

RAPID COMMUNICATION

Diverticulitis in the young patient-Is it different ?

Adi Lahat, Yoram Menachem, Benjamin Avidan, Henit Yanai, Emad Sakhnini, Eytan Bardan, Simon Bar-Meir

Adi Lahat, Yoram Menachem, Benjamin Avidan, Henit Yanai, Emad Sakhnini, Eytan Bardan, Simon Bar-Meir, Department of Gastroenterology, Chaim Sheba Medical Center and Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel
Correspondence to: Simon Bar-Meir, MD, Department of Gastroenterology, Chaim Sheba Medical Center, Tel Hashomer 52651, Israel. barmeirs@yahoo.com
Telephone: +972-3-5302679 Fax: +972-3-5303070
Received: 2005-09-28 Accepted: 2006-01-14

<http://www.wjgnet.com/1007-9327/12/2932.asp>

Abstract

AIM: To prospectively study the incidence and the natural history of acute diverticulitis in young patients.

METHODS: A total of 207 patients hospitalized at our hospital between January 2000 to February 2005 with the diagnosis of acute diverticulitis were included. Their demographic characteristics, medical history, physical, radiographic and endoscopic findings as well as therapy were recorded. Patients were followed every 6 mo for the first year and later annually.

RESULTS: The mean patients' age was 61 (range 27-92) years. Twenty-five patients (12%) were younger than 45 years. Acute diverticulitis was significantly more prevalent among male in the young age group as compared to the older age group (19/25, 76% vs 61/182, 33%, respectively, $P = 0.0001$). Complications occurred more often in the young age group; 32% vs 13%, ($P = 0.002$). During follow-up, 6 patients (28%) remained asymptomatic in the young age group as compared to 87 patients (55%) in the older age group ($P = 0.024$). As a result, sigmoidectomies were performed twice as often in the young age group (38% vs 13%, $P = 0.002$).

CONCLUSION: Diverticulitis in young patients has a male predominance, a more aggressive course with a higher rate of complications and a higher recurrence rate. An earlier surgical approach might be considered in young patients with acute diverticulitis.

© 2006 The WJG Press. All rights reserved.

Key words: Diverticulitis; Young patient; Complications; Sigmoidectomy

Lahat A, Menachem Y, Avidan B, Yanai H, Sakhnini E, Bardan E, Bar-Meir S. Diverticulitis in the young patient-Is it different? *World J Gastroenterol* 2006; 12(18): 2932-2935

INTRODUCTION

Diverticular disease of the colon is a common disease in Western countries. The development of colonic diverticula is associated with a low fiber diet, which is common in the developed countries^[1,2]. The incidence of diverticular disease rises with age, and by the age of 85 about 65% of the population would have diverticuli^[3,4]. It is much less frequent in the younger age group and less than 10% of the population under the age of 40 years would have diverticuli^[5]. Most of the patients will remain asymptomatic, and only 10%-25% will become inflamed and evolve into diverticulitis^[4,6-9]. The clinical presentation of acute diverticulitis varies widely from mild inflammation to full-blown perforation and peritonitis. In most patients however, the disease is mild and responds to antibiotic therapy^[10].

In recent years, there has been conflicting information regarding the incidence and natural history of diverticulitis in young patients. While earlier studies found the incidence to range between 2%-7%^[11-15], more recent studies reported a higher incidence ranging between 18%-34%^[16,17]. The natural course and outcome of diverticulitis in the young patient has also been a matter of debate. While earlier studies reported a more severe course with a higher rate of complications in young patients with diverticulitis^[1,2,11-14,18], recent reports suggested a milder course, not different from that in the general population^[10,16]. All those studies, however, were retrospective. We performed a prospective study in which all patients with acute diverticulitis were enrolled and followed for a period of up to 5 years. We compared the natural history and the course of acute diverticulitis in the young age group to that of the older population.

MATERIALS AND METHODS

Patients

All patients with acute diverticulitis who were hospitalized at the Chaim Sheba Medical Center between January 2000 and February 2005 were enrolled. In fact, our patients' population included all patients who were diagnosed with acute diverticulitis in the emergency room, since the general policy of our institution is to hospitalize these patients regardless the severity of the disease.

Methods

The diagnosis of acute diverticulitis was based on lower

abdominal pain (usually on the left side), fever and leucocytosis. All patients underwent abdominal CT and only those with characteristic findings on CT were included. CT criteria for acute diverticulitis included the presence of colonic diverticuli with thickening of the colonic wall at the site of the diverticuli and peri-colonic fat infiltration. In some of the patients extra colonic air or fluid was seen as well. Patients with a lesion suspicious of colonic cancer on CT scan were excluded. Demographic characteristics of all patients and their medical history, concomitant use of medications, physical, laboratory, radiographic and endoscopic findings and their therapy were recorded.

Patients were followed up during their hospitalization and later by regular phone calls every 6 mo for the first year and then annually. Follow-up was conducted by a specialized study coordinator who was unaware of the patients' course of disease. At their follow-up visits or phone calls, patients were asked about the occurrence of attacks of lower abdominal pain with or without fever, hospitalizations and operations. Based on their reports, patients were classified into 4 major categories: patients who had undergone sigmoidectomy following their discharge, patients who had another episode of acute diverticulitis which required hospitalization and antibiotic therapy, patients who had LLQ abdominal pain for more than twice a week and for at least one hour's duration and patients who had not experienced symptoms suggestive of diverticulitis.

Data was analyzed for the whole group of patients and then for the two subgroups based on their age (older than and younger than 45 years). The age of 45 years was chosen as the average between the different ages used in the literature to define the young age group with acute diverticulitis (40 *vs* 50 years).

Statistical analysis

Patients' demography and other characteristics were analyzed by the Student's *t*-test for continuous variables and χ^2 -test (with Yates correction) or Fisher's exact test for categorical variables. Statistical analyses were conducted by using Statsoft software (Tulsa, OK, USA).

RESULTS

Two-hundred and seven patients with acute diverticulitis were hospitalized between January 2000 and February 2005. Eighty were males and 127 were females. Their age ranged between 27-92 (mean 62 ± 12) years. Twenty-five patients (12%) were younger than 45 years. Their demography and co-morbidities are shown in Table 1. There was a striking male predominance in the young age group with a male: female ratio of 3:1. The older age group showed a female predominance with a female: male ratio of 2:1. As expected, the associated co-morbidities were far more common in the older age group, though only hypertension and ischemic heart disease reached statistical significance. The younger age group had almost no co-morbidities. However, twice as many abdominal operations had been performed in the young age group; 16% appendectomy and 12% inguinal hernioplasty as compared to 8.8% and 6%, respectively.

Table 1 Demographic data and co-morbidities of study subjects

Age (yr)	< 45 <i>n</i> = 25 (%)	>45 <i>n</i> = 182 (%)	<i>P</i> value
Gender (M/F)	19/6	61/121	0.0001
Co-morbidities			
Hypertension	1(4)	57 (31)	0.004
Hypothyroidism	0(0)	19 (10)	0.185
COPD	0(0)	10 (5.5)	0.481
Diabetes mellitus	0(0)	19 (10)	0.185
Ischemic heart disease	0(0)	36 (20)	0.030
Hyperlipidemia	0(0)	17 (9)	0.227
Cholelithiasis	1(4)	11 (6)	0.682
Post appendectomy	4(16)	16 (8.8)	0.253
Post inguinal hernioplasty	3(12)	11 (6)	0.266
Malignancy	0(0)	7 (3)	0.684
Crohn's disease	1(4)	1 (0.5)	0.100
Chronic renal failure	0(0)	4 (2.2)	0.979

COPD: chronic obstructive pulmonary disease.

Table 2 Patients' complications during hospitalization

Age (yr)	< 45 <i>n</i> = 25 (%)	>45 <i>n</i> = 182 (%)	<i>P</i> value
Peri-diverticular air on CT	5 (20)	15 (8)	0.063
Abdominal abscess	2 (8)	4 (2)	0.150
Free perforation	1 (4)	5 (3)	0.540
Death	0 (0)	2 (1)	0.598
Total complication rate	8 (32)	24 (13)	0.030

Clinical course during hospitalization

All patients were followed during hospitalization and their clinical outcome was recorded. One-hundred and seventy-five patients (85%) had a mild course with no complications. The other 32 patients had a more severe and complicated course (Table 2). The most common complication was peri-diverticular air on CT which resolved in all patients by keeping patients fasting and on IV fluids and antibiotics. Six patients (2.8%) developed an abdominal abscess and 3 required CT guided percutaneous drainage. The abscesses resolved in all patients with no need for further intervention. There were 6 patients (2.8%) who developed free perforation and all were operated on. Two patients (0.1%) died during hospitalization, one from sepsis and another from multi-organ failure. Both were older than 80 years and had several co-morbidities. Their deaths were related to the diverticulitis.

The majority of the complications were more common in the young age group (Table 2). Abdominal abscess (8% in the young group *vs* 2% in the old group, *P* = 0.155) and peri-diverticular air on CT (20% in the young *vs* 8% in the old, *P* = 0.063) were the most common. The presence

Tables 3 Patients' follow-up after discharge

Age (yr)	<45 n = 21(%)	>45 n = 159 (%)	P value
Operations following discharge	8 (38)	20 (13)	0.002
Recurrent diverticulitis (not operated)	2 (10)	20 (13)	0.688
Abdominal pain ¹	5 (24)	27 (17)	0.442
No further symptoms	6 (28)	87 (55)	0.024

¹Abdominal pain- pain more than 2 times per week that lasts for at least one hour.

of free perforation, however, was almost equal in both groups; 4% in the young and 3% in the old age group. The overall complication rate was higher in the young age group ($P = 0.03$).

Follow-up

Patients were contacted by telephone every 6 mo for the first year and yearly thereafter. The range of follow up was between 6 and 60 mo, mean: 30 ± 14 mo. Four patients in the young age group (16%) and 23 patients in the old age group (13%) were lost to follow up. Three of the patients in the old age group (2%) died during the follow-up period, all of whom were older than 75 years and their deaths were not related to the diverticular disease.

Data on patients in whom complete follow up was achieved is shown in Table 3. Sigmoidectomy was significantly more often performed in the young age group (38% vs 13%, $P = 0.002$). Most of the patients in the older age group, unlike the younger one, were asymptomatic during their follow up (55% vs 28%, respectively, $P = 0.024$).

DISCUSSION

Our prospective study showed that patients younger than 45 years comprised 12% of all patients who presented to our hospital with acute diverticulitis. The younger age group was male predominant and tended to have a more severe course with a higher complication rate, mainly peri-diverticular air and intra-abdominal abscess. Their recurrence rate during follow-up was higher and as a result their rate of sigmoidectomy was higher also. In 1986, Freischlag *et al*^[13] found that in young patients, the first onset of diverticulitis was often severe and required urgent operation. Other retrospective studies supported this impression^[1,2,18] and described a high recurrence rate and a high complication rate in their young patients with diverticulitis^[19,20]. It was therefore recommended that an elective operation should be performed following the first episode of diverticulitis^[17,19,21]. This policy was even further supported by Chautems *et al* who followed patients with acute diverticulitis under the age of 50 years for nearly 10 years. They found that in the young age group patients experienced a more aggressive disease^[22]. However, other studies published in the last decade, failed to support this finding^[10,16,23-26]. These studies reported a course of disease in young patients not different

from the older age group and with a similar rate of complications. The conclusion of those recent studies was that elective surgery after one episode of acute diverticulitis in young patients is not advocated and such patients should be managed in a similar way to the older ones^[25,26]. The explanation for the difference between studies that either support or reject a severe course in young patients is not clear. A possible explanation might be the difference in the study populations. Studies that found a similar course in both age groups had in their young age group a high proportion of Latino originated patients^[10,16,23]. Young Latinos were reported to have an increased tendency to develop acute diverticulitis^[27]. On the other hand, studies that described a severe course in young patients with acute diverticulitis did not include the Latino originated population. In fact, some of the studies were performed in Europe where Latino origin is quite rare^[19,20,22]. Our study population also did not have patients of Latino origin. Thus, we speculate that young Latino patients with acute diverticulitis have a more benign course similar to that of older patients. The reason for this is not clear.

As a group, our young patients were more prone to recurrent symptoms. Our data is consistent with earlier studies that reported a higher recurrence rate of diverticulitis among young patients^[2,20]. The total complication rate was significantly higher in the young age group. None of the specific complications (free perforation, abdominal abscess or peri-diverticular air) reached statistical significance, probably because of the relative small number of patients in the young age group. Death occurred only in the older age group probably as a result of their higher co-morbidity rates.

In our study, the young patients with acute diverticulitis underwent significantly more sigmoidectomies as compared to our older patients. All those who underwent a sigmoidectomy had recurrent episodes of diverticulitis. The high rate of sigmoidectomies in the young age group was, therefore, the result of a more severe course of the disease in patients who were otherwise in good general condition.

Of interest is that the young age group underwent twice as many appendectomies and inguinal hernioplasties as compared to the older age group. Acute appendicitis in the young age group was even more prevalent than the life time risk for acute appendicitis in the general population (estimated 8.6% in men and 6.7% in women)^[28]. The significance, if at all, of this observation is unclear. Misdiagnosis of previous attacks of acute diverticulitis is a possible explanation.

In conclusion, our prospective, long-term follow-up study shows that acute diverticulitis in general is a mild disease with a low complication rate. In young patients there is male predominance and the disease tends to be more aggressive with a high recurrence rate. An earlier surgical approach might be considered in young patients with acute diverticulitis.

REFERENCES

- Schauer PR, Ramos R, Ghiatas AA, Sirinek KR. Virulent diverticular disease in young obese men. *Am J Surg* 1992; **164**: 443-446; discussion 443-446
- Ambrosetti P, Robert JH, Witzig JA, Mirescu D, Mathey P,

- Borst F, Rohner A. Acute left colonic diverticulitis in young patients. *J Am Coll Surg* 1994; **179**: 156-160
- 3 **Hughes LE**. Postmortem survey of diverticular disease of the colon. I. Diverticulosis and diverticulitis. *Gut* 1969; **10**: 336-344
- 4 **Garcia G**. Diverticulitis. In: Blaser MT, Smith DD, Ravdin JL. Infections of the gastrointestinal tract. 2nd ed. Philadelphia: Lippincott Williams & Wilkins, 2002: 306-316
- 5 **Painter NS**, Burkitt DP. Diverticular disease of the colon: a deficiency disease of Western civilization. *Br Med J* 1971; **2**: 450-454
- 6 **Parks TG**. Natural history of diverticular disease of the colon. *Clin Gastroenterol* 1975; **4**: 53-69
- 7 **Painter NS**, Burkitt DP. Diverticular disease of the colon, a 20th century problem. *Clin Gastroenterol* 1975; **4**: 3-21
- 8 **Farrell RJ**, Farrell JJ, Morrin MM. Diverticular disease in the elderly. *Gastroenterol Clin North Am* 2001; **30**: 475-496
- 9 **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
- 10 **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
- 11 **Ouriel K**, Schwartz SI. Diverticular disease in the young patient. *Surg Gynecol Obstet* 1983; **156**: 1-5
- 12 **Rodkey GV**, Welch CE. Changing patterns in the surgical treatment of diverticular disease. *Ann Surg* 1984; **200**: 466-478
- 13 **Freischlag J**, Bennion RS, Thompson JE Jr. Complications of diverticular disease of the colon in young people. *Dis Colon Rectum* 1986; **29**: 639-643
- 14 **Chappuis CW**, Cohn I Jr. Acute colonic diverticulitis. *Surg Clin North Am* 1988; **68**: 301-313
- 15 **Simonowitz D**, Paloyan D. Diverticular disease of the colon in patients under 40 years of age. *Am J Gastroenterol* 1977; **67**: 69-72
- 16 **Schweitzer J**, Casillas RA, Collins JC. Acute diverticulitis in the young adult is not "virulent.". *Am Surg* 2002; **68**: 1044-1047
- 17 **Guzzo J**, Hyman N. Diverticulitis in young patients: is resection after a single attack always warranted? *Dis Colon Rectum* 2004; **47**: 1187-1190; discussion 1187-1190;
- 18 **Minardi AJ Jr**, Johnson LW, Sehon JK, Zibari GB, McDonald JC. Diverticulitis in the young patient. *Am Surg* 2001; **67**: 458-461
- 19 **Anderson DN**, Driver CP, Davidson AI, Keenan RA. Diverticular disease in patients under 50 years of age. *J R Coll Surg Edinb* 1997; **42**: 102-104
- 20 **Mäkelä J**, Vuolio S, Kiviniemi H, Laitinen S. Natural history of diverticular disease: when to operate? *Dis Colon Rectum* 1998; **41**: 1523-1528
- 21 **Konvolinka CW**. Acute diverticulitis under age forty. *Am J Surg* 1994; **167**: 562-565
- 22 **Chautems RC**, Ambrosetti P, Ludwig A, Mermillod B, Morel P, Soravia C. Long term follow-up after first acute episode of sigmoid diverticulitis: is surgery mandatory?: a prospective study of 118 patients. *Dis Colon Rectum* 2002; **45**: 962-966
- 23 **West SD**, Robinson EK, Delu AN, Ligon RE, Kao LS, Mercer DW. Diverticulitis in the younger patient. *Am J Surg* 2003; **186**: 743-746
- 24 **Biondo S**, Parés D, Martí Ragué J, Kreisler E, Fracalvieri D, Jaurrieta E. Acute colonic diverticulitis in patients under 50 years of age. *Br J Surg* 2002; **89**: 1137-1141
- 25 **Spivak H**, Weinrauch S, Harvey JC, Surick B, Ferstenberg H, Friedman I. Acute colonic diverticulitis in the young. *Dis Colon Rectum* 1997; **40**: 570-574
- 26 **Vignati PV**, Welch JP, Cohen JL. Long-term management of diverticulitis in young patients. *Dis Colon Rectum* 1995; **38**: 627-629
- 27 **Simmany CL**, Shires GT III. Diverticular disease of the colon. In: Feldman M, Friedman LS, Sleisenger MH eds. Gastrointestinal and Liver disease. 7th ed. Philadelphia: Saunders, 2002: 2100-2112
- 28 **Addiss DG**, Shaffer N, Fowler BS, Tauxe RV. The epidemiology of appendicitis and appendectomy in the United States. *Am J Epidemiol* 1990; **132**: 910-925

S- Editor Pan BR L-Editor Zhu LH E-Editor Zhang Y