Original Article

Does Endoscopic Obstruction in Colorectal Cancer Require Urgent Surgery and Result in Poor Prognostic Factors?

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Background: Colonoscopy is an endoscopic tool for evaluation of colorectal cancer, and there is no conclusive evidence of a connection between clinical gut obstructions and obstructed endoscopy. Unplanned urgent operations in obstructed colorectal cancer by endoscopic processes may increase mortality and the possibility of poor outcome. The suitable waiting time to complete staging and prepare patients before surgery is not reported.

Objective: To determine suitable waiting times, incidence of emergency surgery during waiting times, and outcomes of obstructed colonoscopy.

Materials and Methods: Retrospective reviewed of obstructed colonoscopies in colorectal cancer was performed from medical records between January 2009 and December 2015. Patients who refused surgery or failed to attend follow-up appointments were excluded. Data were collected from both emergency and elective operation groups, including incidences of emergency surgery, waiting times, staging, level of obstruction, and outcome.

Results: Four thousand seventeen colonoscopies were performed in the surgical department at Ramathibodi Hospital between January 2009 and December 2015. There were 211 (5.25%) unsuccessful procedures due to tumor obstruction. Two hundred (4.97%) incomplete examinations were due to colorectal cancer obstruction and 11 (5.2%) obstructions were caused by other cancers. Twelve patients (7.3%) had emergency operations while waiting for surgery. The average waiting time was 25 days. No perioperative deaths were reported. The 5-year survival rate was lower in stage II and III.

Conclusion: The present study showed low incidence (7.3%) of emergency surgery in unsuccessful colonoscopy from obstructed colorectal cancer. Patients were able to wait two to three weeks after the date of incomplete colonoscopy without risk of increased mortality. Patients who had Stage II and Stage III colorectal cancer had poor prognostic factors.

Keywords: Endoscopic obstruction, Incomplete colonoscopy, Emergency surgery, Obstructed colorectal cancer

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Colonoscopy is an endoscopic tool for evaluation of colorectal cancer and has a reported rate of 90% to 98% for successful colonoscopy[1]. Factors that cause incomplete colonoscopy include gender, old age, diverticulitis, history of abdominal surgery[2,3]. In patients who had colorectal cancer and the endoscope could not pass through the cancer, most surgeons tend to perform urgent or emergency surgery, even before receiving complete staging results, including pathological reports from biopsy specimens. In addition, there were incidences of inappropriated preoperative management, especially in old-age groups. This situation led to high morbidity[4-7]. Colonoscopy findings and tumor site did not predict bowel obstruction[8] but obstructed endoscopy could be one of the poor prognostic factors[9]. The present study was to determine suitable times and prioritize operations in obstructed endoscopy in colorectal cancer. We aimed to find incidences of urgent or unplanned surgery associated with survival outcomes for the best decision making in this group.

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Materials and Methods

A retrospective charts review was performed from the cases between January 2009 and December 2015 at Ramathibodi Hospital and was approved by the Faculty Ethics Committee. All procedures were performed by general surgeons that are highly experienced in endoscopy. Incomplete colonoscopies by tumor obstruction were included in the present study. Patients who refused surgery, did not return for follow-up, or had incomplete medical records were

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excluded. We defined complete colonoscopy as cecal intubation or terminal ileum[2], and obstruction as being unable to pass the endoscope through a tumor when the tumor appeared during endoscopy using standard colonoscopy for diagnosis. Colorectal cancers were confirmed by pathologic results. Urgent operation was unplanned or emergency surgery. The operation and type of operation depended on each surgeon's decision such as colostomy, Hartmann's Procedure, subtotal colectomy, or on-table colonic larvage. After surgery, patients were treated using standard treatment methods regarding the stage and location of the tumor, including chemotherapy or radiation. We used the sixth edition AJCC as a staging system. Data were collected from both emergency and elective operation groups, including incidences of emergency surgery, waiting times, staging, obstruction levels, and survival rates. For data analysis, we used Stata program, Pearson's Chi-square tests of association for independent samples were used to test the significance of difference between proportions. Fisher's exact tests were used whenever expected cell counts were five or more cases. Analysis of variance and t-tests were conducted when appropriate. All tests of significance were two sided and evaluated at the *p*-value that were smaller than 0.05.

Table 1. Baseline characteristics for obstructed colonoscopy

Characteristics	Elective operation (n = 152)	Emergency surgery (n = 12)	*p*-value
Age (year), mean (SD)	64.2 (11.9)	66.3 (12.49)	0.55
Sex, n (%)			0.183
Female	71 (46.71)	8 (66.67)	
Male	81 (53.29)	4 (33.33)	
Family history*, n (%)	(n = 151)		0.015
Yes	6 (3.97)	2 (16.67)	
No	145 (96.03)	10 (83.33)	
Staging colon*, n (%)	(n = 102)	(n = 9)	0.75
Stage I	10 (9.80)	0 (0.00)	
Stage II	35 (34.31)	3 (33.33)	
Stage III	30 (29.41)	2 (22.22)	
Stage IV	27 (26.47)	4 (44.44)	
Rectum*, n (%)	(n = 47)	(n = 3)	0.11
Stage I	1 (2.13)	1 (33.33)	
Stage II	13 (27.66)	0 (0.00)	
Stage III	18 (38.30)	2 (66.67)	
Stage IV	15 (31.91)	0 (0.00)	
Pathology*, n (%)	(n = 149)		0.182
Well diff adenocarcinoma	44 (29.53)	5 (41.67)	
Moderate diff adenocarcinoma	96 (64.43)	5 (41.67)	
Poorly diff adenocarcinoma	8 (5.37)	2 (16.67)	
Mucinous carcinoma	1 (0.67)	0 (0.00)	
Previous surgery*, n (%)	(n = 149)		0.99
Yes	25 (16.78)	2 (16.67)	
No	124 (83.22)	10 (83.33)	

* Lack of information because based on the secondary data (medical record)

Results

Four thousand seventeen colonoscopies were performed during this period at the surgery department. Two hundred eleven patients' procedures (5.25%) were unsuccessful because 200 patients (4.97%) had obstructed colonoscopy by colorectal cancer, and 11 patients (5.2%) had obstruction by other cancers such as prostate or cervical cancer. We excluded 36 patients due to five patients lost to follow-up, 23 patients had incomplete medical records, and eight patients refused surgery. One hundred sixty-four patients were included in the present study, 12 patients (7.3%) had emergency or unplanned operations (emergency group) and 152 patients had elective or planned operations (elective group). Patients' characteristics in both groups are shown in Table 1. The mean age in the elective group was 64.2, and 66.3 in the emergency group. Only family history of colorectal cancer was the significant difference in the emergency group, but other patients' characteristics were not different in both groups, including staging, pathology results, and history of previous surgery.

Table 2 shows the colonoscopy and operative data. The location of most obstructions were on the left side of the colorectal area but there was no significant difference between the groups ($p = 0.908$). The ulcerative mass in colonoscopy finding was higher in the emergency group and different from the elective group ($p = 0.017$). Indications for colonoscopy, type of bowel preparation, and quality of bowel preparation were not different. The type of operation was not different in both groups, including rate of ostomy ($p = 0.84$). The average waiting time was 25 days from the date of colonoscopy to the date of operation, which was 27 days in the elective group, and 10.5 days in the emergency group. Table 3 presents details of patients who had emergency or unplanned operations. Twelve patients had emergency operations while waiting for surgery because of one peritonitis, four perforation, 4 colonic obstructions, one bleeding from tumor, and two severe abdominal pain.

No patients had perioperative death. The 5-year survival rate is shown in Table 4. This study found a lower 5-year survival rate in stage IIB of the elective group and stage IIIB of the emergency group, were 60% and 33.3%, respectively.

Discussion

Colonoscopy is an effective examination for both diagnosis and screening for colorectal cancer. The

Table 2. Colonoscopic and operative data of obstructed colonoscopies

Characteristics	Elective operation (n = 152)	Emergency surgery (n = 12)	*p*-value
Colonoscopic data			
Site of obstruction, n (%)			0.908
• Rt. side colon	26 (17.11)	3 (25.00)	
• Lt. side colon	26 (17.11)	1 (8.33)	
• Sigmoid	52 (34.21)	5 (41.67)	
• Rectum	48 (31.56)	3 (25.00)	
Colonoscope finding*, n (%)	(n = 102)		0.017**
• Fungating mass	13 (41.45)	1 (8.33)	
• Ulcerative mass	53 (34.87)	5 (41.67)	
• Large polyp	10 (6.58)	0 (0.00)	
• Constrictive lesion	18 (11.84)	3 (25.00)	
• Contact bleeding mass	8 (5.26)	3 (25.00)	
Indication for colonoscopies*, n (%)	(n = 150)		0.091
• Weight loss	4 (2.67)	0 (0.00)	
• Bowel habit change	49 (32.67)	1 (8.33)	
• Anemia	0 (0.00)	0 (0.00)	
• Gut obstruction	8 (5.33)	3 (25.00)	
• Abdominal pain	15 (10.00)	3 (25.00)	
• Occult blood	4 (2.67)	0 (0.00)	
• Family of cancer	1 (0.67)	0 (0.00)	
• Abdominal CT	9 (6.00)	1 (8.33)	
• LGIB	60 (40.00)	4 (33.33)	
Preparation bowel*, n (%)	(n = 147)		0.386
• PEG	18 (12.24)	3 (25.00)	
• Swiff	108 (73.47)	7 (58.33)	
• Unison enema	16 (10.88)	0 (0.00)	
• No preparation	5 (3.40)	2 (16.67)	
Prep bowel result*, n (%)	(n = 144)		0.426
• Good	77 (53.47)	7 (58.33)	
• Fair	33 (22.92)	4 (33.33)	
• Poor	34 (23.61)	1 (8.33)	
Operative data			
Type of procedure, n (%)			0.84
• Resection and diversion	22 (14.47)	1 (8.33)	
• Diversion (colostomy)	12 (7.89)	1 (8.33)	
• Primary anastomosis	118 (77.63)	10 (83.33)	
Operation, n (%)			0.99
• APR	4 (2.63)	0 (0.00)	
• LAR	25 (16.45)	2 (16.67)	
• AR	12 (7.89)	1 (8.33)	
• Sigmiodectomy	21 (13.83)	1 (8.33)	
• Lt. half colectomy	11 (7.24)	1 (8.33)	
• Extended Lt. colectomy	2 (1.32)	0 (0.00)	
• Rt. half colectomy	20 (13.16)	3 (25.00)	
• Extended Rt. colectomy	13 (8.55)	1 (8.33)	
• Subtotal colectomy	7 (4.61)	2 (16.67)	
• Hartmann operation	17 (11.18)	1 (8.33)	
• Transverse colostomy	7 (4.61)	0 (0.00)	
• Sigmoid colostomy	5 (3.29)	0 (0.00)	
• Lap LAR	6 (3.95)	0 (0.00)	
• Enbloc resection	2 (1.32)	0 (0.00)	
Time colonoscope to operation (day)	27	10.5	0.27
• Colon, median (min-max)	25 (2 to 769)	13 (1 to 186)	
• Rectum, median (min-max)	27 (1 to 463)	6 (2 to 41)	

Rt. = right; Lt. = left; CT = computed tomography; LGIB = lower gastrointestinal bleeding; PEG = polyethylene glycol; APR = abdominoperineal resection; LAR = low anterior resection; AR = anterior resection

* Lack of information because based on the secondary data (medical record)

** Significant level <0.05

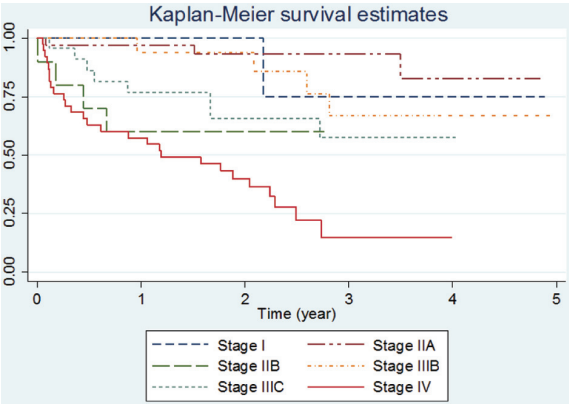

Figure 1. 5 years survival in each colorectal cancer staging.

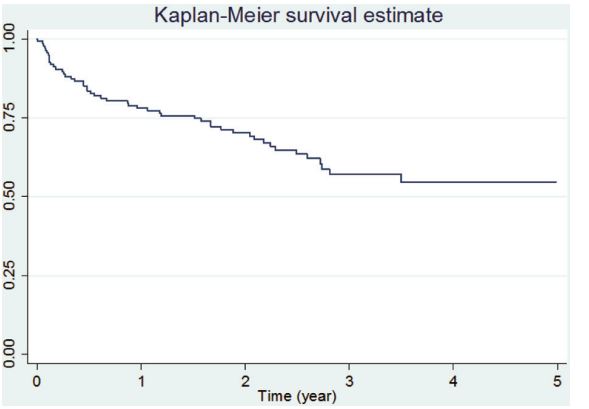

Figure 2. 5 years survival in obstructed colonoscopy.

success rate was reported at 90% to 98% and depended on multifactorial factors including old age, gender, diverticulitis, and history of previous surgery[1-3]. The present study found an unsuccessful factor to be colorectal cancer obstruction, and the incident rate was 4.97% or 200 in 4,017 colonoscopy procedures. Some surgeons were concerned about this situation and attempted to push patients into the operative schedule as soon as possible. Although patients that presented with acute symptoms were reported to be associated with higher staging[4,10], emergency or urgent operations risk higher complications[5,6]. Because the surgeon did not have the time to complete preoperative staging and accurately control any of the underlying disease, there were effects of unnecessary and aggressive operations in obstructed endoscopies, especially not finding a correlation between endoscopic findings and bowel obstruction[11]. Weixler et al reported that emergency operations of colorectal cancer did not impact survival rate[11]. The present study showed that obstructed colonoscopy of

Table 3. Patients' details of emergency surgery group

Patients	Diagnosis	Operation	U/D	Pathology	Obstruction	Waiting time (day)	Indication for surgery
Female 84 years	T3N1M0 stage IIIB CA upper rectum	Hartmann	CAD AF HT	Well diff.	100% ulcerative mass	41	Gut obstruction
Male 56 years	T2N0M0 stage I CA sigmoid	LAR	CKD HT	Well diff.	100% obstruction contact bleeding mass	6	Bleeding
Female 61 years	T4N2M0 stage IIIC CA upper rectum	Rt. half colectomy with ileostomy with colostomy	HT	Moderately diff.	90% obstruction contact bleeding mass	2	Impending perforation
Male 81 years	T4N2M1 stage IV CA hepatic flexure	Extended Rt. half colectomy (palliative resection)	-	Poorly diff.	100% fungating mass	8	peritonitis
Male 65 years	T3N1M1 stage IV CA ascending colon	Rt. half colectomy	-	Well diff.	100% ulcerative mass	24	Gut obstruction
Female 62 years	T3N0Mo stage IIA CA sigmoid	Sigmoidectomy	CKD HT	Moderately diff.	80% constrictive lesion	13	Gut obstruction
Female 79 years	T3N2M0Stage IIIC CA sigmoid	Subtotal colectomy	-	Moderately diff.	100% obstruction contact bleeding mass	1	perforation
Male 52 years	T4N2M0 stage IIIC CA sigmoid	Subtotal colectomy	-	Moderately diff.	100% ulcerative mass	29	perforation
Female 84 years	T4N1M1 stage IV CA upper rectum	LAR	HT	Moderately diff.	80% constrictive mass	1	Abdominal pain
Female 52 years	T3N0M0 stage IIA CA splenic flexure	Lt. half colectomy	HT	Well diff.	100% constrictive mass	186	Gut obstruction
Female 66 years	T3N0M0 stage IIA CA cecum	Rt. half colectomy	HT DM	Well diff.	100% ulcerative massl	22	Impending perforation
Female 54 years	T3N0M1 stage IV CA sigmoid	Anterior resection	-	Poor diff.	100% ulcerative mass	6	Abdominal pain

U/D = underlying disease; CA = cancer; Rt. = right; Lt. = left; LAR = low anterior resection; CAD = coronary artery disease; AF = atrial fibrillation; HT = hypertension; CKD = chronic kidney disease; DM = diabetes mellitus; diff. = differentiated

Table 4. 5-year survival rate of obstructed colonoscopy

Characteristics	Elective operation (n = 152)	Emergency surgery (n = 12)
Staging (TMN system)		
Stage I	100%	-
Stage IIA	90%	100%
Stage IIB	60%	-
Stage IIIA	-	100%
Stage IIIB	75%	33.3%
Stage IV	32%	-

colorectal cancer patients can wait before surgery for thorough preparation of both staging and underlying diseases. Although carcinoembryonic antigen [CEA] levels were collected in our research, the results were not directly related to bowel obstruction. The average waiting time was 25 days, which was 27 days in the elective group, and 10.5 days in the emergency group. During the waiting time, the incidence of unplanned or emergency operations was low (7.3%) and no perioperative deaths were reported in either group. These results demonstrated that obstructed endoscopy from colorectal cancer still had time to prepare and complete staging before surgery. Other than staging, prognostic factors of colorectal cancer generally depend on multifactorial factors. Bowel obstruction is one of the poor prognostic factors[12,13] but there are few reports of endoscopic obstruction. Some reports showed that endoscopic obstruction was not related to survival or local recurrence[14,15] but Hong et al presented this as a factor of systemic metastasis and decreased survival rate[9]. The present study showed that obstructed endoscopy had lower survival rate in Stage II of the elective group and Stage III in the emergency group. Our study confirmed these were poor prognostic factors. The present study had limitations due to the retrospective study design and small sample size, but could inspire future large studies.

Conclusion

Patients of obstructed colonoscopy in colorectal cancer can wait two or three weeks before surgery with low incidence of emergency operation, which is one of poor prognostic factors in Stages II and III.

What is already known on this topic?

Colonoscopy is a useful tool for diagnosing colorectal cancer. Previous studies report factors causing incomplete colonoscopy include gender, old

age, diverticulitis, history of abdominal surgery[2,3]. Emergency or urgent cases of colorectal cancer lead to likely complications and high morbidity[5,6]. However, emergency surgery does not affect survival rates[11]. Survival rates in colorectal cancer depend on staging and tumor biology[12,13].

What is study adds?

Tumor is one of the factors that cause incomplete colonoscopy. Obstruction by colonoscopy does not require emergency or urgent operation and the patient can wait two or three weeks for preparation or pre-operative management. This study shows obstructed colonoscopy is one of the poor prognosis factors in colorectal cancer.

Potential conflicts of interest

The authors declare no conflict of interest.

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การตรวจพบการอุดกั้นของมะเร็งลำไส้ใหญ่จนไม่สามารถส่องกล้องผ่านจุดอุดกั้นได้ จำเป็นต้องผ่าตัดเร่งด่วนและเป็นปัจจัยที่ไม่ดีในการพยากรณ์โรคหรือไม่

เสริมศรี พงษ์รัตนกูล, ไชยรัตน์ ทรัพย์สมุทรชัย, ปิติโชติ หิรัญเทพ, จักรพันธ์ จิรสิริธรรม, จุมพล วิลาศรัศมี

ภูมิหลัง: การส่องกล้องลำไส้ทางทวารหนักเป็นเครื่องมือชิ้นหนึ่งที่ช่วยในการวินิจฉัยโรคมะเร็งลำไส้ การตรวจพบการอุดกั้นของลำไส้ และกล้องไม่สามารถผ่านจุดอุดกั้นได้นั้น ขณะนี้ยังไม่มีข้อมูลที่สรุปได้แน่ชัดในเรื่องความสัมพันธ์ระหว่างการอุดกั้นของลำไส้ที่ตรวจพบจากการส่องกล้องทางทวารหนักกับอาการลำไส้อุดกั้นหรือไม่ ผู้ป่วยสามารถรอการผ่าตัดได้นานเท่าไร และมีโอกาสในการเกิดภาวะแทรกซ้อนระหว่างที่รอ เพื่อเตรียมการผ่าตัดหรือส่งตรวจวินิจฉัยเพิ่มเติม การทำการผ่าตัดเร่งด่วนในผู้ป่วยที่มีภาวะลำไส้อุดกั้น มีโอกาสเกิดภาวะแทรกซ้อนหรือเสียชีวิตได้มากกว่า เนื่องจากบางครั้งไม่มีเวลาในการเตรียมตัวผู้ป่วยหรือรอผลการวินิจฉัยทางชิ้นเนื้อ

วัตถุประสงค์: เพื่อศึกษาอัตราการผ่าตัดแบบเร่งด่วนและภาวะแทรกซ้อนในระหว่างรอการผ่าตัดในผู้ป่วยลำไส้อุดกั้น และช่วงเวลาเฉลี่ยที่ผู้ป่วยรอ มีผลกระทบอย่างไร

วัสดุและวิธีการ: การศึกษาเป็นแบบย้อนหลังเก็บข้อมูลจากฐานข้อมูล และเวชระเบียน โดยเป็นกลุ่มผู้ป่วยที่มีการอุดกั้นของมะเร็งลำไส้ที่ตรวจพบจากการส่องกล้องทางทวารหนัก และไม่สามารถผ่านจุดที่มีการอุดกั้นนั้นได้ ในช่วงเดือนมกราคม พ.ศ. 2552 ถึง ธันวาคม พ.ศ. 2559 จากข้อมูลแยกออกได้เป็น 2 กลุ่ม คือ กลุ่มที่ได้รับการผ่าตัดแบบเร่งด่วน และกลุ่มที่ได้รับการผ่าตัดตามตารางผ่าตัดปกติ รวมถึงข้อมูลจำนวนผู้ป่วยที่ต้องผ่าตัดเร่งด่วน ช่วงเวลาในการรอการผ่าตัด ระยะของมะเร็ง ระดับการอุดกั้น และภาวะแทรกซ้อนต่าง ๆ

ผลการศึกษา: การส่องกล้องทางทวารหนักในช่วง พ.ศ. 2552 ถึง พ.ศ. 2559 จำนวน 7 ปี มีทั้งหมด 4,017 คน มีการอุดกั้นที่ตรวจพบและไม่สามารถผ่านจุดอุดกั้นได้ทั้งหมด 211 คน คิดเป็น 5.25% ของทั้งหมด โดยมีสาเหตุจากมะเร็งลำไส้อุดกั้นที่ตำแหน่งต่าง ๆ ทั้งสิ้น 200 คน คิดเป็น 4.97% และมีเพียง 12 ราย ที่ต้องเข้ารับการผ่าตัดเร่งด่วน คิดเป็น 7.3% ระยะเวลาโดยรวมในการรอผ่าตัดเฉลี่ย คือ 25 วัน โดยไม่มีผลต่ออัตราการตายในช่วงระหว่างการผ่าตัด หรือ กระทบต่ออัตราการรอดชีวิตในช่วง 5 ปี ของแต่ละระยะของมะเร็ง

สรุป: พบว่าการส่องกล้องทางทวารหนักพบการอุดกั้นที่กล้องไม่สามารถผ่านได้นั้นมีปัญหาแทรกซ้อนในช่วงการรอผ่าตัดค่อนข้างน้อย คิดเป็น 7.3% ที่จำเป็นต้องผ่าตัดเร่งด่วน โดยผู้ป่วยส่วนใหญ่รอการผ่าตัดประมาณ 2-3 สัปดาห์ได้ โดยไม่ได้มีผลกระทบต่ออัตราการรอดชีวิตของผู้ป่วยในแต่ละระยะของโรค ซึ่งสามารถรอเพื่อเตรียมความพร้อมก่อนการผ่าตัดหรือผลวินิจฉัยทางรังสีและชิ้นเนื้อได้ และพบว่าเป็นปัจจัยในการพยากรณ์โรคที่ไม่ดีในผู้ป่วยระยะที่ 2 และ 3