

Impact of Race on the Surgical Management of Adhesive Small Bowel Obstruction

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- BACKGROUND:** Small bowel obstruction (SBO) represents roughly 15% of admissions by general surgeons. Management of SBO relies heavily on provider judgment, including decisions on how long to try nonsurgical management and whether to use a laparoscopic or open approach when surgery is needed. Given the subjective nature of these decisions, it is unknown if patient race influences management of SBO.
- STUDY DESIGN:** The National Surgical Quality Improvement Program was used to identify patients who underwent adhesiolysis or small bowel resection for adhesive SBO between 2010 and 2015 (n = 13,896). Adjusted logistic regression models incorporating patient comorbidity, American Society of Anesthesiologists (ASA) class, and emergency status were used to analyze odds of receiving surgery after 5 days from hospital admission (Eastern Association for the Surgery of Trauma guidelines) and of undergoing an open operation.
- RESULTS:** Patients who waited more than 5 days for a procedure had greater adjusted odds of postoperative complication (odds ratio [OR] 1.56 95% CI 1.37 to 1.79) compared with those waiting 5 days or less. Similarly, open procedures had higher odds of complication compared with laparoscopic (OR 2.31 95% CI 2.00 to 2.68). Regression analysis demonstrated that black patients were significantly more likely than white patients to wait more than 5 days for surgery (OR 1.31 95% CI [1.13–1.53]) and undergo open surgery (OR 1.56, 95% CI 1.36 to 1.79). There was no statistical difference for Hispanics patients waiting more than 5 days (OR 0.98, 95% CI 0.73 to 1.31) or receiving open surgery (OR 0.84, 95% CI 0.70 to 1.01) compared with white patients.
- CONCLUSIONS:** Clinical decisions regarding SBO management differ based on patient race. Future studies focusing on the surgical decision-making process and the influence of bias are needed. (J Am Coll Surg 2017;■:1–9. Published by Elsevier Inc. on behalf of the American College of Surgeons.)

Small bowel obstruction (SBO) is one of the most common and burdensome surgical emergencies that general surgeons encounter, representing 12% to 16% of all

surgical admissions and costing more than \$2 billion per year.^{1,2} In total, SBO accounts for more than 300,000 operations annually in the US.³ Although common, the management of SBO is not always straightforward. For example, although a trial of nonoperative management for clinically stable patients has become the mainstay of therapy for SBO, the optimal duration has been debated.^{4,5} The Eastern Association for the Surgery of Trauma (EAST) has published practice management guidelines recommending that patients without clinical signs of deterioration can safely undergo a trial of expectant management for up to 5 days.¹ Yet other authors have noted that waiting beyond 72 hours may worsen outcomes.⁶ In practice, the decision of when to operate on SBO is quite variable, and relies heavily on the clinical judgment of the individual surgeon. Additionally, when the decision to operate is made, the surgical approach of open vs laparoscopic is also up for debate. There is some evidence to suggest benefits of laparoscopy,^{7,8} although clinical factors also play a

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Abbreviations and Acronyms

ASA = American Society of Anesthesiologists
 EAST = Eastern Association for the Surgery of Trauma
 OR = odds ratio
 SBO = small bowel obstruction

significant role. The EAST guidelines recommend laparoscopic approach “when feasible,” leaving the decision again up to clinical judgment.¹ With this level of subjectivity, it is unknown if factors beyond the clinical picture influence surgical decision-making, and particularly, if these decisions are affected by inherent biases of the practitioner.

Racial disparities in health care have long been noted and became a national focus with the Institute of Medicine’s report, “Unequal Treatment.”⁹ In the surgical realm, racial disparities in outcomes have been proven across a multitude of operations and specialties.¹⁰⁻¹³ Additionally, much attention has been paid to the differences in access to care and how this affects surgical mortality¹⁴⁻¹⁶; however, less is known about the role patient race plays in clinical decision making.

Surgical management of SBO presents a unique opportunity to evaluate bias and disparity in surgical decision-making. Small bowel obstruction is a common diagnosis, does not require access to specialized surgeons or hospitals, and generally, patients will present acutely. Once patients with SBO are admitted, surgeons are faced with several important decisions that are judgment-based, including duration of trying nonoperative management and surgical approach if surgery is needed (laparoscopic or open). The aim of this study was to better understand the impact race has on surgical decision-making by evaluating these clinical decisions for SBO.

METHODS**Data source**

Data from the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) were analyzed. The NSQIP is a multi-institutional database that uses trained reviewers to collect detailed preoperative risk factors, operative details, and postoperative outcomes. The study protocol was exempted by the local institutional review board.

Study population

Between 2010 and 2015, patients were identified in NSQIP who were older than 18 and diagnosed with a primary *International Classification of Diseases, Ninth Revision* code of 560.81, corresponding with adhesive small

bowel obstruction. All patients who had Current Procedural Terminology (CPT) codes for a primary procedure of laparotomy (CPT 49000), open adhesiolysis (CPT 44005), laparoscopic adhesiolysis (CPT 44180), open small bowel resection (CPT 44120), or laparoscopic small bowel resection (CPT 44202) were included. Patients were classified as having either open or laparoscopic surgery based on their primary CPT code. Laparoscopic converted to open cases (n = 209) were defined as having a primary CPT of open, but with a secondary laparoscopic CPT code.¹⁷ Laparoscopic converted to open cases were considered open cases in terms of outcomes; however, converted cases were considered laparoscopic cases when analyzing the surgical approach decision. All individuals with missing comorbidity, complication, or mortality data were excluded.

Race in NSQIP is defined as American Indian or Alaska Native, Asian, black or African American, Native Hawaiian or Pacific Islander, and white. Hispanic ethnicity was a separately defined category. For the purposes of our study, we grouped race/ethnicity as non-Hispanic white, non-Hispanic black, Hispanic, and other. The remaining groups were placed together in an “other” category due to the small numbers among each group. Patients with missing or unknown race were excluded from analysis.

Outcomes

The primary outcomes of interest were length of time from admission to surgery—dichotomized into 5 days or less and more than 5 days—and use of an open approach for surgery. The main comparison was between black and white patients. Secondary outcomes included 30-day mortality and complication rate based on the 2 surgical decisions. Complications were generalized into wound, infectious, respiratory, thromboembolic, renal, neurologic, cardiac, and bleeding complications. For analysis purposes, patients were defined as having “any complication” if they had at least 1 of the complications.

Statistical analysis

Categorical values were compared using chi-square test; continuous variables were compared with Student *t*-tests. Outcomes of interest were analyzed using multivariable logistic regression models adjusting for preoperative variables including age, sex, race/ethnicity, BMI, American Society of Anesthesiologists (ASA) score, functional status, emergency status, clinical sepsis, and history of comorbidity. The specific comorbidities available in NSQIP include history of bleeding disorders, smoking, COPD, ventilator dependence, ascites, hypertension, chronic heart failure, diabetes, dialysis, disseminated

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