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Pathology Studies of Combined Radical Resection of Seminal Vesicle in the Treatment of Rectal Cancer

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To inhibit local recurrence of rectal cancer, it is very important to ensure that there is a sufficient circumferential resection margin. We evaluated pathology studies of combined radical resection of seminal vesicles in the treatment of rectal cancer. We analyzed data from 7 cases of combined radical resection of the seminal vesicle in the treatment of rectal cancer; we also analyzed data from 35 control cases without seminal vesicle resection. The circumferential resection margin averaged 5.97 mm for cases that had combined radical resection of the seminal vesicle, and this was significantly longer than for cases without resection ($P < 0.001$). Local recurrence was not seen in cases that had combined radical resection of the seminal vesicle, whereas 3 cases (5.9%) occurred in the group that did not undergo resection. Combined radical resection of the seminal vesicle in patients with rectal cancer ensures that the distance of the circumferential resection margin is sufficient to inhibit local recurrence.

Key words: Combined radical resection – Seminal vesicle – Circumferential resection margin – Denonvilliers fascia

To inhibit local recurrence, it is very important to ensure a sufficient circumferential resection margin (CRM). Consequently, total pelvic exenteration[1] is the standard procedure performed for patients with locally advanced rectal cancer. Recently, intraoperative evaluations identified only localized involvement of the prostate. The combined radical retropelvic prostatectomy with bladder-sparing surgery is frequently reported to be without sacrificing survival.[2,3] But the combined radical resection of the seminal vesicle alone has been less well studied, especially with regard to disease

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Table 1 Clinicopathologic findings

	Combined radical resection of seminal vesicle (n = 7)	Without resection of seminal vesicle (n = 35)	*P* (Mann-Whitney *U* test)
Age, y	54.9	53.8	0.826
Maximum tumor size, cm	6.1	5.9	0.574
Macroscopic tumor configuration, No. (%)			0.855
Ulcerated type with clear margin	6 (85.7)	29 (82.9)	
Ulcerated type with infiltration	1 (14.3)	6 (17.1)	
Histologic type, No. (%)			0.374
Well-differentiated adenocarcinoma	1 (14.3)	4 (11.4)	
Moderately differentiated adenocarcinoma	6 (85.7)	25 (71.4)	
Poorly differentiated adenocarcinoma	0 (0)	5 (14.3)	
Mucinous adenocarcinoma	0 (0)	1 (2.9)	
Surgical procedure, No. (%)			0.675
Low anterior resection	2 (28.6)	8 (22.9)	
Abdominoperineal resection	5 (71.4)	26 (22.9)	
Hartmann procedure	0 (0)	1 (2.9)	
Dukes classification, No. (%)			0.408
Dukes B	2 (28.6)	16 (45.7)	
Dukes C	5 (71.4)	19 (54.3)	

pathology. We evaluated disease pathology for combined radical resection of the seminal vesicle in the treatment of rectal cancer.

Materials and Methods

We enrolled 7 patients who had combined radical resection of the seminal vesicle for treatment of rectal cancer. We recruited patients from the Department of Gastroenterological Surgery, Aichi Cancer Center Hospital (Nagoya, Japan), from January 1990 to December 2001 (Table 1). In all patients, the tumor was located in the rectum, and a radical operation was performed. However, a pelvic total extirpation surgery case was excluded. In the 6 remaining patients, combined radical resection of the seminal vesicle was predetermined before the operation (Fig. 1); in only 1 case was the combined radical resection assessed intraoperatively. The combined, radical, bilateral resection of the seminal vesicle was done for the right seminal vesicle in 4 patients and the left seminal vesicle in 1 patient. In the same study period, 35 cases without resection were weighed.

There were no significant differences between combined radical resection cases and cases without resection in terms of patient age, maximum tumor size, macroscopic tumor configuration, histologic type, surgical procedure, and Dukes classification score.

The resected specimens were fixed with 10% formalin for several days, and the entire tumors were macroscopically sliced into 4-mm sections at the deepest part of the tumor containing tissue sample. Histopathologic diagnosis was made by

Fig. 1 The patient was evaluated for invasion of the bilateral seminal vesicles by preoperative computed tomography (arrow). During surgery, we determined that the bilateral seminal vesicles were invaded, so a low anterior resection was done, and bilateral seminal vesicles were removed.

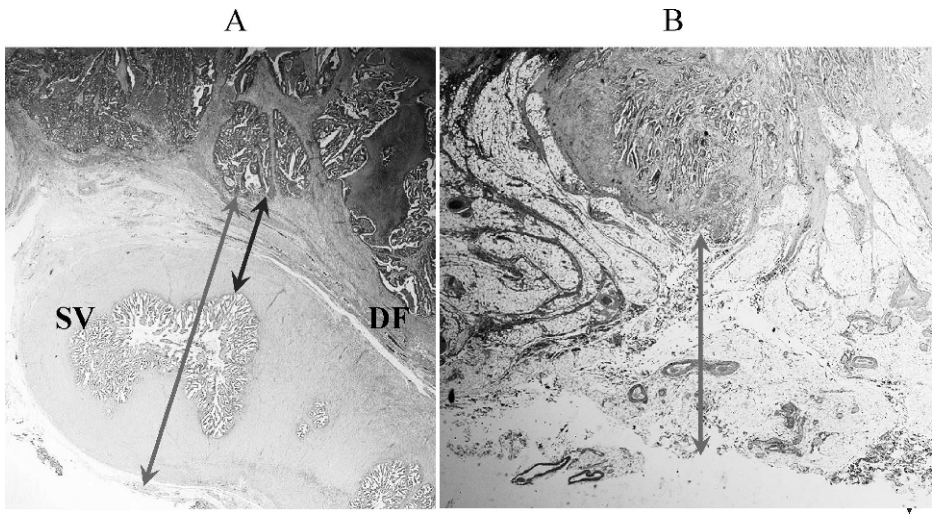

Fig. 2 We evaluated the CRM (gray arrow) and the shortest distance between the deepest part of the cancer and the surface of the seminal vesicle (SV; black arrow). (A) Combined resection of the seminal vesicle cases. (B) Cases without combined resection of the seminal vesicle. DF, Denonvilliers fascia.

hematoxylin and eosin stain in the usual manner, without specific immunostaining.

Using a microscope, we evaluated the CRM[4]—that is, the shortest distance between the deepest part of the cancer and the incisal surface—and the shortest distance between the deepest part of the cancer and the surface of seminal vesicle (Fig. 2).

We also evaluated the ''tumor deposit'' in fat tissue surrounding the excised specimen, that is, the carcinomatous clumped tissue that was continuous with the main tumor, including lymphatic or vascular invasions (Fig. 3).[4] But the worldwide consensus on the definition of ''tumor deposit'' was made as a decision.[5] Ueno *et al*[6] advocated ''extramural cancer deposits'' that differ in structure from lymph nodes. Ishikawa *et al*[7] defined ''extranodal cancer deposits'' as small cancers in the fatty tissue outside the colon or rectum and in the detached fatty tissue around the dissected lymph nodes. Here, we defined a positive finding as one in which the ''tumor deposit'' was present less than 1000 μm from the incisal surface.

We sought to determine the local recurrence rate between patients undergoing combined radical resection of the seminal vesicle and patients without resection.

All data are expressed as mean (±SD). Statistical analysis was performed using the χ^2 test or Fisher exact probability text, or Student *t* test or Mann-Whitney *U* test. Multivariate stepwise logistic regression analysis was subsequently performed to identify factors that were considered to have an influence on lymph node metastasis. Statistical significance was set at $P < 0.05$.

Results

Among combined radical resection cases of the seminal vesicle, no histopathologic invasion to the

Fig. 3 A tumor deposit was recognized in fat tissue surrounding the excision specimen (black arrow). v, vascular invasion.

Table 2 The average CRM distance and the distances between seminal vesicle and the surface of cancer[a]

	Combined radical resection of seminal vesicle, mean ± SD (n = 7)	Without resection of seminal vesicle, mean ± SD (n = 35)
CRM, mm	15.20 ± 7.10[a]	5.97 ± 3.85[b]
Distance between seminal vesicle and the surface of cancer, mm	6.85 ± 5.59[c]	

[a–b]$P < 0.001$, Mann-Whitney U test.

[a–c]$P = 0.038$, Mann-Whitney U test.

seminal vesicle was found. Denonvilliers fascia was not destroyed in all cases.

The average CRM distance was 5.97 mm (range, 0.48–16.08 mm) among the combined radical resection cases, which was significantly longer than the distance in cases without resection ($P < 0.001$). The CRM of the combined radical resection cases was significantly longer than the distance between the seminal vesicle and the surface of the cancer ($P = 0.038$; Table 2).

There were no tumor deposits in the combined radical resection cases, but 7 cases were found in the group without resection (Table 3).

Disease recurrence was seen in 2 cases (28.6%) in the combined radical resection group and in 17 cases (33.7%) in the group without resection. Local recurrence was not seen among combined radical resection cases; it was seen in 3 cases (5.9%) without resection (Table 4).

Discussion

The CRM of surgical specimens has evolved as an important prognostic factor in cases of rectal cancer.[4,8] Previously, cases that had a distance of 1 mm or less were taken as CRM involvement in the tumor, and local recurrence was well recognized.[9,10] Recently, it was reported that a CRM smaller than 2 mm is associated with a poor prognosis and that such patients should receive neoadjuvant therapy.[8,11]

But so far only the distance of the resection margin was investigated, and this was done without an anatomic study. In particular, where the main tumor is located on the anterior wall of the rectum, it is important to be aware of the relationship among seminal vesicle, Denonvilliers fascia, and the main tumor. Denonvilliers fascia lies posterior to the prostate and seminal vesicles and anterior to the extraperitoneal rectal wall, anterior mesorectum, and fascia propria.[12–14]

To date, histopathologic studies about operative, local, far-advanced rectal cancer, such as total pelvic resection or prostatectomy,[1,2] have been frequently discussed. In these specimens, Denonvilliers fascia that was destroyed by local, far-advanced rectal cancers or by recurrent colorectal cancer was almost completely recognizable, and consequently the earlier phases of the histopathologic mode of invading Denonvilliers fascia were not well understood. But our study indicates that no histopathologic invasion into the seminal vesicle was found,

Table 3 ''Tumor deposits'' in the specimen

	Combined radical resection of seminal vesicle, No. (%) (n = 7)	Without resection of seminal vesicle, No. (%) (n = 35)	P (Mann-Whitney U test)
Positive	0 (0)	7 (13.7)	0.345
Negative	7 (100)	44 (86.3)	

Table 4 Disease recurrence in the combined radical resection group and in the group without resection

	Combined radical resection of seminal vesicle, No. (%) (n = 7)	Without resection of seminal vesicle, No. (%) (n = 35)[a]	P (Mann-Whitney U test)
Local	0 (0)	3 (5.9)	0.815
Line of anastomosis	1 (14.3)	1 (2.0)	0.607
Distant: lung, liver, bone	1 (14.3)	14 (27.5)	0.591
Peritoneum	0 (0.0)	1 (2.0)	0.944
Total	2 (28.6)	17 (33.7)	0.852

[a]Including some overlap cases.

and Denonvilliers fascia was not destroyed in all combined radical resection cases, despite identification of invasion on gross findings during surgery. Our histologic study gives the first detailed description of the therapeutic effectiveness of combined radical resection of the seminal vesicle in the treatment of rectal cancer in the light of Denonvilliers fascia.

The pathologic finding that a tumor deposit was not found inside the seminal vesicle suggested that Denonvilliers fascia has the potential to protect against the invasion of rectal cancer. Similarly, Kinugasa *et al*[15] reported that Denonvilliers fascia prevented invasion.

Accordingly, the combined radical resection of the seminal vesicle ensures the full-thickness excision of Denonvilliers fascia, whereas the combined radical resection of the seminal vesicle in the treatment of rectal cancer ensures a sufficiently large CRM and attenuates local recurrence.

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