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Management of Right-Sided Diverticulitis: A Retrospective Review from a Hospital in Japan

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Abstract

Purpose. Right-sided diverticulitis is a rare clinical entity in Western countries; however, in some Asian countries diverticulitis affects the right side of the colon more often than the left side. This study aims to establish some guidelines for patients with right-sided diverticulitis because at present, there are only guidelines for those with acute left-sided diverticulitis.

Methods. A review was conducted of the medical records of patients with acute right-sided diverticulitis admitted to Okinawa Prefectural Chubu Hospital, a teaching hospital in Japan, between 1994 and 2005.

Results. Right-sided diverticulitis was identified in 110 patients. The mean age of these patients was significantly lower than that of those with left-sided diverticulitis (43.4 ± 14.8 years vs 54.8 ± 17.4 years, respectively). Emergency laparotomy was performed for suspected acute appendicitis in 10 patients. Initial conservative therapy did not fail in any of the remaining 100 patients, although 5 underwent subsequent elective surgery, and 8 (8.4%) of the remaining 95 suffered recurrent right-sided diverticulitis, which was treated successfully with conservative therapy.

Conclusion. Patients with acute right-sided diverticulitis seldom require emergency surgery unless acute appendicitis is misdiagnosed preoperatively. Most cases of uncomplicated right-sided diverticulitis, even if it is recurrent, can be treated conservatively.

Key words Right-sided diverticulitis · Management · Surgical indication · Japan

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Introduction

Acute diverticulitis is a common reason for surgical admissions. In Western countries, the sigmoid colon is the segment of the large bowel with the highest incidence of diverticula, and by far the most frequent site of involvement.[1] However, the situation is very much the reverse in Asian countries such as Japan.[2,3] The clinical presentation of right-sided diverticulitis, particularly cecal diverticulitis, often resembles that of other causes of right lower quadrant pain.[4] Consequently, in the past, more than 70% of patients with cecal diverticulitis underwent surgery based on a preoperative assumptive diagnosis of acute appendicitis.[5,6] Fortunately, ultrasonography and computed tomography (CT) are now used efficiently for distinguishing acute appendicitis[7] and right-sided diverticulitis.[8,9] Several guidelines for the treatment of left-sided diverticulitis have been established,[10–13] but no consensus has been reached regarding the management of right-sided diverticulitis. Thus, the study was conducted to elucidate whether patients with right-sided diverticulitis can be treated using similar criteria to that for left-sided diverticulitis, by reviewing the experience of an affiliated hospital in treating right-sided diverticulitis versus left-sided diverticulitis.

Patients and Methods

Patient Selection

A review was conducted of the clinical records of patients treated for a diagnosis of acute diverticulitis between 1994 and 2005 at Okinawa Prefectural Chubu Hospital, a regional teaching hospital in Japan. Data on patient demographics, presenting symptoms and signs, laboratory and radiographic findings, preoperative diagnosis, operative details, duration of hospitalization,

and complications and deaths were collected for comparison between right- and left-sided diverticulitis.

Diagnosis of Diverticulitis

The initial workup of a patient with suspected diverticulitis included taking a thorough history and physical examination. If the diagnosis of diverticulitis was in question, then abdominal ultrasonography or CT with intravenous contrast was done. Intraoperatively, perforation or inflammatory reaction of the colonic diverticula was diagnosed as diverticulitis.

Treatment of Acute Diverticulitis

If a clinical diagnosis of colonic diverticulitis was made preoperatively, conservative therapy with bowel rest and intravenous antibiotics was started. Surgical intervention was reserved for "complicated diverticulitis" such as abscess, free perforation, fistula, or obstruction. Elective colectomy was not routinely performed for patients younger than 50 years. This strategy was also applied to recurrent diverticulitis.

Definitions

Colonic diverticulitis was categorized according to the affected side. Right-sided diverticulitis was defined as the inflammation of diverticula in the cecum, ascending colon, or proximal transverse colon; whereas left-sided diverticulitis was defined as the inflammation of diverticula in the sigmoid colon, descending colon, or distal transverse colon. Recurrence of diverticulitis was diagnosed when a patient presented with the same symptoms and clinical findings as when the initial diagnosis of diverticulitis was made. The episode had to occur ≥1 month after a prior episode, after a symptom-free interval.[14]

Statistical Analysis

Values are expressed as mean ± standard deviation. Categorical variables were analyzed using the χ^2 test or Fisher's exact test. Continuous variables were analyzed using the Mann–Whitney *U*-test. Values of $P < 0.05$ were considered significant.

Results

Patients' Characteristics

Acute colonic diverticulitis was diagnosed in 145 patients during the study period; as right-sided in 110 and left-sided in 38, including 3 patients who displayed separate episodes of diverticulitis on both sides. A total of 1114 appendectomies were performed during the same period. The ratio of right-sided diverticulitis to appendicitis was approximately 1:10. All patients were Asian, and comprised 144 Japanese and 1 Taiwanese. The patient demographics are shown in Table 1. The mean age of the patients with right-sided diverticulitis was 43.3 ± 14.8 years versus 54.8 ± 17.4 years for patients with left-sided diverticulitis ($P < 0.05$). No significant difference in gender was identified between patients with right- and left-sided diverticulitis. Cardiovascular disease tended to be more common in patients with left-sided diverticulitis (right, 16.4%; left, 31.6%, $P < 0.05$). No other significant difference in patient comorbidity was apparent (Table 1).

Presenting Signs and Symptoms

The clinical manifestations of diverticulitis are shown in Table 2. Fewer than half of the patients with right-sided diverticulitis suffered nausea and vomiting or anorexia (23.7% and 38.1%, respectively). Only 29 (24.6%) presented with high-grade fever (>38°C) and 43 (36.4%)

Table 1. Patient demographics and pre-existing conditions

Variable	Right-sided diverticulitis ($n = 110$)	Left-sided diverticulitis ($n = 38$)	*P* value
Age (years)	43.3 ± 14.8	54.8 ± 17.4	0.005
Male	61 (55.5%)	18 (47.4%)	0.388
Female	49 (44.5%)	20 (52.6%)	
Body weight (kg)	61.9 ± 12.8	61.6 ± 14.9	0.938
Comorbidity			
Cardiovascular	18 (16.4%)	12 (31.6%)	0.044
Pulmonary	6 (5.5%)	1 (2.6%)	0.868
Diabetes	7 (6.4%)	2 (5.3%)	0.806
End-stage renal disease	4 (3.6%)	3 (7.9%)	0.533
Steroid or immunosuppressant	3 (2.7%)	3 (7.9%)	0.359
Connective tissue disease	2 (1.8%)	2 (5.3%)	0.583

Table 2. Presenting signs and symptoms of diverticulitis

	Right side ($n = 118$)	Left side ($n = 48$)	P value
Nausea/Vomiting	28 (23.7%)	11 (22.9%)	0.910
Anorexia	45 (38.1%)	18 (37.5%)	0.939
Fever (>38.0°C)	29 (24.6%)	7 (14.6%)	0.226
RLQ or LLQ tenderness	111 (94.1%)	43 (89.6%)	0.495
RLQ or LLQ rebound	77 (65.3%)	27 (56.3%)	0.276
RLQ or LLQ mass	1 (0.8%)	1 (2.1%)	0.902
Leukocytosis (WBC >10000)	84 (71.2%)	34 (70.8%)	0.963

RLQ, right lower quadrant; LLQ, left lower quadrant; WBC, white blood cells

Table 3. Emergency surgery in patients with diverticulitis

	Right side	Left side
Emergency operation rate*	9.1% (10/110)	16.6% (6/38)
Appendectomy	7	0
Diverticulectomy	2	0
Diversion/ostomy	0	6
Resection and primary anastomosis	1	0
None	0	0
Other	0	0
Recurrence rate**	8.4% (8/95)	21.4% (6/28)

In 10 patients with right-sided diverticulitis, acute appendicitis was presumed preoperatively
* $P = 0.399$, ** $P = 0.117$

complained of migration pain, which is common in acute appendicitis. On physical examination, most (94.1%) patients had abdominal tenderness, with rebound tenderness in 77 (65.3%). Laboratory tests revealed leukocytosis in 84 (71.2%) patients.

Diagnosis

Emergency laparotomy was performed for a preoperative diagnosis of appendicitis in 10 of the 110 patients with right-sided diverticulitis. The diagnosis of diverticulitis was confirmed intraoperatively in all 10 patients. The rate of emergency surgery was significantly lower in the patients with right-sided diverticulitis than in those with left-sided diverticulitis (Table 3). Clinical findings and imaging investigations led to the correct diagnosis of acute right-sided diverticulitis in the other 100 patients. Ultrasonography and CT were used for the diagnosis in 96 (87.3%) and 86 (78.2%) patients, respectively.

Treatment and Follow-Up

Complicated diverticulitis was diagnosed after the intraoperative discovery of abscess formation in one patient, who subsequently underwent right hemicolectomy. The other nine patients underwent appendectomy ($n = 7$) or diverticulectomy ($n = 2$). No postoperative complications were identified (Fig. 1).

The 100 patients who did not undergo surgery were treated with bowel rest and intravenous antibiotics. No failure of conservative treatment was encountered. The mean duration of hospitalization was 8.0 days in the conservative management group and the duration of intravenous antibiotic administration was 4.8 days. Elective right hemicolectomy was performed in five patients. Indications for surgery were influenced by the medical conditions such as an immunocompromised state or the inability to exclude carcinoma. There were no deaths among the patients with right-sided diverticulitis.

Recurrence

Eight (8%) patients suffered an uncomplicated recurrent episode of right-sided diverticulitis and one (1%) suffered an uncomplicated recurrent episode of left-sided diverticulitis (Table 3). All patients were successfully managed conservatively. No cases of a third episode of right-sided diverticulitis were identified.

Discussion

Acute diverticulitis is one of the most common causes of acute abdomen in Western countries. The location of diverticula in different populations is of particular interest, as they predominantly involve the left side in

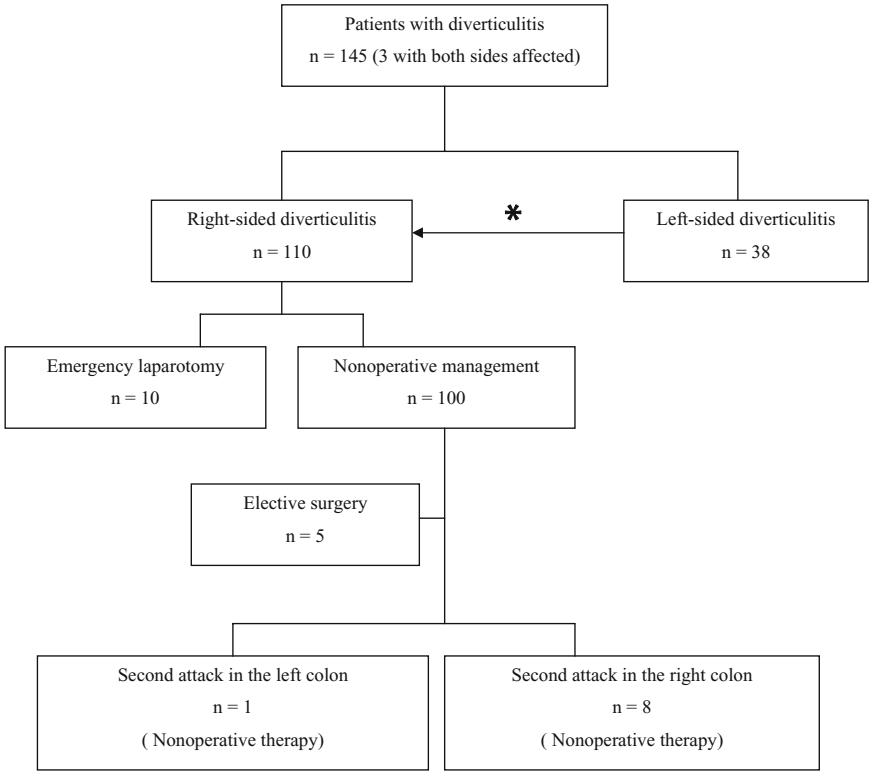

Fig. 1. Clinical course of the patients with right-sided diverticulitis. *Asterisk*: second attack after left-sided diverticulitis in two patients

Western countries, and the right side in Japan and other Asian countries.[2,15] The etiology of this difference remains unclear. Originally, right-sided diverticula in Western countries were thought to be congenital and to differ completely from the left-sided form.[15] Furthermore, some authors insisted on different pathophysiologies of cecal diverticulitis in Western and Asian populations.[16] However, a postmortem survey of cecal diverticula in 10 subjects from a Western population revealed false diverticula in all cases,[17] calling this hypothesis into question.

The patient with right-sided diverticulitis often presents with right lower quadrant pain closely mimicking acute appendicitis. Accurate diagnosis is an imperative part of the management of right-sided diverticulitis because surgery is usually necessary for acute appendicitis. Physical examination and laboratory findings have both failed in differentiating between these two conditions. According to some previous reports, a preoperative misdiagnosis of acute appendicitis was made in more than half the patients with right-sided diverticulitis.[6,18] Emergency laparotomy was performed for a preoperative misdiagnosis of acute appendicitis in only 10 (9.1%) patients in this series, which is probably due to the increasing use of sophisticated imaging modalities. Nowadays, carefully performed ultrasonography has a sensitivity of 75%–90% and a specificity of 86%–100% for the diagnosis of acute appendicitis, and CT has a sensitivity of 90%–100% and a specificity of 91%–99%.[19] We performed ultrasonography and CT of the abdomen in 87.6% and 76.3% of our patients with right-sided diverticulitis, respectively. Before introducing the selective use of ultrasonography and CT for suspected appendicitis in the 1980s, the negative appendectomy rate in our institute was 10.5%, but this has improved to 2.7% in the last decade. Considering the overall negative appendectomy rate, right-sided diverticulitis is still difficult to differentiate from acute appendicitis.

The current recommendations for the treatment of diverticulitis usually focus on the left colon.[10–13] A nonoperative approach with antibiotics is the initial treatment of choice for uncomplicated left-sided diverticulitis; however, surgical intervention is indicated for complicated diverticulitis with abscess, fistula, obstruction, or free intra-abdominal perforation. A consensus has not yet been reached regarding the initial management of right-sided diverticulitis. Most reports from Asia have concluded that initial conservative therapy is feasible for uncomplicated right-sided diverticulitis, as for left-sided diverticulitis;[6,14] however, some authors recommend aggressive surgical treatment, particularly when confronted with uncomplicated diverticulitis.[16,20] Although ileocecal resection was performed in one patient with complicated diverticulitis, of the nine patients with intraoperatively diagnosed uncomplicated diverticulitis, two underwent diverticulectomy and seven underwent appendectomy alone. Patients who underwent operations in which inflamed diverticula

were left untreated had an uneventful postoperative course and no recurrences were identified. Moreover, 100 patients recovered with conservative therapy.

Diverticular disease, particularly in the left colon, is uncommon in patients younger than 40 years.[21,22] Furthermore, left-sided diverticulitis in young patients has been described as being more virulent, with a higher risk of perforation and recurrence.[23] Nevertheless, several observational studies have concluded that young patients with left-sided diverticulitis should be treated using the same criteria as for older patients.[24,25] My data revealed a mean age of less than 50 years old for patients with right-sided diverticulitis, which was significantly younger than that of the patients with left-sided diverticulitis. A similar finding was reported from a non-Asian region.[9] The favorable natural course of diverticulitis in younger patients does not lend itself to the recommendation of elective surgery after a single episode.

The timing of elective colectomy for recurrent diverticulitis is not clearly defined, and decisions should be made on a case-by-case basis.[26] The purpose of elective surgery is to prevent recurrence because traditionally, with each recurrent episode, the patient is less likely to respond to medical therapy.[27] Some reports object to a policy of elective colectomy after recovery from uncomplicated acute left-sided diverticulitis.[28,29] There is no clear evidence that elective colectomy decreases the likelihood of emergency surgery or overall mortality. Moreover, no clear correlation exists between number of recurrences and the likelihood of response to medical therapy of right-sided diverticulitis. My data support the findings of a previous study from Japan, in which patients with recurrent acute uncomplicated right colonic diverticulitis responded to medical therapy regardless of the number of recurrences.[14] Of course, medical conditions such as immunocompromised status must be taken into consideration when examining the feasibility of elective surgery.

In conclusion, considering the generally favorable course of acute right-sided diverticulitis, most cases can be treated successfully with medical therapy. Aggressive surgical therapy is not recommended for right-sided diverticulitis, even for recurrence.

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