Is prophylactic resection valid as an indication for elective surgery in diverticular disease?

John W. Lorimer, MD

Objective: To determine whether interval resection in asymptomatic patients after 1 or 2 episodes of acute diverticulitis (prophylactic resection) is justified as a means of preventing late inflammatory complications of diverticular disease.

Design: A retrospective analysis.

Setting: A university-affiliated tertiary care hospital.

Patients: Those requiring hospitalization from 1987 to 1995 for treatment of acquired diverticular disease of the colon. Twenty-eight patients underwent elective resection and 154 were treated for inflammatory complications (perforation, fistula, complete large-bowel obstruction).

Interventions: Standard surgical management for diverticular disease, but only 3 prophylactic resections were undertaken during this period.

Outcome measures: Type of operation, stoma creation and closure, hospital death. In those treated for complicated disease, the effects on outcome of all previous outpatient treatment and hospitalizations.

Results: Only 10% of those presenting with complications had been treated conservatively for acute diverticulitis and only 5% had been hospitalized for this reason.

Conclusions: Prophylactic resection is unlikely to prevent late major complications of diverticular disease; therefore, as an elective indication for surgery in this disease its use is questionable.

Objectif : Déterminer si une résection d'intervalle chez les patients asymptomatiques après une ou deux crises de diverticulite aiguë (résection prophylactique) est justifiée comme moyen de prévenir les complications inflammatoires tardives de la diverticulite.

Conception : Analyse rétrospective.

Contexte : Hôpital de soins tertiaires affilié à une université.

Patients : Personnes qu'il a fallu hospitaliser, de 1987 à 1995, pour traitement d'une diverticulite acquise du côlon. Vingt-huit patients ont subi une résection élective et 154 ont été traités pour des complications inflammatoires (perforation, fistule, occlusion complète du gros intestin).

Interventions : Traitement chirurgical standard de la diverticulite, mais on a effectué trois résections prophylactiques seulement au cours de cette période.

Mesures des résultats : Type d'intervention, création et fermeture de stoma, décès à l'hôpital. Chez les patients traités pour des complications, effets que tous les traitements et les hospitalisations antérieurs en service externe ont eus sur le résultat.

Résultats : Seulement 10 % des sujets qui présentaient des complications avaient été traités de façon conservatrice pour une diverticulite aiguë et 5 % seulement avaient été hospitalisés pour cette raison.

Conclusions : Il est peu probable que la résection prophylactique prévienne les complications tardives importantes de la diverticulite et c'est pourquoi l'intervention chirurgicale élective dans ce cas est d'une utilité douteuse.

From the Department of Surgery, Ottawa General Hospital and University of Ottawa, Ottawa, Ont.

Accepted for publication May 1, 1997

Correspondence to: *Dr. John W. Lorimer, Department of Surgery, Rm. K-11, Ottawa General Hospital, 501 Smyth Rd., Ottawa ON K1H 8L6*

Diverticular disease of the colon is a major cause of morbidity and mortality in much of the industrialized world. Much remains to be learned about its causes and about the factors resulting in progression to symptomatic or to complicated illness. It has been estimated that about one-third of those hospitalized for acute diverticulitis require surgery for complications that occur during admission.[1,2] Urgent operation is the mainstay of management for the major inflammatory complications of diverticular disease, but indications for elective surgery in symptomatic diverticular disease have never been as clear.[3] Those whose symptoms are ongoing, intractable and severe can benefit from elective resection, particularly the two-thirds of this group who have evidence of inflammation in the resected specimens.[4,5] Occasionally carcinoma cannot be ruled out, and operation is necessary to distinguish between inflammatory and neoplastic strictures. Probably the most debated indication for elective surgery in diverticular disease is that of prophylactic resection in patients who have become asymptomatic. Surgery has been recommended after 1 or 2 episodes of acute diverticulitis (particularly in younger or immunocompromised patients) as a means of preventing future morbidity and possible need for a stoma.[6–8] This practice has been further justified by the demonstration that such surgery is safe in carefully chosen candidates.[9]

In our hospital, prophylactic surgery has been offered only infrequently. Because of the anticipated cost and long follow-up that would be required to address this issue prospectively or by randomized trial, it is unlikely that the role of such surgery will ever be determined by such means. The present review was undertaken to confirm that few prophylactic resections have been performed in our hospital and to determine from past experience whether earlier intervention could realistically have been expected to improve outcomes for patients treated with inflammatory complications of diverticular disease.

Patients and methods

All patients with acquired diverticular disease admitted to a university teaching hospital from 1987 to 1995 were reviewed to identify all those who had complicated diverticulitis and any who underwent operation for diverticular disease. Patients with uncomplicated diverticulitis whose condition settled with conservative management (and this included some with very small abscesses and radiologically demonstrated microperforations) were excluded from further review, as were patients with lower gastrointestinal hemorrhage believed to be due to diverticulosis. Elective resection with anastomosis was done in 28 patients (10 men, 18 women) with no deaths. These patients ranged in age from 36 to 75 years (median 55 years). The indications for elective resection were continuing abdominal pain with documented episodes of acute inflammation (12 patients), pain believed to be due to diverticular disease (9) and inability to exclude carcinoma (4). Only 3 prophylactic resections were identified; these were in asymptomatic patients with 2 or 3 previous hospitalizations for acute diverticulitis. In 1 of these, the elective resection was prompted by concern for endocarditis with concomitant mitral stenosis. Eleven of the 28 patients had between 1 and 6 previous hospitalizations for treatment of acute diverticulitis.

During the same time period, 154 patients were admitted with complicated acute diverticulitis, representing 39% of 392 patients admitted for acute diverticulitis. There were 62 men and 92 women, ranging in age from 30 to 90 years (median 67 years). The principal diagnoses were perforation (115 patients), colonic fistula without abscess (24) and complete large-bowel obstruction (15). Many of these patients were in poor health: 291 associated conditions were identified in 105 patients (Table I). Forty-six (30%) received some part of their care at other hospitals before transfer. Most (82%) underwent operation, but 28 patients did not for the following reasons: 14 patients had nonoperative therapy; in 6 patients operation was withheld because the general prognosis was poor; in 4 patients the diagnosis was made only at autopsy; 3 patients refused surgery and 1 patient died during attempted stabilization in preparation for operation. The other 126 patients underwent operation as follows: resection with anastomosis (31), resection without anastomosis (80) and nonresectional diversion, drainage or lavage in some very poor-risk patients (15). In the 80 patients treated by resection without anastomosis (almost all Hartmann procedures), only 49 (61%) eventually underwent reanastomosis.

Results

In 154 consecutive patients with complicated diverticulitis there were 22 hospital deaths, for an overall death rate of 14%. The operative death rate was 9%. The causes of death were as follows: unresolved intra-abdominal sepsis (17), cardiac events (4) and seizure from a known brain metastasis (1). Only 1 death followed resection with anastomosis. This patient was transferred after breakdown of an anastomosis after surgery elsewhere. Another death occurred from necrotizing fasciitis beginning around a loop ileostomy, but the distal anastomosis

remained intact. There were no deaths after colostomy closure.

In 153 of these patients, a reliable history was obtainable. Fifteen had been treated for diverticular inflammation and 8 of them had required hospitalization. Thirteen of these 15 patients had been treated for diverticulitis 6 months to 20 years earlier. The other 2 (ages 83 and 88 years) had both presented with colonic fistulas 2 years earlier. The first had been treated nonoperatively with apparent closure and the other had been partly treated elsewhere by a proximal diversion. The complications requiring admission during the study period in these 15 patients were perforation (5 patients), fistula (4) and large-bowel obstruction (6). Twenty operations were performed in this entire group and in 3 patients colostomies were never closed. The only patient who died was an 80-year-old woman who had been turned down for resection because of a cardiac condition 1 year earlier when she presented with a symptomatic sigmoid stricture.

Discussion

Before 1950, operation for diverticular disease was reserved almost exclusively for complications.[10] During the next decade a much more aggressive surgical approach evolved, and interval elective resection was seen as a likely means of avoiding morbid complications and extensive staged surgery.[10,11] It was believed that morbidity and mortality were higher with recurrent attacks of acute inflammation,[12] and that in most patients with complications, symptomatic diverticular disease had been present for months to years.[11] Advocacy of an aggressive surgical approach to prevent complications has prevailed to the present, at least in North America, and currently the most common indications for elective resection in diverticular disease are recurrent acute attacks of inflammation and chronic symptoms that remain unrelieved by conservative therapy.[8] Many authoritative sources consider a single recurrent attack of acute diverticulitis to be an indication for interval resection in asymptomatic patients (prophylactic resection) and also advocate resection after a single resolved episode in certain patients who are thought to be at particular risk of serious later complications (age at onset less than 55 years, immunosuppressed patients, those with radiologically apparent microperforations, urinary tract symptoms or evidence of obstruction).[7,9,13]

Other standard references advise a less aggressive approach to prophylactic surgery[14] and support this with sources who believe that the natural history of colonic diverticular disease is not as bleak as has been depicted. Larson, Masters and Spiro[15] followed up 99 patients for a mean of 9.2 years after conservative treatment of acute diverticulitis and found that only one-quarter of them were readmitted and 9 underwent resection, all on an elective basis. Haglund and colleagues[2] followed up 295 patients for 2 to 12 years after an initial attack of acute diverticulitis treated conservatively. They identified a 25% recurrence rate but no cases of perforative diverticulitis during follow-up. They believed that after the first attack diverticular disease usually runs a benign course and that prophylactic resection could not be recommended.[2] Nylamo[16] followed up 57 patients for at least 10 years after their initial attack and documented a 42% recurrence rate but no serious complications. In 48 other patients who underwent emergency op-

Table I

Associated Conditions or Relevant Factors Identified in 105 Patients With Complicated Diverticular Disease

Condition/factor	No. of patients
Intercurrent hospitalization	15
Acetylsalicylic acid use	16
Nonsteroidal anti-inflammatory drug use	34
Corticosteroid use	31
Active malignant disease	19
Current chemotherapy	10
Current radiotherapy	3
Bone marrow transplantation	1
Connective tissue disease	17
Chronic pulmonary disease	31
Ischemic heart disease	34
Other heart disease	8
Peripheral vascular disease	14
Active hypertension	18
Diabetes mellitus	11
Chronic liver disease	2
Alcoholism	11
End-stage renal failure	16

eration during the same period, only 2 had previous episodes of acute diverticulitis. Nylamo concluded that prophylactic resection stood little chance of preventing serious complications. Even within North America, there is no standard approach to elective surgery in diverticular disease, and clearly some major centres have not accepted that prophylactic surgery has a role in preventing serious complications.[17]

It is likely that more rigorous standards of proof will be expected to justify specific interventions in future clinical practice and that less respect will be accorded to intuitive reasoning and individual experience.[18–20] The present review was undertaken to investigate a clinical impression that most patients presenting with serious complications of diverticular disease had not had previous attacks of uncomplicated acute diverticulitis. In our hospital population, only 10% of those presenting with complicated diverticulitis had histories of symptomatic diverticular disease and only 5% had been hospitalized for this reason. At the same time, our practice had not been to offer elective surgery to patients who had become asymptomatic after 1 or 2 episodes of acute diverticulitis. The historic basis for recommending prophylactic resection appears to have been reached on conceptual reasoning, and there is an absence in the literature of recent objective evidence attesting to its benefit. Our experience suggests that a policy of aggressive interval resection is unlikely to prevent major complications and deaths from catastrophic diverticulitis. This indication for elective surgery remains speculative at best. In making the admittedly difficult decision to recommend elective rectosigmoid resection, more emphasis should be placed on the intractability of symptoms and the presence of significant obstruction and less on speculation about unproven future benefits for the patient.

References

1. Parks TG, Connell AM. The outcome in 455 patients admitted for treatment of diverticular disease of the colon. *Br J Surg* 1970;57:775-8.

2. Haglund U, Hellberg R, Johnsen C, Hulten L. Complicated diverticular disease of the sigmoid colon: an analysis of short and long term outcome in 392 patients. *Ann Chir Gynaecol* 1979;68:41-6.

3. Moreaux J, Vons C. Elective resection for diverticular disease of the sigmoid colon. *Br J Surg* 1990;77:1036-8.

4. Morson BC. The muscle abnormality in diverticular disease of the colon. *Proc R Soc Med* 1963;56:789-90.

5. Breen RE, Corman ML, Robertson WG, Prager ED. Are we really operating on diverticulitis? *Dis Colon Rectum* 1986;29:174-6.

6. Almy TP, Howell DA. Diverticular disease of the colon. *N Engl J Med* 1980;302:324-31.

7. Chappuis CW, Cohn I Jr. Acute colonic diverticulitis. *Surg Clin North Am* 1988;68:301-13.

8. Schoetz DJ Jr. Uncomplicated diverticulitis: indications for surgery and surgical management. *Surg Clin North Am* 1993;73:965-74.

9. Corman ML. *Colon and rectal surgery*. 3rd ed. Philadelphia: JB Lippincott; 1993.

10. Bartlett MK, McDermott WV. Surgical treatment of diverticulitis of the colon. *N Engl J Med* 1953;248:497-9.

11. Colcock BP. Surgical management of complicated diverticulitis. *N Engl J Med* 1958;259:570-3.

12. Welch CE, Allen AW, Donaldson GA. An appraisal of resection of the colon for diverticulitis of the sigmoid. *Ann Surg* 1953;138;332-43.

13. Freeman SR, McNally PR. Diverticulitis. *Med Clin North Am* 1993;77:1149-67.

14. Gordon PH. Diverticular disease of the colon. In: Gordon PH, Nivatvongs S, editors. *Principles and practice of surgery for the colon, rectum, and anus*. St. Louis: Quality Medical Publishing; 1992. p. 739-97.

15. Larson DM, Masters SS, Spiro HM. Medical and surgical therapy in diverticular disease: a comparative study. *Gastroenterology* 1976;71:734-7.

16. Nylamo E. Diverticulitis of the colon: role of surgery in preventing complications. *Ann Chir Gynaecol* 1990;79:139-42.

17. Alexander J, Karl RC, Skinner DB. Results of changing trends in the surgical management of complications of diverticular disease. *Surgery* 1983;94:683-90.

18. Rosenberg W, Donald A. Evidence based medicine: an approach to clinical problem-solving. *BMJ* 1995;310:1122-5.

19. Naylor CD. Grey zones of clinical practice: some limits to evidence-based medicine. *Lancet* 1995;345:840-2.

20. Reemtsma K, Morgan M. Outcomes assessment: a primer. *Bull Am Coll Surg* 1997;82:34-9.