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Rising post-colectomy complications in children with ulcerative colitis despite stable colectomy rates in United States [☆]

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Abstract

Background and aims: In children with ulcerative colitis, data on temporal colectomy trends and in-hospital post-colectomy complications are limited. Thus, we evaluated time trends in colectomy rates and post-colectomy complications in children with ulcerative colitis.

Methods: We identified all children (≤ 18 years) with a diagnosis code of ulcerative colitis (ICD-9: 556.X) and a procedure code of colectomy (ICD-9: 45.8 and 45.7) in the Kids' Inpatient Database for 1997, 2000, 2003, 2006 and 2009. The incidence of colectomies for pediatric ulcerative colitis was calculated and Poisson regression analysis was performed to evaluate the change in colectomy rates. In-hospital postoperative complication rates were assessed and predictors for postoperative complications were evaluated using multivariate logistic regression.

Results: The annual colectomy rate in pediatric ulcerative colitis was 0.43 per 100,000 person-years, which was stable throughout the study period ($P > .05$). Postoperative complications were experienced in 25%, with gastrointestinal (13%) and infectious (9.3%) being the most common. Postoperative complication rates increased significantly by an annual rate of 1.1% from 1997 to 2009 ($P = .01$). However, other independent predictors of postoperative complications were not identified.

Abbreviations: CI, confidence interval; HCUP, Healthcare Cost and Utilization Project; ICD-9-CM, International Classification of Diseases, 9th Revision, Clinical Modification; IRR, incidence rate ratio; KID, Kids' Inpatient Database; NIS, Nationwide Inpatient Sample; OR, odds ratio; Q1, first quartile; Q3, third quartile; TNF, tumor necrosis factor; UC, ulcerative colitis; US, United States.

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Patients with postoperative complications had significantly longer median length of stay (14.3 days vs 8.2 days; $P < .001$) and higher median hospital charges per patient (US \$81,567 vs US \$55,461; $P < .001$) compared to those without complications.

Conclusion: Colectomy rates across the United States in children with ulcerative colitis have remained stable between 1997 and 2009; however, in-hospital postoperative complication rates have increased.

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1. Introduction

Ulcerative colitis (UC) is a chronic inflammatory condition of the colon that imparts a significant burden to patients and society.¹ A meta-analysis of population-based studies has shown that the 10-year risk of colectomy in children with UC is 22%.² Population-based time trend analyses of colectomy rates have shown that the 10-year risk of colectomy has decreased over the past several decades in adults.² However, similar studies in children are lacking. A small population-based study of 30 children with UC who underwent a colectomy over a 27 year period reported a stable colectomy rate of 0.06 per 100,000 person-years.³ In contrast, a study conducted in the same health region demonstrated that colectomy rates in adults significantly decreased by 4% per year over a 15-year period.⁴ The difference in colectomy rates over time between children and adults may be due to earlier adoption and greater utilization of immunomodulators and/or biologics in adults with UC as compared to children. Alternatively, non-significant time trend results may be attributable to the smaller sample size of pediatric studies.

In children with UC, the reported incidence of in-hospital or early postoperative complications ranges between 30 and 55%,^{3,5-7} with infections (e.g., abscess formation) and gastrointestinal complications (e.g., bowel obstruction) being the most common.^{3,5,6,8} In contrast to the adult literature, pediatric studies have not reported mortality following colectomy for UC.^{5,6,9,10} One population-based study reported higher postoperative complication rates in children with emergency colectomy (90% vs 50%) and delayed colectomy of >2 weeks after admission (60% vs 0%).³ However, this study was restricted to one geographic area and limited by the small sample size.

Hence, the objective of the present study was to evaluate the nationwide colectomy rates and in-hospital complications following colectomy in children with UC in the United States (US), using the Kids' Inpatient Database (KID) from 1997 to 2009.

2. Materials and methods

2.1. Data source

The KID, part of the Healthcare Cost and Utilization Project (HCUP), is the largest all-payer pediatric inpatient database with 2 to 3 million pediatric discharges per year. Stratified random sampling is done to ensure that the database is representative of the US population and accounts for approximately 90% of all pediatric hospitalizations in US.¹⁷

The database contains information on demographic characteristics, admission type (emergent, urgent or elective), up to 25 diagnostic and 15 procedure codes based on the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), outcomes (length of stay and hospital charges), and hospital characteristics.¹¹ KID assigns individual-level discharge weights that allow estimation of national case rates and trends. It has been used to study hospitalization and surgical intestinal resection in pediatric IBD.^{12,13}

2.2. Study population

All discharges for children (≤ 18 years) with a diagnosis of UC (ICD-9-CM: 556.X) and a procedure code of colectomy (ICD-9-CM: 45.8 & 45.7) were identified in the HCUP KID for 1997, 2000, 2003, 2006 and 2009. Validation studies have shown that administrative data correctly identified UC patients who underwent colectomy in 96% of children³ and 86% of adults. To minimize misclassification with Crohn's disease, we excluded 25 discharges of patients who were coded with both UC and Crohn's disease (ICD-9-CM: 555.X).

2.3. Variables

Our primary factors of interest were the admission type and the number of preoperative days between admission and colectomy among emergently admitted patients. Admission type was categorized into emergent and urgent/elective as this was previously shown in a validation study to increase the specificity of identifying patients admitted for emergent colectomy.¹⁴ An emergent admission refers to unplanned admissions to hospital for a serious medical condition. In contrast, elective and urgent admissions are both planned admissions with urgent admission referring to a medical condition that requires immediate attention for treatment.

Covariates included patients' age; sex; race/ethnicity (white or non-white); patients' residence (urban or rural); admission source (non-hospital or hospital transfer); health care insurance status (Private, Medicaid/Medicare, or other); hospital region (Northwest, Midwest, South or West); hospital location (urban or rural); hospital type [teaching or non-teaching; pediatric or non-pediatric (pediatric hospital is defined as either a children's hospital or a general hospital with a children's unit)]; hospital size (small, medium or large); and creation of pouch at time of colectomy. A year variable was included to indicate the year the data was collected to test for trends over time.

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