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Feasibility of Laparoscopic Resection with D3 Lymph Node Dissection for Primary Tumors in Stage IV Colorectal Cancer

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ABSTRACT

Introduction : The feasibility and prognostic effect of laparoscopic primary tumor resection with D3 lymph node dissection for stage IV colorectal cancer remain unknown.

Methods : Patients who had undergone laparoscopic D3 lymph node dissection for colorectal cancers of stage IV (11 patients) or stage IIIb (8 patients) at Kashiwa Hospital from January 2001 through December 2010 were retrospectively studied. The medical records of all patients were reviewed.

Results : Between patients with stage IV or IIIb disease there was no significant difference in operative duration, intraoperative blood loss, postoperative hospital stay, or postoperative complications. Although tumor diameter, depth of tumor invasion, and pathological type did not differ significantly between the patient groups, the number of lymph node metastases was significantly greater in patients with stage IIIb disease. After primary tumor resection 3 patients with stage IV disease underwent conversion hepatectomy. The 5-year survival rates were 85.7% for patients with stage IIIb disease and 27.2% for those with stage IV disease. For more than 4 years after surgery postoperative local recurrence has not been observed in either group.

Conclusion : Laparoscopic primary tumor resection with D3 lymph node dissection for stage IV colorectal cancer is oncologically acceptable and may allow metastatic lesions to be treated after colorectal primary resection. (Jikeikai Med J 2015 ; 62 : 63-7)

Key words : laparoscopic colorectal surgery, colorectal cancer, stage IV

INTRODUCTION

Despite the widespread screening for the early detection of colorectal cancer[1,2], tumors in 15% to 20% of patients are diagnosed with synchronous distant metastases. For patients with stage IV colorectal cancer, survival is reportedly longer when primary tumors are resected rather than treated with chemotherapy alone[3]. However, for patients who have undergone laparoscopic surgery for stage IV colorectal cancer, the prognostic effect of primary tumor resection with D3 lymph node dissection remains unclear.

Laparoscopic colorectal surgery at Kashiwa Hospital, The Jikei University School of Medicine, was started in 2001[4-8]. Our indications for laparoscopic surgery for colorectal cancer have been as follows : colorectal cancer without peritoneal dissemination, no local invasive cancer with traversal colonoscopy including cancer infiltrating to

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other organs, no history of serious surgical or nonsurgical complications, and a body mass index < 30 kg/m^2. Since being introduced, this procedure has been performed in a steadily increasing number of patients.

The aim of the present retrospective study was to evaluate the feasibility of primary tumor resection with D3 lymph node dissection after laparoscopic surgery for colorectal cancer in patients with stage IIIb or stage IV colorectal cancer.

Materials and Methods

The subjects of this study were patients who had undergone laparoscopic D3 lymph node dissection for colorectal cancers at Kashiwa Hospital from 2001 through 2010 : 11 patients with stage IV disease and 8 patients with stage IIIb disease (Table 1). The medical records of all patients were reviewed and classified according to the *Japanese Classification of Colorectal Carcinoma*[9].

Follow-up after surgery and postoperative adjuvant chemotherapy

All patients were followed up for 5 years with the measurement of serum carcinoembryonic antigen and computed tomography every 6 months and colonoscopy every 12 months.

From 6 weeks after surgery the patients with stage IV disease received first, second, and third-line sequential chemotherapy, according to the Japanese Society for Cancer of the Colon and Rectum Guidelines[10], and the patients with stage IIIb disease received oral S-1 (Taiho Pharmaceuticals Co. Ltd., Tokyo, Japan) or capecitabine (Xeloda ; Hoffmann-La Roche, Basel, Switzerland).

Statistical Analysis

All data were analyzed with the computer program

Table 1. Clinicopathological charactaristics of the patients between stage IV and IIIb

Variable	stage IV (n=11)	stage IIIb (n=8)	p value
Age (years)	69.0 (62-79)	52.4 (35-80)	0.017
Gender			
Male	10 (91)	5 (62)	0.352
Female	1 (9)	3 (38)	
Tumor lacation			
Colon	6 (55)	1 (12)	0.163
Rectum	5 (45)	7 (88)	
Operation time (minutes)	171.8 (110-260)	196.9 (45-420)	0.434
Intraoperative blood loss (ml)	46.4 (0-370)	45.0 (0-220)	0.993
Postoperative hospital stay (days)	10.3 (10-13)	13.1 (10-32)	0.224
Postoperative complications			
Anastomoitic leakage	0 (0)	1 (13)	
Small bowel obstraction	0 (0)	0 (0)	
Tumor diameter (mm)	42.9 (11-75)	50.8 (30-84)	0.356
depth of tumor			
Muscularis propria	1 (9)	2 (25)	0.232
Subserosa	8 (73)	6 (75)	
Serosal invasion	2 (18)	0 (0)	
Pathological type			
Well differentiated adenocarcinoma	3 (27)	3 (38)	0.302
Moderately differentiated adenocarcinoma	6 (55)	5 (62)	
Poorly differentiaed adnocarcinoma	2 (18)	0 (0)	
Number of dissected lymp nodes	10.4 (6-19)	13.6 (7-24)	0.238
Number of metastatic lymph nodes			
0-3	10 (91)	0 (0)	0.001
≥ 4	1 (9)	8 (100)	

The data are presented as mean (range) or as n (%).

IBM SPSS Statistics, version 22.0, (IBM Japan, Ltd., Tokyo, Japan). The survival rates were examined with the Kaplan-Meier method and log-rank analysis. Only deaths from recurrent carcinoma were counted as events, and non-cancer deaths were censored at the date of the last follow-up examination. A p-value of less than 0.05 was considered to indicate significance.

Results

Comparison of patients' characteristics between stage IV and IIIb

Between patients with stage IV disease and those with IIIb disease there was no significant difference in surgical technical factors, such as operative duration, intraoperative bleeding, postoperative hospital stay, and postoperative complication (Table 1). Although the patient groups did not differ significantly in tumor diameter, depth of tumor invasion, the pathological characteristics of the tumor, or the number of dissected lymph nodes, they did differ significantly in the number of lymph node metastases.

Characteristics of the patients in stage IV

Of the 11 patient with stage IV disease, 10 had multiple unresectable metastases in the liver alone and 1 had multiple unresectable metastases in the liver, lungs, and bones (Table 2). Three patients underwent hepatic resection as conversion therapy and survived for more than 4.5 years after the first operation

Oncological outcome

The 5-year survival rates were 85.7% for patients with stage IIIb disease and 27.2% for patients with stage IV disease (Fig. 1). Disease did not recur locally for more than 4 years after surgery in either group of patients.

Discussion

Several studies have suggested that resection of a primary tumor may prevent potential local tumor complications, such as bleeding, obstruction, and perforation[11,12]. However, the feasibility and prognostic effects of laparoscopic resection with D3 lymph node dissection for the primary tumors of stage IV colorectal cancer remain unclear.

Laparoscopy-assisted colectomy for benign and malignant diseases was first reported in 1991[13]. Because surgical techniques have improved greatly since then, laparoscopic surgery has become the gold standard for treating colorectal cancer in Japan and other developed counties[14-16]. In Japanese Society for Cancer of the Colon and Rectum Guidelines 2010[10], laparoscopic surgery is indicated for only stage 0 or stage I colon cancer. However, according to the national survey conducted by the Japanese Society of Endoscopic Surgery[17], more advanced cancers (T2 or higher) now account for more than 50% of all cases. We have been performing laparoscopic surgery for advanced colorectal cancer, including stage IV disease, since 2001.

In patients with colorectal cancer, primary tumor resection with D3 lymph node dissection is significantly associated with a better overall survival[18,19]. Because lymph nodes tend to follow the arterial supply, D3 lymph node dissection will remove the highest draining nodes that may harbor occult metastases. The greatest survival advantage of D3 lymph node dissection is expected to be seen in patients with stage III disease. Although the primary tumor was more locally advanced in patients with stage IIIb dis-

Table 2. Characteristics of patents in stage IV

Case	1	2	3	4	5	6	7	8	9	10	11
Gender	Male	Male	Male	Male	Male	Male	Male	Male	Male	Male	Female
Age (years)	63	69	73	69	76	63	66	76	62	64	79
Site of metastasis											
Liver	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lung	No	No	No	No	No	Yes	No	No	No	No	No
Bone	No	No	No	No	No	Yes	No	No	No	No	No
Conversion therapy	No	No	No	No	Yes	No	Yes	No	No	Yes	No
Outcome	death	death	death	death	alive	death	death	death	death	alive	death
Survival after operation (days)	106	226	716	512	1,712	348	3,300	832	462	1,741	199

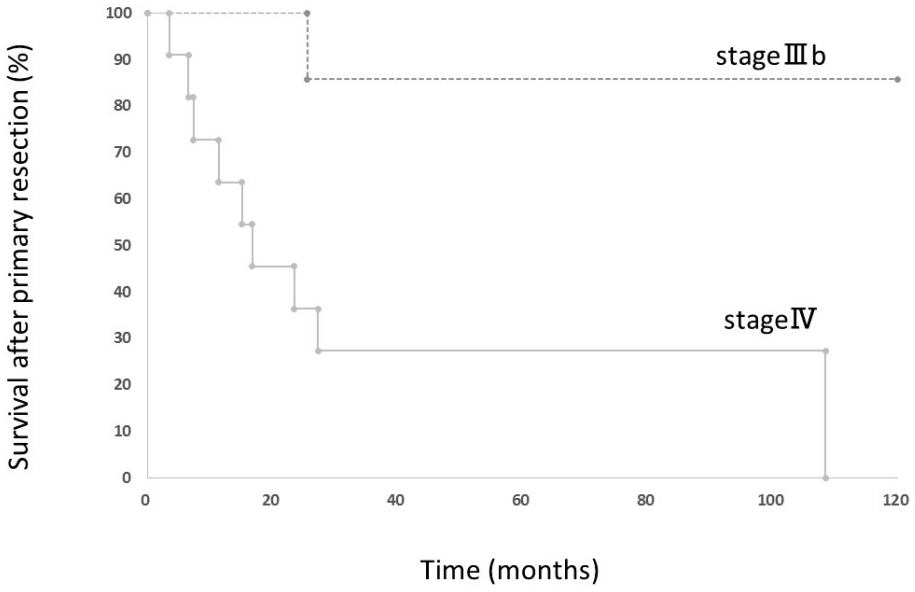

Fig. 1. Kaplan-Meier survival curves for patients with stage IIIb or stage IV adenocarcinoma.

ease than in those with stage IV disease in the present study, laparoscopic D3 lymph node dissection was associated with a low rate of local recurrence after surgery, and the 5-year survival rate of patients with stage IIIb disease was higher, at 85.7%.

Recent advances in chemotherapy for colorectal cancers have enabled rapid responses and have improved survival by more than 2 years in patients with advanced or recurrent colorectal cancers[20-22]. For these reasons, primary tumor resection with D3 lymph node dissection for patients with stage IV colorectal cancer seems to allow the treatment of metastatic lesions to be concentrated on after primary colorectal resection.

For patients with stage IV colorectal cancer, laparoscopic surgery achieves faster recovery, decreased morbidity, decreased pain, shorter hospital stay, and better prognosis than does open surgery[23,24]. In the present study, there were no postoperative complications or local recurrence in patients with stage IV disease.

In conclusion, laparoscopic resection with D3 lymph node dissection for primary tumors of stage IV colorectal cancer is safe and oncologically acceptable and allows physicians to concentrate on the treatment of metastatic lesions after surgery.

Authors have no conflicts of interest.

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