Surgical outcomes of cholecystectomies among racial groups in the United States: A comparative analysis among American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) Hospitals

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Introduction

The cholecystectomy is one of the most common general surgery procedures in the United States, with more than 750,000 people undergoing the procedure annually. Numerous studies have shown that patients from low-income households experience higher rates of postoperative complications and readmissions. In our own 2021 study, we found that among 40,537 patients with acute cholecystitis from the National Inpatient Sample database, minority patients, particularly patients identifying as Black and Asian or Pacific Islander are subject to an increased risk of postoperative complications after cholecystectomy such as peritonitis and worse outcomes such as increased rates of non-routine discharge, total hospital charges, and extended length of stay, despite comparable baseline health status. Given the existing data, we sought to assess disparities among racial groups in the postoperative outcomes following cholecystectomy

Materials and Methods

Retrospective cohort study including all patients that underwent cholecystectomy between 2017 and 2021 (n=250,753) in NSQIP. Prism 10 software was utilized for data analysis, specifically making use of One Way ANOVA as well as Chi-Square test for independence to compare the postoperative outcomes across four racial groups defined by NSQIP: White non-hispanic, Black, American Indian or Alaskan Native, Asian, and Hispanic. NSQIP defines postoperative outcomes as 1) 30-day postoperative readmission and 2) 30-day postoperative reoperation. The data was then stratified into emergent and elective surgery groups, to determine if there are statistically significant differences among and within each of these groups. Patients with incomplete demographic and perioperative data were excluded from the study.

Figures

2017-2021		Elective Cases	Emergent Cases	Readmission	Reoperation
White Non-Hispanic	**178080**	119751 (67.2%)	15262 (8.6%)	8317 (4.7%)	2072 (1.16%)
Black	**21455**	16618 (77.4%)	2622 (12.2%)	1356 (6.3%)	330 (1.54%)
American Indian/Alaskan Natives	**1988**	1138 (57.2%)	172 (8.6%)	74 (3.7%)	27 (1.3%)
Asian	**9550**	7447 (77.9%)	1480 (15.5%)	462 (4.8%)	124 (1.3%)
Hispanic	**39680**	29917 (75.4%)	6741 (17%)	1589 (4%)	345 (0.87%)
Total Cases	**250753**	169871	26277	11798	2898

Figure 1: Contingency table of all cholecystectomies, *delineating the breakdown of racial groups defined by NSQIP 1) White Non-Hispanic, 2) Black, 3) American Indian/Alaskan Natives, 4) Asian, 5) Hispanic. Additionally, the breakdown of elective and emergent cases is shown. Finally, the numbers of postoperative readmission and reoperation are shown for each racial group. The percentages represent the fraction of each column over the total number of patients in the racial group. i.e. total number of elective cases for White patients / total number of white patients in the cohort = 67.2%.*

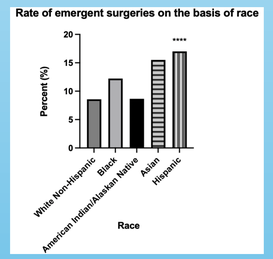


Figure 2: ***Rates of emergent surgeries across racial groups defined by NSQIP****: Hispanic patients had the highest rates of emergent surgery among all other racial groups (p <0.0001, R=0.9983)*

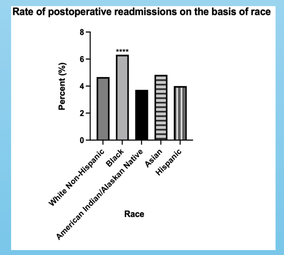


Figure 3: ***Rates of 30-day postoperative readmissions among racial groups defined by NSQIP****: Black patients had the highest number of 30-day postoperative readmissions (6.3%, p<0.0001, R=0.9788)*

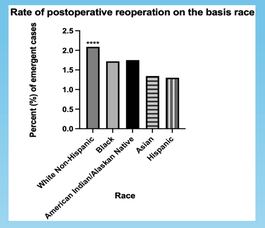


Figure 4: ***Rates of 30-day postoperative reoperations among racial groups defined by NSQIP:*** *Black patients had the highest number of postoperative reoperations across all racial groups, which was statistically significant when compared to White Non-Hispanic patients and American Indian/Alaskan Natives (1.54%, p=0.008, R=0.9702), however not when compared to Asian and Hispanic patients.*

2017-2021	Emergent Cases	Readmission	Reoperation
White Non-Hispanic	**15262**	828 (5.4%)	319 (2%)
Black	**2622**	146 (5.6%)	45 (1.7%)
American Indian/Alaskan Natives	**171**	7 (4%)	3 (1.7%)
Asian	**1486**	66 (4.4%)	20 (1.3%)
Hispanic	**6752**	224 (3.3%)	88 (1.3%)
Total Cases	**26,293**	1,271	475

Figure 5: Contingency table of emergent surgeries, *delineating the breakdown of emergent surgeries among racial groups defined by NSQIP 1) White Non-Hispanic, 2) Black, 3) American Indian/Alaskan Natives, 4) Asian, 5) Hispanic. Among all emergent cases, the numbers of postoperative readmission and reoperation are shown for each racial group.*

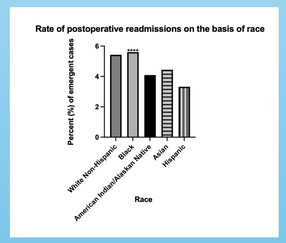


Figure 6: ***Rates of postoperative readmissions among emergent surgeries.*** *Black patients had the highest rates of postoperative readmission among all emergent cases (5.6%, p < 0.0001, R=0.9901).*

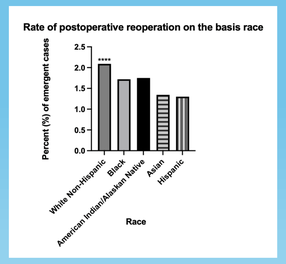


Figure 7: ***Rates of postoperative reoperations among emergent surgeries.*** *White Non-Hispanic patients had the highest rates of postoperative reoperation among all emergent cases (2.1%, p < 0.0001, R= 0.9718).*

Results

Hispanic patients had the highest rates of emergent surgery (17%, p <0.0001, R=0.9983) among all racial groups. Black patients had the highest rates of 30-day postoperative readmissions (6.3%, p<0.0001, R=0.9788). Black patients had the highest rates of postoperative reoperations (1.54%, p=0.008, R= 0.9702), which was significant when compared to White patients and American Indian/Alaskan Native patients, however not when compared to Hispanic and Asian patients who had postoperative reoperation rates of 0.87% and 1.3% respectively. Among emergent cases (n=26,293), Black patients had the highest rates of postoperative readmission (5.6%, p < 0.0001, R=0.9901). Among emergent cases, White Non-Hispanic patients had the highest rates of postoperative reoperation (2.1%, p < 0.0001, R= 0.9718),

Conclusion

Among all cholecystectomies documented in NSQIP between 2017 and 2021, patients from minority backgrounds have the highest rates of emergent surgeries and postoperative complications. Among emergent cases alone, Black patients have the highest rates of postoperative readmissions while White Non-Hispanic patients have the highest rates of postoperative reoperation. Future studies aim to determine the cause of these disparities.

Acknowledgements/Disclosures

Thank you to my mentor Dr. Vithiananthan for supporting me in this project and through medical school. A huge thanks to SAGES for funding and sponsoring this work as part of the SAGES Medical Student Research Grant