection (DDG) for cancer of the rectum and sigmoid confers any significant five-year survival advantage on patients over non-dissection (non DDG), the outcome of 761 patients was reviewed. Our retrospective study showed higher rates of distant lymph node dissection in Dukes B (65.4%) and C (56.4%) than in A (28.4%) and D (20.4%). This was the evidence that we had been making efforts to cure advanced B and C stage patients. As we have already reported[1], aggressive surgery with distant lymph node dissection should be indicated for Dukes D patients. Consequently, in this study, a statistical difference was found in comparison of overall patients between DDG and non DDG of D stage (Table 1). Since DDG included cases with sampling removal of distant

lymph nodes, the rate of pathological involvement was only 3.8% (13 out of 338 cases).

Pezim *et al*[2] reported that high ligation of the inferior mesenteric artery had not been found to improve five-year survival in patients with cancer of the rectum or rectosigmoid. However, we found statistical differences between DDG and non DDG in S, Rs, and Ra of Dukes B (Tables 2, 3, 4,). These DDG results indicated that prophylactic distant node dissection for cancer of the rectum and sigmoid contributes to improvement of the survival rates of stage B.

Bonfanti *et al*[3] studied 61 patients who had undergone extended surgery for cancer of the rectum and sigmoid. Their results compare favorably with those reported after ordinary resection for rectum and sigmoid cancers of Dukes C, and seem to justify the use of extended surgery when cancer of the rectum and sigmoid has invaded contiguous structures. Recently, Moriya *et al*[4] recommended nerve-sparing surgery for rectal adenocarcinoma. We could not analyze our clinical records from the viewpoint of such factors. However, in addition to the prophylactic effects of DDG for stage B, distant node dissection (DDG) disclosed better survival rates than those of non DDG except for the rectum (Ra+Rb) of Dukes A and the lower colon (S+Rs) of C. These data support the usefulness of the DDG technique for cancer of this area. Statistical differences between DDG of the lower colon (S+Rs) and non DDG of the rectum (Ra+Rb) in Dukes B and C indicate the importance of upward dissection for lower colon cancer.

Furthermore, aggressive DDG of rectal cancer is very strongly recommended for selected patients in spite of Dukes D stage.

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