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Hispanic ethnicity and complication profile following laparoscopic and open cholecystectomy



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ABSTRACT

Background: Hispanic ethnicity is associated with increased incidence of gallbladder disease. Additionally, ethnicity has been shown to be an outcome determinant in several conditions and procedures but has never been studied as a potential determinant of morbidity or mortality after laparoscopic or open cholecystectomy.

Methods: Using the American College of Surgeons National Surgical Quality Improvement Program database, patients who underwent cholecystectomy and related procedures were studied in Hispanic and non-Hispanic cohorts. Mortality and postoperative complication rates were calculated and adjusted for patient demographics and comorbidities through multivariate analysis.

Results: Hispanics had decreased morbidity following cholecystectomy as compared to non-Hispanics on univariate analysis in combined, laparoscopic, and open cohorts (RR 0.64, P value < 0.001 ; 0.68, < 0.001 ; 0.77, < 0.001 , respectively). The reduction was not found to be statistically significant in multivariate analysis. A similar reduction was seen for mortality (RR 0.30, < 0.001 ; 0.39, < 0.001 ; 0.28, < 0.001 , respectively) which remained on multivariate analysis in both combined and open cohorts (RR 0.63, 0.008 and 0.48, 0.021, respectively). Additionally, the rates of several postoperative complications were found to be reduced in Hispanic patients. Though our study demonstrates a lower rate of established comorbidities for poor outcomes in Hispanics, after adjustment in multivariate analysis, the entirety of the reduced risk could not be accounted for.

Conclusions: While the Hispanic cohort has an increased incidence in gallbladder disease as compared to non-Hispanics, the complication, morbidity, and mortality rates are lower in unadjusted analysis. With adjustment, morbidity was not statistically significant and mortality was only significant in combined and open cohorts. This suggests that increased incidence rates do not equate with worse outcomes, but Hispanic ethnicity may be associated with better outcomes.

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Disclaimers: The American College of Surgeons National Surgical Quality Improvement Program and the hospitals participating in the ACS NSQIP are the source of the data used herein; they have not verified and are not responsible for the statistical validity of the data analysis or the conclusions derived by the authors.

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Introduction

Cholecystectomy is one of the most commonly performed general surgery procedures in the United States and is deemed medically necessary by many conditions, most commonly cholelithiasis and biliary colic.^{1,2} Racial and ethnic disparities are recognized in multiple areas of medicine and surgery, and both the prevalence and management of gallbladder disease are no exception.^{3,4} Gallbladder disease is much more common in Hispanics as compared to non-Hispanic whites.^{5,6} This has been mostly attributed to their Amerindian admixture since Native Americans have the highest incidence rate of gallbladder disease.⁷ Additionally, both diabetes mellitus and metabolic syndrome are risk factors for gallstone disease.^{8,9} An increased prevalence of both of those conditions among the Hispanic population has been well established.¹⁰ Hispanics have also been shown to be the ethnicity most likely to undergo cholecystectomy for specific gallbladder-related diseases, such as gallstone pancreatitis.¹¹ Furthermore, gallbladder disease has been seen at an increased incidence in the pediatric population with Hispanic ethnicity being an independent risk factor for gallbladder disease in this population.¹²

In addition to the increased prevalence of gallbladder disease and cholecystectomy in the Hispanic population, minority races have been shown to have an independent association with increased complications following surgery.¹³ However, it is unclear if this is a risk factor for clinically observed 30-d outcomes following cholecystectomy. Risk factors for increased morbidity and mortality following cholecystectomy have been explored in many studies. In one study, male gender and American Society of Anesthesiologist (ASA) classification were found to be associated with morbidity, mortality, and conversion to open surgery from laparoscopic cholecystectomy.¹⁴ Preoperative morbidity due to preexisting conditions such as heart disease, metabolic diseases, or other chronic medical conditions also influences postoperative complication rates. Furthermore, the significance of Hispanic ethnicity on the morbidity and mortality of patients undergoing cholecystectomy nor the comparison between laparoscopic and open cholecystectomy has not been described.¹⁵

Methods

The American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) database has been used to study the safety, efficacy, utilization, and variation in hospital outcomes.^{1,16,17} NSQIP is a prospectively maintained, risk-adjusted, and validated database from over 350 hospitals.¹⁸ We included 198,815 patients aged 18–89 y who underwent laparoscopic and open cholecystectomy from 2008 to 2014. The data were taken from the (ACS) NSQIP database with current procedural terminology codes designating laparoscopic and open cholecystectomy (47,562, 47,563, 47,564, 47,600, 47,605, 47,610, 47,612, and 47,620). The cases were stratified by ethnicity (Hispanic or non-Hispanic), and the data were adjusted for comorbidities and risk factors for complications following surgery in multivariate analysis. These comorbidities included age (stratified by above or below 90 y), obesity (stratified by categorical body mass index [BMI], values), hypertension, disseminated cancer, diabetes, dialysis, chronic obstructive pulmonary disease (COPD), bleeding disorder, congestive heart failure, ascites, and ASA classification (low, high, and unknown). Indication for cholecystectomy (due to acute cholecystectomy, choledocholithiasis, etc.) and insurance status were not included in the study because they are not variables included in the NSQIP database.

Comorbidities with large null responses were excluded from the analysis. Further analysis was performed to check for outlier effects. Continuous variables were described using mean, standard deviation, minimum, and maximum observations. Categorical variables were described using frequencies and proportions. The student's *t*-test and chi-squared tests were used to assess the association between Hispanics and non-Hispanics groups. The log–binomial and Poisson regression with a robust variance estimator models was used to assess the adjusted and unadjusted associations (this reports the RR).¹⁹ In the case where log–binomial failed to converge, the Poisson regression was used. Values less than 5% were considered statistically significant. All analyses were performed using SAS V.9.4 and Stata 13.

Table 1 – Laparoscopic and open cohorts—descriptive statistics of the continuous variables.

Laparoscopic and open cholecystectomy cohorts											
n = 199,884						Non-Hispanics: n = 173,104 (86.6%): laparoscopic: n = 157,345 (90.9%); open: n = 15,759 (9.1%)					P value
Variable	n	Mean	SD	Min	Max	n	Mean	SD	Min	Max	
BMI	169,848	31.1	7.88	9.04	186.3	26,169	30.9	7.0	10.5	115.4	<0.0001
Height	170,050	65.64	3.96	40	96	26,204	63.6	3.6	41.0	81.0	<0.0001
Weight	171,834	190.94	51.88	51	916	26,557	177.7	44.4	64.0	591.0	<0.0001
Age	171,910	50.93	17.32	18	89	26,714	43.2	16.1	18.0	89.0	<0.0001

SD = standard deviation; BMI = body mass index.

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