SAFETY MARGIN IN ANUS-SAVING RESECTION FOR LOW RECTAL CANCER

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The length and method of measurement of the safety-margin below the rectal cancer, being of the utmost importance for its prognosis, is still under debate. The following study was designed and done for its solution.

Light microscopic examination was done on 83 resected rectal cancer specimens to assess the extent of intramural invasion towards the anus. By use of a ruler, the distance between the lower tumour margin and the resection line or the dentate line was measured when the specimen was: 1. freshly resected, 2. after fixing in 10% formalin, and 3. after being mounted in sections. The measurements were compared. By the same method, the distance between the lower tumor margin and the intended resection line was measured immediately before resection. It was compared with the measurement immediately after the resection.

In 83 rectal cancer specimens, the extent of intramural infiltration toward the anus was: ≤0.5 cm in 75 cases (90.4%). >1 cm in 2 cases which showed highly malignant carcinomas. These 2 cases, however, should not have been indicated for anus-saving resection. In 46 fresh specimens, the tumor-resection line distances gave an average of 2.7 cm. After fixing in 10% formalin, they became shortened by 0.7 cm. And, mounting in sections further shortened them by another 0.5 cm, giving a total shortening of 1.2 cm. The tumor-resection line distance in 7 of the 11 fresh specimens resected by the Dixon’s operation was shortened, though never more than 0.5 cm immediately the operation.

In performing anus-saving resection for the low rectal cancer, after full isolation the rectum and stretching it slightly, ≥3 cm of the rectum distal to the lower tumor margin should be resected. A safety margin of more than 2.5 cm is necessary in the fresh specimen. If formalin fixed specimen is measured, the safety margin should be ≥2 cm.

Key words: Rectal cancer, Intramural invasion, Pathologic processing, Anus-saving resection, Safety margin.

Intramural invasion toward the anus is crucial in the choice of operation for rectal cancer, especially in deciding whether the anus or the anal sphincters could be preserved. The authors had observed and measured the extent of invasion of rectal cancer toward the anus and the “give” in the rectal canal length as a additional safety margin by slightly stretching of the rectal canal before resection. The distances between the lower tumor margin and the resection line (intended and completed) were measured: 1. after slight stretching in vivo, 2. when freshly resected, 3. after fixation in 10% formalin, and 4. after mounting in sections. The changes in the length of rectal canal were studied and efforts were made to provide basis of a wider indication to preserve the anus in rectal cancer surgery.

MATERIALS AND METHODS

Clinicopathologic Observation on Intramural
Invasion toward the Auns

This study was done in 83 patients. Male 40, female 43. Ages 24–74, with an average of 49. The distances between the lower margin of the tumor and the anorectal line were 3 to 18 cm. Four patients had received preoperative radiotherapy. The rest 79 patients had grossly: bulging type 53, localized ulcerating type 23, infiltrative ulcerating type 1, and diffused infiltrating type 2. Histologic classification showed: well-differentiated adenocarcinoma 9, moderately differentiated adenocarcinoma 56, poorly differentiated adenocarcinoma 11, and mucinous adenocarcinoma 3.

Observation on the Changes in Length after Pathologic Processing of the Specimen

Forty-six rectal cancer specimens were examined. The patients' ages ranged from 26–69 years with an average of 49. The sex incidence was 21 males to 25 females. Only those having lesions with the lower tumor margin within 4 cm of the resection line or the dentate line were analyzed (the segment of rectal canal caught in the stapling device was not counted). These patients were treated by Dixon, Parks, Hartman or Miles operation. Immediately after the specimen was removed from the patient, the rectal canal was out open along the line opposite to the tumor and was spread on the table. The distance between the lower margin of the tumor and the resection line was measured. Then, the specimen was measured in the same way after having been fixed in 10% formalin for 16–24 hours. Finally, after dehydration, embedding in paraffin, HE stain, the specimen was measured under light microscope.

Observation on the Difference in Rectal Canal Length before and after Resection

Eleven patients, 5 males and 6 females were examined. The ages ranged from 34–71 with an average of 53. After full isolation the rectal canal before resecting it, the author (BNZ) exerted a slight pull upon the organ to straighten it. Clamped and measured it with a ruler and then resection was done. Among these 11 specimens, the distance between the lower tumor margin and the resection line was: 3 cm in 6 specimens, 3.5 cm in 2 specimens and 4 cm in 3. When the operation was completed, the above measurements were repeated and compared.

RESULTS

Infiltration Length

Our study of the microscopic measurement of intramural infiltration towards the anus on 83 rectal cancer specimens showed that: 32 cases (39%) for <0.1 cm infiltration, 51 cases (61%) for ≥0.1 cm, 11 cases for 0.1 cm, 2 cases for 0.15 cm, 7 for 0.2 cm, 8 for 0.3 cm, 7 for 0.4 cm, 8 for 0.5 cm, 4 for 0.6 cm, 2 for 0.7 cm and only 2 for more than 1 cm. And the maximum infiltration was 1.5 cm.

Factors Related to Infiltration Length

Study of factors related to the length of infiltration as assessed by statistical analysis revealed that the extent in the circumference of the rectal canal, gross type, histologic classification, lymphatic metastasis and Dukes staging were related to the infiltration length whereas sex, age and clinical course were not. The study of circumferential infiltration showed that: 18 cases had 1/4 circumferential infiltration, 18 had 1/3 and 22 had 1/2, with an average of 0.17 cm infiltration. In contrast, 2 others involving 2/3 circumference, 6 involving 3/4 and 17 involving the whole circumference gave an average infiltration of 0.34 cm. The difference between these two groups was very significant (P<0.01). Twenty-three cases of the localised ulcerating type gave an average infiltration of 0.25 cm whereas 53 cases of the bulging type gave an average infiltration of 0.15 cm. The difference therein was also significant (P<0.05). The poorly differentiated adenocarcinoma infiltrated farther than the moderately and the well-differentiated adenocarcinomas. The difference between the first group and the second and third groups were both significant (P<0.01). There were 15 Dukes B1, 27 Dukes C1 and 36 Dukes C2 lesions. Their average infiltration lengths were 0.11 cm, 0.18 cm and 0.31 cm, respectively. The fact that the infiltration length increased with the Dukes staging was evidenced by statistical significance between the Dukes B1 and C2 lesions.

Difference in Rectal Canal Length after Pathologic Processing

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