

Timing of Elective Surgery for Diverticular Disease

David A. Margolin, M.D.¹

ABSTRACT

The timing of elective surgery for the treatment of diverticular disease is constantly evolving. Historically, the indications for elective surgery were relatively consistent. It was recommended that patients undergo elective resection after two documented attacks of uncomplicated diverticulitis or after one attack of complicated diverticulitis in which the patient did not require emergent surgery. There were some exceptions to these guidelines; people <50 years old could undergo elective resection after their first attack, and patients who had previous solid organ transplants could undergo resection after a single attack. In this article, the author updates the data regarding the timing of surgery in elective diverticular disease and challenges surgical dogma.

KEYWORDS: Diverticulitis, elective resection, indications

Objectives: Upon completion of this article, the reader should be able to summarize indications and timing in the elective management of diverticulitis.

The timing of elective surgery for the treatment of diverticular disease is constantly evolving. Historically, the indications for elective surgery were relatively consistent. It was recommended that patients undergo elective resection after two documented attacks of uncomplicated diverticulitis and after one attack of complicated diverticulitis in which the patient did not require emergent surgery. Documented attacks are defined as more than left lower quadrant pain in which a physician started a patient on antibiotics. The patient must show some sign of systemic illness. Ideally, the patient should have a fever and elevated white blood cell count (WBC) count; if this is the patient's first episode, a computed tomography (CT) scan to diagnose the extent and severity of the disease. Complicated diverticulitis is defined as attacks that include obstruction, fistula, abscess, hemorrhage, and free perforation causing either

purulent or feculent peritonitis. There have been some exceptions to these guidelines: people ≤ 50 could undergo elective resection after their first attack due to the perceived increased prevalence of complicated diverticulitis over time. It was also recommended that patients who had solid organ transplants undergo elective resection after a single attack. This was actually a change from when patients were counseled to undergo elective sigmoid resection prior to transplantation. Taking all this into consideration, an update regarding the timing of surgery in elective diverticular disease is provided here.

UNCOMPLICATED DIVERTICULITIS

The current guidelines for the timing of surgery in uncomplicated diverticulitis—that patients undergo elective resection after two documented attacks of

¹Department of Colon and Rectal Surgery, Ochsner Clinic Foundation, New Orleans, Louisiana.

Address for correspondence and reprint requests: David A. Margolin, M.D., Department of Colon and Rectal Surgery, Ochsner Clinic Foundation, 1514 Jefferson Hwy., New Orleans, LA 70121 (e-mail: damargolin@ochsner.org).

Diverticular Disease; Guest Editor, David A. Margolin, M.D.

Clin Colon Rectal Surg 2009;22:169–172. Copyright © 2009 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA. Tel: +1(212) 584-4662.

DOI 10.1055/s-0029-1236161. ISSN 1531-0043.

uncomplicated diverticulitis—stem from the work of Parks in the late 1960s.¹ Parks found in his evaluation of 455 patients that the risk of recurrent symptoms of diverticulitis ranged from 7 to 45% and that with each attack patients would be less likely to respond to medical therapy. He found that there would only be a 6% chance of responding to medical therapy after the third attack. Though the 1995 American Society of Colon and Rectal Surgery (ASCRS)² and the 1999 Scientific Committee of the European Association for Endoscopic Surgery³ endorsed these recommendations, there was limited objective supporting evidence. In fact, the updated 2006 recommendations from the ASCRS states that elective sigmoid colectomy after recovery from acute diverticulitis should be made on a case-by-case basis.⁴ Why the difference?

As Parks stated, it was felt that that with each attack of diverticulitis the risk complications requiring emergency surgery increased significantly. This is probably not the case as diverticulitis appears to follow a relatively benign course. Authors have shown that between 75 to 85% patients who present with complicated diverticulitis requiring surgery do so with no antecedent history of diverticulitis.⁵⁻⁷ With that limited clinical data, authors have utilized a Markov model to determine the optimal time for elective resection after documented attacks of uncomplicated sigmoid diverticulitis. Markov modeling allows for decision tree analysis of complicated multifactorial events. The model assumes that a patient is always in one of a finite number of discrete health states. With regards to diverticular disease, the models usually use patients recovering from the initial attack, dying from unrelated causes, or having recurrent disease. The decision tree branches with recurrent disease to include a surgical branch, a medical branch, or death. This can be further broken down into patients who have a stoma and subsequent closure or those with primary anastomosis. All events are represented as transitions from one state to another.⁸ According to an analysis done by Salem et al, performing an elective colectomy in patients ≥ 50 after the fourth attack of documented uncomplicated diverticular disease resulted in a 0.5% decrease in mortality and 0.7% fewer colostomies with a cost saving of \sim \$1035 per patient. The key finding in this analysis was that only 0.3% of patients would go on to have a fourth attack of diverticulitis.⁹ Richards and Hammitt also utilized Markov modeling to arrive at similar conclusions. They found that the optimal time for elective resection was after the third attack of uncomplicated diverticulitis and that the probability of surgery after the first hospitalized attack was the same after three attacks. Furthermore, they calculated a cost saving of approximately \$4000 per patient by waiting until after three attacks.¹⁰

Consequently, it appears that elective resection has little impact on patients requiring urgent surgery.

The current ASCRS guidelines that state that elective sigmoid colectomy after recovery from acute diverticulitis should be made on a case-by-case basis are extremely reasonable in contrast to the dogmatic approach that mandates elective resection after the second documented attack.⁴

COMPLICATED DIVERTICULITIS

There appears to be less controversy as to the timing of surgery in complicated diverticulitis. Obviously, for patients who are in extremis or those who fail non-operative treatment, appropriate surgical intervention is indicated. The question arises, when and if to operate on patients who recovered from a nonoperative treatment plan of complicated diverticulitis to eradicate the disease and prevent recurrence. Currently, the standard is that patients under elective resection 6 to 8 weeks after resolution of complicated diverticulitis.⁴ Unfortunately, there is little data in the literature regarding the timing of elective surgery following medical treatment of complicated diverticulitis as most of the literature speaks to acute surgical management of complicated diverticulitis. In 1994, Farmakis and colleagues reported on the results of questionnaires sent to the primary physicians of 176 patients discharged from the hospital with a diagnosis of complicated diverticulitis. Of the 120 patients who responded, 10 died from recurrent complicated diverticular disease; 29 died from other disorders. Forty of 110 patients (excluding those who died from recurrence) were still symptomatic or were so at the time of unrelated death. Thirty-nine patients developed a severe complication after the initial admission, 14 of whom had the same complication initially. Of the 77 patients who had initially been managed by sigmoid resection, only two developed recurrent complications compared with 37 of 43 patients managed conservatively. Of the 10 patients who died from recurrent diverticular disease, nine had not undergone sigmoid colectomy at or after the original admission.¹¹ Although this study has the inherent biases present in any survey, it strongly supports elective sigmoid resection following resolution of complicated diverticulitis. Currently, it is our practice to perform an elective resection, whether open or laparoscopic after resolution of the inflammatory process.

YOUNG PATIENTS

The optimal timing of elective resection following attacks of diverticulitis in young people (<50 years old) is controversial. One school of thought is that, whether due to pathophysiology or lifestyle, young patients are more prone to repeat attacks and elective colectomy is recommended after one attack of uncomplicated diverticulitis.^{12,13} However, other authors have questioned these results. In a recent article, Hjern et al

compared 58 patients ≤ 50 years old with 176 matched controls ≥ 50 years old and found that the rate of recurrent diverticulitis or surgery during follow-up was higher in younger patients (25 versus 19.5%), but this was not significant ($p=0.423$).¹⁴ Guzzo and Hyman retrospectively reported their experience involving 762 patients with diverticulitis. They compared 259 patients 50 years old or younger with 503 patients older than age 50 years using a log-rank test. They found the risk of requiring surgery on initial hospital presentation was similar between the two groups (24 versus 22%, respectively; $p=0.8$). In less than 50 of 196 patients who had been initially medically managed, only one patient presented at a later date with perforation (0.5%).¹⁵ Our current practice is that younger patients with uncomplicated diverticulitis by CT criteria generally respond well to medical management and seldom require an emergent operation and colostomy. Young patients with diverticulitis should be treated according to the same criteria used for older patients.

TRANSPLANT PATIENTS

Elective surgery for patients who have undergone solid organ transplantation is extremely rare. The incidence of diverticulitis is 0.7 to 8.6% in patients who have undergone heart and lung transplantation, significantly higher than the general patient population, which ranges from 0.025 to 0.053%.^{16,17} Unfortunately, those patients who are awaiting organ transplant are generally poor surgical candidates, making prophylactic colectomy a poor choice for disease management. However, posttransplant immunosuppression also poses a significant problem, masking symptoms and impairing wound healing in the perioperative period. Authors have looked at the incidence of diverticulitis in patients who have had heart, lung, or kidney transplants, and have found a paucity of data regarding diverticulitis and liver transplantation. Given the severity of the outcome of delayed surgical treatment, most authors recommend early surgical resection. When surgery is performed, the most common operation is a Hartmann's procedure. Even with this procedure, the mortality of surgery for diverticular disease is still extremely high ranging from 7 to 18%.¹⁸⁻²¹ Hence, the surgeon must be hypervigilant with a low threshold for urgent surgery.

CONCLUSION

The timing of elective surgery for diverticular disease is in a constant state of evolution. As we continue to better understand the natural history of diverticulitis, we can hopefully question surgical dogma and utilize evidence-based outcomes to do the best for our patients. With that in mind, elective resection for uncomplicated

diverticulitis in young patients is no longer mandated after the second or first attack, respectively, but rather patients need to be individualized to achieve the best outcome.

REFERENCES

1. Parks TG. Natural history of diverticular disease of the colon. A review of 521 cases. *BMJ* 1969;iv:639-642
2. Roberts P, Abel M, Rosen L, et al. Practice parameters for sigmoid diverticulitis. The Standards Task Force of the American Society of Colon and Rectal Surgery. *Dis Colon Rectum* 1995;38(2):125-132
3. Köhler L, Sauerland S, Neugebauer E; The Scientific Committee of the European Association for Endoscopic Surgery. Diagnosis and treatment of diverticular disease: results of a consensus development conference. *Surg Endosc* 1999;13(4):430-436
4. Rafferty J, Shellito P, Hyman NH, Buie WD. Practice parameters for sigmoid diverticulitis. *Dis Colon Rectum* 2006; 49(7):939-944
5. Mueller MH, Glatzle J, Kasperek MS, et al. Long-term outcome of conservative treatment in patients with diverticulitis of the sigmoid colon. *Eur J Gastroenterol Hepatol* 2005; 17(6):649-654
6. Chapman JR, Dozois EJ, Wolff BG, Gullerud RE, Larson DR. Diverticulitis: a progressive disease? Do multiple recurrences predict less favorable outcomes? *Ann Surg* 2006; 243(6):876-830; discussion 880-883
7. Somasekar K, Foster ME, Haray PN. The natural history of diverticular disease: is there a role for elective colectomy? *J R Coll Surg Edin* 2002;47(2):481-482, 484
8. Sonnenberg FA, Beck JR. Markov models in medical decision making: a practical guide. *Med Decis Making* 1993;13(4): 322-338
9. Salem L, Veenstra DL, Sullivan SD, Flum DR. The timing of elective colectomy in diverticulitis: a decision analysis. *J Am Coll Surg* 2004;199(6):904-912
10. Richards RJ, Hammitt JK. Timing of prophylactic surgery in prevention of diverticulitis recurrence: a cost-effectiveness analysis. *Dig Dis Sci* 2002;47(9):1903-1908
11. Farmakis N, Tudor RG, Keighley MR. The 5-year natural history of complicated diverticular disease. *Br J Surg* 1994; 81(5):733-735
12. Pautrat K, Bretagnol F, Hutten N, de Calan L. Acute diverticulitis in very young patients: a frequent surgical management. *Dis Colon Rectum* 2007;50(4):472-477
13. Minardi AJ Jr, Johnson LW, Sehon JK, Zibari GB, McDonald JC. Diverticulitis in the young patient. *Am Surg* 2001;67(5):458-461
14. Hjern F, Josephson T, Altman D, Holmström B, Johansson C. Outcome of younger patients with acute diverticulitis. *Br J Surg* 2008;95(6):758-764
15. Guzzo J, Hyman N. Diverticulitis in young patients: is resection after a single attack always warranted? *Dis Colon Rectum* 2004;47(7):1187-1190; discussion 1190-1191
16. Salem L, Anaya DA, Flum DR. Temporal changes in the management of diverticulitis. *J Surg Res* 2005;124(2):318-323
17. Kang JY, Hoare J, Tinto A, et al. Diverticular disease of the colon on the rise: a study of hospital admissions in England between 1989/1990 and 1999/2000. In: Everhart JE, ed.

- Digestive Disease in the United States: Epidemiology and Impact. Bethesda, MD: National Institutes of Health; 1994: 553-565
18. Khan S, Eppstein AC, Anderson GK, et al. Acute diverticulitis in heart- and lung transplant patients. *Transpl Int* 2001;14(1):12-15
 19. Goldberg HJ, Hertz MI, Ricciardi R, Madoff RD, Baxter NN, Bullard KM. Colon and rectal complications after heart and lung transplantation. *J Am Coll Surg* 2006; 202(1):55-61
 20. Qasabian RA, Meagher AP, Lee R, Dore GJ, Keogh A. Severe diverticulitis after heart, lung, and heart-lung transplantation. *J Heart Lung Transplant* 2004;23(7):845-849
 21. Valle RD, Capocastle E, Mazzoni MP. Acute diverticulitis with colon perforation in renal transplantation. *Transp Proceed* 2005;06:2507-2510