Influence of Sigmoid Resection on Progression of Diverticular Disease of the Colon

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The surgeon is frequently confronted with the problem of how much colon to resect when operating on patients with colonic diverticulosis or diverticulitis. Two questions arise: 1) will diverticulosis progress in the proximal colon if only the sigmoid is removed, and 2) will diverticulitis recur in the more proximal diverticula? To evaluate these potential problems, the histories were reviewed of 61 patients who had elective sigmoid resection for diverticular disease and who had barium-enema examinations before operation, early during the postoperative period, and at least five years later. Progression of diverticulosis was noted in only nine (14.7 per cent) patients on repeat barium-enema examination five to nine years after resection; the progression was noted to be minimal in all nine. Seven patients (11.4 per cent) had signs and symptoms of recurrent diverticulitis. Only three patients demonstrated progression of diverticulosis and recurrent diverticulitis. We see no benefit in resecting all of the diverticula-bearing colon after adequate sigmoid resection, as there is minimal progression in the diverticular process and the risk of recurrence is low. [Key words: Diverticulosis; Recurrent diverticulitis; Sigmoid resection]

SHOULD RESECTIVE SURGERY for sigmoid diverticulitis associated with diffuse colonic diverticulosis be limited to the sigmoid or include other portions or even the entire colon? It is generally agreed that a colon affected by diverticular disease will be involved by further diverticula with the passage of time.[1] In 1955, Judd[2] stated that despite the presence of diverticula in the transverse colon or even in the right colon, diverticulitis is almost always confined to the sigmoid colon. Indeed, in 98 per cent of proved cases of diverticulitis, only the sigmoid was affected.[2,3] The current retrospective study was undertaken to determine whether 1) diverticular disease will progress to the proximal colon after initial sigmoid resection for diverticulitis and 2) the remaining or new diverticula in the proximal colon will engender further diverticulitis.

Patient Population and Methods

Between 1971 and 1976, 505 patients underwent elective sigmoid resection for symptomatic diverticulitis or, more rarely, for sigmoid carcinoma in which associated diverticulosis was a prominent feature. Of these, 61 patients had barium-enema examinations performed at the Mayo Clinic during the immediate perioperative period and within five years afterward, and their records were available for review. The extent of diverticulosis in the remaining colon was assessed radiologically and categorized as follows: Group A) no diverticula, group B) one to five diverticula, group C) six to 15 diverticula, group D) 16 to 25 diverticula, and group E) more than 25 diverticula (Table 1). All roentgenograms, but mostly partial post-evacuation roentgenograms that highlighted the diverticula and spanned a time period of five to ten years, were carefully reviewed by a gastrointestinal radiologist (R.L.M.). Films in which overlying bowel was seen were not used. Demographic data collected included age, sex, extent of the diseased segment, length of bowel resected at the time of surgery, and extent of follow-up. Any symptoms suggestive of recurrent diverticulitis and documentation of diverticulitis also were noted.

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Results

The ages of the 61 patients (34 women and 27 men) at the time of resection ranged from 29 to 76 years (mean 60.6). Resection was most often limited to the sigmoid, and the average length of the resected specimen was 22.1 cm. In ten patients, the splenic flexure was mobilized and a small portion of the descending colon resected; in two of these ten, resection included a portion of the distal transverse colon.

After sigmoid resection, seven of the 61 patients (11.4 per cent) suffered recurrent diverticulitis, while the diverticulosis progressed in nine (14.7 per cent). Three of the 61 patients (4.9 per cent) had a documented episode of recurrent diverticulitis and barium-enema examination showed progression of diverticular disease proximal to the anastomosis in the descending and transverse colon. Nearly one-third of the patients had symptoms of irritable bowel syndrome, but none was diagnosed as having diverticulitis.

When individual categories were considered, no clear-cut correlation between the number of diverticula (either

left behind or appearing later at follow-up) and the ensuing risk of diverticulitis was noted (Table 1).

Discussion

Our results show that when surgical resection for diverticulitis is confined to the sigmoid colon 14.7 per cent of the patients will develop new diverticula in their remaining colon and 11.4 per cent will suffer from recurrent diverticulitis. Colcock[4] has stated that 20 to 25 per cent of patients with diverticular disease—that is, diverticulosis and diverticulitis—will require surgical correction. However, the exact risk of progression of the diverticular disease and, more unfortunately, of further diverticulitis after initial sigmoid resection has not been well documented. Judd[2] noted, in 1955, that patients with many diverticula were, on the average, older than those with few diverticula, but that patients with extensive or total colonic involvement were not older than patients with disease localized to the sigmoid or to the sigmoid and descending colon. He, therefore, concluded that the diverticular malady progressed more often in the already affected segment rather than spreading to other colonic areas.

Most authors recommend limiting the resection of the sigmoid or lower descending colon and sigmoid. In our series, the descending colon was incorporated in ten of the 61 resected specimens. Since diverticulitis almost always affects the sigmoid colon, and since the prognosis for patients with pancolonic diverticular disease is no worse than that for patients with only sigmoid or sigmoid and descending colon involvement, Parks[5] argued against total colectomy. Other authors have also stated that a limited resection is usually adequate and that it is not necessary to resect all of the diverticula-bearing portion of the colon.[6-8] This usually amounts to between 10 and 20 cm of sigmoid colon.[9]

Leigh *et al.*[10] followed up 65 patients for a minimum of five years. Of these, 81.5 per cent remained asymptomatic, 3.1 per cent required further resection for acute diverticulitis, and 4.6 per cent were plagued by recurrent diverticulitis for which surgery was not offered. Of the 65 patients, 37 had an extended follow-up, that is, 12 patients were followed up from ten to 19 years, 22 from 20 to 29 years, and three for more than 30 years after sigmoid resection. Two patients had further diverticulitis, for which one underwent reoperation.

TABLE 1. *Progression and Recurrence by Group*

Group	Number of Diverticula at Follow-up	Number of Patients	Patients with	
			Progression	Recurrent Diverticulitis
A	0	14	1	0
B	1-5	21	5	4
C	6-15	16	2	1
D	16-25	5	0	0
E	25	5	1	2
Total		61	9	7

Wychulis *et al.*[11] reported a series of 152 patients who had resection for diverticular disease of the colon (Table 2). Ninety-four per cent of their patients remained asymptomatic over a follow-up period that averaged almost ten years, and only 4 per cent of patients required further surgery for recurrent diverticulitis.

It would seem from these data and the extended follow-up that resection for diverticulitis is an effective procedure with a low recurrence rate, comparable to that (11.4 per cent) in our current series of 61 patients. Subtotal colectomy may be indicated in selected patients who have diverticular disease of the colon with serious disturbance of function and extensive pathologic anatomy[9] and in patients who have colonic bleeding and pancolonic extensive diverticular disease.[6]

Conclusions

The progression of diverticulosis after sigmoid resection was 14.7 per cent and, while the diverticula involved were somewhat larger over a period of time, the increase in numbers was minimal, with one or two additional diverticula being noted after the passage of five years or more. The rate of recurrent diverticulitis in patients in this series was 11.4 per cent; none required reoperation. We conclude that the causes of pandiverticular disease and sigmoid disease are different in that once distal and proximal inflammatory disease of the entire sigmoid is resected, there is little danger of recurrent diverticulitis or of progression of diverticulosis in the remaining bowel. On this basis, it seems unnecessary to extend the margin in cases of extensive diverticulosis.

TABLE 2. *Follow-up of 152 Patients With Resection for Diverticular Disease of Colon**

Follow-up	Number of Patients
Preoperative diverticulitis without complication (75 pt)†	
No diverticula remaining	42
Fecal fistula	1
Diverticula remaining	33
Anastomotic stenosis	2
Preoperative diverticulitis with complications (77 pt)‡	
No diverticula remaining	46
Recurrent fistula	2
Anastomotic stenosis	1
Diverticula remaining	31
Mild recurrent diverticulitis	1
Recurrent abscess	1

*Data from Wychulis AR, Beahrs OH, Judd ES. Surgical management of diverticulitis of the colon. Surg Clin North Am 1967;47:961-9.
†Follow-up ten years.
‡Follow-up eight years.

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Announcement

70TH ANNUAL CLINICAL CONGRESS

The 70th annual Clinical Congress of the American College of Surgeons will be held in San Francisco, October 21-26, 1984. More than 10,000 physicians are expected to register for the Congress, with total attendance, including guests, other medical professionals, and scientific and industrial exhibitors, exceeding 20,000. Co-headquarters for the Congress will be the Moscone Convention Center, the Fairmont Hotel, and the San Francisco Hilton and Towers. Scientific and technical exhibition will be located in the Moscone Convention Center. Portions of the scientific program will take place in the Moscone Convention Center, as well as the Fairmont, San Francisco Hilton, and Westin St. Francis hotels. The main registration area during the week of the Congress will be in the Moscone Convention Center. There will also be advance registration desks at the Fairmont Hotel, the San Francisco Hilton and Towers, and the Westin St. Francis Hotel on Sunday, October 21 only. Due to space limitations, nurses, medical students, and allied health professionals may register to attend only those scientific sessions that will be held in the Moscone Convention Center. They may also tour the scientific and technical exhibit areas without additional charge. The American College of Surgeons is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. The College designates that this continuing medical education offering also meets the criteria for hour-for-hour credit in Category I as outlined by the American Medical Association for the Physician's Recognition Award. Registration fees for the Clinical Congress are waived for Fellows of the College whose dues are paid for 1983 and for Initiates and participants in the Candidate Group. The registration fee for non-Fellows is $255. Surgical residents who bring a letter verifying their residency status may register for $125. Participants who enroll in postgraduate courses, including those whose registration for the Congress is free, must pay the appropriate fees for the courses selected. For further information, contact Linn Meyer or Kathryn Jordan, 55 East Erie Street, Chicago, Illinois 60611. Telephone (312) 664-4050.