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Surgery After an Initial Episode of Uncomplicated Diverticulitis: Does Time to Resection Matter?



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ABSTRACT

Background: The aim of this study was to determine whether time to surgery after an initial episode of uncomplicated diverticulitis is associated with undergoing an emergent versus an elective resection.

Methods: In this retrospective, administrative claims database study, we identified patients at least 18 y old in the 2005-2011 California State Inpatient Database who had an initial episode of uncomplicated diverticulitis and then underwent a bowel resection within 2 y. After characterizing the distribution in time to surgery among all patients, we used a multivariable logistic regression to determine whether time to surgery was associated with undergoing an emergent resection. Next, we assessed differences in three outcomes between elective and emergent resections: at least one of eight postoperative complications, extended length of stay (defined as the top decile of hospitalizations), and 30-d inpatient readmissions. Analyses adjusted for time between initial hospitalization and resection, number of inpatient hospitalizations for diverticulitis before the resection, clinical factors, and hospital clustering.

Results: We identified 4478 patients with an initial episode of uncomplicated diverticulitis followed by a bowel resection within the subsequent 2 y. One-fifth (21.1%) underwent an emergent resection. The median time from the initial episode to resection was 3.8 mo (IQR: 2.3-8.1 mo) for elective resections and 5.1 mo (IQR: 2.3-12.4 mo) for emergent resections. The adjusted odds of undergoing an emergent relative to an elective resection increased by 7% (aOR 1.07 [1.02-1.11]) for every 3 passing mo. Emergent resections were associated with greater adjusted odds of complications (adjusted odds ratio [aOR] 1.75 [95%-CI 1.43-2.15]), extended LOS (aOR 4.52 [3.31-6.17]), and 30-d readmissions (aOR 1.49 [1.09-2.04]).

Conclusions: Among patients who experienced an initial episode of uncomplicated diverticulitis and eventually underwent a resection, the odds of having an emergent relative to elective surgery increased with every 3 passing mo. These findings may

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inform the management of uncomplicated diverticulitis for high-risk patients eventually needing surgery.

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Introduction

Diverticular disease is one of the most common gastrointestinal diagnoses in the Western world and remains a leading cause of emergent bowel resections.¹ The disease can be thought of in three broad categories: diverticulosis, diverticulitis, and diverticular bleeding. While most patients with diverticulosis are asymptomatic, nearly 20% of affected individuals report abdominal symptoms. The well-recognized manifestations of acute diverticulitis can be further divided into uncomplicated and complicated disease. Patients with complicated diverticulitis typically present with either abscess, macroperforations, fistula, or obstruction secondary to strictures, whereas patients with uncomplicated diverticulitis present with abdominal pain and general constitutional symptoms, but none of the previously mentioned.²

Subsequently, the incidence of acute diverticulitis has become one of the most common indications for hospitalization, resulting in an estimated 300,000 inpatient admissions per year.³ One of the largest studies to date identified 210,268 patients with diverticulitis, and of those medically managed, 16.3% experienced a second attack. The risk for a second attack was approximately 7%, highest in the first year and a half after the initial episode. Mortality after emergent resections after the second episode was 4.6%; however, this likely varies significantly nationwide, depending on hospital- and surgeon-related characteristics.^{4,5}

Given the concern for recurrent diverticulitis and the risks associated with emergent resection, prior literature has recommended elective surgery after two attacks secondary to uncomplicated diverticulitis.⁶ More recently, however, data indicate that patients who have experienced two or more episodes are not at an increased risk for morbidity or mortality, even with surgical intervention.^{7,8} This has led the American Society of Colon and Rectal Surgeons (ASCRS) to revise its guidelines and recommend against linking the number of recurrences to the need for elective surgery, and rather, that this be pursued on a unique, case-by-case basis. Advisory groups in Europe have adopted similar recommendations.⁸⁻¹⁰

Many of these previous studies sought to use the number of diverticulitis episodes to evaluate whether patients should undergo bowel resection. However, to our knowledge, few have assessed whether increasing time between an initial episode of uncomplicated diverticulitis and eventually undergoing a resection has potential clinical consequences. As such, the primary purpose of this study was to evaluate whether the time between an initial episode of uncomplicated diverticulitis and undergoing surgery was associated with having an emergent *versus* an elective resection. We hypothesized that increasing amount of time after the initial episode of uncomplicated diverticulitis may be associated with higher odds of undergoing an emergent resection, which would also be associated with worse outcomes.

Methods

Study population

We used the California State Inpatient Database (SID) from 2005 to 2011, which captures all inpatient records in the state. The California SID maintains a unique identification for each patient, allowing us to track patients and their hospitalizations throughout the study period. Using International Classification of Diseases 9 (ICD-9) codes, we identified all patients at least 18 y of age who experienced an initial episode of uncomplicated diverticulitis (562.10, 562.11). We defined patients as having an initial episode if they were without any reported diverticulitis-associated hospitalizations during the previous year. We then used the absence of all of the following diagnosis codes to specify uncomplicated diverticulitis: abscess (569.5), fistula (569.81), obstruction (560), peritonitis (567), and sepsis (995.9). To identify patients who were medically managed during their initial presentation and then underwent a bowel resection afterward, we included patients who had their procedure at least 30 d from admission but within 2 y after their initial episode, both determined a priori using clinical experience. To remove potential confounding from other complex medical conditions, we removed patients with diagnoses for malignancy (153, 196, 197, 198) and those undergoing various procedures during the study period: spinal cord (3.9), thorax (33.2, 34.9), ventral hernia (53.4, 53.5), and salpingo-oophorectomies (65.4, 65.6). In addition, patients with missing clinical factors were excluded.

Demographics and clinical characteristics

Patient factors included age at admission (continuous), gender (male, female), race and ethnicity (white, black, Hispanic ethnicity, and other), payer (private, Medicare, Medicaid, and uninsured), and Elixhauser score (continuous) to capture patient comorbidities significantly associated with in-hospital mortality.^{11,12} For every patient, we tabulated the total number of inpatient hospitalizations before eventually having his or her resection, represented as a categorical variable (1 visit, 2 visits, 3+ visits). We also assessed whether patients had an episode of complicated diverticulitis, after their initial episode of uncomplicated diverticulitis, by the presence of at least one of the following: abscess, fistula, obstruction, peritonitis, and sepsis.

Outcomes

The primary outcome of the first aim in this study was whether patients underwent an emergent resection, instead of an elective resection. We defined a resection as emergent in the database when patients presented through the emergency department, as guided by criteria from the American

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