THYROID SURGERY

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Racial Disparities in Thyroid Disease Care

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Review of: Maduka RC, Gibson CE, Chiu AS, Raymond AJ, Wills-Johnson N, Azar SA, Oliveira K, Ahuja V. 2020 Racial disparities in surgical outcomes for benign thyroid disease. Am J Surg. Epub 2020 Jul 6. PMID: 32669203.

SUMMARY

Background

Recent protests over police brutality as well as the COVID-19 pandemic have brought to light the systemic racism that pervades all sectors of our society, including the practice of medicine (1,2). Not unexpectedly, racial inequity is found in many areas of endocrinology (3), most notably in diabetes. A PubMed search, completed on October 2, 2020, of “racial disparities in diabetes” found over 1000 papers on this subject published since 2015.

Disparities in the care of patients with thyroid disease have also been reported, including increased risks of surgical complications in minorities with malignant thyroid disease (4,5). In the current study, Maduka et al. sought to examine the issue of racial inequity in patients with benign thyroid disease (6). Given the frequent use of surgery to manage benign thyroid conditions, including multinodular goiter, benign nontoxic or toxic adenoma, and Graves’ disease, this is an important concern.

Methods

This is a retrospective review of data from the American College of Surgeons National Surgical Quality Improvement Program (NSQIP). The study population consisted of all adults >17 years old who underwent total or partial thyroidectomy for nonmalignant disease, including Graves’ disease, goiter, adenoma, or “other benign nodule,” from

2016 to 2017 in the United States, captured within a multi-institutional database. Demographic and other data that were recorded included race (White, Black, Hispanic, Asian, and other/unknown), sex, age group, body-mass index (BMI), previous neck surgery, and surgical indication.

Outcomes included neck hematoma; injury to the recurrent laryngeal nerve (RLN), defined as hoarseness or vocal-cord dysfunction up to 30 days after surgery; symptomatic hypocalcemia requiring medical evaluation or intravenous calcium up to 30 days after surgery; and other general surgical complications. Logistic-regression models were used to evaluate the association between outcomes and race. A multivariate model controlled for baseline data as well as the presence of end-stage renal disease while a patient was on dialysis, American Society of Anesthesiologists (ASA) class (used to classify physical status and preoperative comorbidities), and type of operation. Race was a covariate associated independently with each of the complications, and odds ratios with 95% confidence intervals were determined with White race as the reference.

Results

There were 6187 patients included, the majority of whom were female (81.3%), non-Hispanic White (55%), 40 to 65 years of age (56.5%), and obese

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(48%) with no history of neck surgery (92.4%) and who had presented with goiter (65%). The overall rates of postoperative complications were low, with the most common being RLN injury in 357 patients (5.2%), followed by significant hypocalcemia in 336 (4.9%), neck hematoma in 135 (2%), and postoperative complications not specific to thyroid surgery in 128 (1.9%).

Black patients had the highest incidence of neck hematoma (3.1% vs. 1.3% in White patients, $P < 0.01$), RLN injury (8.7% vs. 4.3%, $P < 0.01$), and other surgical complications (2.5% vs. 1.4%, $P < 0.01$). The incidence of hypocalcemia was highest in Hispanic patients (7.3%), but this was not statistically significantly different when compared with other ethnicities.

When baseline and clinical factors were controlled for, the odds of each of the following outcomes in Black patients were significantly greater than in White patients: neck hematoma (OR, 2.46; 95% CI, 1.61–3.77), RLN injury (OR, 1.93; 95% CI, 1.50–2.49), and surgical complications (OR, 1.82; 95% CI, 1.17–2.83).

Conclusions

When demographics and clinical factors including comorbidities and surgical risk are considered, Blacks who undergo surgery for benign thyroid disease have a higher incidence of neck hematoma, RLN injury, and other general complications than do Whites. In addition, relative to Whites, Asians have a higher risk of RLN injury, and Hispanics have a nonstatistically significant increase in postoperative hypocalcemia.

COMMENTARY

Racial disparities have long been described in medicine in general (1) and in endocrinology in particular (3). There have been several studies on the subject in the area of thyroid disease (Table 1). The data of Maduka et al. (6) are consistent with prior studies that included thyroidectomy for malignant disease, showing that Black patients have worse outcomes (4,5,15). As discussed by Maduka et al., the causes of the observed disparities are numerous (6), including disease severity at presentation, access to care, health literacy, surgeon experience and volume of cases, and patient mistrust of the health care system. For example, in both benign and malignant thyroid conditions, minority patients appear to present with more advanced disease (7,8,16). This may be a direct result of reduced access to care, as demonstrated in a study by Lim et al. (16). This report identified that public hospital patients, who were predominantly minorities and those who lacked private insurance, were more likely to present with advanced stage disease than their counterparts

at an academic teaching hospital.

We should also consider whether management strategies are contributing to these disparate outcomes. For example, Elfenbein et al. found that Black patients were more likely than Whites to undergo surgical management of Graves' disease (9). Iwata et al. noted that Whites were 62% more likely to undergo fine-needle aspiration (FNA) biopsy for incidentally identified thyroid nodules (13) than were non-White patients. In evaluating the management of thyroid cancer, including extent of surgery and administration of radioactive iodine (RAI) ablation, Famakinwa et al. found that White patients were more likely than Blacks to receive the recommended interventions in accordance with the American Thyroid Association clinical practice guidelines for thyroid nodules and thyroid cancer (12).

Surgical expertise and volume are also important considerations. A landmark study by Sosa et al.

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showed that higher surgeon volume predicts lower complication rates after thyroid surgery (17). Another study by Sosa et al. (5) revealed that the majority of Blacks had surgery by the lowest-volume surgeons, as compared with a smaller proportion of Whites. In another study, Al-Qurayshi et al. analyzed more than 20,000 thyroidectomies and found that African American patients from high-risk communities (risk was based on smoking, obesity, excessive alcohol consumption, educational level, unemployment, and income among other factors) were more commonly operated on by low-volume surgeons, with post-operative complications being more common in this population (15). However, even when surgeon

volume was adjusted for, Sosa et al. found that significant racial disparities in length of stay and cost persisted (5).

In addition to a higher rate of adverse surgical outcomes among minorities, the medical management of a nonsurgical thyroid disease such as hypothyroidism appears to differ among races. For example, in hypothyroid patients older than age 65, initiation of thyroid hormone treatment in non-White patients is significantly less likely than in White patients (10). Further, non-White patients with hypothyroidism more commonly receive generic levothyroxine rather than brand-name products (11).

Table 1. Racial Disparities in Thyroid Disease Presentation, Management, and Outcomes

Finding	Relative Risks	Study
Thyroid Disease at Presentation		
More advanced disease in benign nodular disease	Blacks > Whites	Kuo et al. (7)
Later stage of thyroid cancer	Blacks > Whites	Harari et al. (8)
Thyroid Disease Management		
Surgical treatment of Graves' disease	Blacks > Whites	Elfenbein et al. (9)
Surgery by low-volume surgeon	Blacks > Whites	Sosa et al. (5)
Initiation of thyroid hormone administration among older adults	Whites > Nonwhites	Somwaru et al. (10)
Treatment with brand-name thyroid hormone	Whites > Blacks	Ross et al. (11)
Postoperative RAI or surgery in compliance with ATA guidelines	Whites > Blacks	Famakinwa et al. (12)
FNA of incidental thyroid nodule	Whites > Blacks	Iwata et al. (13)
Thyroid Disease Outcomes		
Complications following thyroidectomy	Blacks > Whites	Al-Qurayshi et al. (4), Sosa et al. (5), Maduka et al. (6)
Survival rates in differentiated thyroid cancer	Whites > Blacks	Harari et al. (8), Asban et al. (14)

Note: This is not an exhaustive compilation of all the available papers regarding racial disparities in thyroid disease. Also, in some studies, statistical significance was lost when other clinical factors were accounted for, but the above trends were still present.

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A newer concept in patient care takes into account the social circumstances and environment of the individual; these are commonly referred to as social determinants of health and can affect the presentation, management, and outcomes of illnesses. For example, Swegal et al. reported that lower household income correlated with a higher risk of disease-related death in patients with differentiated thyroid cancer (DTC) (18). Asban et al. found higher 10- and 20-year mortality rates in Black males with DTC as compared with Black females and White males and females (14). A study of Graves' disease at an urban hospital found that lower income and lack of insurance predicted whether surgical management would be chosen over medical or RAI therapy (19).

The lack of data on these social determinants of health in the NSQIP database is a limitation of the study by Maduka et al. (6). Another limitation is the lack of information on referral patterns, which, as stated above in the case of surgical experience, are likely to influence outcomes. Details on patients' medical visits leading up to surgery would also be informative. For example, referral for surgery may have been delayed because of providers' implicit

biases, impaired patient-provider communication, or difficulties with patient adherence or access to care.

Investigating and addressing the causes of racial and ethnic disparities in medical and surgical care is critical to informing health care decision making. In addition to improved surgical care for racial minorities, strategies that address the barriers to high-quality care for Blacks and other minorities for all thyroid diseases are needed. Achieving health equity will require responding to social determinants of health; balancing the distribution of power, money, and resources; and improving living conditions (20). Our health care delivery systems need to be integrated with social care so that the adverse effects of social risk factors, including discrimination and lack of access to stable housing, nutritious food, reliable transportation, and education, can be mitigated (21). Hopefully, studies like the one by Maduka et al. (6) will force us to confront and challenge the status quo.

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