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Reduced disparities and improved surgical outcomes for Asian Americans with colorectal cancer

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ABSTRACT

Background: Studies suggest Asian Americans may have improved oncologic outcomes compared with other ethnicities. We hypothesized that Asian Americans with colorectal cancer would have improved surgical outcomes in mortality, postoperative complications (POCs), length of stay (LOS), and readmissions compared with other racial/ethnic groups.

Methods: We queried the 2011-2014 American College of Surgeons National Surgical Quality Improvement Program for patients who underwent surgery for colorectal cancer and stratified patients by race. Primary outcome was 30-d mortality with secondary outcomes including POCs, LOS, and 30-d readmission. Stepwise backward logistic regression analyses and incident rate ratio calculations were performed to identify risk factors for disparate outcomes.

Results: Of the 28,283 patients undergoing colorectal surgery for malignancy, racial/ethnic groups were divided into Caucasian American (84%), African American (12%), or Asian American (4%). On unadjusted analyses, compared with other racial/ethnic groups, Asian Americans were more likely to have normal weight, not smoke, and had lower American Society of Anesthesiologists score of 1 or 2 ($P < 0.001$). Postoperatively, Asian Americans had the shortest LOS and the lowest rates of complications due to ileus, respiratory, and renal complications ($P < 0.001$). There were no racial differences in 30-d mortality or readmission. On adjusted analyses, Asian American race was independently associated with less postoperative ileus (odds ratio 0.8, 95% confidence interval 0.66-0.98, $P < 0.001$) and decreased LOS by 13% and 4% compared with African American and Caucasian American patients, respectively ($P < 0.001$).

Conclusions: Asian Americans undergoing surgery for colorectal cancer have shorter LOS and fewer POCs when compared with other racial/ethnic groups without differences in 30-d mortality or readmissions. The mechanism(s) underlying these disparities will require further study, but may be a result of patient, provider, and healthcare system differences.

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Introduction

In the United States, colorectal cancer (CRC) accounts for 8% of all new cancer and is the fourth most common type of cancer.[1] Although the incidence of CRC in Asian Americans is less than Caucasian Americans and African Americans, disparities in survival rates are observed with Asian Americans having more favorable outcomes. In epidemiologic studies, Caucasian American and African American men have a 53% and 118% higher overall mortality rate attributed to CRC compared with Asian Americans.[2] Similarly, Asian Americans also have a lower incidence of mortality compared with other racial/ethnic groups when examining gastric and hepatocellular cancer.[3,4] The driving mechanisms for these observations are unclear. A better understanding of the contributing factors for improved Asian American survival, however, may lead to identification and development of strategies to improve outcomes in other racial/ethnic groups.

Racial disparities exist in surgical outcomes with vulnerable populations having particularly worse outcomes, especially within cancer.[5-9] The majority of these studies, however, focus on African Americans as the comparative group with few examining Asian Americans. A study of racial disparities after major surgery during 2005-2008 suggested that Asian Americans have no increased risk for adverse operative outcomes compared with Caucasian Americans and do not experience an increased length of stay (LOS) after abdominal, thoracic, or pelvic cancer surgery.[10] No recent studies have investigated short-term surgical outcomes for Asian Americans with CRC. Therefore, in this study, we aimed to determine the association between Asian American ethnicity and CRC surgical outcomes using recent national data. We hypothesized that Asian Americans with CRC would have improved surgical outcomes in 30-d mortality, postoperative complications (POCs), LOS, and hospital readmissions compared with other racial/ethnic groups.

Methods

We queried the 2011-2014 American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) for all patients who underwent surgery for a CRC diagnosis using Current Procedure Terminology (CPT) codes. The cohort was then categorized based on patient-identified race as non-Hispanic White or Caucasian American, Black or African American, and Asian American. Patients not within those groups were excluded.

The CPT codes used to identify patients included total colectomy (CPT44150-44151, 44210), partial colectomy (CPT44140-44141, 44204), low anterior resection/abdominoperineal resection (APR)/Hartmann's procedure (CPT44143-44147, 44206-44208), and ileocolic resection (CPT44160). Preoperative ACS-NSQIP assessed variables included age, gender, body mass index (BMI), smoking status within 1 y, hypertension, diabetes mellitus, history of severe chronic obstructive pulmonary disease (COPD), congestive heart failure (CHF) within 30 d of surgery, current dialysis treatment, ventilator dependency, wound classification, >10% weight loss in prior 6 mo, functional status, American Society of Anesthesiologists (ASA) classification, pathologic stage of malignancy, serum creatinine, serum albumin, serum total bilirubin, and serum hematocrit. Procedure-specific factors included procedure type, operative approach, elective *versus* emergency, and total operation time.

The primary outcome was 30-d mortality. Secondary outcomes included LOS and ACS-NSQIP POCs including venous thromboembolism (VTE), respiratory complications, cardiac complications, renal complications, urinary tract infection, organ–space surgical site infection (SSI), return to operating room, postoperative ileus (POI), readmission, anastomotic leak, wound complications, and sepsis. All outcomes reflect 30-d outcomes assessed by ACS-NSQIP from the time of surgery. LOS was defined as number of days from operation to hospital discharge. ACS-NSQIP defines POI as prolonged NPO (nil per os: nothing by mouth) status or nasogastric tube use.

Univariate and bivariate comparisons were used to examine patient- and procedure-specific differences between Asian American, African American, and Caucasian American patients undergoing CRC operations. Chi-square and Wilcoxon Rank-Sums tests were used to test differences among categorical and continuous variables, respectively. Logistic regression using stepwise backward selection was used to identify independent predictors of each categorical outcome with adjusted least square means and incident rate ratios (IRR) for LOS using generalized linear models with a Poisson distribution. Preoperative ACS-NSQIP (patient and procedure) variables and POCs having statistically significant variation by race were included for adjustment in all models. Tests and model coefficients were considered statistically significant with an alpha level <0.05. All analyses were completed using SAS v9.4 (SAS Institute, Cary, NC).

Results

Of the 28,283 patients identified as undergoing CRC surgery in the 2011-2014 ACS-NSQIP database, 23,728 (84%) were Caucasian American, 3275 (11.6%) were African American, and 1280 (4.5%) were Asian American. Asian Americans had lower rates of obesity, hypertension, COPD, and CHF ($P < 0.001$; Table 1). Furthermore, Asian Americans had lower ASA scores compared with other racial/ethnic groups (ASA 1-2: 54.8% for Asian Americans, 35.4% for African Americans, and 42.8% for Caucasian Americans; $P < 0.001$).

At the procedure-level Asian Americans were more likely than other groups to undergo a minimally invasive procedure (68.0% for Asian Americans, 56.3% for African Americans, and 59.9% for Caucasian Americans; $P < 0.001$). Asian Americans were also more likely to undergo a partial colectomy or LAR/APR/Hartmann procedure than ileocolic or total colectomy procedure.

Unadjusted analyses revealed no differences in 30-d mortality between Asian Americans and other racial/ethnic groups (Table 2). Asian Americans experienced significantly fewer POCs compared with other racial/ethnic groups. Specifically, Asian Americans had lower rates of POI, respiratory complications, VTE, and renal complications ($P < 0.001$).