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Thyroidectomy in older adults: an American College of Surgeons National Surgical Quality Improvement Program study of outcomes

Zeyad T. Sahli, MD,[a] *Ghedak Ansari, MPH,*[b] *Merve Gurakar, BA,*[b] *Joseph K. Canner, MHS,*[b] *Dorry Segev, MD PhD,*[a] *Martha A. Zeiger, MD,*[a] *and Aarti Mathur, MD*[a,*]

[a] *Department of Surgery, The Johns Hopkins University School of Medicine, Baltimore, Maryland*
[b] *Johns Hopkins Bloomberg School of Public Health, Johns Hopkins Medical Institutions, Baltimore, Maryland*

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ABSTRACT

Background: The growth of the US geriatric population coupled with the rise in thyroid nodular disease and cancer will result in an increased number of thyroidectomies performed in older adults. We aim to evaluate outcomes after thyroidectomy in older adults as compared with younger adults.

Methods: A retrospective cohort study using the American College of Surgeons National Surgical Quality Improvement Program database from 2012-2015 categorized thyroidectomy patients into three age groups: 18-64 y, 65-79 y, and ≥80 y. Thirty-day perioperative outcomes were analyzed using bivariate χ^2 test and multivariate logistic regression to estimate risk of outcomes.

Results: Our study identified 60,990 patients who underwent thyroidectomy: 47,855 (78.4%) patients between 18 and 64 y old, 11,716 (19.2%) between 65 and 79 y old, and 1419 (2.3%) ≥80 y. Compared with younger adults, patients aged ≥80 y were 2.67 times more likely to develop a complication (95% confidence interval [CI]: 2.02-3.53, $P < 0.001$), 1.83 times more likely to be readmitted for any reason (95% CI: 1.40-2.38, $P < 0.001$), 1.54 times more likely to be readmitted for a reason related to the thyroidectomy (95% CI: 1.10-2.16, $P < 0.05$), and 1.66 times more likely to have an extended hospital stay (95% CI: 1.44-1.91, $P < 0.001$). Patients aged 65-79 y were 1.40 times more likely to develop a complication (95% CI: 1.19-1.63, $P < 0.001$).

Conclusions: Patients aged ≥65 y have significantly higher rates of overall complications. In addition, patients aged ≥80 y have higher rates of total and thyroidectomy-related readmissions and extended length of hospital stay.

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* *Corresponding author.* Aarti Mathur, M.D., FACS, Endocrine Surgery, Department of Surgery, The Johns Hopkins University School of Medicine, 600 North Wolfe Street, Blalock 606, Baltimore, MD 21287. Tel.: +1 410 614 1197; fax: +1 410 630 7822.
E-mail address: aartima@aol.com (A. Mathur).

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Introduction

According to the United States Census Bureau, the proportion of older adults is rising in the United States and around the world.[1,2] In 2012, 562 million (8.0%) of the world's population was at least 65 y old, and this increased to 617 million (8.5%) in 3 y.[2] In the United States, there were an estimated 47.8 million adults 65 y or older in 2015, and this number is estimated to almost double to 88.0 million by 2050.[1,2] For this reason, the future will bring unique health care challenges as providers and public health officials begin to understand the implications of surgery on the aging population.

Studies have reported increasing age to be independently associated with increased postoperative morbidity and mortality in older patients undergoing major or high-risk elective surgery.[3,4] However, data is limited and conflicting for patients undergoing thyroidectomy, which is considered an intermediate-risk surgery.[5] Multiple single-institution studies have shown that the advances in endocrine surgery and anesthesia practices have reduced the overall risks of surgery to older patients, thereby increasing the number of elective operations carried out in older adults over the past few years.[6-8] Furthermore, the number of thyroidectomies performed in older adults is expected to rise due to the increase in thyroid nodular disease and cancer with age, an increase in thyroid cancer incidence over the last several decades, and growth of the geriatric population.[9-11]

The data regarding the risks of thyroidectomy of surgery in the older population are conflicting. Single-institution studies cite similar safety, efficacy, and equivalency outcomes between older and younger patients, but some have limited power or missing data on outpatient procedures.[6-8] However, population-based studies have demonstrated that elderly patients undergoing thyroidectomies are at risk for long hospitalization times and major systemic complications, in addition to higher readmission rates, but have limited comparisons of age groups among older adults and lack the risk of specific outcomes in older adults *versus* younger adults.[12,13] Therefore, the goal of our study was to compare surgical outcomes of thyroidectomy performed in young adults (18-64 y), *versus* older adults (65-79 y) and the super-elderly (≥80 y) by analyzing the 30-d perioperative outcomes, reoperation rates, readmission rates, and length of hospital stay by using a national database with surgical outcomes from inpatient and outpatient data.

Methods

Study design

Under institutional review board approval, we conducted a retrospective study, using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database from 2012 to 2015. The NSQIP database contains information gathered from over 700 enrolled health care institutions, providing clinical data related to operative cases and 30-d postoperative outcomes. NSQIP only began to capture readmission data in 2012. Therefore, we identified patients who underwent thyroidectomy on or after the year 2012 by using Current Procedural Terminology (CPT) codes: 60,210 (partial thyroid lobectomy: unilateral; with or without isthmusectomy); 60,212 (partial thyroid lobectomy with contralateral subtotal lobectomy, including isthmusectomy); 60,220 (total thyroid lobectomy, unilateral with or without isthmusectomy); 60,225 (total thyroid lobectomy, unilateral; with contralateral subtotal lobectomy, including isthmusectomy), 60,200 (isthmusectomy); 60,240 (total thyroidectomy, total or complete); 60,271 (thyroidectomy-cervical approach); 60,252 (thyroidectomy with limited neck dissection); 60,254 (thyroidectomy with radical neck dissection); 60,260 (thyroidectomy, removal of all remaining thyroid tissue after previous removal of a portion of thyroid).

Demographic information was collected, including age, sex, patient comorbidities including functional status and American Society of Anesthesiologist score class, body mass index (BMI) category, operative characteristics, postoperative complications, and postoperative diagnosis. For information on how ACS-NSQIP data are collected and a complete list of parameters followed, please refer to the ACS-NSQIP web site (http://www.acsnsqip.org/).

To evaluate outcomes after thyroidectomy, operative time, estimated blood loss, wound infections, hematoma requiring readmission, respiratory complications, cardiac complications, renal complications, neurologic complications, infectious complications, extended hospital stay (defined as stay ≥2 d), hypoparathyroidism, hypocalcemia, mortality within 30 d, and tracheostomy were identified in the database as postoperative outcomes. All complications were grouped to assess an overall complication rate. Readmission and reoperation rates, operative time, length of hospital stay, and postoperative length of stay were assessed as perioperative outcomes. Readmissions were defined in two ways: total readmissions and related readmissions to initial procedure. Related readmissions were defined by NSQIP and included only thyroid-related readmissions. Reoperations were defined to include hematoma drainage (CPT10140); incision and drainage of deep abscess or hematoma (CPT 21501); planned tracheostomy (CPT 31600); emergency tracheostomy (CPT 31603); exploration of neck for postoperative hemorrhage, thrombosis, or infection (CPT 35800); exploration of chest for postoperative hemorrhage, thrombosis, or infection (CPT 35820); direct therapeutic laryngoscopy with injection into vocal cord (CPT 31571); incision and drainage of infected thyroglossal duct cyst (CPT 60000); ligation of internal jugular vein (CPT 37565); diagnostic direct laryngosocopy, with or without tracheoscopy (CPT 31525); horizontal partial laryngectomy excision (CPT 31370); incision and removal of foreign body from subcutaneous tissue (CPT 10120); incision and drainage of abscess (CPT 10060); ligation of major artery in neck (CPT 37615); and incision and drainage procedure of postoperative wound (CPT 10180).

Statistical analysis

The data were analyzed by dividing the patients into three age groups: group A (18-64 y); group B (65-79 y); and group C (≥80 y). Categorical variables were analyzed using Pearson's χ^2 test, and continuous variables comparing age groups were analyzed using *t*-test. Multivariable logistic regression was performed to adjust for important covariates, and odds ratios

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