

RAPID COMMUNICATION

## Clinical investigation of 41 patients with ischemic colitis accompanied by ulcer

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### Abstract

**AIM:** To investigate the relationship among the presence of ulcer lesions, underlying disease, and clinical course in patients with ischemic colitis.

**METHODS:** The subjects were 41 patients (10 male and 31 female; mean age 70 years) with ischemic colitis who were admitted to and received treatment in our hospital from 2000 to 2006. We compared their characteristics and analyzed the mean lengths of admission and fasting for 9 patients with ulcer lesions (ulcer group) and 32 without (non-ulcer group).

**RESULTS:** The groups with presence and absence of ulcer differed significantly only in white blood cell (WBC) count. Lengths of fasting and admission were 7.9 d and 17.9 d for the ulcer group and 4.4 d and 10.7 d for the non-ulcer group, respectively, and significantly longer in the ulcer group ( $P = 0.0057$  and  $0.0001$ ). There was no correlation between presence of ulcer and presence of underlying diseases.

**CONCLUSION:** Lengths of fasting and admission were significantly longer in patients with ischemic colitis with ulcer than for those without ulcer.

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**Key words:** Ischemic colitis; Ulcer; Fasting; Admission; White blood cell

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### INTRODUCTION

Ischemic colitis was first reported as a result of reversible vascular occlusion of the colon in 1963 by Boley *et al*<sup>[1]</sup>, and in 1966 Marston *et al*<sup>[2]</sup> suggested the name “ischemic colitis” for it and clarified its clinical and histopathological features.

Marston *et al*<sup>[2]</sup> classified this disease into 3 forms, transient, strictures, and gangrene. It is defined as a “reversible condition caused by obstruction of blood flow in intestinal tract mucosa without apparent blockage of the main artery”. In general, it is common in the elderly<sup>[3]</sup>, and its prevalence increases with age, although it is seen in younger patients as well<sup>[4-6]</sup>. Its causes include vascular factors such as ischemia and embolus<sup>[7-9]</sup>, intestinal factors such as constipation<sup>[5,10]</sup>, irritable bowel syndrome<sup>[11,12]</sup> and history of intestinal surgery<sup>[13,14]</sup> as well as administration of drugs such as alosetron<sup>[11]</sup>, cocaine<sup>[15]</sup>, non-steroidal anti-inflammatory drugs<sup>[16]</sup>, oral contraceptives<sup>[17]</sup> and oral laxatives<sup>[18]</sup>.

While surgery is indicated for the gangrenous form of this disease, transient and stricturing forms are often ameliorated by bowel rest, fasting, and parenteral fluid administration alone. The lengths of fasting and admission vary among individuals. Significant prolongation of healing is sometimes observed, especially in patients with ulcer. We therefore examined the associations among etiology, clinical course, and presence of ulcer lesions in patients with transient and stricturing forms of ischemic colitis.

### MATERIALS AND METHODS

The subjects were 41 patients (10 male and 31 female; mean age 70 years) with ischemic colitis who were admitted to and received treatment in our hospital from 2000 to 2006. Patients who developed ischemic colitis during admission for other diseases were excluded. Ischemic colitis was diagnosed comprehensively based on the essential criteria including lack of antibiotic administration, negative bacterial culture of feces or biopsy, lack of history of inflammatory bowel disease (IBD), as well as endoscopic and histopathological findings on biopsy. Age and mode of disease onset, symptoms and affected sites were included as complementary parameters.

Patients were divided into 2 groups by the presence of ulcer lesions and compared for age, gender, affected sites, hematological findings, performance status (0-4, 0: asymptomatic; 1: symptomatic but completely ambulant; 2: symptomatic, < 50% in bed during day time; 3:

Table 1 Clinical features of ischemic colitis patients: Comparison between ulcer and non-ulcer groups (mean  $\pm$  SD)

Clinical features	Ulcer group (n = 9)	Non-ulcer group (n = 32)	Statistical significance
Age (mean, range, yr)	68 $\pm$ 19 (35-87)	71 $\pm$ 11 (42-92)	NS
Percentage of females (%)	77.8	75.0	NS
Lesion location: left colon (%)	88.9	100	NS
Performance status 0-1 (%)	77.8	87.5	NS
WBC ( $\times 10^9$ /L)	12.27 $\pm$ 4.67	8.44 $\pm$ 3.17	P = 0.0065
CRP (mg/dL)	2.6 $\pm$ 4.1	1.5 $\pm$ 2.3	NS
K (mEq/L)	3.8 $\pm$ 0.4	4.0 $\pm$ 0.5	NS
Total cholesterol (mg/dL)	179.3 $\pm$ 30.6	191.4 $\pm$ 35.6	NS
TG (mg/dL)	93.3 $\pm$ 41.0	73.2 $\pm$ 23.4	NS
LDH (IU/L)	190.0 $\pm$ 42.8	203.8 $\pm$ 37.8	NS
CPK (IU/L)	80.7 $\pm$ 38.9	82.7 $\pm$ 39.5	NS

Percentage of females and lesion location were evaluated with an  $\chi$ -square test; Other data were evaluated with Student's *t* test after skewing with log transformation. CRP: C-reactive protein; K: potassium; TG: triglyceride; LDH: lactate dehydrogenase; CPK: creatinine phosphokinase.

Table 2 Underlying diseases: Comparison between ulcer and non-ulcer groups n (%)

	Ulcer group (n = 9)	Non-ulcer group (n = 32)	Statistical significance
Hypertension	6 (66.7)	19 (59.4)	NS
Hyperlipemia	0	6 (18.8)	NS
Diabetes mellitus	1 (11.1)	3 (9.4)	NS
Atrial fibrillation	1 (11.1)	1 (3.1)	NS
Cerebral infarction	1 (11.1)	2 (6.3)	NS
Chronic constipation	5 (55.6)	19 (59.4)	NS
Medications			
NSAIDS	0	1 (3.1)	NS
Antihypertensive agents	5 (55.6)	18 (56.3)	NS
Others	2 (22.2)	5 (15.6)	NS
History of abdominal surgery	4 (44.4)	14 (43.8)	NS

Percentages were evaluated with an  $\chi$ -square test. NSAIDS: non-steroidal anti-inflammatory agents.

symptomatic, > 50% of time in bed, but not bed bound; 4: bed bound, using the WHO score criteria), underlying disease (hypertension, hyperlipemia, diabetes, chronic atrial fibrillation, cerebral infarction, constipation, and history of abdominal surgery), oral medications, and mean lengths of fasting and admission.

All patients underwent endoscopy of the lower gastrointestinal tract within 3 d after admission and 5 d after disease onset. As treatment, fasting and bowel rest with fluid replacement were used in all patients. Twenty-two (53.7%) patients received oral antitflatulents and 13 (31.7%) patients a combination with antibiotics. Total parenteral nutrition *via* a central venous line was performed in none of the patients. After disappearance of abdominal pain, patients were allowed to begin oral ingestion. Patients were discharged if they exhibited no relapse of symptoms after restarting oral ingestion.

### Statistical analysis

Data are expressed as mean  $\pm$  SD or percentage. Percentage of females, lesion location, performance status and underlying systemic diseases were evaluated with an X-square test. Other data were evaluated with Student's *t* test after skewing variable with log transformation. All data analysis was performed with the StatView 5.0. Statistical significance was set at *P* < 0.05.

## RESULTS

Forty-one patients were analyzed (10 male and 31 female; mean age 70 years). Affected sites included the sigmoid colon (70.7%), descending colon (51.2%), transverse colon (12.2%), rectum (4.9%), and ascending colon (2.4%), with some overlap. The disease developed in 92.7% of the patients for the first time, and the remaining 7.3% for the second time. The disease was accompanied by ulcer in 9 (22.0%) patients.

Nine patients had ulcer (2 male and 7 female; mean age 66, range 35-87 years), the affected site was the left hemicolon in 8 patients. On the other hand, 32 patients had no ulcer (8 male and 24 female; mean age 71, range 42-92 years), the affected site was in the left hemicolon in all of them. In both groups, underlying diseases including hypertension, hyperlipemia, diabetes, atrial fibrillation, cerebral infarction, chronic constipation, and history of abdominal surgery, as well as oral medications, performance status, and hematological findings were examined as parameters. The significant difference was found between groups only in white blood cells (WBC), which was higher in the ulcer group (12.27  $\times 10^9$ /L) than in the non-ulcer group (8.44  $\times 10^9$ /L, *P* = 0.0065; Table 1). There were no statistically significant differences between groups in other parameters (Table 1 and Table 2).

Lengths of fasting and admission were 7.9 d and 17.9 d for the ulcer group and 4.4 and 10.7 d for the non-ulcer

Table 3 Durations of fasting and hospitalization: Comparison between ulcer and non-ulcer groups (mean  $\pm$  SD)

	Ulcer group (n = 9)	Non-ulcer group (n = 32)	Statistical significance
Fasting (d)	7.9 $\pm$ 4.1	4.4 $\pm$ 2.9	P = 0.0057
Hospitalization (d)	17.9 $\pm$ 6.8	10.7 $\pm$ 3.6	P = 0.0001

group, respectively, being significantly longer in the ulcer group ( $P = 0.0057$  and  $0.0001$ ; Table 3).

## DISCUSSION

The etiology of ischemic colitis remains unclear. However, it may involve combination of vascular factors such as hypertension or hyperlipemia and intestinal factors such as chronic constipation and history of abdominal surgery. These may cause reduction of blood flow in the mucosa or wall of the intestinal tract, leading to ischemia. In the present study, patients with hypertension (61%), chronic constipation (58.5%), and history of abdominal surgery (43.9%) exhibited higher prevalence of ischemic colitis, which are consistent with previous reports<sup>[19,20]</sup>.

Tohda *et al*<sup>[7]</sup> detected the correlation between arteriosclerosis and ischemic colitis using pulse wave velocity (PWV) as an indicator related to vascular factors, and reported higher PWV levels for the elderly. Similarly, we compared the contributions of vascular and intestinal factors to the occurrence of ischemic colitis in age, and observed that 2 (25%) patients developed the disease because of vascular factors and 7 (87.5%) patients because of intestinal factors among the eight younger patients aged less than 60 years. This indicates that vascular factors contribute predominantly to development of ischemic colitis.

In the present study, only WBC at admission was correlated with presence of ulcer. Notably, no difference in number of WBC between *H pylori*-infected patients with gastritis and those with ulcer has been noted<sup>[21]</sup>. Additionally, little difference has been reported in number of WBC between those with active disease and those with inactive disease in patients with inflammatory bowel disease<sup>[22]</sup>. Bjornestad *et al*<sup>[23]</sup> performed three routine laboratory tests (white blood cell count, hemoglobin concentration and erythrocyte volume fraction) in patients with four acute abdominal diseases (acute mesenteric ischemia: AMI, perforation of colon, perforation of peptic ulcer and intestinal obstruction). The WBC in patients with AMI was significantly higher than the normal range. The three variables were higher in AMI patients than in the other patients ( $P < 0.001$ ). The discriminant analysis of the variables classified 80% of the patients correctly into AMI and non-AMI groups. This difference may reflect the inflammatory response in the acute stage and biological reactions associated with continued chronic inflammation.

This is the first report on lengths of fasting and admission in patients with ischemic colitis. In the present study, these lengths were 7.9 d and 17.9 d for the ulcer group and 4.4 d and 10.7 d for the non-ulcer group, respectively, being significantly longer in the ulcer group. Although we did not evaluate patient quality of life

(QOL), stress on patients due to fasting and prolonged admission may cause a decrease in QOL. In addition, the costs associated with prolonged admission also causes a problem.

Strategies for the treatment of ischemic colitis are determined based on the severity of ischemia. Surgery is indicated for the gangrenous form of the disease. On the other hand, for transient and stricturing forms of the disease, younger patients may obtain prompt relief solely with follow-up, while older patients or those who have severe abdominal pain will require hospitalization, fasting, and management using parenteral fluid administration.

Lengths of fasting and admission were significantly longer in patients with ischemic colitis with ulcer than in those without ulcer. Ulcer associated with ischemic colitis is often localized in the left hemicolon. Noninvasive and local ulcer treatment such as use of enema preparations in addition to conventional treatment centering on bowel rest should be considered for ischemic enteritis accompanied by ulcer.

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