

Demographic Disparities in Hypoglossal Nerve Stimulation Surgery

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Abstract

Background: Moderate to severe obstructive sleep apnea (OSA) is estimated to afflict over 10% of US adults, and patient adherence to the historical gold standard treatment, continuous positive airway pressure (CPAP) therapy, is consistently estimated at or below 50%. Hypoglossal nerve stimulator (HNS) implantation has emerged as a surgical alternative to CPAP, though inequities in OSA treatment modalities persist when comparing patient race.

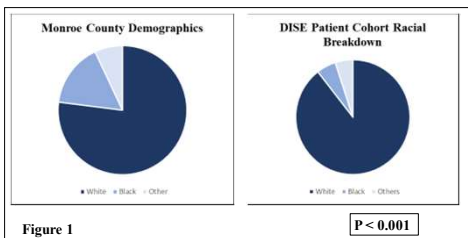
Methods: Retrospective chart analysis of patients who underwent DISE at the University of Rochester Medical Center (URMC) from 2013-2023. Rates of OSA prevalence, complete concentric collapse, and HNS implantation were examined comparing white and black patient populations.

Results: Statistically significantly fewer black patients with OSA underwent drug induced sleep endoscopy (DISE) as compared to white patients with OSA. Once evaluated, however, there was no statistically significant difference between eligible black and white patients for rates of HNS implantation.

Conclusions: Disparities remain regarding patient access to and evaluations by subspecialty sleep medicine between black and white patients with a diagnosis of OSA. Once evaluated for OSA at this institution, however, there exists an equal rate of HNS implantation for eligible patients regardless of race.

Introduction

Obstructive sleep apnea (OSA) affects nearly 1 billion people worldwide.¹ OSA has been shown to cause daytime sleepiness and morning headaches, as well as chronic health conditions like hypertension and depression. Unfortunately, the long-term adherence rate for the gold standard of OSA treatment, continuous positive airway pressure (CPAP) therapy, is estimated between 25-50%.^{2,3} Hypoglossal nerve stimulator (HNS) implantation has emerged as a leading surgical option to treat OSA, with reproducible results demonstrating improvements in objective sleep index measures, such as Apnea-Hypopnea Index (AHI) and Oxygen Desaturation Index (ODI), often to the levels of patients without OSA. Unfortunately, black patients have been shown to undergo HNS implantation at disproportionately lower rates than white counterparts.⁴ This is despite evidence demonstrating an increased prevalence of OSA and worse CPAP adherence in minority patients.⁵



Methods

Retrospective chart analysis of patients who underwent drug induced sleep endoscopy (DISE) at a single institution from 1/1/2013 to 2/3/2023. A database was collated including patient demographics including race, DISE findings, and sleep surgery procedures performed. When examining rates of those patients who underwent HNS implantation, patients with AHI < 15 or > 65 were excluded, as were those patients with complete concentric collapse patterns identified on DISE.

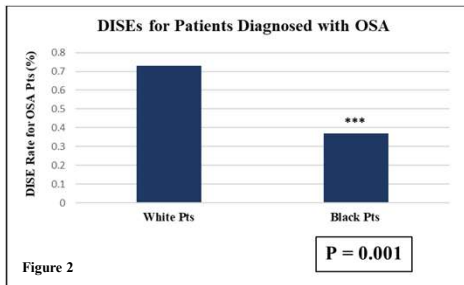
SlicerDice analysis was performed to query the electronic medical record (EMR) and determine the prevalence of and demographic breakdown for patients with OSA with medical charting information in the URMC system.

Statistical analysis was performed comparing rates of OSA prevalence, DISE procedures, complete concentric collapse patterns, and HNS implantation utilizing Chi-Square tests with a p-value at or less than 0.05 deemed significant.

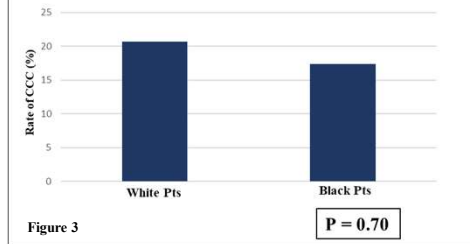
Results

420 patients underwent DISE between 2013 and 2023 at URMC. Of this cohort, 376 (89.5%) were white and 23 (5.5%) were black. This is statistically significantly different from the demographic makeup of Monroe County, which is 77% white and 16% black ($p < 0.001$) [Figure 1]. Of those patients in the URMC EMR with OSA diagnoses, 51,806 were white and 6,283 were black. Rates of DISE evaluation for those patients with OSA, therefore, are 0.73% and 0.37% for white and black patients, respectively ($p = 0.001$) [Figure 2].

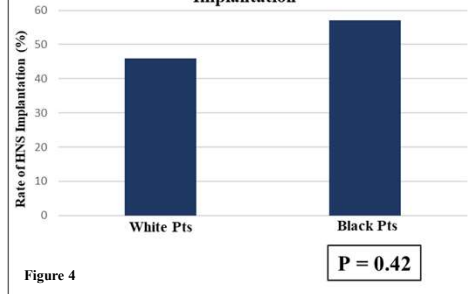
When examining DISE findings, the rate of complete concentric collapse (CCC) was compared between black (17.4%) and white (20.7%) patient populations ($p = 0.70$) [Figure 3]. Similarly, the rates between white and black patients who underwent HNS implantation were 45.9% and 57.1%, respectively ($p = 0.42$) [Figure 4].



Rate of Complete Concentric Collapse (CCC)



Rate of Hypoglossal Nerve Stimulator Implantation



Discussion

Retrospective analysis of patients who underwent DISE between 2013 and 2023 demonstrates a significant disparity for black patients as compared to their white counterparts as a proportion of both those with OSA diagnoses as well as the representative demographics of the surrounding area. Once patients have undergone DISE at this institution, however, there is no difference in the rate of HNS implantation between black and white patient cohorts. Additionally, the rates of complete concentric collapse patterns of the velum during DISE are not statistically significantly different between black and white patient cohorts.

Conclusions

- As compared to white patients, fewer black patients undergo DISE as a proportion of patients with OSA as well as in relation to expected population demographics
- Once they have undergone DISE, black and white patients have no statistically significant difference in rates of HNS implantation at URMC
- The rate of CCC of the velum on DISE is not statistically significantly different between white and black patients

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