Comparative Study between Preoperative and Postoperative Histologic Grading in Adenocarcinoma of the Colon and Rectum

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Background: *Preoperative histologic grading was used to decide the length of the margin of resection in adenocarcinoma of colon and rectum.*
Objectives: *The aim of the present study was to determine the accuracy of preoperative histologic grading by comparison with postoperative histologic grading.*
Material and Method: *Preoperative and postoperative histologic grading of patients with adenocarcinoma of the colon and rectum in the department of surgery, Phramongkutklao Hospital between January 1999 and October 2004 were collected and compared together using percentage and chi-square test.*
Results: *260 patients were included in the present study. 47.3% of all cases had inaccurate preoperative histologic grading. 43% of all cases had worse differentiation. 52.7% of all cases had the same differentiation. Only 4.3% of all cases had better differentiation.*
Conclusion: *Preoperative histologic grading was not accurate and could not be used in deciding the length of the margin of resection.*

Keywords: *Adenocarcinoma, Rectum, Colon, Differentiation, Grading*

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The principle in the treatment of colon and rectal cancer is to eliminate the primary tumor with adequate normal bowel margin and lymphatic drainage. Insufficient length of bowel margin is responsible for anastomotic recurrence because of the cancer cells remaining. The length of the normal bowel below the tumor that should be removed for curative clearance is controversial.

One problem after resection for colon and rectal cancer was anastomotic recurrence. The reported incidence of recurrence after anterior resection for cancer of lower and middle third of the rectum was 19-42 percent[1-4]. 17 percent of anastomotic recurrence was in the 2-4 cm distal margin[4]. 83 percent of anastomotic recurrence was in the 0-2 cm distal margin[4]. About 80-85 percent of the recurrence occured within 2 years after surgery[5-8].

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Adequate distal bowel margin, more than 5 cm, caused fewer opportunities to maintain bowel continuity. At present, surgeons try to maintain bowel continuity by using less normal bowel margin, less than 5 cm. However, clinical and retrospective follow-up studies on patients who had sphincter-saving procedures performed for various reasons have shown that a distal clearance of more than 4 cm was required because anastomotic recurrence is more frequent in patients with a distal clearance length of less than 4 cm[9].

About distal intramural spread, well differentiation had a short distal spread which gave more opportunity to maintain bowel continuity. But poor differentiation had far distal spread which gave less opportunity to maintain bowel continuity. Histological examination of resected specimens showed that the spread of cancer to the distal bowel in most patients was not beyond 2 cm, if it was not poorly differentiated and mucinous[10].

The problem was how accuracy of preoperative pathological report of tumor differentiation. If

preoperative pathological report was well differentiation and surgeons cut too small a distal margin, but if the postoperative report was poor differentiation, the patient will lose the opportunity to be cured from the disease.

The objective of the present study was to determine whether preoperative cell differentiation could be used to decide the length of bowel margin of colon and rectal resection by comparing between preoperative and postoperative pathological reports of histologic grading.

Material and Method

Patients with adenocarcinoma of the colon and rectum undergoing resection and having preoperative and postoperative pathological reports of histologic grading between January 1999 and October 2004 at department of surgery, Phramongkutklao Hospital were included in the present study. Preoperative histologic grading was obtained from tumor fragment biopsy at rigid sigmoidoscopy or colonoscopy. When more than one biopsy occurred the highest grade was assigned. Postoperative histologic grading was obtained from specimens after tumor resection and was used as the definitive grade.

Histologic grading of adenocarcinoma was divided according to World Health Organization classificaion of tumours (Lyon 2000). The percentage of the tumor showing formation of gland-like structure was used to define the grade. Well differentiated (grade 1) lesion exhibited glandular structure in more than 95% of the tumours; moderately differentiated (grade 2) adenocarcinoma had 50-95% glands; poorly differentiated (grade 3) adenocarcinoma had 5-50%; and undifferentiated (grade 4) carcinoma had less than 5%. Mucinous adenocarcinoma and signet-ring cell carcinoma by convention were considered poorly differentiated (grade 3) adenocarcinoma. The term mucinous adenocarcinoma was used if more than 50% of the lesion was composed of mucin. Signet-ring cell carcinoma was defined by the presence of more than 50% of tumor cells with prominent intracytoplasmic mucin.

Parameters evaluated were age, sex, and the preoperative and postoperative pathological reports of degree of cell differentiation. The preoperative histologic grading was compared to the postoperative histologic grading of the same tumors. Statistical analysis was conducted using percentage and the chi-square test.

Results

260 patients were included in the present study, 144 men and 116 women. The average age was 66 years and a range from 21 to 86 years. Comparison of preoperative to postoperative histologic grading with rigid sigmoidoscopy, with colonoscopy, and with both rigid sigmoidoscopy and colonoscopy are shown in Table 1-3 respectively. The difference between preoperative and postoperative histologic grading were statistically significant ($p < 0.001$). There was no statistical difference in the accuracy of preoperative histologic grading between rigid sigmoidoscopy and colonoscopy ($p = 0.480$).

47.3% (123 in 260 cases) of all cases had inaccurate preoperative histologic grading. 43% (112 in 260 cases) of all cases had worse postoperative differentiation. 52.7% (137 in 260 cases) of all cases had the same differentiation between preoperative and postoperative histologic grading. Only 4.3% (11 in 260 cases) of all cases had better postoperative differentiation.

Table 1. Preoperative and postoperative histologic grading with rigid sigmoidoscopy

Preop. grading	Postop. grading			
	Well	Moderate	Poor	Total
Well	6	27	2	35
Moderately	1	49	5	55
Poorly	-	2	6	8
Dysplasia	1	5	-	6
Adenoma	-	1	-	1
Inflammation	-	1	-	1
Others	-	-	-	-
Total	8	85	13	106

$p < 0.001$

Table 2. Preoperative and postoperative histologic grading with colonoscope

Preop. grading	Postop. grading			
	Well	Moderate	Poor	Total
Well	6	37	3	46
Moderate	1	65	10	76
Poor	1	6	5	12
Dysplasia	1	8	-	9
Adenoma	-	3	1	4
Inflammation	-	6	-	6
Others	-	1	-	1
Total	9	126	19	154

$p < 0.01$

Table 3. Total preoperative and postoperative histologic grading

Preop. grading	Postop. grading			
	Well	Moderate	Poor	Total
Well	12	64	5	81
Moderate	2	114	15	131
Poor	1	8	11	20
Dysplasia	2	13	-	15
Adenoma	-	4	1	5
Inflammation	-	7	-	7
Others	-	1	-	1
Total	17	211	32	260

$p < 0.001$

79% and 6.2% of preoperative well differentiation turned to be postoperative moderate differentiation and poor differentiation, respectively. 11.5% of preoperative moderate differentiation turned to be postoperative poor differentiation. 5% and 40% of preoperative poor differentiation turned to be postoperative well and moderate differentiation, respectively. 55% of preoperative poor differentiation had accurate preoperative differentiation. 10.8% (28 in 260 cases) of all adenocarcinoma cases had preoperative histologic grading as dysplasia or other benign lesions. One case of preoperative adenoma turned out to be postoperative poor differentiation.

Discussion

At present, surgeons perform colon resection with a margin at 2 cm (less than 5 cm), especially in preoperative histologic grading as well differentiation, in order to maintain bowel continuity instead of making a permanent colostomy. But 17% of anastomotic recurrences were in the 2-4 cm distal margin of resection[4].

Williams et al[10] and Kwok et al[11] reported that patients with distal intramural spread more than 2 cm died of distant metastasis more than local recurrence within 3 years, but the number of cases were 12 and 8 cases respectively. Nakagoe et al[12] found that patients with distal intramural spread of more than 2 cm had 5-year disease free survival rate at 47%. That is patients with distal intramural spread more than 2 cm had a lot of chance for cure, probably from better adjuvant treatment. Margin of resection at 2 cm made a lot of patients lose of their opportunities for cure.

Criteria in deciding the margin of resection at 2 cm or 5 cm was preoperative histologic grading, whether it is well differentiation or not. If preoperative histologic grading was well differentiation, the margin of resection could be at minimum of 2 cm. If preoperative histologic grading was poor differentiation, the margin of resection should be more than 5 cm. Some surgeons routinely make distal margin at 2 cm if preoperative grading was not poor differentiation, which would make more chance of anastomotic recurrence.

The present study found that preoperative histologic grading was inaccurate (85.7% of preoperative well differentiation had worse postoperative differentiation, even in preoperative adenoma). That is preoperative grading could not be used as a decision making for the length of distal margin of resection. Therefore, the margin of resection should be at least 5 cm in any preoperative grading of differentiation.

The inaccuracy of preoperative histologic grading occurred because the operative specimens provided more tumor tissues available for examination and there was the tendency to underestimate grading on preoperative biopsy specimens. Adenocarcinoma of the colon and rectum are not homogeneous. One area of a tumor had better differentiation than another area. The part of biopsied specimens might not be the part of the tumor which had the worst differentiation. However, the accuracy of rigid sigmoidoscopy and colonoscopy was not different.

The principle in the treatment of adenocarcinoma should be aimed at curative resection more than sphincter preserving. In these cases, the surgeon's misjudgement in the choice of operation must be blamed for the recurrence. Choosing the correct operation is imperative for the patients' life and health. Therefore, the margin of resection more than 5 cm should be the best length for cure and preventing anastomotic recurrence, which is achieved by most careful surgeons.

One indication for local excision for rectal adenocarcinoma was well differentiation. If preoperative well differrentiation was not accurate, local excision should not be used. Local excision should be preserved for rectal adenocarcinoma as palliative treatment in patients who could not tolerate standard resection.

Conclusion

Preoperative histologic grading can not be used as a factor in deciding the length of the margin of resection in adenocarcinoma of colon and rectum. Adequate margin of resection should routinely be more than 5 cm in all cases, including preoperative histologic grading as adenoma.

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การศึกษาเปรียบเทียบทางเซลล์วิทยาในระยะก่อนและหลังผ่าตัดโรคมะเร็ง Adenocarcinoma ของลำไส้ใหญ่และทวารหนัก

บรรลือ เฉลยกิตติ

ที่มา: *ศัลยแพทย์นิยมใช้ผลของ histologic grading จากการตรวจชิ้นเนื้อก่อนผ่าตัดเป็นตัวกำหนดระยะห่างระหว่างขอบที่จะตัดลำไส้กับก้อนมะเร็ง จุดประสงค์ในการวิจัยเพื่อศึกษาว่าผลของ histologic grading จากการตรวจชิ้นเนื้อก่อนผ่าตัดมีความถูกต้องเพียงใดและสามารถนำไปใช้เป็นตัวกำหนดระยะห่างระหว่างขอบการตัดลำไส้กับก้อนมะเร็งได้หรือไม่*

วัสดุและวิธีการ: *ผู้ป่วยมะเร็งลำไส้ใหญ่ชนิด adenocarcinoma ที่ได้รับการผ่าตัดก้อนมะเร็งในโรงพยาบาลพระมงกุฎเกล้าระหว่างเดือนมกราคม พ.ศ. 2542 และเดือนตุลาคม พ.ศ. 2547 และมีผล histologic grading ของก้อนมะเร็ง ทั้งก่อนและหลังผ่าตัดนำมาเปรียบเทียบกันโดยใช้เปอร์เซ็นต์และการทดสอบไคสแควร์*

ผลการศึกษา: *มีผู้ป่วยทั้งสิ้น 260 ราย พบว่า 47.3% มีผลของ preoperative histologic grading ไม่ถูกต้องโดย 43% มีผลหลังผ่าตัดเลวลงและ 4.3% มีผลหลังผ่าตัดดีขึ้น*

สรุป: *ผลของ histologic grading ที่ได้รับก่อนผ่าตัดไม่มีความน่าเชื่อถือเป็นอย่างมากจึงไม่ควรนำมาพิจารณาเลือกระยะห่างระหว่างขอบการตัดลำไส้จากก้อนมะเร็ง*