Frequency of Occult Colon Cancer in Diverticulitis Patients at Vajira Hospital

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Abstract

Objective: Current recommended diagnostic methods for diverticulitis include computed tomography (CT) and follow-up colonoscopy to exclude a cancer diagnosis. This study aimed to determine the prevalence of occult colon cancer in diverticulitis patients due to similar CT findings.

Methods: This was a retrospective analysis of patients diagnosed with acute diverticulitis by CT at Vajira Hospital between 2012 and 2017. Data on sex, age, BMI, laboratory parameters, smoking status, alcohol consumption, clinical presentation, and modified Hinchey classification were collected. Risk factors for the discovery of colon cancer after an acute diverticulitis diagnosis by CT were identified by chi-squared test.

Results: We included all 91 patients diagnosed with diverticulitis by CT scan and reported by a radiologist. Five patients were excluded because they had not undergone colonoscopy after their diverticulitis subsided. The mean age was 69.1 years (range, 35–96 years), and 54.7% were male. The main presenting symptom was abdominal pain (69.8%). Diverticulitis occurred most frequently in the sigmoid colon (52.3%). Colon cancer was observed in eight diverticulitis patients (9.3%). The factors associated with colon cancer occurrence were the location of the disease in the sigmoid colon ($P = 0.038$), clinical presentation of abdominal pain ($P = 0.002$), and Hinchey II score ($P < 0.001$).

Conclusion: Occult colon cancer could be found in diverticulitis patients because of some mimicking imaging features in 9.3% of patients, and therefore, all patients diagnosed with diverticulitis should undergo colonoscopy after their disease has subsided, especially those at least 65 years of age, those with sigmoid diverticulitis, and those with Hinchey classification II, as they are at a higher risk for colon cancer.

Keywords: colonoscopy, diverticulitis, prevalence occult colon cancer, retrospective studies

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อัตราการพบมะเร็งลำไส้ใหญ่ในผู้ป่วยที่ได้รับการวินิจฉัยถุงผนังลำไส้อักเสบในวชิรพยาบาล

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บทคัดย่อ

บทนำ: ปัจจุบันการตรวจโดยเอกซเรย์คอมพิวเตอร์ช่องท้องถือเป็นการตรวจที่ดีที่สุดเพื่อช่วยในการวินิจฉัยโรคถุงผนังลำไส้อักเสบ และตามด้วยการส่องกล้องตรวจลำไส้ใหญ่เพื่อตรวจหามะเร็งลำไส้ การศึกษานี้เพื่อหาอัตราการพบมะเร็งลำไส้ใหญ่ในผู้ป่วยที่ได้รับการวินิจฉัยโรคถุงผนังลำไส้อักเสบจากเอกซเรย์คอมพิวเตอร์ช่องท้อง

วิธีดำเนินการวิจัย: การศึกษาย้อนหลังเชิงพรรณนาในผู้ป่วยที่ได้รับการวินิจฉัยโรคถุงผนังลำไส้อักเสบจากเอกซเรย์คอมพิวเตอร์ช่องท้องที่รับการรักษาในวชิรพยาบาลตั้งแต่ปี 2555-2560 โดยเก็บข้อมูลเพศ อายุ น้ำหนัก ดัชนีมวลกาย ผลเลือดทางเคมี ข้อมูลการสูบบุหรี่และแอลกอฮอล์ ลักษณะอาการและระยะตาม modified Hinchey classification และวิเคราะห์ปัจจัยและอัตราการพบมะเร็งลำไส้ใหญ่

ผลการวิจัย: ผู้ป่วยทั้งหมด 91 รายได้รับการวินิจฉัยเป็นโรคถุงผนังลำไส้อักเสบจากเอกซเรย์คอมพิวเตอร์ช่องท้อง คัดออกจากการศึกษา 5 รายเนื่องจากไม่ได้รับการส่องกล้องลำไส้ใหญ่หลังหายจากการอักเสบ พบอายุเฉลี่ย 69.1 ปี ระหว่าง 35–96 ปี (ร้อยละ 54.7) เป็นเพศชาย อาการหลักที่มาพบคืออาการปวดท้อง (ร้อยละ 69.8) พบการอักเสบเกิดขึ้นที่ลำไส้ใหญ่ส่วน sigmoid เป็นหลัก (ร้อยละ 52.3) และพบผู้ป่วยเป็นมะเร็งลำไส้ 8 ราย (ร้อยละ 9.3) ปัจจัยที่เกี่ยวข้องกับมะเร็งลำไส้ใหญ่ได้แก่ ตำแหน่งลำไส้ใหญ่ส่วน sigmoid ($P = 0.038$) อาการปวดท้อง ($P = 0.002$) และ ระยะ Hinchey II score ($P < 0.001$)

สรุป: มะเร็งลำไส้ใหญ่พบในผู้ป่วยที่ได้รับการวินิจฉัยถุงผนังลำไส้อักเสบจากเอกซเรย์คอมพิวเตอร์ช่องท้องได้ถึงร้อยละ 9.3 ดังนั้นการส่องกล้องลำไส้ใหญ่จึงมีความสำคัญที่จะต้องทำเพื่อหามะเร็งที่อาจซ่อนอยู่ โดยเฉพาะในผู้ป่วยที่มีอายุตั้งแต่ 65 ปีขึ้นไป มีอาการปวดท้องด้านซ้ายและเป็นที่ลำไส้ใหญ่ส่วน sigmoid ร่วมกับระยะ Hinchey classification II ซึ่งเป็นปัจจัยที่สำคัญในการพบมะเร็งลำไส้ใหญ่

คำสำคัญ: การส่องกล้องลำไส้ใหญ่, ถุงผนังลำไส้อักเสบ, อัตราการเป็นมะเร็งลำไส้ใหญ่, การศึกษาแบบย้อนหลัง

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Introduction

Diverticulosis is a common disease, and most patients are asymptomatic. Risk factors for diverticulosis include old age (>60 years, ~30%; >80 years, ~60%), geographic location (Western countries > Asian countries), gender (male > female), a low-fiber diet, smoking, and obesity.

Only 10%–25% patients are symptomatic. The clinical presentation varies and includes abdominal pain, perforation, and obstruction. The sigmoid colon is the most common site of the disease in Western patients, but in Asians, diverticulitis is more common in the right-sided colon (cecum and ascending colon). Right-sided diverticulitis is commonly found in younger patients and is more common in males. By contrast, left-sided diverticulitis is more common in elderly patients, but its frequency is not significantly different between genders. The initial clinical presentation of acute sigmoid diverticulitis is left lower quadrant abdominal pain, and nausea and vomiting are infrequent. Approximately 10%–33% of patients present with severe symptoms such as paracolic abscess (5%), bowel obstruction (5%), and perforation (5%).

The gold standard for the diagnosis of acute diverticulitis is computed tomography (CT)[1–3], the most common findings of which are bowel wall thickening (96%) and fat stranding (95%). Other findings that are less common but more specific for diverticulitis are fascial thickening (specificity, 96%), ascites (specificity, 45%), and inflamed diverticulum (specificity, 43%). Some findings of colon cancer on CT mimic those of diverticulitis, and therefore, the American Society of Colon and Rectal Surgeons and the American College of Gastroenterology recommend that diverticulitis patients undergo colonoscopy after the inflammation subsides in approximately 4–6 weeks[3]. Early colonoscopy in diverticulitis should be avoided because of the high risk for perforation. Rather than a colonoscopy, a barium enema should be performed at that time. Ambrosetti et al. found that 3 of 402 patients who were diagnosed with sigmoid diverticulitis also had sigmoid cancer (0.7%)[4]. Lahat et al.[5] found that 3 of 224 diverticulitis patients had colon cancer (1.3%). In addition, Sakhnini et al. reported that 1.9% of patients with acute sigmoid diverticulitis had colon cancer[6]. Colonoscopy after diverticulitis has subsided is less controversial. This study aimed to identify prevalent occult cancer in acute diverticulitis patients.

Methods

This retrospective study enrolled patients with an International Classification of Disease (ICD)-10 diagnosis code K57 (diverticular disease of the large intestine) at any point after admission to Vajira Hospital between 2012 and 2017. Patient data (age, gender, BMI, smoking, alcohol consumption, clinical presentation, duration of symptoms, laboratory parameters, prior diverticulitis, Hinchey classification, location of the disease, and surgical procedures) were obtained from electronic medical records. This study included only patients diagnosed with acute diverticulitis of colon by CT scan, which was confirmed by a radiologist.

The modified Hinchey classification was determined according to radiological findings[7]. This classification includes six stages based on radiological findings: stage 0, diverticulitis ± colonic wall thickening; stage Ia: colonic wall thickening with paracolic soft tissue changes; stage Ib, Ia changes + paracolic or mesocolic abscess; stage II, Ia changes + distant abscess (generally deep in the pelvis or interloop regions); stage III, free perforation with purulent peritonitis; and stage IV, the same findings as stage III plus fecal peritonitis.

Colonoscopy was performed between 6 and 12 months of follow-up. The diagnosis of colorectal cancer was based on the pathological findings of the biopsied tissue obtained during colonoscopy or during surgery. This study was approved by the Committee on Human Rights Related to Research Involving Human Subjects, Faculty of Medicine, Vajira Hospital, Navamindradhiraj University (Protocol Number: ID 009/61).

Statistical analysis

Normally distributed data were tested by Student's t-test, and chi-squared test was used for the statistical analysis. All data analyses were performed using IBM SPSS Statistics version 22.

Results

As shown in Tables 1 and 2, a total of 91 patients were clinically and radiologically diagnosed with acute colonic diverticulitis. Five patients who did not undergo colonoscopy after their disease subsided were excluded. Therefore, 86 patients were analyzed. The mean age of the patients was

Table 1:
Demographic data of colonic diverticulitis patients

	n	% of total
Characteristics		
<60	15	17.4
60–65	14	16.3
>65	57	66.3
BMI (kg/m^2)	24.53	4.53
<25	54	62.8
>25	32	37.2
Gender		
Male	47	54.7
Female	39	45.30
Smoking (pack/year)		
None	78	90.7
<15	5	5.8
15–30	1	1.2
>30	2	2.3
Alcohol consumption (grams/day)		
None	81	
<20	3	3.5
>20	2	2.3
Underlying disease		
COPD	3	3.5
Chronic kidney disease	7	8.1
Coronary artery disease	11	12.8
Diabetes Mellitus	25	29.1
Hyperlipidemia	25	29.1
Hypertension	43	50
Others (e.g., gout, HBV, and HCV)	36	41.9

69.1 ± 13.8 years, and 54.7% were male. The mean BMI was 24.5 ± 4.5 kg/m^2. The most common clinical presentations were abdominal pain (69.8%), bleeding (26.7%), and obstruction (3.5%). The locations of the disease were the sigmoid colon (52.3%), ascending colon (19.8%), cecum (17.4%), descending colon (5.8%), and multiple sites (4.7%). In all, 63 (73.3%) patients were diagnosed with uncomplicated acute diverticulitis or Hinchey I disease. Acute diverticulitis occurred in the sigmoid colon in 52.3%, in the right colon in 37.2% (ascending and cecum), and in the descending colon in 5.8%. Colonoscopy was performed after the acute diverticulitis subsided, and consequently, colon cancer was found in eight diverticulitis patients (9.3%). Leukocytosis was found in 52.3% of patients.

Table 2:
Clinicopathological characteristics

	(N = 86)	% of total
Clinical presentation		
Abdominal pain	60	69.8
Bleeding	23	26.7
Obstruction	3	3.5
Duration of symptoms		
<1 month	76	88.4
>1 month	10	11.6
Location		
Cecum	15	17.4
Ascending colon	17	19.8
Sigmoid colon	45	52.3
Multiple (>1 site)	4	4.7
Modified Hinchey classification		
I	63	73.3
II	13	15.1
III	1	1.2
IV	9	10.5
Leukocytosis (>10,000)	45	52.3
Recurrence		
None	64	74.4
>1 time	19	22.1
>4 times	3	3.5
Length of hospital stay (days)		
<7	52	60.5
>7	34	39.5
Occult cancer	8	9.3

As shown in Table 3, a subgroup analysis of the colon cancer group found that most cancer patients were female (62.5%) and older than 60 years (87.5%), but these values were not significantly different from those of the noncancer group. The mean age of patients with both colon cancer and diverticulitis in our study was 65.8 years. Most patients presented with abdominal pain (75%). The most common disease location was the sigmoid colon (75%), which was statistically significant (P = 0.038). Leukocytosis was found in approximately 52% of patients (P = 0.89). Six patients (75%) with colon cancer were diagnosed with Hinchey II diverticulitis (75%, P = 0.000).

As shown in table 4 specific data about eight patients who were diagnosis cancer; all of them age older than 55 years old. The most presentation was abdominal pain which prolong period less than 12 months as non occult cancer were. All of occult cancer patients have the same location of CT diagnosis of diverticulitis.

Discussion

The incidence of diverticulosis increases with age. Most cases of diverticulosis in Western countries involve the left side of the colon, and diverticulosis is predominantly present on the right side of the colon in Asian countries. The incidence of diverticulitis also increases with age; like diverticulosis, colonic diverticulitis is predominantly located on the left side of the colon in Western countries[8], and is located on the right side of the colon in only 1.5% of patients[9]. The mean age at admission of acute diverticulitis patients is 63 years[10]. The prevalence of diverticulitis is higher in women than in men, and although a male preponderance was noted in early series, subsequent studies have suggested either an equal distribution between the sexes or a female preponderance.

In our study, of 86 patients, the mean age of acute diverticulitis patients was 69.15 years. We classified patients into three groups according to age: 17.44% were 60 years of age or younger, 16.27% were 60–65 years, and most patients (66.27%) were older than 65 years, which is in agreement with other reports[11-12]. In an opposing paper from South Korea, Lim et al. reported[13] that the mean age of the population with acute diverticulitis was 43.2 ± 17 years and was significantly higher in patients with left-sided (57.0 ± 15.7) diverticulitis than in those with right-sided (41.4 ± 13.4) disease, but most patients in this population had right-sided diverticulitis. Similar to other studies in Asian countries, our study reported a difference in mean age because all populations were admitted, which indicates low intake, severe clinical presentation, and the presence of more than two comorbidities, which are commonly observed in older patients. Some mild right-sided diverticulitis cases reported in Thailand did not improve and were resolved by outpatient clinic treatment. In the subgroup analysis, our study reported that 48.8% of 86 acute diverticulitis patients were 70 years old or older. Physicians should pay attention to these differences to better treat fragile patients and as a consideration for future surgery.

Table 3:

Subgroup analysis of the cancer group

	Cancer found N = 8 (%)	Chi-squared	P-value
Sex (female)	5 (62.5%)	1.047	0.306
Age > 60 years	7 (87.5%)	0.294	0.588
Abdominal pain	4 (50%)	12.205	0.002
Sigmoid location	6 (75%)	10.144	0.038
Leukocytosis	4 (50%)	0.19	0.89
Modified Hinchey II	6 (75%)	25.507	0

Table 4:

Demonstrate all of occult cancer in the patients who was diagnosis colonic diverticulitis by CT scan

No	Sex	Age (years)	BMI (kg/cm^2)	Clinical	Timing	Hct (%)	Leukocytosis ($cell/mm^3$)	N (%)	Location	Operation	Staging	CEA (ng/ml)	CT finding
1	M	75	17.26	Obstruction	1- 6 months	29.4	7410	79.2	Descending	Lt hemicolectomy with transverse loop colostomy	2B	1.91	Descending and sigmoid diverticulitis, abscess
2	M	61	23.53	Abdominal pain	< 1 month	40.4	7500	61.2	Descending	Lt hemicolectomy with small bowel resection	2A	2.03	Thickening descending & sigmoid, fat stranding, abscess
3	F	60	19.29	Abdominal pain	< 1 month				Sigmoid	Sigmooidectomy	3B	5.47	Sigmoid diverticulitis with abscess
4	F	55	19.53	Bleeding	6-12months	27.7	16250	80.4	Sigmoid	Sigmoidectomy with small bowel resection	2B	18.7	Sigmoid diverticulitis, abscess
5	F	78	26.16	Obstruction	1- 6 months	32.6	17600	85	Caecum and sigmoid	Rt hemicolectomy and sigmoidectomy	1	2.21	Small bowel inflame, sigmoid & descending diverticulitis, abscess
6	F	71	34.08	Bleeding	1- 6 months	22.6	7610	57.1	Sigmoid	Sigmoidectomy with Hartmann's procedure	4		Segmental bowel thickening of sigmoid & large bowel obstruction
7	F	65	22.38	Abdominal pain	1- 6 months	34.1	11000	67.2	Sigmoid	Sigmoidectomy	2A	29.62	Sigmoid diverticulitis with abscess
8	M	62	19.83	Abdominal pain	1- 6 months	27.4	10490	82.4	Sigmoid	Sigmoidectomy	2B	22.3	Thickening sigmoid, fat stranding, large abscess

(M; male, F; female, BMI; body mass index N; neutrophil, Hct; hematocrit, CEA; carcinoembryonic antigen)

In our study, most diverticulitis cases were in the sigmoid colon (52.3%), followed by the ascending colon, cecum, and multiple sites in 19.8%, 17.4%, and 4.7%, respectively. In Western countries, studies have reported that acute sigmoid diverticulitis occurs primarily in the left side of the colon[14]. In a study from Spain in 2020, Díaz et al. reported left-sided diverticulitis in 98.44% of patients (sigmoid, 89.08%; descending colon, 9.36%)[15], whereas right-sided diverticulitis occurred in a smaller population. In a 1997 Asian study in Singapore, Wong et al.[16] reported that left-sided diverticulitis occurred in 49% of patients and ride-sided diverticulitis occurred in 38%. In a recent study from Singapore in 2019, Teo et al. performed a retrospective cohort study of 402 patients who presented between 2004 and 2013, in which right-sided diverticulitis was predominant in 73.1% and left-sided diverticulitis was observed in 23.9%[17]. In reports from Japan and Korea[14, 18-20], Kim et al.[18] reported the characteristics of 1175 patients with diverticulitis and found right-sided disease in 88.3% and left-sided disease in 11.7%. Moreover, the number of patients with right-sided colonic diverticulitis gradually increased, and the number of patients with left-sided colonic diverticulitis remained relatively steady. We identified the sigmoid colon as the most common location, which may be due to gradual changes in multiple factors, such as the living environment, dietary composition, regional obesity prevalence, and diagnostic capability, and these, in turn, are correlated with urban lifestyles in Western countries.

Leukocytosis was found in only 52.3% of all diverticulitis patients, whereas this finding was reported earlier in approximately 64%.

Abdominal CT has been demonstrated to be useful in diagnosing diverticulitis, grading the severity of the disease, assessing secondary complications, and predicting the success of conservative management. However, we found that some patients were misdiagnosed with diverticulitis on follow-up colonoscopy. In particular, the risk of cancer, although it is still low, is higher than in the average population, especially when abscesses are observed or if the disease is classified as modified Hinchey II on CT. To exclude cancer, colonoscopy is usually performed as a follow-up procedure, the findings of which can mimic the presentation and/or CT features of diverticulitis.

As a previous report from 2002 stated, the prevalence of cancer after colonoscopy was 0.7% (3/402) in patients with acute uncomplicated diverticulitis[4]. Another study in 2004 by Sakhnini et al. identified a prevalence of 1.9% (2/107)[6].

The prevalence of colorectal cancer in our study was 8 of 86 patients (9.3%). Six of eight cancer patients had neoplastic lesions at the same sites as the previously diagnosed acute diverticulitis, which suggests that these malignant lesions may have been misdiagnosed as diverticulitis even with CT evaluation. Compared with the current literature, our finding of colorectal cancer at a prevalence of 9.3% is considerably higher than that found in a large population-based systematic review and meta-analysis in 2019 by Meyer et al.[21], who reported a 1.9% prevalence of colorectal cancer in patients with acute diverticulitis and a higher colorectal cancer prevalence of 7.9% in those with complicated diverticulitis. The difference between our study and these recent studies is that most patients had uncomplicated diverticulitis and a higher incidence of colorectal cancer, which suggests that we should highly suspect occult cancer in patients 65 years of age or older who present with left lower abdominal pain. Colonoscopy is still recommended after diverticulitis subsides in approximately 6 weeks, but if cancer is a concern, earlier colonoscopy can be performed after 2 weeks by an experienced endoscopist.

The limitations of our study include its retrospective design and small population, which reduced the power of the study to detect clinically significant differences.

We did not report the definitive duration of the chief complaint; description of findings, such as fascial fat stranding; and the location of abscesses

on abdominal CT scan. Because of no standard pattern of CT record form of colonic diverticulitis, the reports from CT scan depending on experience and perspective of radiologists and not of all CT scan were official report due to emergency studies. The finding of diverticulitis, which has featured that mimic cancer, is very challenging, and it guided us to perform early colonoscopy to detect occult cancer.

We conclude that occult cancer can be found in diverticulitis patients because some abdominal CT findings mimic those of diverticulitis, especially complicated diverticulitis. After diverticulitis subsides, colonoscopy should be performed as a follow-up procedure, especially in patients with atypical CT findings, such as abscess and local perforation (modified Hinchey classification II). Here, we evaluated the prevalence of colorectal cancer in CT-proven acute colonic diverticulitis cases and found cancer at a relatively high prevalence of 9.3%.

Ethical approval

Committee on Human Rights Related to Research Involving Human Subjects, Faculty of Medicine, Vajira Hospital, Navamindradhiraj University. Protocol Number: ID 009/61.

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