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Patients with Pouchitis Demonstrate a Significant Cost Burden in the First Two Years after Ileal Pouch-Anal Anastomosis

Edward L. Barnes, MD, MPH^{1,2}, Michael D. Kappelman, MD, MPH^{2,4}, Xian Zhang, PhD³, Millie D. Long, MD, MPH^{1,2}, Robert S. Sandler, MD, MPH^{1,3}, Hans H. Herfarth, MD, PhD^{1,2}

¹Division of Gastroenterology and Hepatology, University of North Carolina at Chapel Hill, Chapel Hill, NC

²Multidisciplinary Center for Inflammatory Bowel Diseases, University of North Carolina at Chapel Hill, Chapel Hill, NC

³Center for Gastrointestinal Biology and Disease, University of North Carolina at Chapel Hill, Chapel Hill, NC

⁴Division of Pediatric Gastroenterology, University of North Carolina at Chapel Hill, Chapel Hill, NC

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pouchitis; ulcerative colitis; costs; administrative claims

INTRODUCTION

Pouchitis, the most common long-term complication after colectomy with IPAA for UC, can lead to increased health-care costs and diminished quality of life.¹ In this study, we aimed to compare the total costs among patients diagnosed with pouchitis in the first 2 years after an IPAA to those among patients who were not diagnosed with pouchitis, using a large administrative claims database. Additionally, we aimed to investigate the specific drivers of cost among patients with an IPAA during the two-year study period, including inpatient hospitalizations, Emergency Department (ED) visits, and pharmacy-related costs.

Corresponding Author: Edward L. Barnes, MD, MPH, Division of Gastroenterology and Hepatology, University of North Carolina at Chapel Hill, Campus Box #7080, 130 Mason Farm Road, Chapel Hill, NC 27599-7080, Phone: 919-962-3112, Fax: 919-966-6842, edward_barnes@med.unc.edu.

Authorship Statement:

Edward L. Barnes, MD, MPH is acting as the submission's guarantor. ELB was involved in the study concept and design, acquisition of data, statistical analysis and interpretation of data, drafting of the manuscript, and critical revision of the manuscript. MDK, MDL, RSS, and HHH were involved in the study concept and design, acquisition of data, interpretation of data, and critical revision of the manuscript. XZ was involved in the study concept and design, statistical analysis and interpretation of data, and critical revision of the manuscript. All authors approved the final version of the article, including the authorship list.

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METHODS

Study Design

We performed a cross-sectional study evaluating the costs associated with pouchitis in the first 2 years after IPAA.

Data Source

The IQVIA Legacy PharMetrics Adjudicated Claims Data is an administrative claims data source containing longitudinal pharmacy, hospital, and medical claims in a de-identified manner. Please see Supplemental Methods for more details.

Patient Selection

Patients age 18 and <64 years with at least 6 months of continuous health plan enrollment between January 1, 2007 and July 1, 2016 were eligible for inclusion. Patients with pouchitis were identified using a previously published case-finding definition.²

Outcome Measures

The primary outcome was the total allowed costs within the first 2 years after IPAA, evaluated on a per-year basis. We specifically chose to evaluate pouchitis in the first 2 years after IPAA given that many patients in the United States experience frequent turnover in commercial insurance coverage.³ Secondary outcomes included the total costs related to inpatient hospitalization and ED visits, and total pharmacy-related costs. Gastrointestinal-specific inpatient costs were identified using specialty-specific coding in the IQVIA Legacy PharMetrics Adjudicated Claims Data. We also compared mean monthly costs in the 6 months prior to colectomy to those after IPAA. Please see Supplemental Methods for full Statistical Analysis plan.

RESULTS

Between January 1, 2007 and July 1, 2016, a total of 547 patients with UC underwent proctocolectomy with IPAA and met study inclusion criteria. Of these, 260 (48%) developed pouchitis during the 2-year follow up period.

In the evaluation of the total costs in the first year after IPAA, there was no significant difference when comparing patients who developed pouchitis and those who did not (\$18,128 vs. \$14,284, $P=0.064$, Table 1). When comparing total costs in the second year after IPAA, patients with pouchitis demonstrated significantly higher mean total costs (\$21,617 vs. \$10,898, $P<0.001$, Table 1). The mean total monthly costs in both of these time periods were lower than the mean total monthly costs in the 6-months prior to the index date for both groups (Supplemental Figure 1).

Patients with pouchitis demonstrated higher mean ED-associated costs compared to patients without pouchitis (first year: \$758 vs. \$252, $P=0.001$; second year: \$1,593 vs. \$162, $P<0.001$). Patients with pouchitis also demonstrated higher gastrointestinal-related costs during inpatient admissions during the first year after IPAA (mean \$977 vs. \$332, $P=0.007$).

The most common primary indications for inpatient admissions among patients with pouchitis were intestinal obstruction (16%), acute kidney failure (4%), and pouchitis (3%). Among patients without pouchitis, intestinal obstruction represented the most common reason for admission (13%). In comparison to patients who did not develop pouchitis, patients with pouchitis had significantly greater costs attributed to multiple medication classes during the second year after IPAA including aminosalicylates, immunomodulators, and steroid therapies.

In a multivariable analysis adjusting for pre-colectomy costs, sex, age at IPAA, the Deyo modification of the CCI, and use of anti-TNF pre-colectomy, patients with pouchitis demonstrated significantly greater costs in both year 1 and year 2 (Supplemental Table 1).

DISCUSSION

In this study, we demonstrated that the development of pouchitis is associated with significantly higher total costs in the first 2 years after IPAA after adjusting for potential confounders. Although this likely represents a decrease in costs compared to chronic therapy for UC,¹ pouchitis appears to be associated with a significant economic burden to patients and the health system in the first 2 years after IPAA for UC.

In contrast to previous studies^{4, 5} we evaluated patients in a more current study period, which may be more reflective of the current epidemiology and cost burden of pouchitis. We additionally attempted to evaluate the drivers of costs over time in the 6 months pre-colectomy and in the first 2 years after IPAA. Evaluating the 6-months pre-colectomy also ensured that the colectomy and IPAA were incident events. Patients with UC seem to have significant costs in many areas pre-colectomy including costs related to inpatient and outpatient care, in addition to the expected pharmacy-related costs. The potential exists that our analyses were underpowered to detect differences in cost in the first year in bivariate analysis given that many patients will require healthcare visits and other resources in the first months after surgery. As such, the highest total costs in year 1 in both groups may be demonstrated in patients who experience postoperative complications. Additionally, because not all patients who developed pouchitis did so in the first year after IPAA, the true financial impact of pouchitis may become more apparent in the second year after IPAA.

Our study has limitations. We only evaluated patients with commercial insurance and thus the uninsured and those with federal or other forms of health insurance are not represented. The study relied on a validated case definition for pouchitis that was designed for use in administrative claims data.² However, because this definition does not rely on a single ICD or CPT code, we could not analyze costs specific to a pouchitis-related encounter. Although there remains the possibility of misclassification of exposure when evaluating administrative data, we used previously validated strategies for the preoperative identification of patients with UC⁶ and for the postoperative identification of patients with pouchitis.²

In conclusion, patients who developed pouchitis in the first 2 years after IPAA demonstrated significantly higher total costs compared to patients who did not develop pouchitis. To

decrease the economic burden associated with pouchitis, future studies should aim to identify reliable risk factors for this complication and then pursue prevention strategies in patients at risk.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Conflicts of Interest:

Edward L. Barnes has served as a consultant for AbbVie, Gilead, Pfizer, Takeda, and Target RWE.

Hans H. Herfarth has served as a consultant for Alivio, AMAG, Finch, Gilead, Lycera, Merck, Otsuka, Pfizer, PureTech, Seres and has received research support from Pfizer and Artizan Biosciences

Michael D. Kappelman has served as a consultant for Abbvie, Takeda, Janssen, and Eli Lilly and has received research support from Abbvie and Janssen.

Millie D. Long has served as a consultant for AbbVie, UCB, Takeda, Janssen, Pfizer, Salix, Valeant, Target Pharmsolutions and has received research support from Pfizer and Takeda.

Robert S. Sandler and Xian Zhang have no relevant disclosures or conflicts of interest.

Statement Regarding Data Availability:

Data was obtained under licensing from IQVIA, and thus requests for data sharing must comply with the licensing agreements. Please direct any questions regarding analytic methods to edward_barnes@med.unc.edu

Abbreviations:

CPT	Current Procedural Terminology
ED	emergency department
IPAA	ileal pouch-anal anastomosis
IBD	inflammatory bowel disease
ICD	International Classification of Diseases
ICD-9	ICD-9 th Clinical Modification
ICD-10	ICD-10 th Clinical Modification

IQR	interquartile range
PSC	primary sclerosing cholangitis
SD	standard deviation
UC	ulcerative colitis
US	United States

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Table 1.

Comparison of costs in the first two years after ileal pouch-anal anastomosis among patients who developed pouchitis and those who did not

Year 1 Costs	Patients without pouchitis (n=287)		Patients with pouchitis (n=260)		p-value
	Mean	SD	Mean	SD	
Total costs	\$14,284	\$27,713	\$18,128	\$28,616	0.064
Inpatient admission	\$5,292	\$18,187	\$6,727	\$18,944	0.508
Emergency Department	\$252	\$1,173	\$758	\$7,547	0.001
Outpatient physician's office	\$2,761	\$9,450	\$2,766	\$6,785	0.471
Pouchoscopy	\$61	\$279	\$279	\$747	0.106
Pharmacy	\$2,055	\$4,694	\$2,549	\$4,370	0.588
Antibiotic-specific	\$8	\$77	\$8	\$51	0.369
Biologics	\$772	\$4,016	\$503	\$3,014	0.075
Aminosalicylates	\$46	\$236	\$194	\$714	0.066
Immunomodulators	\$8	\$77	\$8	\$51	0.369
Steroids	\$11	\$110	\$44	\$355	0.073
Year 2					
Total costs	\$10,898	\$25,952	\$21,617	\$38,739	<0.001
Inpatient admission	\$2,780	\$13,688	\$7,148	\$21,335	0.630
Emergency Department	\$162	\$729	\$1,593	\$16,825	<0.001
Outpatient physician's office	\$1,923	\$5,396	\$2,822	\$11,395	0.015
Pouchoscopy	\$91	\$366	\$291	\$650	0.716
Pharmacy	\$2,219	\$5,121	\$3,403	\$6,088	0.084
Antibiotic-specific	\$11	\$89	\$14	\$80	0.220
Biologics	\$936	\$4,907	\$889	\$4,406	0.251
Aminosalicylates	\$68	\$472	\$203	\$715	<0.001
Immunomodulators	\$11	\$89	\$14	\$80	0.039
Steroids	\$18	\$150	\$93	\$725	0.004