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Trends and attributable costs of anorectal involvement in pediatric Crohn's disease



Colin G. DeLong, MD,^{a,*} Afif N. Kulaylat, MD, MSc,^a
 Audrey S. Kulaylat, MD, MSc,^a Christopher S. Hollenbeak, PhD,^{b,c}
 Robert E. Cilley, MD,^a and Dorothy V. Rocourt, MD^a

^a Division of Pediatric Surgery, Department of Surgery, The Pennsylvania State University, College of Medicine, Hershey, Pennsylvania

^b Department of Surgery, The Pennsylvania State University, College of Medicine, Hershey, Pennsylvania

^c Department of Public Health Sciences, The Pennsylvania State University, College of Medicine, Hershey, Pennsylvania

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ABSTRACT

Background: Pediatric Crohn's disease (CD) with anorectal involvement has not been well characterized. We sought to describe trends in the prevalence of pediatric CD with anorectal involvement and its influence on health-care utilization.

Materials and methods: Patients (<21 y of age) with an International Classification of Diseases, Ninth Revision diagnosis of CD (555.X) were identified in the Kid's Inpatient Database (2003, 2006, 2009, 2012) and stratified by anorectal involvement based on the International Classification of Diseases, Ninth Revision diagnosis and procedural codes. Patient characteristics and resource utilization (length of stay [LOS] and costs) were compared between CD patients with and without anorectal involvement using univariate and multivariable analyses. Propensity score matching was used to estimate attributable LOS and costs.

Results: There were 26,029 patients with CD identified in the study interval. Of these, 1706 (6.6%) had anorectal involvement. Those with anorectal disease were younger (age 16 versus 17 y old), more likely to be male (59.4% versus 49.9%) and black or Hispanic (24.7% versus 18.2%), and were more commonly treated in urban teaching hospitals compared with rural or nonteaching hospitals (83.2% versus 70.9%) ($P < 0.001$ for all). The proportion of patients with anorectal involvement increased over time (odds ratio 1.03, 95% confidence interval 1.02-1.05). After propensity score matching, attributable LOS and costs were 0.5 d and approximately \$1600, respectively.

Conclusions: There has been an increase in the proportion of pediatric CD hospitalizations with anorectal manifestations. This pattern of disease is associated with longer hospitalization and higher costs compared with CD alone. Further research is required to understand the underlying etiology of these observed trends.

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* Corresponding author. Division of Pediatric Surgery, The Pennsylvania State University, College of Medicine, Penn State Children's Hospital, 500 University Drive, Hershey, PA 17033. Tel.: +717 531 0003; fax: +717 531 8887.

E-mail address: colin.g.delong@gmail.com (C.G. DeLong).

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Introduction

Inflammatory bowel disease (IBD) poses a significant burden on patients and health-care systems. Epidemiologic studies have demonstrated an increasing incidence of IBD globally,¹ with a disproportionately higher rate of growth observed in Crohn's disease (CD) compared with ulcerative colitis.^{2,3} This trend has also been observed in pediatric populations.⁴⁻⁶ Concurrently, hospitalization rates for IBD have also been on the rise over the last 3 decades. This increase in disease has been accompanied by a concurrent rise in rates of hospitalization for IBD over the last 3 decades in both adult and pediatric populations.⁷⁻¹⁰

The economic burden of managing IBD is significant, with escalating costs noted in recent studies.^{7,9} National estimates of annual total direct costs for CD in the US were \$2.29 billion in 2012.¹¹ Among children, treatment and management of IBD accounted for 64,985 hospitalization days and \$152.4 million in costs in 2010.¹² Compared with adults, health-care utilization and costs are higher in the pediatric population.¹³⁻¹⁶ Costs are driven by disease severity, with relapsing or uncontrolled disease states primarily influencing financial burden.^{17,18}

The management of anorectal involvement in CD—including anal fissures and ulcers, perianal abscesses, fistulas, draining sinuses, skin tags, and anorectal strictures—is complicated.^{19,20} While the incidence of anorectal manifestations does not appear to be more common in pediatric populations, the younger age of onset of the disease extends the interval of time over which potential anorectal complications may occur.²¹ Multiple studies suggest that 10%-15% of children have anorectal manifestations at the time of diagnosis, while 25%-62% of patients may subsequently develop anorectal complications in the course of their disease.²²⁻²⁴ The aim of this study was to better characterize the prevalence of anorectal CD in the pediatric population and its associated impact on health-care utilization.

Methods

This study was reviewed by the Penn State College of Medicine institutional review board and determined to be exempt from formal review.

Data

Data used in this study were identified in the Kid's Inpatient Database (KID), which is part of the Healthcare Cost and Utilization Project. This database is updated every 3 y with 1 full year of administrative claims data; for this study, data from the years 2003, 2006, 2009, and 2012 were used. The KID contains data for children and adolescents under 21 y of age, and the data are weighted to be nationally representative of all inpatient hospital discharges within the United States. Data available within the KID include patient demographics, hospital length of stay (LOS) and hospitalization charges, hospital characteristics, and both diagnosis and procedural codes according to the International Classification of Diseases, Ninth Revision (ICD-9), Clinical Modification system.

Patient selection and outcomes

All hospitalizations with a primary or secondary ICD-9 diagnosis code of 555.X, indicating CD, were identified within the database. Of these, hospitalizations involving anorectal disease were identified with either ICD-9 diagnosis codes (565.X, 566.X) or procedural codes (49.0, 49.1, 49.3, 49.7, 49.9). Patients with missing data were excluded from the analysis ($n = 3878$). National survey weights were utilized to estimate national trends in

Table 1 – Patient demographics and hospital characteristics.

Variable	Nonanorectal ($n = 24,323$)	Anorectal ($n = 1706$)	P-value
Age, y (median, IQR)	17 (14-19)	16 (13-19)	<0.001
0-6	1.8%	1.5%	
6-10	4.4%	6.7%	
10-20	93.8%	91.8%	
Sex			<0.001
Male	49.9%	59.4%	
Female	50.1%	40.6%	
Race			<0.001
White	58.1%	51.9%	
Black	12.0%	17.0%	
Hispanic	6.2%	7.7%	
Asian	1.2%	1.5%	
Other	3.1%	3.3%	
Sum of comorbidities	0.85	0.80	0.02
Type of admission			0.78
Elective	18.9%	18.6%	
Nonelective	81.1%	81.4%	
Payer			0.88
Medicaid	24.4%	24.9%	
Commercial	66.1%	65.6%	
Other	9.5%	9.6%	
Hospital size			0.08
Small	10.8%	9.4%	
Medium	23.0%	22.0%	
Large	66.2%	68.6%	
Hospital setting			<0.001
Rural	5.9%	3.1%	
Urban nonteaching	23.2%	13.7%	
Urban teaching	70.9%	83.2%	
Hospital region			0.01
Northeast	21.2%	23.0%	
Midwest	28.9%	25.3%	
South	33.3%	35.1%	
West	16.5%	16.5%	

IQR = interquartile range.

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