



The impact of preoperative steroid use on short-term outcomes following surgery for inflammatory bowel disease ☆, ☆ ☆



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Abstract

Background: Inflammatory bowel disease (IBD) patients are frequently treated with steroids prior to surgery. We characterized the association between preoperative steroid use and postoperative complications in a large prospective cohort.

Methods: We identified patients who underwent major IBD-related abdominal surgery in the American College of Surgeon's National Surgical Quality Improvement Program (ACS-NSQIP) between 2005 and 2012. We compared the risk of postoperative complications and 30-day mortality between preoperative steroid users and non-users.

Results: We identified 8260 Crohn's disease (CD) and 7235 ulcerative colitis (UC) patients who underwent major abdominal surgery. Preoperative steroid use was associated with higher risk of postoperative complications, excluding death, in both CD (22.6% vs. 18.5%, $P < 0.0001$) and UC (30.1% vs. 22.5%, $P < 0.0001$). The adjusted odds ratio for any postoperative complication associated with steroids was 1.26 (95% CI: 1.12–1.41) for CD and 1.44 (95% CI: 1.28–1.61) for UC. Infectious complications were more frequent with steroid use in both CD (15.2% vs. 12.9%, $P = 0.004$) and UC (19.4% vs. 15.6%, $P < 0.0001$), specifically intra-abdominal infections and sepsis. Steroid use was associated with increased risk of venous thromboembolism (VTE) in both CD (OR, 1.66; 95% CI: 1.17–2.35) and UC (OR, 2.66; 95% CI: 2.01–3.53). 30-day mortality did not differ among steroid users and non-users (6.8/1000 vs. 5.8/1000, $P = 0.58$ for CD; 13.5/1000 vs. 15.2/1000, $P = 0.55$ for UC).

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Conclusions: Preoperative steroids are associated with higher risk of postoperative sepsis and VTE in IBD. Increased infectious control measures and VTE prophylaxis may reduce adverse events.

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1. Introduction

The inflammatory bowel diseases (IBDs), comprising Crohn's disease (CD) and ulcerative colitis (UC) are chronically relapsing conditions that frequently lead to complications requiring intestinal surgery. Nearly 40% of CD patients undergo intestinal resection within 20 years of disease onset.¹ A third of these individuals will require a second surgery within 10 years of the initial surgery.¹ For UC, the 20-year cumulative risk of colectomy is 15%.² However, unlike CD, surgery for UC is curative.

Surgery is usually only recommended after IBD patients have failed conventional medical therapy. Corticosteroids remain a mainstay of conventional medical therapy and up to half of IBD patients are treated with at least one course of steroids during their first 5 years of diagnosis.¹ While the use of steroids in CD remains stable, it seems to be increasing in UC.³ Because steroids are frequently used prior to surgery, their association with poor wound healing and infectious complications has raised concerns regarding their potential impact on postoperative outcomes. A number of small studies have shown conflicting results as to whether steroids are associated with infectious or overall complications.^{4–13} The vast majority of these studies were underpowered to detect differences in steroid-associated postoperative complications. A meta-analysis of the aforementioned studies has demonstrated an increase in aggregate risk of infectious and overall postoperative complications associated with steroids, but was not able to assess individual complications.¹⁴

The American College of Surgeon's National Surgical Quality Improvement Program (ACS-NSQIP) is a geographically diverse database of surgeries throughout the United States that contains over 100 quality-controlled clinical variables. Its large study population of IBD patients who have undergone major abdominal surgery is nearly 10-fold greater than the total number of individuals in the above meta-analysis and provides a unique opportunity to definitively characterize the impact of corticosteroid use on a myriad of individual postoperative short-term complications.

2. Methods

2.1. Study population

The ACS-NSQIP was designed to assess short-term surgical outcomes and their predictors. These clinical data are prospectively collected from individuals who are 15 years old and older at participating hospitals. The NSQIP database and methodology have been previously described.^{15–19} We used ICD-9 codes to identify all individuals between 2005 and 2012 with a diagnosis of Crohn's disease (555.x) and ulcerative colitis (556.x) who underwent open or laparoscopic large or small bowel resection (CPT codes: 44005–44160; 44180–44238);

stoma formation (CPT codes: 44300–44346); stricturoplasty (CPT codes: 44615); fistula repair (CPT codes: 44602–44680); and resection of the rectum (CPT codes: 45110–45397).

2.2. Predictor variables

The primary predictor variable was the preoperative use of steroids for >10 days for chronic inflammatory conditions (including IBD) within 30 days prior to surgery. The specific indication for and dosage and route of administration of corticosteroids were not recorded. Other predictor variables included age, sex, smoking status, functional status, body mass index, weight loss, anemia, selected preoperative comorbidities (diabetes, anemia, cardiovascular disease, renal disease), predicted mortality and morbidity scores (based on logistic regression models incorporating preoperative variables that were developed in general surgery and vascular patients), and emergency status.

2.3. Outcome variables

Primary outcomes included 30-day mortality, return to operating room, infectious complications (superficial and deep wound infections, intra-abdominal infection, pneumonia, urinary tract infection); wound dehiscence; cardiac complications (cardiac arrest and myocardial infarction); neurological sequelae (stroke and coma); renal complications (acute renal failure and progressive renal insufficiency); and venous thromboembolism. In the subset of patients admitted for surgery in 2011 and 2012, data on 30-day readmissions and unplanned reoperations were also available and analyzed in this subgroup.

Measures of resource utilization, including total length of stay and postoperative length of stay were also measured. We used the work relative value unit (RVU) to estimate the quantity of physician services associated with each surgery.

2.4. Statistical analysis

Analyses were performed using the Stata 10.0 SE software package (Stata Corp LP, College Station, Texas). Categorical variables were compared between steroid users and non-users using the chi-square or Fishers exact test, while continuous variables were compared using the unpaired Student's t-test. Multiple logistic regression models were used to assess for predictors of select postoperative outcomes while simultaneously adjusting for other predictors and accounting for clustering using the robust variance estimator.

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