Image-guided conservative management of right colonic diverticulitis

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Overview

INTRODUCTION

Interestingly, there is a unique predilection for diverticular disease of the colon in Western and Asian populations, and is predominant in the left colon in Caucasians[1], while much more common in the right colon in Asians[2]. Many studies have focused on left colonic diverticulitis and subsequently, therapeutic guidelines have been established, while that of right colonic diverticulitis still remains controversial[2-8]. In the past, the majority of patients with right colonic diverticulitis were faced with an operation for presumed appendicitis[3,4,9]. Thus, there is a lack of objective information for patients with right colonic diverticulitis compared with left colonic diverticulitis. Much of this information is based on case series data, which have relatively small sample sizes and the preoperative diagnosis was not made using imaging studies. Recent studies suggest that colonic diverticulitis can be correctly diagnosed by computed tomography (CT) scan[6,7], or ultrasonography (US)[11-14], and with the use of these imaging studies, right colonic diverticulitis is more common than has been previously assumed[7]. The aim of this study was to evaluate the clinical course and results of medical therapy in patients with right colonic diverticulitis, of which the final diagnosis was based on radiographic evidence from CT or US, or operative findings.

AIM: To study the clinical outcomes of medical therapy in patients with right colonic diverticulitis.

METHODS: The records of 189 patients with right colonic diverticulitis which was finally diagnosed by computed tomography, ultrasonography, or operative findings were retrospectively reviewed.

RESULTS: Of the 189 patients hospitalized for right colonic diverticulitis, the stages of diverticulitis by a modified Hinchey classification were 26 patients (13.8%) in stage 0, 139 patients (73.5%) in stage Ia, 23 patients (12.2%) in stage Ib, and 1 patient (0.5%) in stage III. Medical therapy was undertaken in 185 of 189 patients (97.9%). One hundred and eighty three of 185 patients were successfully treated with bowel rest and antibiotics. Two patients in stage Ib required a resection or surgical drainage because of an inadequate response to conservative treatment. Recurrent diverticulitis developed in 15 of 183 patients (8.2%) who responded to medical therapy. All 15 patients who suffered a second attack had uncomplicated diverticulitis, and were successfully treated with medical therapy.

CONCLUSION: Our results indicate that right colonic diverticulitis is essentially benign and image-guided conservative treatment is primarily required.

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Key words: Ascending colon; Cecum; Medical therapy; Colonic diverticulitis

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MATERIALS AND METHODS

Patients
Using computerized patient databases, we searched for all patients who were hospitalized with the diagnosis of colonic diverticulitis from January 1998 to August 2007 at Kyung Hee University Hospital, Seoul, Korea. Excluded were patients who were clinically suspected of having colonic diverticulitis without operative findings or radiologic evidence from CT or US, patients whose colonic diverticulosis alone was present without any evidence of inflammation, and those whose follow-up records were unobtainable. A total of 189 patients were retrospectively reviewed and data were collected with regard to age and sex, clinical presentation, location of disease, diagnostic studies (CT, US, barium enema, and colonoscopy), laboratory findings, type of complication, treatment modality, preoperative diagnosis, operative findings, type of operation, and outcome. The final diagnosis was based on radiographic evidence from CT or US, or operative findings. CT was performed in 138 patients (73%) and US was performed in 114 patients (60.3%). Both CT and US were performed in 80 patients (42.3%) and 17 patients underwent surgery without CT or US. Recurrence of diverticulitis was defined as the presence of the same symptoms and signs leading to re-hospitalization. Recurrence was tracked either by interviewing the patient or by telephone contact.

A modification of the Hinchey classification system was used to define the patients. \(^{15,14}\) Patients were categorized into the six stages according to CT, US, or operative findings. Complicated diverticulitis is defined as diverticulitis associated with abscess, fistula, obstruction, or free perforation. \(^{17}\) Therefore, uncomplicated diverticulitis included stage 0 and Ia, whereas complicated diverticulitis included stage Ib, II, III, and IV.

The data were analyzed using the chi-square test or Fisher’s exact test. All \(P\) values of less than 0.05 were considered to be statistically significant.

RESULTS

Characteristics and presentation of patients
Of the 189 patients hospitalized for right colonic diverticulitis, 111 were men and 78 were women. The median age of the patients was 37 years (range, 14-88 years). The mean age of women (40.4 years) was not significantly different from that of men (36.7 years) \((P = 0.088)\). One hundred and eight patients (57.1%) were under the age of 40 years. By a modified Hinchey classification, stages of diverticulitis present on admission were as follows: 26 patients (13.8%) in stage 0, 139 patients (73.5%) in stage Ia, 23 patients (12.2%) in stage Ib, and 0 patients (0%), 1 (0.5%), 0 (0%) patient in stage II, stage III and stage IV, respectively (Table 1). The majority of patients commonly presented with phlegmon. The majority of patients (87.3%) had mild diverticulitis (stage 0 or Ia) on admission and only 24 patients (12.7%) had complicated diverticulitis. The average white blood cell count was 11417 ± 275. Fever was seen in 20.6% of patients.

| Modified Hinchey classification | Total (\(n = 189\)) |
|-------------------------------|------------------|
| 0 Direct visualization of the diverticulum with Sx or Sign\(^1\) | 26 |
| Ia Confined pericolic inflammation (phlegmon) | 139 |
| Ib Confined pericolic abscess | 23 |
| II Distant intraabdominal or retroperitoneal abscess | 0 |
| III Generalized purulent peritonitis | 1 |
| IV Fecal peritonitis | 0 |

\(^1\)Right abdominal pain, leukocytosis, or fever with no radiologic evidence of appendicitis. Sx: Symptom.

Figure 1

Recurrence

Recurrent diverticulitis developed in 15 of 183 patients (8.2%) who responded to medical therapy. The median interval to the onset of recurrence was 11 mo (range, 0.5-96 mo). The median disease free period was 44 mo (range, 0.5-129 mo). All 15 patients who suffered a

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second attack had uncomplicated diverticulitis, and were successfully treated with medical therapy. One patient, an 80-year-old woman, experienced five episodes of right colonic diverticulitis, which were uncomplicated and successfully treated with medical therapy. Five of these 15 patients had an elective operation at the surgeon’s request after successful conservative treatment. There were no deaths in these patients with right colonic diverticulitis.

**Pathology and follow-up study**
A total of 15 patients underwent colonic resection. Nine of these 15 patients were reported to have multiple false diverticula. The pathologic reports of the other six patients contained no mention of the type of diverticulum.

During the original hospitalization, CT or US was supplemented by colonoscopy or double-contrast barium enema in 31 patients. In addition, 1 mo after recovery from an initial episode of diverticulitis, 60 patients agreed to re-evaluation by double-contrast barium enema (54 patients) or colonoscopy (six patients). In a total of 87 patients, including four patients duplicated, multiple diverticula were reported in 62 patients (71.3%) and a solitary diverticulum was reported in 13 patients (14.9%). The number of diverticulum could not be identified in 12 patients due to poor bowel preparation.

**DISCUSSION**

The Hinchey classification and its several modifications have been used to define the stages of acute diverticulitis although the systems were mostly applied to left colonic diverticulitis. In the present study, the diagnosis of right colonic diverticulitis was made in 167 of 172 (97%) patients using CT or US. The original Hinchey classification is not detailed enough to reflect right colonic diverticulitis with which the majority of patients have mild forms. We therefore used a modified system including subcategories in the early stage. The majority of patients (87.3%) had uncomplicated diverticulitis (stage 0 or I a) on admission and the other patients even those with complicated diverticulitis had a relatively early stage (stage I b) such as pericolic abscess with the exception of one patient (stage III).

To date, no therapeutic guidelines for patients with right colonic diverticulitis have been established. In contrast, practice parameters for the treatment of left colonic diverticulitis do exist. Conservative treatment is recommended for uncomplicated left colonic diverticulitis because it results in resolution of the problem in 70% to 100% of patients. In our study, all of the 165 patients with uncomplicated right colonic diverticulitis (stage 0 or I a) were successfully treated with bowel rest and antibiotics, including 22 patients who underwent an appendectomy for presumed appendicitis. We believe that patients with uncomplicated right colonic diverticulitis can be successfully treated with medical treatment in the same way as those with uncomplicated left colonic diverticulitis.

However, some authors advocate surgical resection for right colonic diverticulitis encountered during surgery for presumed appendicitis. Lo et al. reported their experience of 22 patients over an 11-year period. They performed preoperative US and CT in only one patient. At operation, an inflammatory phlegmon or indurated mass was found in 18 patients, however, colectomy with primary ileocolic anastomosis was performed in 21 patients including these 18 patients. Lane et al. reported a series of 49 patients over a 22-year period. The authors stated that because the pathophysiology of cecal diverticulum may largely be a pathological myth. Graham and Ballantyne reviewed the American experiences. Among 128 histologic cases compiled from the medical literature, they found that 52 (41%) were true diverticula while 76 (59%) were, in fact, false diverticula. In addition, among 288 cases gathered from the literature, 233 (81%) were solitary, while 55 (19%) were multiple.
present study, nine of 15 patients who underwent colonic resection were reported to have multiple false diverticula. Of 87 patients receiving double-contrast barium enema or colonoscopy, multiple diverticula were reported in 62 patients (71.3%) and solitary diverticulum was reported in 13 patients (14.9%). The incidence of true or false diverticula in the right colon is not well known, particularly between Western and Asian populations. This is because the pathologic differentiation between true and false diverticula may be difficult once inflammation occurs, and to our knowledge, the type of diverticula in right colonic diverticulitis has not been pathologically described in the Asian literature.

Some authors who advocate aggressive resection for right colonic diverticulitis assert that leaving the diseased foci in situ with the possibility of developing some serious complications later seems to be impractical and recurrence of diverticulitis should be an indication for aggressive resection. If recurrence is high and complications frequent, surgical resection is essentially required. However, after successful conservative treatment, a recurrence rate of 3.6% to 23.8% has been reported in the literature. Ngoi et al. reported a recurrence rate of 1.5%, but 58% of their patients underwent diverticulectomy. It is interesting to note that in these studies, there was little complicated diverticulitis in recurrent cases: Fang et al. reported three complicated cases in 10 recurrences in 42 patients receiving conservative treatments, and Harada et al. reported one complicated case in four recurrences in 29 patients. The other authors reported that all of the recurrent cases were uncomplicated diverticulitis, which responded well to medical therapy. Komuta et al. mentioned that recurrent uncomplicated right colonic diverticulitis responded well to medical therapy regardless of the number of recurrences. In our study, 15 of 183 patients (8.2%) who responded to medical therapy developed recurrent diverticulitis. All 15 patients had uncomplicated diverticulitis, and were successfully treated with medical therapy. Therefore, we believe that if the recurrence rate after conservative treatment is not high and if complications are not frequent even after recurrence occurs, recurrence of right colonic diverticulitis should initially be an indication for medical treatment and not for surgery.

In conclusion, our results indicate that right colonic diverticulitis is essentially benign and image-guided conservative treatment is primarily required. Although our study is limited by the retrospective design and relatively few recurrent patients, our results suggest that recurrence after conservative treatment of right colonic diverticulitis is low, and rarely associated with complicated diverticulitis. Thus, recurrence of right colonic diverticulitis should initially be an indication for medical treatment, while surgical resection should be selectively considered for patients with complicated diverticulitis.

**REFERENCES**

1. Hughes LE. Postmortem survey of diverticular disease of the colon. I. Diverticulosis and diverticulitis. Gut 1969; 10: 336-344
2. Sugihara K, Muto T, Morioya Y, Asano A, Yamamoto T. Diverticular disease of the colon in Japan. A review of 615 cases. Dis Colon Rectum 1984; 27: 531-537
3. Lo CY, Chu KW. Acute diverticulitis of the right colon. Am J Surg 1996; 171: 244-246
4. Lane JS, Sarkar R, Schmit PJ, Chandler CF, Thompson JE Jr. Surgical approach to cecal diverticulitis. J Am Coll Surg 1999; 188: 629-634; discussion 634-635
5. Fang JF, Chen RJ, Lin BC, Hsu YB, Kao JL, Chen MF. Aggressive resection is indicated for diverticulitis. Am J Surg 2003; 185: 135-140
6. Katz DS, Lane MJ, Ross BA, Gold BM, Jeffrey RB Jr, Mindelzun RE. Diverticulitis of the right colon revisited. AJR Am J Roentgenol 1996; 171: 151-156
7. Oudenhoven LF, Koumans RK, Pylaert JB. Right colonic diverticulitis: US and CT findings--new insights about frequency and natural history. Radiology 1998; 208: 611-618
8. Komuta K, Yamanaka S, Okada K, Kamohara Y, Ueda T, Makimoto N, Shiogama T, Furui J, Kanematsu T. Toward therapeutic guidelines for patients with acute right colonic diverticulitis. Am J Surg 2004; 187: 233-237
9. Graham SM, Ballantyne GH. Cecal diverticulitis. A review of the American experience. Dis Colon Rectum 1987; 30: 821-826
10. Jang HJ, Lim HK, Lee SJ, Lee WJ, Kim EY, Kim SH. Acute diverticulitis of the cecum and ascending colon: the value of thin-section helical CT findings in excluding colonic carcinoma. AJR Am J Roentgenol 2000; 174: 1397-1402
11. Liljegren G, Chabok A, Wickbom M, Smedh K, Nilsson K. Acute colonic diverticulitis: a systematic review of diagnostic accuracy. Colorectal Dis 2007; 9: 480-488
12. Pradel JA, Adell JF, Taourel P, Djafari M, Monnin-Delhom E, Bruel JM. Acute colonic diverticulitis: prospective comparative evaluation with US and CT. Radiology 1997; 205: 503-512
13. Chou YH, Chiu DJ, Tian CM, Chen JD, Hsu CC, Lee CH, Lui WY, Hung GS, Yu C. Sonography of acute right side colonic diverticulitis. Am J Surg 2001; 181: 122-127
14. Hollerweger A, Macheiner P, Rettenbacher T, Brunner W, Gratzmann N. Colonic diverticulitis: diagnostic value and appearance of inflamed diverticula-sonographic evaluation. Eur Radiol 2001; 11: 1956-1963
15. Wasvary H, Turfah F, Kadro O, Beauregard W. Same hospitalization resection for acute diverticulitis. *Am Surg* 1999; 65: 632-635; discussion 636

16. Kaiser AM, Jiang JK, Lake JP, Ault G, Artinyan A, Gonzalez-Ruiz C, Essani R, Beart RW Jr. The management of complicated diverticulitis and the role of computed tomography. *Am J Gastroenterol* 2005; 100: 910-917

17. Wong WD, Wexner SD, Lowry A, Vernava A 3rd, Burnstein M, Denstman F, Fazio V, Kerner B, Moore R, Oliver G, Peters W, Ross T, Senatore P, Simmang C. Practice parameters for the treatment of sigmoid diverticulitis—supporting documentation. The Standards Task Force. The American Society of Colon and Rectal Surgeons. *Dis Colon Rectum* 2000; 43: 290-297

18. Hinchey EJ, Schaaf PG, Richards GK. Treatment of perforated diverticular disease of the colon. *Adv Surg* 1978; 12: 85-109

19. Markham NI, Li AK. Diverticulitis of the right colon—experience from Hong Kong. *Gut* 1992; 33: 547-549

20. Yang HR, Huang HH, Wang YC, Hsieh CH, Chung PK, Jeng LB, Chen RJ. Management of right colon diverticulitis: a 10-year experience. *World J Surg* 2006; 30: 1929-1934

21. Moon HJ, Park JK, Lee JJ, Lee JH, Shin HJ, Kim WS, Kim MS, Jeong HJ. Conservative treatment for patients with acute right colonic diverticulitis. *Am Surg* 2007; 73: 1237-1241

22. Parks TG, Connell AM. The outcome in 455 patients admitted for treatment of diverticular disease of the colon. *Br J Surg* 1970; 57: 775-778

23. Larson DM, Masters SS, Spiro HM. Medical and surgical therapy in diverticular disease: a comparative study. *Gastroenterology* 1976; 71: 734-737

24. Haglund U, Hellberg R, Johnsen C, Hultén L. Complicated diverticular disease of the sigmoid colon. An analysis of short and long term outcome in 392 patients. *Ann Chir Gynaecol* 1979; 68: 41-46

25. Thompson WG, Patel DG. Clinical picture of diverticular disease of the colon. *Clin Gastroenterol* 1986; 15: 903-916

26. Cheskin LJ, Bohlman M, Schuster MM. Diverticular disease in the elderly. *Gastroenterol Clin North Am* 1990; 19: 391-403

27. Detry R, James J, Kartheuser A, Zech F, Vanheuverzwijn R, Hoang P, Kestens PJ. Acute localized diverticulitis: optimum management requires accurate staging. *Int J Colorectal Dis* 1992; 7: 38-42

28. Hachigian MP, Honickman S, Eisenstat TE, Rubin RJ, Salvati EP. Computed tomography in the initial management of acute left-sided diverticulitis. *Dis Colon Rectum* 1992; 35: 1123-1129

29. Kellum JM, Sugerman HJ, Coppa GF, Way LR, Fine R, Herz B, Speck EL, Jackson D, Duma RJ. Randomized, prospective comparison of cefoxitin and gentamicin-clindamycin in the treatment of acute colonic diverticulitis. *Clin Ther* 1992; 14: 376-384

30. Harada RN, Whelan TJ Jr. Surgical management of cecal diverticulitis. *Am J Surg* 1993; 166: 666-669; discussion 669-671

31. Ngoi SS, Chia J, Goh MY, Sim E, Rauff A. Surgical management of right colon diverticulitis. *Dis Colon Rectum* 1992; 35: 799-802