Preoperative Diagnosis of Urinary Bladder Involvement in Adenocarcinoma of Colon and Rectum

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Objective: *Objective of the study was to compare urinary symptoms, urinalysis, computed tomography, intravenous pyelography, ultrasonography between colorectal adenocarcinoma with urinary bladder involvement and without urinary bladder involvement.*
Material and Method: *Patients with adenocarcinoma of the colon and rectum who had the first operation between January 1999 and October 2004 were included in the present study. All patients were divided into the bladder adhesion group and nonadhesion group. Sex, sites of tumor, urinary symptoms and preoperative investigations were compared.*
Results: *453 patients were included in the present study with 264 males and 189 females (sex ratio M:F = 1.4:1). 26 cases (5.7%) had bladder adhesion. Males had more chance of having bladder involvement. Sigmoid and rectum were the most common sites of bladder adhesion. All cases with urinary symptoms had bladder involvement. Urinalysis and computed tomography had a sensitivity of 59% and 61%, respectively. All cases whose computed tomography showed bladder involvement had bladder adhesion during surgery. Cystoscopy had a sensitivity of 75%. Ultrasonography and IVP did not help in detection of bladder invasion.*
Conclusion: *History of urinary symptoms, urinalysis, computed tomography should be routinely performed in patients with adenocarcinoma of the sigmoid and rectum to detect urinary bladder involvement and to inform modes of urinary tract diversion to patients before surgery.*

Keywords: *Bladder, Adenocarcinoma, Colon, Rectum*

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Performing operations in adenocarcinoma of the colon and rectum, surgeons sometimes do not know preoperatively whether there was urinary bladder involvement of the tumor, which total cystectomy and ileal conduit was performed without informing consent of this condition to patients before surgery. If surgeons knew the possibility of urinary bladder involvement, they could inform prognosis and types of procedure preoperatively to patients or could plan any management suitable for that condition. When there was involvement to the urinary trigone, total cystectomy and ileal conduit was selected to be performed instead of partial cystectomy. Surgeons should do a cystoscopic biopsy to confirm the diagnosis and inform patients in order to get their consent.

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There are a lot of problems in the detection of urinary bladder involvement preoperatively. Which investigations have to be routinely used? Could urinary symptoms, abnormal urinalysis, and computed tomography predict urinary bladder involvement? Does computed tomography have to be routinely used? Does gross involvement of a tumor to the bladder have the risk of positive microscopic invasion? Does mucosal edema of urinary bladder from cystoscopy mean microscopic invasion?

There have been few studies regarding urinary involvement in colorectal adenocarcinoma with a small number of cases[1-4]. The urinary tract is close to the large bowel, especially the sigmoid and upper rectum. However, adenocarcinoma of cecum and transverse colon could involve the bladder[1,3], but no tumor of the descending colon has invaded the urinary bladder in any of the literature.

Objective of the present study was to compare urinary symptoms, urinalysis, computed tomography, intravenous pyelography and ultrasonography between colorectal adenocarcinoma with urinary bladder involvement and without urinary bladder involvement.

Material and Method

Patients with adenocarcinoma of the colon and rectum who had the first operation in the department of surgery, Phramongkutklao Hospital between January 1999 and October 2004 were included in the present study. Patients with recurrent tumor or surgery from other hospitals were excluded from this study. All cases were divided into two groups: nonadhesion group and adhesion group. Patients who had urinary bladder or ureter invasion, or hydroureter or hydronephrosis from computed tomography, cystoscopy, intravenous pyelography or ultrasonography were included in the adhesion group. Other patients were included in the nonadhesion group. The adhesion group was subdivided into two groups: ureter adhesion group and bladder adhesion group. patients with bladder adhesion and patients with bladder and ureter adhesion were classified in the bladder adhesion group. Patients with only ureter adhesion were classified as the ureter adhesion group.

Variables included age, sex, site of tumor, urinary symptoms, preoperative urinalysis, preoperative computed tomography, preoperative cystoscopy, preoperative intravenous pyelography, preoperative ultrasonography, gross adhesion during surgery, surgical finding, type of operation, pathological reports, staging, follow-up, and current status. Urinalysis reports which had leucocyte of more than 10 per high power field or erythrocyte more than 10 per high power field were classified as positive urinalysis. All adhesion cases had enbloc resection to the adhesion if possible.

Variables were computed with SPSS 10.0. Statistical analysis was performed using percentage for descriptive data and chi-square test for comparative data.

Results

453 patients were included in the present study with 264 males and 189 females. The average age was 65 years (range 21-90 years). 418 cases were in the nonadhesion group (237 males, 181 females). 35 cases were in the adhesion group (27 males, 8 females). Site of tumors is shown in Table 1.

35 cases were suggested to have bladder or ureter invasion preoperatively. During surgery, 4 cases had ureter adhesion, 20 cases had bladder adhesion, 6 cases had bladder and ureter adhesion, 2 cases had no adhesion to any organs of the urinary system, 3 cases did not have celiotomy because of high risk for surgery. Therefore, 26 cases were in the bladder adhesion group and 4 cases were in the ureter adhesion group. Characteristics of 26 cases with bladder adhesion group are shown in Table 2. of 4 cases were in the ureter adhesion group, only one case was preoperatively suggested to have ureter adhesion from hydroureter in computed tomography and positive urinalysis. Enbloc ureter resection was performed in all 4 cases but there was no pathological tumor invasion. 2 cases were died from liver metastasis in 8 months.

26 cases (5.7%) had urinary bladder adhesion, 21 males (8.0%) and 5 females (2.7%) (M:F = 4.2:1), which was different in sex distribution from the nonadhesion group. Males had a higher more risk of having bladder involvement than females ($p = 0.013$).

Urinary symptoms were found in 5/26 cases (19.2%) in the bladder adhesion group but none in the nonadhesion group. All cases with urinary symptoms had abnormal urinalysis, bladder adhesion from computed tomography, and bladder adhesion during surgery.

Table 1. Distribution of cancer

Site	Number of cases in the nonadhesion group N (%)	Number of cases in the bladder adhesion group N (%)	Percentage of bladder adhesion N (%)
Right colon	68 (16.2)	0	
Transverse colon	35 (8.4)	0	
Descending colon	22 (5.3)	0	
Sigmoid	148 (35.4)	20 (80.0)	20/168 (11.9)
Rectum	145 (34.7)	6 (20.0)	6/151 (3.9)
Total	418 (100.0)	26 (100.0)	

Urinalysis in the bladder adhesion group was positive in 13 out of 22 (59%). 4 cases did not have urinalysis performed. In the nonadhesion group, 21/169 cases (12.4%) had positive urinalysis. The bladder adhesion group had more positive urinalysis than the nonadhesion group ($p < 0.001$).

Computed tomography in the bladder adhesion group could suggest bladder adhesion in 11/18 cases (sensitivity 61 percent). Computed tomography was not performed in 8 cases. In 11 cases, 5 had pathological invasion, 3 had no pathological invasion, and 3 were unresectable. All cases who has computed tomography showed bladder adhesion and had macroscopic adhesion during surgery (specificity 100%). Therefore, computed tomography could predict macroscopic bladder adhesion.

Cystoscopy was performed in selected cases with preoperative urinary symptoms, abnormal urinalysis, abnormal computed tomography, or abnormal ultrasonography. Cystoscopy in the bladder adhesion group could detect tumor, fistula, or edema of mucosa in 9/12 cases (sensitivity 75 percent). 14 cases did not have cystoscopy performed. All 9 cases of cystoscopic invasion had pathological invasion reports (specificity 100%). Edema of bladder mucosa from cystoscopy indicated tumor invasion.

Nearly all ultrasonography and intravenous pyelography had normal findings. Therefore, ultrasonography and intravenous pyelography did not help in the detection of bladder adhesion.

In the bladder adhesion group, one patient had total cystectomy, 17 patients had partial cystectomy, 8 patients were unresectable. 20 cases of adenocarcinoma of sigmoid and 6 cases of adenocarcinoma of rectum had urinary bladder adhesion. Sigmoid had more chance to adhere to urinary bladder than the rectum.

One tumor of the colon and rectum in this series was stage 1; 8 were stage 2, 6 were stage 3, and 5 were stage 4. Bladder recurrence was found in 2 cases

Table 2. Characteristics of 26 patients in the bladder adhesion group

Number	Bladder symptom	Urinalysis	Computed tomography	Cystoscopy	Operation	Pathological invasion
1	Yes	Abnormal	NP	NP	Unresectable	Unresectable
2	Yes	Abnormal	Yes	Tumor	PC	Yes
3	No	Abnormal	NP	Tumor	Unresectable	Yes
4	No	Normal	NP	NP	PC	No
5	No	Normal	No	Fistula	PC	No
6	No	Abnormal	NP	NP	Unresectable	Unresectable
7	No	Normal	NP	NP	PC	Yes
8	No	Abnormal	Yes	Tumor	PC	Yes
9	No	Abnormal	Yes	Normal	PC	No
10	No	Normal	No	NP	PC	No
11	Yes	Abnormal	Yes	Edema	PC	Yes
12	No	Abnormal	Yes	NP	PC	No
13	Yes	Abnormal	NP	NP	PC	No
14	No	NP	No	Normal	PC	No
15	No	NP	No	NP	Unresectable	Unresectable
16	No	Normal	No	NP	PC	No
17	No	NP	Yes	Edema	Unresectable	Unresectable
18	No	Abnormal	Yes	Edema	Unresectable	Unresectable
19	No	Abnormal	Yes	Edema	PC	Yes
20	No	Abnormal	No	NP	PC	No
21	No	Normal	Yes	NP	PC	Yes
22	No	Normal	NP	Tumor	Unresectable	Yes
23	No	Normal	NP	NP	PC	Yes
24	Yes	Abnormal	Yes	Normal	PC	No
25	No	NP	Yes	NP	Unresectable	Unresectable
26	No	Normal	No	NP	TC	No

NP = not performed, PC = partial cystectomy, TC = total cystectomy

of partial cystectomy with no pathological invasion. 13 patients died of the disease and 7 patients were still alive without the disease, at a mean follow-up time of 12.2 (2-48) months.

Discussion

Urinary bladder invasion in adenocarcinoma of colon and rectum was not uncommon, with an incidence of 2.9-10%[1,3]. Sigmoid and rectum were the most common sites of bladder invasion with an incidence of 11.0% and 3.9%, respectively. The finding of the present study was similar to the study of Kobayashi et al[1] which found that sigmoid and rectum were the most common sites of bladder invasion with an incidence of 5.8% and 2.7%, respectively. Sigmoid was more common than the rectum because the rectum was separated from the bladder by Denonvillier's fascia. Adenocarcinoma of the sigmoid and rectum should routinely do investigations to detect bladder invasion in order to inform patients before surgery and to prepare for the surgical procedure.

Urinary symptoms were present in 19-47% of adhesion cases[5]. All cases with urinary symptoms had bladder adhesion in the present study. This study found that abnormal urinalysis indicated bladder adhesion. Patients who had urinary tract infection must be suspected to have bladder adhesion because most patients with urinary invasion had urinary tract infection[1].

The present study found that all cases who had computed tomography showed bladder adhesion had macroscopic adhesion during surgery. Computed tomography did not overestimate the need for urinary bladder resection, which was different from the study of McNamara et al[2].

Cystoscopy in the bladder adhesion group can detect tumor, fistula, or edema of bladder mucosa in 75%. Therefore, cystoscopy was the best method to determine bladder invasion, site of invasion, and plan of operation. Cystoscopic finding of edema, fistula, or tumor indicated bladder invasion.

Therefore, history of urinary symptoms, urinalysis, computed tomography should be routinely performed in patients with adenocarcinoma of the sigmoid and rectum to detect bladder invasion. After that, cystoscopy should be performed when urinalysis and computed tomography were abnormal.

Ultrasonography and intravenous pyelography[1] did not help in detecting bladder adhesion because computed tomography and ultrasonography were positive when intravenous pyelography and ultrasonography were positive. However, computed tomography could look for other invasion and metastasis.

Although most adhesions were negative microinvasion, en bloc resection provided better local control and prognosis. Trial dissection of the adhesion between the tumor and bladder resulted in local recurrence[1,3] and should not be performed[1]. Partial cystectomy with adequate negative margin provided the same prognosis as total cystectomy or pelvic exenteration[3,5,6]. Total cystectomy was necessary when trigone was involved[2]. But none of preoperative studies appeared to be useful for the prediction of the necessity for total cystectomy[1].

Although total cystectomy had only a few cases[1], patients should know the possibility to have ileal conduit or probably colostomy before surgery. Surgeons should routinely inform this possibility because the rate of bladder involvement was 2.9-10 percent.

Conclusion

History of urinary symptoms, urinalysis, computed tomography should be routinely performed in patients with adenocarcinoma of the sigmoid and rectum to detect urinary bladder involvement and to inform modes of urinary tract diversion to patients before surgery.

References

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การวินิจฉัยการลุกลามของมะเร็งลำไส้ใหญ่สู่กระเพาะปัสสาวะก่อนการผ่าตัด

บรรลือ เฉลยกิตติ

บทนำ*: ศัลยแพทย์มีความจำเป็นต้องรู้การลุกลามของมะเร็งลำไส้ใหญ่สู่กระเพาะปัสสาวะก่อนการผ่าตัดเพื่อสามารถบอกทางเลือกในการผ่าตัดแก่ผู้ป่วยก่อนการผ่าตัด*

วัตถุประสงค์*: เพื่อศึกษาเปรียบเทียบ อาการทางปัสสาวะ ผลการตรวจปัสสาวะ การตรวจเอกซเรย์คอมพิวเตอร์การเอกซเรย์ทางเดินปัสสาวะโดยการฉีดสารทึบแสง และอัลตราซาวด์ ระหว่างผู้ป่วยมะเร็งลำไส้ใหญ่ที่ไม่มีการลุกลามและผู้ป่วยที่มีการลุกลามสู่กระเพาะปัสสาวะ*

วัสดุและวิธีการ*: ผู้ป่วยมะเร็งลำไส้ใหญ่ที่ได้รับการผ่าตัดครั้งแรกในโรงพยาบาลพระมงกุฎเกล้าระหว่างมกราคม พ.ศ. 2542 ถึงตุลาคม พ.ศ. 2547 แบ่งเป็นสองกลุ่มคือกลุ่มที่มีการลุกลามสู่กระเพาะปัสสาวะและกลุ่มที่ไม่มีการลุกลามสู่กระเพาะปัสสาวะ ข้อมูลเกี่ยวกับ ตำแหน่งของก้อนมะเร็ง อาการทางปัสสาวะ ผลการตรวจปัสสาวะ และการตรวจก่อนผ่าตัดอย่างอื่น ๆ ของทั้งสองกลุ่มนำมาเปรียบเทียบกัน*

ผลการศึกษา*: ผู้ป่วย 453 ราย ชาย 264 ราย หญิง 189 ราย มีการลุกลามสู่กระเพาะปัสสาวะ 26 ราย (5.7%) เป็นชายมากกว่าหญิง มักพบจากมะเร็งลำไส้ใหญ่ส่วนซิกมอยด์ ประวัติการปัสสาวะผิดปกติ ผลการตรวจปัสสาวะที่ผิดปกติและเอกซเรย์คอมพิวเตอร์สามารถบอกการลุกลามมาสู่กระเพาะปัสสาวะได้ถูกต้องแต่มีความไวในการทดสอบ 59 และ 61 เปอร์เซ็นต์ตามลำดับ การใช้อัลตราซาวด์และการเอกซเรย์ฉีดสารทึบแสงทางเดินปัสสาวะไม่สามารถตรวจพบได้*

สรุป*: ผู้ป่วยมะเร็งลำไส้ใหญ่ควรทำการตรวจปัสสาวะและเอกซเรย์คอมพิวเตอร์ทุกราย เพื่อหาการลุกลามสู่กระเพาะปัสสาวะก่อนการผ่าตัด*