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RAPID COMMUNICATION

Clinical outcome of intersphincteric resection for ultra-low rectal cancer

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Abstract

AIM: To analyze oncological outcome of intersphincteric resection (ISR) in ultra-low rectal cancer with intent to spare colostoma.

METHODS: From 1995 to 1998, patients with a non-fixed rectal adenocarcinoma (tumor stage T2) preserving the lower margin at 1-3 cm above the dentate line without distant metastasis was enrolled (period I). ISR was practiced in eight patients, and their postoperative follow-up was at least 5 years. In addition, from 1999 to 2003, another 10 patients having the same tumor location as period I underwent ISR (period II). Among those, 6 patients with T3-4-staged tumor received preoperative chemoradiotherapy.

RESULTS: All patients received ISR with curative intention and no postoperative mortality. In these case series at period I, local recurrence rate was 12.5% and metastasis rate 25.0%; the 5-year survival rate was 87.5% and disease-free survival rate 75.0%. There was no local recurrence or distant metastases in 10 patients with a median follow-up of 30 (range, 18-47) mo at period II.

CONCLUSION: As to ultra-low rectal cancer, intersphincteric resection could provide acceptable local control and cancer-related survival with no permanent stoma in early-staged tumor (tumor stage T2); moreover, preoperative concurrent chemoradiotherapy would make ISR feasible with surgical curative intent in more advanced tumors (tumor stages T3-4).

Key words: Intersphincteric resection; Ultra-low rectal cancer

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INTRODUCTION

In earlier ages, tumors within 7-8 cm above the anal verge were treated by abdominoperineal resection (APR), especially when the rectal tumor could be easily palpated by an examiner's finger.

Along with the recent development of circular stapling devices, it facilitates the feasibility of ultra-low anterior resection of rectal tumor. Recent studies have shown that a distal clearance margin greater than 1.5 cm is sufficient when tumor histological differentiation is not poor to achieve curative resection of low rectal tumors[1]. These have established the feasibility of ultra-low anterior resection for tumors at level as low as 3 cm from the dentate line.

For the ultra-low tumors, i.e., tumor with lower margin situated within 1-3 cm above the dentate line, the mandatory surgical procedure is still controversial. It is hardly practical to apply conventional ultra-low anterior resection with autosuture instrumentation to achieve an adequate section margin, because of the extreme difficultly in placing a stapler across the optimal distal rectal margin. While most surgeons insist in performing APR in these cases, intersphincteric resection (ISR) has drawn increasing attention as it provides anus preservation and more clear vision for resection.

Many retrospective studies have pointed out that there is a good local control after sphincter-saving resection for rectal cancer[2-11]; however, the majority of studies did not carry more than the 5-year follow-up interval and they examined all rectal tumors, many of which can be removed by low/ultra-low anterior resection. This study assessed the oncological outcome of patients with very low rectal cancer by intersphincteric resection to determine whether abdominoperineal resection could be abolished.

MATERIALS AND METHODS

Patients

There were two distinct periods in the present study. During period I, from January 1995 to December 1998, eight consecutive patients having a non-fixed rectal adenocarcinoma (tumor stage T2) without distant metastasis

were enrolled. All tumors were smaller than 5 cm in maximal diameter and the lower margin was within 1-3 cm from the dentate line. Each patient underwent ISR. Post-operative follow-up interval was over 5 years. During period II, from January 1999 to December 2003, 10 patients with ultra-low rectal adenocarcinoma underwent ISR. Among those, six patients with T3-4 tumors received preoperative concurrent chemoradiotherapy (CCRT). The median follow-up time was 30 (range, 18-47) mo.

Methods

ISR was performed according to the methods previously described by Schiessel *et al*[4] This procedure was initiated by placing the patient in the Sim's position for the anal approach, mucosal incision, further exposure of the internal anal sphincter and intersphincteric space. After meticulous hemostasis was reached in the operation field, followed by closure of the rectal stump, and the patient was placed in lithotomy position to facilitate low anterior resection of the rectum with total mesorectal excision by laparotomy. A colonic J-pouch in all the patients as 6-8 cm in length was constructed from the distal descending colon and/or proximal sigmoid colon with uniform linear staplers. Mobilization of the splenic flexure colon, descending colon, sigmoid colon and ligation of the inferior mesenteric vein at the inferior margin of the pancreas are critical components of this procedure to enable the pouch to be easily drawn toward the anus. The constituted reservoir was then anastomosed to the dentate line with interrupted sutures. Under direct vision, the external anal sphincter was preserved to maintain defecation function.

During period II, ISR was performed on 10 patients with the same tumor location as period I. Among those, six patients with fixed tumors (T3-4) underwent preoperative CCRT (5 040 cGy in 28 fractions over 6 wk with continuous infusion of 5-FU and LV on the first and last 5 d during radiotherapy).

All patients in period I and period II were performed temporary diverting colostomy. Follow-up evaluations were performed on an outpatient basis. As to that whether tumor recurrence or distant metastasis existed, it was determined by digital rectal examination, clinical symptoms, measurement of serum tumor marker level and image study facilities.

RESULTS

Clinical and pathological data

There were eight patients enrolled in the period I from 1995 to 1998, 2 males and 6 females, median age was 61 years (range: 44-79 years). Pathologic staging as TNM categorization for these 8 patients comprised 7 T2N- and 1 T2N+. On the other hand, there were 10 patients recruited in the period II since 1999 till 2003, 5 males and 5 females, median age was 62 (range: 42-72) years. No statistic difference in age or gender between period I and period II was proved (Table 1).

Among the period II group, six patients with fixed tumors were undertaken by the protocol of preoperative CCRT (5 040 cGy in 28 fractions over 6 wk concurring with continuous infusion 5-FU and LV on the first and last 5 d during radiotherapy). In comparing the tumor staging between pre- and post-CCRT, there were seven patients with a significant tumor regression status, including two complete regressions. Pathologic TNM classifications for the 10 patients were 2 T0, 1 T1N-, 5 T2N-, 1 T2N+ and 1 T3N+ (Table 2).

Table 1 Characteristics of cases

	Period I 1995-01/1998-12	Period II 1999-01/2003-12
Number of patients	8	10
Male	2	5
Female	6	5
Age range (yr)	44-79 (median 61)	42-72 (median 62)
Follow-up (mo)	60	18-47 (median 30)
Tumor		
Non-fixed (T2)	8	4
Fixed (T3-4)	0	6 (pre-operative CCRT)

Table 2 Pathologic results

Clinical stage	Period I (n = 8)	Period II (n = 10)	
	T2Nx (n = 8)	T2Nx (n = 4)	T3-4Nx (n = 6) CCRT
T0	0	0	2
T1N0	0	0	1
T2N0	7	3	2
T2N1	1	1	0
T3Nx	0	0	1 (T3N1)

Regardless of period I or period II, curative resection of malignancy with microscopically clear oncologic section margin was confirmed by postoperative pathologic diagnosis in all the patients. The median distal resection margin was 1.5 (range: 0.5-2) cm. There was no postoperative mortality. Postoperative morbidity was found as follows: wound infection in 4/18 (22.2%), prolonged Foley catheter indwelling in 3/18 (16.7%), and urinary tract infection in 2/18 (11.1%).

All patients underwent interval colostomy closure at a median of 7 (range, 3-14) mo, no colostomy closure-related complication was proposed.

Postoperative local recurrence and distant metastasis

In the period I group, there were two patients who developed local recurrence/metastasis after at least a 5-year follow-up; it was comprised of local recurrence with multiple liver metastases in one patient and multiple lung metastases in another patient. Local recurrence rate was 12.5% and metastasis rate 25.0%; the 5-year survival rate was 87.5% and disease-free survival rate 75.0%. In the period II group, there was no local recurrence or distant metastasis in these 10 patients after a median follow-up of 30 (range: 18-47) mo (Table 3).

Functional outcome

None of the patients in the period I group could be traced for functional evaluation, but we appraised bowel function in the period II group by patient themselves using self-

Table 3 Recurrence, metastasis and survival

	Period I (n = 8)	Period II (n = 10)
Follow-up (mo)	>60	18-47 (median 30)
Local recurrence	1/8 (12.5%),	-
	12 mo after operation	-
Distant metastasis	2/8 (25%)	
Liver	1/8, 52 mo after operation	
Lung	1/8, 25 mo after operation	
Survival rate	7/8 (87.5%)	100%
Disease-free survival rate	6/8 (75.0%)	100%

Table 4 Functional outcome of patients in period II

	Period II (n = 10, %)
Stool frequency: ≤3	5/10 (50)
4–6	3/10 (30)
7–9	1/10 (10)
≥10	1/10 (10)
Urgency	5/10 (50)
Continence: Perfect	3/10 (30)
Incontinence of flatus	2/10 (20)
Minor soiling to liquids	3/10 (30)
Major soiling to liquids	2/10 (20)
Incontinence to solids	0/10 (0)

confession method in one year later after the colostomy being closed. Eight patients (80%) experienced six or fewer bowel movements per day, urgency was reported in 5 patients (50%), and most of them could tolerate anal continence status well. Only two patients stated that they were incontinent to liquid stools and required pad use at night time (Table 4).

DISCUSSION

The distal section margin of 1-2 cm would be currently considered sufficient for ultra-low rectal cancer in most instances[1,5,7,8]. Parks *et al*[12] reported that long-term survival and local recurrence rate after ISR were similar to those after APR. Several specialized studies have investigated ISR for low rectal cancer, and their local recurrence rates ranged from 0% to 12%[2-11]; however, some studies reported that the patients with the location of rectal cancer at 5 cm more proximal to anal verge and did not always carried more than a 5-year follow-up interval. In this study, the local recurrence rate was 12.5% for T2-staged ultra-low rectal tumor after at least a 5-year follow-up. However, the number of patients in this study is small because of the highly selected criteria, size of the tumors smaller than 5 cm and the lower margin of tumors within 1 to 3 cm from the dentate line.

The radial involvement of a tumor is another critical predictive factor for local recurrence after rectal cancer resection. In most instances, patients with T3-4 carcinomas of the low-third rectum require APR. Recently, by using a multimodal approach, intersphincteric resection was practical in patients with T3-4 carcinomas of the lower third of the rectum[7,10,11,13-15].

Preoperative CCRT reducing tumor volume, causing tumor down-staging, and further facilitating surgical resection of malignancy have been proposed. Recent studies concerning preoperative chemoradiotherapy have demonstrated that it improves local control and cancer-related survival. Rullier *et al*[10] reported only 2% (1/43) local recurrence rate if combining preoperative CCRT and successive ISR for ultra-low rectal cancer were attempted (median follow-up was 30 mo)[10]. Luppi *et al*[13] reported 94% local control rate for T3-4 rectal cancer using preoperative chemoradiotherapy[13]. Saito *et al* reported similar results for local control and acceptable anal function in a series of 35 patients (median follow-up: 23 mo), these patients had T3-staged ultra-low rectal cancer and were treated by preoperative CCRT with consecutive ISR[7].

In the past 4 years, 10 patients with ultra-low rectal cancer were managed in this study by multimodality treatment and no distant metastasis was disclosed during the follow-up period. Preoperative CCRT was applied to six T3-4 staged patients, and this treatment enhanced tumor shrinkage more than 25% in five patients; it is inspiring that no residual cancer was identified in 2 patients among these 5 patients. After a median follow-up of 30 mo, there was no local recurrence or distant metastasis developed.

Cluster defecation associated with tenesmus, urgency, and incontinence are not uncommon in straight coloanal anastomosis. The colonic pouch could convert the functional deficiencies associated with the loss of rectal capacity and reduced compliance resulting from straight coloanal anastomosis. Lazorthes *et al*[16] and Parc *et al*[17] conducted a colonic J pouch anastomosing at the dentate line, and they assumed superior functional outcome compared to straight anastomosis[16,17]. A number of clinical series have evidence to support that utilizing a colonic pouch anal anastomosis could enhance the functional results and postoperative quality of life of patients after rectal cancer resection[16-19,21,22]. The functional advantages of a colonic pouch anal anastomosis have been achieved within a shorter period than straight coloanal anastomosis after surgery. This superiority in J pouch groups remains evident when compared with the straight coloanal anastomosis 2 years after the surgery as reported by Joo *et al*[21] and Sailer *et al*[22].

Optimal pouch size remains unclear. Numerous J pouch sizes have been attempted, ranged from 5 to 12 cm in length. Increasing pouch length is always associated with incomplete evacuation and requires suppositories or enemas to rescue such sufferings. Parc recommended an adequate limb length of 8-10 cm[17]. Hida *et al*[20] proposed that a 5-cm pouch could function as adequate reservoir, and it is technically easy with requiring not too long a segment of bowel for construction[20]. Clinical experience to date favors that the optimal pouch is achieved by employing two 6-7 cm limbs of the colon. In this study, a 6-8 cm pouch was constructed and harvested proper functional outcome. During the time the colonic Jpouch was constituted, the distal colon must be mobilized and adequate perfusion should be preserved to prevent complications such as mobilized colon ischemic change or

anastomotic insufficiency. We believe that these standard surgical issues have facilitated the achievement of tolerable functional results.

In conclusion, ISR could achieve acceptable local control, cancer-related survival and avoid permanent stoma in patients with early staged ultra-low rectal cancer. Preoperative CCRT facilitates intersphincteric curative resection in patients with T3-4 staged ultra-low rectal cancer. Longer follow-up of these patients should be recommended, especially for those receiving preoperative chemoradiotherapy.

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