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Racial disparities in the cost of surgical care for parathyroidectomy



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ABSTRACT

Background: Parathyroidectomy is the only curative therapy for hyperparathyroidism, but its cost and variation in use among different racial and ethnic groups are largely unexamined. The purpose of this study was to examine the association between race and ethnicity and the total hospital cost of parathyroidectomy.

Methods: This retrospective study included 899 consecutive complete parathyroidectomies in our institution between September 2011 and July 2016. Total length of stay and cost were primary outcomes. Nonparametric and chi-square tests were used for analysis.

Results: The study population was 66.4% Caucasian, 31.4% African American, 0.7% Hispanic, and 0.3% Asian. Total hospital costs were greater for African-American patients (\$6154.87 ± 389.18) compared to Caucasian patients (\$5253.28 ± \$91.74). Mean length of stay was 0.99 ± 0.18 for African-American patients and 0.44 ± 0.05 for Caucasian patients. African-American patients were more likely than Caucasian patients to be readmitted (4.6% versus 1.2%). Among African Americans, males had a more expensive hospital cost, higher incidence of cases that cost greater than \$10,000, and longer length of stay compared to females. **Conclusions:** African-American race was associated with higher hospital costs for parathyroidectomy compared to Caucasian patients, especially male patients. The increased cost could be explained in part by longer length of stay. More detailed efforts are needed to reduce racial disparity in the management of parathyroidectomy patients.

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Introduction

Racial disparities regarding disease incidence, health care access, and patient outcomes in the U.S. health care system are well documented.¹ These inequalities in health care are particularly present in the African-American community who experience shorter life expectancies and increased rates of cancer, cardiovascular disease, diabetes, and many other disorders.² Few studies have reported racial disparities in parathyroid diseases. For example, African-American patients presented with higher

serum calcium and parathyroid hormone levels in primary hyperparathyroidism³ but with conflicting data on severity of symptoms at presentation compared to Caucasians.^{4,5} Several other studies that conglomerate both thyroidectomies and parathyroidectomies report higher in-hospital mortality⁶ and more complications such as lower self-reported voice outcomes,⁷ higher rate of neck hematoma,⁸ and overall post-operative complication⁶ in African-American patients compared to Caucasian patients. However, a very small percentage of the cases examined in these studies represent parathyroid disease.

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While researchers have dedicated resources to investigating racial disparities regarding the incidence of diseases, access to health care, and patient outcomes, fewer institutions have assessed racial differences related to the cost of various treatments. Fighting rising costs has been a difficulty for hospitals as cost of health care continues to increase.⁹ The challenge for hospitals is to control the steadily growing cost of providing effective treatments and continue to increase their standard of care. Addressing the mounting problem of cost requires examination from all angles, including racial disparities in cost of care. Parathyroidectomy is a suitable surgical procedure for analyzing racial disparity because there are relatively clear indications for the surgery,^{10,11} and it can typically proceed with few complications¹²; therefore, cost differences can potentially be attributed to particular causes more accurately.

Parathyroidectomy is the mainstay therapy for most benign and malignant parathyroid diseases, which are steadily rising in incidence.¹³ However, its cost and its variation among different races and ethnicities are largely unexamined. For the first time, this study aims to expose potential inequalities by examining the role that racial differences play in the total hospital costs associated with a parathyroidectomy.

Methods

Patient selection and database review

This retrospective single-institution study included all parathyroidectomy cases coded as complete parathyroidectomy (06.81, $n = 205$), parathyroidectomy or exploration of parathyroid (60.500 and 60.502, $n = 510$), or other parathyroidectomy (06.89, $n = 184$) using International Statistical Classification of Diseases and Related Health Problems-9 and-10 procedural codes in the University of Alabama at Birmingham (UAB) Hospital between September 2011 and July 2016. The UAB Hospital is particularly well equipped for studies in racial disparity as African Americans represent about one-third of UAB Hospital's patients. The nature of a single-institution study likely addresses the issue of variations in cost among different hospitals for the same procedure.¹⁴⁻¹⁹ There were no exclusion criteria. Demographics, insurance providers, patient type (outpatient versus inpatient), admission date, discharge date, readmission information to the UAB Hospital, and mortality status during hospitalization of each patient were collected.

The primary outcome of the study was total cost of hospitalization. The UAB Hospital uses the Change Healthcare (formerly McKesson) Performance Analytics suite of products for our cost accounting and decision support functions. Additional information available from the database includes fees to anesthesiology, radiation oncology, heart center, and laboratories among other specific costs. Our Institutional Review Board has approved the study of these data. All patient-related information was encrypted, deidentified, and compliant with the Health Insurance Portability, Affordability and Accountability regulations.

Statistical analysis

The data were analyzed using SPSS Statistics 23 (IBM, Armonk, NY), R software (R Core Team [2015]. R is a language and environment for statistical computing. The R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>), and Microsoft Excel (Microsoft Corporation, Redmond, WA). Continuous variables were compared using Mann-Whitney U tests or Kruskal-Wallis tests, where appropriate. Chi-squared test was used for categorical variables. P value < 0.05 was considered significant. All error ranges are reported with \pm standard error of the mean, unless otherwise specified.

Results

Patient characteristics

From September 2011 and July 2016, there were 899 cases of parathyroidectomy meeting the inclusion criteria for this study. Of these cases, reportedly 66.4% were Caucasian, 31.4% were African American, 0.7% were Hispanic, and 0.3% were Asian. Because of the low sample size of Hispanic ($n = 6$) and Asian ($n = 3$) patients, they were excluded from analysis of racial disparity. The clinical characteristics of study patients are described in Table 1. The mean age of the patients at the time of surgery was 60 ± 0.42 y. Only three patients were aged < 18 y. As expected, the majority of the parathyroidectomies were done on female patients (76%) in an outpatient setting (84%). The mean readmission rate to the UAB Hospital was 2.2%, and there was no in-hospital mortality.

A majority of the patients were discharged on the same day as the operation (66%); however, the mean length of stay for African Americans was 0.99 ± 0.18 d, whereas it was 0.44 ± 0.05 d for Caucasians ($P = 0.004$). The distributions of length of stay for Caucasians and African-American patients are shown in Figure 1. It was more likely for Caucasians to be discharged on the same day ($P < 0.001$) and for African Americans to be discharged after 5 d ($P = 0.002$). There were very few cases where the length of stay exceeded 10 d in both groups (two cases each).

Total cost of parathyroidectomy by race

The total hospital cost of parathyroidectomy was more expensive for African Americans ($\$6154.87 \pm 389.18$, $P = 0.007$) compared to Caucasians ($\$5253.28 \pm \91.74). Compared to Caucasian patients, African-American patients had a higher incidence of cases that cost greater than \$10,000 (6.7% versus 2.2%, $P = 0.001$), where the difference in total cost was no longer statistically significant if these cases were removed from analysis ($P = 0.090$). Since the duration of the patients' hospitalization after parathyroidectomy significantly influenced the total cost (Fig. 2), the costs in the care of Caucasian and African-American patients were compared across the same length of stays. Very few patients were discharged after 5 d for a meaningful comparison beyond 5 d length of stay. Generally, there were no statistically significant differences in

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