

Brief Report

# Emergency department presentation, admission, and surgical intervention for colonic diverticulitis in the United States



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## KEYWORDS:

Diverticulitis;  
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## Abstract

**BACKGROUND:** Diverticulitis in admitted inpatients is well reported. This study examined colonic diverticulitis treated in the emergency department (ED).

**METHODS:** The 2010 Nationwide Emergency Department Sample was used to examine relationships among patient age and inpatient admission, surgical intervention, and in-hospital mortality among ED patients with a primary diagnosis of diverticulitis.

**RESULTS:** Of 310,983 ED visits for primary diverticulitis, 53% resulted in hospitalization and 6% in surgical intervention. Most patients 65+ years old were female (69%), and most were hospitalized (63%). Seven percent of ED patients aged 65+ underwent surgery and .96% died in hospital. Patients aged less than 40 years (13% of all admissions) were mostly male (63%), 42% were hospitalized, 4% underwent surgery, and less than .01% died. Compared with patients aged less than 40 years, those 65+ demonstrated greater odds of admission (odds ratio 1.53, 95% confidence interval 1.43 to 1.64) and surgical intervention (odds ratio 1.45, 95% confidence interval 1.27 to 1.65).

**CONCLUSIONS:** Half of ED patients were hospitalized and 6% of ED visits resulted in colectomy. Fully 13% of ED patients were less than 40 years old. Future studies examining outpatient services may further illuminate the epidemiology of diverticulitis.

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Colonic diverticular disease, including diverticulitis and diverticulosis, is the 5th most common gastrointestinal reason for ambulatory care visits, with treatment costs

estimated at approximately 3.6 billion dollars in 2004.<sup>1</sup> Diverticulosis is an age-dependent phenomenon that is estimated to affect up to 60% of adults above the age of 60. On the other hand, diverticulitis, the disease condition which is the focus of this study, is estimated to affect approximately 1% to 2% of patients in their lifetime.<sup>2</sup> Unlike neoplastic diseases, there are no nationwide patient registries for diverticulitis, which have hindered the understanding of the natural history of the disease process.<sup>3</sup> Indeed, there

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are basic questions surrounding diverticulitis epidemiology that have remained unsettled. For example, there is limited reporting on diverticulitis among younger adults and there have been conflicting reports on whether younger patients with diverticulitis have a more aggressive disease course.<sup>4,5</sup>

Past studies have used the Nationwide Inpatient Sample and data from the Centers for Medicare and Medicaid Services to characterize recent changes in the epidemiology of colonic diverticulitis, which is reported to be changing rapidly.<sup>3</sup> For example, Etzioni et al<sup>3</sup> demonstrated a 26% increase in overall inpatient admissions for diverticulitis between 1998 and 2005. Most epidemiologic studies examining diverticulitis have focused primarily on inpatient admissions and have not included those patients presenting to hospital emergency departments (EDs) with diverticulitis who were not admitted to inpatient care. Understanding the epidemiology of emergency cases of diverticulitis and their course of treatment, especially regarding age at presentation, will provide a broader, but not complete, understanding of the disease. Using data from a nationally representative ED dataset, we sought to understand the epidemiology of emergency admissions with diverticulitis at the level of the US national population.

We performed a retrospective cross-sectional study of the Nationwide Emergency Department Sample (NEDS) for the year 2010. NEDS is a database of the Healthcare Cost and Utilization Project sponsored by the Agency for Healthcare Research and Quality. The NEDS is the largest nationally representative hospital-based ED database in the United States, containing data for ED visits from over 950 hospitals. The NEDS dataset was created using a 20% stratified sample of US hospital-based EDs, which, through the application of sampling weights, enables calculation of population-level estimates.<sup>6</sup> The 2010 NEDS data were queried to identify all patients presenting with a primary diagnosis of colonic diverticulitis (International Classification of Diseases, Ninth Revision, Clinical Modification [ICD-9-CM] diagnosis code 562.11 or 562.13).

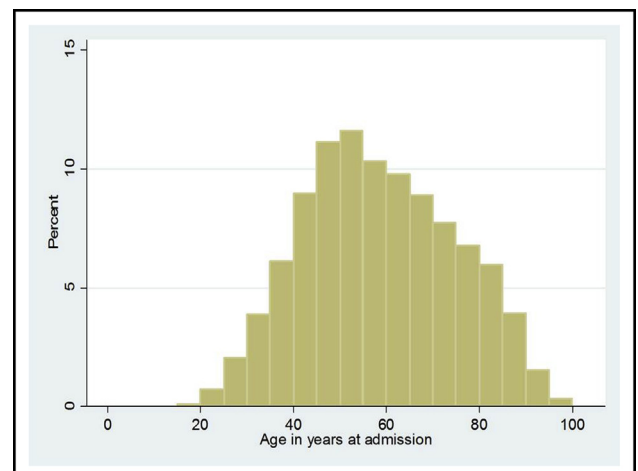
After weighting data to represent the US population, demographic variables, admission to inpatient status, inpatient length of stay, comorbidity burden, surgical intervention (as defined by ICD-9 procedure codes), and in-hospital mortality (death occurring either in the ED or as an inpatient) were compared among patients across 3 age categories: (1) less than 40 years of age, (2) age 40 to 64, and (3) age 65+. The patient-level burden of comorbid disease was categorized using the Charlson comorbidity index.<sup>7</sup>

The database was queried to determine if patients underwent any one or more of the following surgical interventions: sigmoid colectomy (ICD-9 code 17.36 or 45.76), left hemicolectomy (ICD-9 code 17.35 or 45.75), and other bowel surgical procedures (ICD-9 codes 45.71, 45.79, 45.8, 45.81, 45.82, 45.83, 48.63, 17.3, 17.31, and 17.39).<sup>8</sup> Standard descriptive statistical analyses were employed. Multivariable logistic regression, controlling for patient's sex and comorbidity burden, as well as hospital region and location, examined age-related differences in inpatient admission, surgical intervention, and in-hospital

death. A 2-sided *P* value of less than or equal to .05 was considered statistically significant. All analyses were performed using Stata 12.1 (StataCorp, College Station, TX).

Based on weighted estimates, approximately 310,983 ED visits with a primary diagnosis of colonic diverticulitis occurred in the United States in 2010. Mean patient age was 58.0 (standard deviation [SD] 16.1) years (Fig. 1). Patient's sex, comorbidity burden, location (urban vs rural), and region of the United States differed significantly across age strata; most notably, patients 65+ years were predominantly female (69%), while those less than 40 years were primarily male (63%). Overall, 164,523 (53%) patients were hospitalized, with older patients more likely to be admitted (63% among patients aged 65+ years vs 49% among those aged 40 to 65 years vs 42% among patients younger than 40 years; *P* < .001). A total of 18,743 patients underwent surgical intervention, representing 6% of all ED patients (11% of patients admitted to inpatient status). Sigmoid colectomy (75%) and left hemicolectomy (16%) were the most common surgical interventions. Overall, 1,207 (.4%) patients died in the hospital (Table 1).

In multivariable analysis, the odds of inpatient admission were higher among patients 65 years or older (odds ratio [OR] 1.53, 95% confidence interval [CI] 1.42 to 1.63) and those aged 40 to 64 (OR 1.10, 95% CI 1.04 to 1.16) compared with individuals younger than 40 years of age. Greater comorbidity burden was also associated with increased odds of inpatient admission as was female sex (Table 2). Patients aged 65 and older (OR 1.45, 95% CI 1.27 to 1.65) and those aged 40 to 64 (OR 1.30, 95% CI 1.15 to 1.47) demonstrated greater odds of surgical intervention compared with those younger than 40 years. Again, greater comorbidity burden was associated with increased odds of surgical intervention; however, in adjusted analysis across the entire cohort, female patients demonstrated reduced odds of surgery compared with male patients (Table 2). Although in-hospital mortality was rare, it was strongly associated with patient age and comorbidity burden, but not with patient sex (Table 2).



**Figure 1** Age distribution of patients presenting for ED treatment of colonic diverticulitis.

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