



Trends of Patients by Age Undergoing Thyroidectomy: An Analysis of Inpatient Data in the U.S. from 2005-2011

Kristen A. Echanique, BS; Aparna Govindan, BA; Michael Sylvester, AB;
Soly Baredes, MD, FACS; Yu-Lan Mary Ying, MD, FACS; Evelyne Kalyoussef, MD, FACS

Abstract

Background: As the country ages, thyroidectomies can be expected to be performed more frequently in the elderly. In this study, we sought to evaluate demographics and stratify patients by age to explore demographics and associated complications in patients undergoing thyroidectomy.

Methods: Analysis of the Nationwide Inpatient Sample (NIS) yielded 74,716 cases undergoing thyroidectomy between 2005 and 2011. Complications, outcomes, patient demographics, length of stay, and hospital charges were evaluated among patients and stratified by age.

Results: There were 74,716 thyroidectomy cases identified: ages 18-44 (30.6%), ages 45-59 (45%), ages 60-79 (20.6%), and age 80 and above (3.4%) ($P < 0.001$). There was a significant difference in lengths of stay, total hospital charges, and mortality throughout the different age groups ($P < 0.001$), all trending upward with advancing age. In the aging population, incidence of recurrent laryngeal nerve (RLN) injury, hematoma, transfusion of erythrocytes, and acute cardiac complications increased with age ≥ 40 ($P < 0.001$) while hypocalcemia and hypoparathyroidism were seen to decrease with age ≥ 40 ($P < 0.001$). Patients 40 and older were found to have higher rates of solid tumor without metastases ($P < 0.001$), while those under the age of 40 were found to have higher rates of metastatic cancer ($P < 0.001$).

Conclusion: This study utilized a national database to describe and elucidate trends found in older populations undergoing thyroidectomy. Thyroid-related complications such as hypocalcemia and RLN injury were found to correlate with age of the patient undergoing the procedure. This information will help to guide pre- and post-operative care in aging patients undergoing thyroidectomy.

Introduction

- As advances in disease prevention and treatment continue to improve, future physicians will be required to care for an increasing older patient population.
- In the year 2000, Americans 80 years and older comprised approximately 3.3 percent of the population; this number is expected to more than double by the year 2050.¹ By the year 2030, 1 in 5 Americans will be above the age of 65. The percentage of the population 65 and over is expected to rise from 15 to 21 percent.²
- Advanced age is associated with a higher incidence of both benign and malignant thyroid disease; Nodular thyroid disease is estimated to be present in approximately 90% of women over the age of 70 and 60% of men over the age of 80.³
- The literature has not yet reached a uniform consensus on whether the safety of thyroidectomy in the geriatric population is comparable to younger cohorts.
- Studies by Mekel et al.³ and Sosa et al.¹ both report higher rates of complications in the elderly undergoing thyroidectomy while studies by Seybt et al.⁴ and Tartaglia et al.⁵ conclude that there is no increased risk of complications in the elderly.
- The impact of this progressive demographic shift towards an aging population will play a significant role in thyroid surgery. Thus, it is important to understand the morbidity and mortality of thyroid surgery with respect to elderly patients.

Methods and Materials

Patient Database:

- The National Inpatient Sample (NIS) contains data from approximately 7 million hospitalizations each year, and estimates more than 36 million hospitalizations annually when weighted.
- The 2005-2011 NIS was queried for all patients undergoing thyroidectomy. ICD-9 codes for benign and malignant disease were used.
- Complications, outcomes, patient demographics, length of stay, and hospital charges were investigated. Patients were stratified into groups by age.

Statistical Methods

- SPSS 23 (IBM, Armonk, New York) was used to conduct all statistical analyses
- Univariate analyses were conducted using cross-tabulations, Pearson's chi squared, Fisher's exact test, and independent 2-tailed t tests.
- Statistical significance was determined via p values < 0.05 .

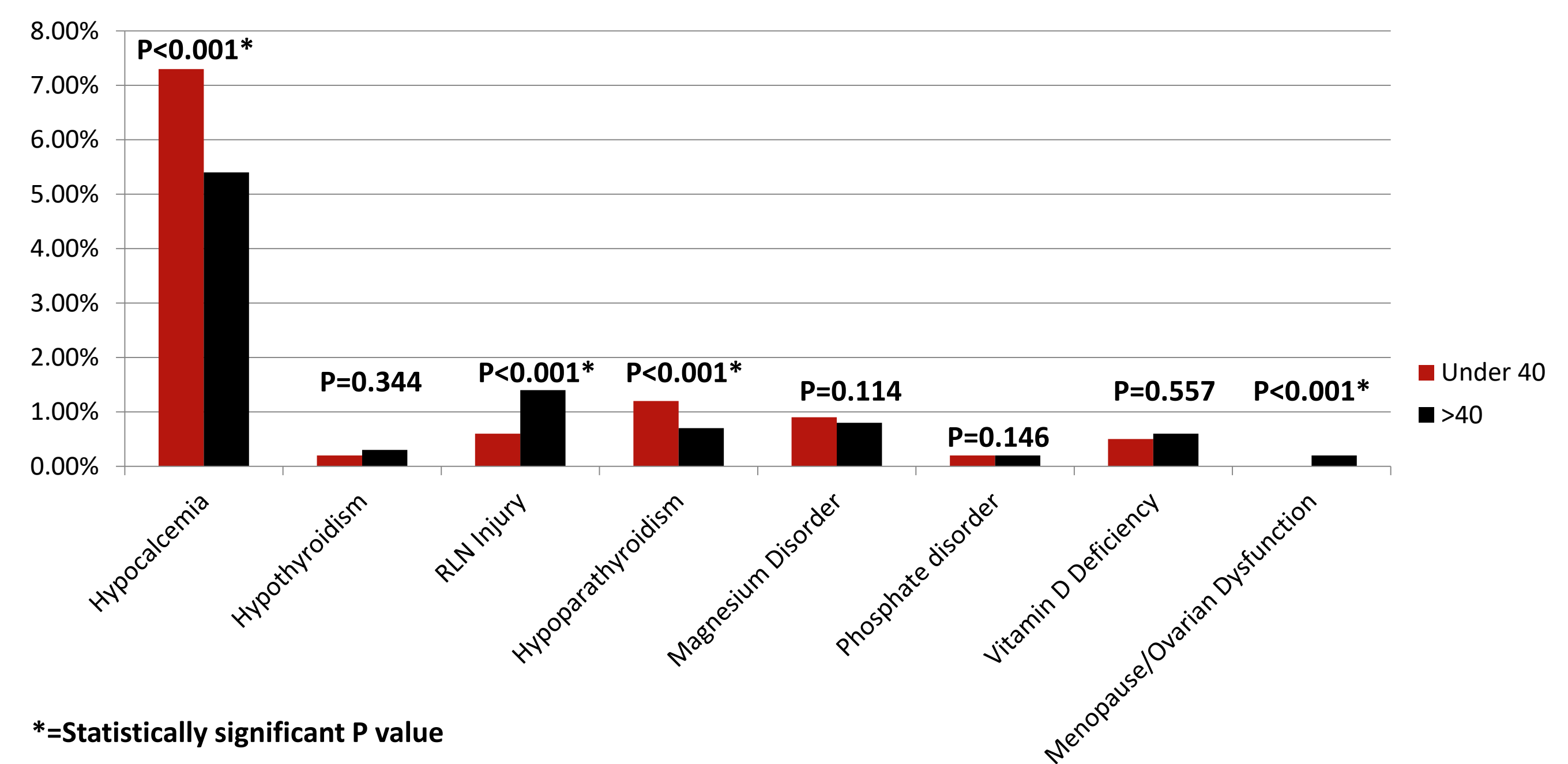
Conclusions

- Increasing age was associated with increased rates of in-hospital mortality, increasing length of stay, and increased hospital charges.
- Age < 40 was associated with higher rates of metastatic disease and radical neck dissection. This could be due to higher rates of more aggressive forms of well differentiated thyroid carcinoma in patients < 40 with greater likelihood of metastasis.
- Age ≥ 40 was found to be associated with significantly increased rates of RLN injury and menopause/ovarian dysfunction ($p < 0.001$).
- Age < 40 was found to be associated with significantly increased rates of hypocalcemia and hypoparathyroidism. This may be due to higher rates of more aggressive surgical dissection due to risk of metastasis, a tendency to be less stringent in trending the calcium in younger patients undergoing thyroidectomy, or perhaps more aggressive supplementation of calcium in those ≥ 40 .
- Increased age was found to be associated with significant increases in in-hospital complication including hematoma, acute cardiac complications, and transfusion of erythrocytes.

Table 1. Characteristics of Patients Undergoing Thyroidectomy

	18-44	45-59	60-79	80 & up	P value
Age cohorts (%)	5.1	12.1	22.3	21.6	$< 0.001^*$
Sex (%)					
Male	15.2	21.2	26.6	24.3	$< 0.001^*$
Female	84.8	78.8	73.4	75.7	
Race					$< 0.001^*$
White	63.7	68.6	73.7	80.2	
Black	12.9	14.3	11.6	8.4	
Hispanic	12.8	8.8	7.9	6.8	
Asian/Pacific Islander	5.6	4.6	3.6	2.2	
Other	0.6	0.5	0.5	0.5	
Unknown	4.5	3.2	2.8	1.9	
Mean Length of Stay, (days), (Std. Dev)	1.6 (1.9)	1.6 (2.0)	1.9 (2.9)	2.7 (4.3)	$< 0.001^*$
Mean Hospital Charges, (\$)	22482.10	22837.11	24788.21	28271.89	$< 0.001^*$
Mortality	0.0	0.0	0.1	0.5	$< 0.001^*$

Figure 1. Percentage of Complications in Thyroidectomy Patients by Age Cohort.



*=Statistically significant P value

Table 2. Extent of Disease in Thyroidectomy Patients by Age Cohort

	Under 40	≥ 40	P value
Metastatic cancer (%)	11.0	6.4	$< 0.001^*$
Solid tumor, M0 (%)	0.9	1.6	$< 0.001^*$
Neck Dissection (%)	7.6	4.7	$< 0.001^*$

Table 3. Complications in Thyroidectomy Patients by Age Cohort

	Under 40	≥ 40	P value
Acute Cardiac Complications	0.3	2.2	$< 0.001^*$
Transfusion of erythrocytes	0.2	0.7	$< 0.001^*$
Wound Complications	0.0	0.0	0.508
Hematoma (%)	1.0	1.7	$< 0.001^*$
Sepsis (%)	0.0	0.0	1.00
Postoperative Infection	0.1	0.1	0.450
Other Surgical Complications (%)	0.3	0.3	0.544

Contact

Evelyne Kalyoussef, MD, FACS
Department of Otolaryngology- Head and Neck Surgery
Rutgers New Jersey Medical School
kalyouev@njms.rutgers.edu

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