

Study on the causes of local recurrence of rectal cancer after curative resection: analysis of 213 cases

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Abstract

AIM To study the local recurrent rate and the causes of rectal cancer after surgery.

METHODS The clinicopathological data of 213 rectal cancer patients and the follow-up information were analyzed. The overall recurrent rate and the recurrent rates from different surgical approaches were calculated. The main causes of recurrence were investigated.

RESULTS Among the 213 cases, 73 (34.27%) had local recurrence. The recurrent time ranged from 3 months to 62 months after the first operation. Most of the recurrence (65/73, 89.04%) occurred within 3 years after operation.

CONCLUSION Local recurrence had no significant correlation with surgical methods or pathological types, but closely related to Dukes' stages, location of primary tumors and the length of the distal rectum resected. Early resection and a wide tumor free resection margin are key factors to prevent local recurrence.

INTRODUCTION

For rectal cancer, surgical resection remains the only possible cure. However, long-term survival after surgery is not satisfactory due to local recurrence or distant metastasis. Local recurrence is a major cause of cancer-related morbidity and mortality. To evaluate the rate and find out the causes of local recurrence after radical resection for rectal cancer, we carried out the following study.

PATIENTS AND METHODS

We studied 213 successive patients (108 males and 105 females) aged 21 to 78 years who underwent curative surgery for rectal cancer between January 1986 to January 1993, in the Institute of Oncology, Hubei Medical University. Primary tumor sites in this series were in the upper segment of their rectum (28), in the middle segment (52), and in the lower segment (133). The pathological types were papillary adenocarcinoma in 33 cases, tubular adenocarcinoma in 121 cases, mucinous adenocarcinoma in 30 cases, villous adenocarcinoma in 10 cases, signet-ring-cell carcinoma in 9 cases, and undifferentiated carcinoma in 10 cases. According to the Dukes' staging system, 50 cases were in stage A, 88 in stage B, and 75 in stage C. The initial operation procedures were Miles operation in 108 cases, Dixon operation in 86 cases and Bacon operation in 19 cases. The recurrence was confirmed by digital rectal examination, ultrasonography, computer tomography (CT) scan, biopsy and pathology, if necessary.

Statistical analysis

The Chi-square analysis was employed on computer using SAS software to evaluate the difference among different categories, with $P=0.05$ as the level of significance.

RESULTS

Overall rate

Among the 213 cases, 73 (34.27%) had recurrence.

Time of recurrence

Recurrence within 3 to 24 months after operation happened in 37 cases, within 25 to 36 months in 28

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cases, and over 37 months in 8 cases. Most of the recurrence (65/73, 89.04%) occurred within 3 years after operation.

Site of recurrence

Thirty-five cases recurred in the pelvic cavity, 21 in the anastomosis, 16 in the perineal region and 1 in the abdominal incision.

Pathological types and recurrence

The rates of recurrence were higher in mucinous adenocarcinoma and undifferentiated carcinoma than in villous adenocarcinoma, tubular adenocarcinoma, papillary adenocarcinoma and signet-ring-cell carcinoma, although the difference was of no statistical significance ($P > 0.05$, Table 1).

Table 1 Pathological types and local recurrence

Pathological types	Number	Local recurrence (%)
Tubular adenocarcinoma	121	40 (33.06)
Papillary adenocarcinoma	33	11 (33.33)
Mucinous adenocarcinoma	30	12 (40.00)
Villous adenocarcinoma	10	3 (30.00)
Undifferentiated carcinoma	10	4 (40.00)
Signet-ring-cell carcinoma	9	3 (33.33)
Total	213	73 (34.27)

Operational approaches and local recurrence

The rates of local recurrence in Miles, Dixon, and Bacon operation were 37.01%, 31.40% and 31.58%, respectively. The difference was of no statistical significance ($P > 0.05$, Table 2).

Table 2 Operational methods and local recurrence

Operational methods	Number	Local recurrence (%)
Miles	108	40 (37.01)
Dixon	86	27 (31.40)
Bacon	19	6 (31.58)
Total	213	73 (34.27)

The length of distal rectum resected in Dixon operation and anastomotic recurrence

Among the 86 patients who underwent Dixon operation, 27 had local recurrence, 21 of which were anastomotic recurrence. In the 26 cases with a distal resection margin of less than 3 cm, 11 (42.31%) had anastomotic recurrence. However, in the 60 cases with a distal resection margin of greater than 3 cm, only 10 (16.67%) had anastomotic recurrence. The difference was

statistically significant ($P < 0.05$, Table 3).

Table 3 Distal resection margin in Dixon operation and anastomotic recurrence

Length of distal resection margin	Number	Anastomotic recurrences (%)
<3cm	26	11 (42.31)
≥3cm	60	10 (16.67) ^a
Total	86	21 (24.42)

^a $P < 0.05$ vs <3cm margin group.

Dukes' stages and local recurrence

The rates of local recurrence rose with the increase in Dukes' stages (Table 4).

Table 4 Dukes' stages and local recurrence

Dukes' stage	Number	Local recurrence (%)
A	50	6 (12.00)
B	88	30 (34.09) ^a
C	75	37 (49.33) ^{ab}
Total	213	73 (34.27)

^a $P < 0.01$, stage A vs stage B, stage A vs stage C, ^b $P < 0.05$, stage B vs stage C.

Sites of primary tumors and local recurrence

Tumors located in the middle segment of the rectum had a slightly higher rate of local recurrence than those in the upper segment of the rectum ($P < 0.05$, Table 5).

Table 5 Primary tumor sites and local recurrence

Primary tumor sites	Number	Local recurrence (%)
Upper rectum	28	5 (17.86)
Middle rectum	52	21 (40.38) ^a
Lower rectum	133	47 (37.59)
Total	213	73 (34.27)

^a $P < 0.05$, vs middle rectum.

DISCUSSION

Local recurrence after curative surgery for rectal cancer is a major adverse prognostic indicator.

Although many investigations have been carried out in the prevention, early detection and treatment of this problem, about 7% - 65% of all rectal cancer patients still develop local recurrence^[1-3]. In our series, the local recurrence rate was 34.27%. We also found that the causes are closely related to Dukes' stages, the length of distal rectum resected and the site of primary tumors, while the

pathological types and operational methods have no significant correlation with the postoperative recurrence.

Dukes' stages

Dukes' stage is an important factor related to postoperative local recurrence especially the pelvic recurrence. When tumors penetrate the whole rectal wall or metastasize to the regional lymph nodes (stage B and C) the local recurrence rate is 20%-40%. However, when these two negative factors combine together, the local recurrence rate will reach as high as 40%-60%^[4,6]. In our series of 213 cases, the rate of postoperative local recurrence rose with the advancing stages, which clearly confirms the close correlation between local recurrence and extent of local invasion and regional lymph node involvement. From these observations there is a hope to reduce recurrence if extensive radical resections are routinely performed on patients with Dukes' B or C stage diseases, because these operations will further reduce the unseen residual tumors^[7]. Other adjuvant treatments such as radiotherapy, chemotherapy or both, may be considered also for these high-risk patients.

Length of distal resection margin

The nature of transitional mucosa (the mucosa between the normal mucosa and the tumor) has been studied intensively. The transitional mucosa is a highly unstable precancerous lesion which closely links to postoperative recurrence and poor prognosis. The wider this region is, the shorter the post-operative five-year survival will be^[8,9].

In clinical practice, when Dixon operation is performed, the length of proximal colon to be resected is seldom limited. However the length of the distal rectum to be resected is limited by several factors, including the preservation of sphincter functions, the available space of pelvic cavity and the operational manipulation. Preservation of sphincters will inevitably limit the length of distal resection margin. Moreover, the lower location of the tumor and the small pelvic cavity set a deep and narrow operation field with very limited exposure, which makes it extremely difficult for the surgeons to achieve a fairly clear distal margin. During the operation, the pulling and tracting will make the distal rectum to be resected seem longer. The intraoperative resection length sometimes is less than the resection length actually required.

The inadequate distal margin means increased chance of residual transitional mucosa or even occult residual cancer cells at the resection margin, which

will eventually result in anastomotic recurrence. In general, a 3cm distal resection is required, while for highly malignant tumors, 5 to 7cm distal margin is necessary^[10,11]. In our 86 cases of Dixon operation, 21 had anastomotic recurrence. The rates were 42.31% for those with a less than 3cm distal margin and 16.67% for those with a greater than 30cm distal margin.

Locations of primary tumors

The risk of local recurrence is directly correlated with the location of primary tumors. Cancers at the upper segment of the rectum behave like colon cancer. They are apt to metastasize distantly^[2,3]. Because of their higher position, better exposure and easier operation manipulation, it is easy to carry out en bloc resection according to the principles of tumor surgery. Therefore, the rate of local recurrence is low. On the other hand, cancers at the middle and lower segments of the rectum are apt to locally recur because of the downward and lateral lymph drainage network and the lack of serosa to ward off local infiltration by the tumor. In these cases even extensive whole pelvic resection often cannot guarantee complete clearance. Therefore, the tendency to local recurrence is relatively high. And there are psychological causes too. For patients with low rectal cancers, Miles operation is the only possible curative treatment. But some of these patients refuse this procedure due to various reasons. Instead they chose Dixon or Bacon operation, which often cannot ensure a true tumor free margin for their conditions. Local recurrence will be unavoidable in some of these patients.

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