

Introduction

A thyroidectomy is the removal of all or part of the thyroid gland. It is the most common endocrine surgery in the United States and is mostly performed as a total thyroidectomy, which is the removal of the entire organ. Thyroid surgery has traditionally been performed as an inpatient procedure. However, with increased awareness of the risks of hospitalization and emphasis on reduction of healthcare costs, there has been rising interest in performing thyroidectomy as an outpatient procedure.³ Also, patients would prefer avoiding a hospital stay. The concerns with outpatient thyroidectomies are the risk for complications including hematoma (causing airway obstruction), hypocalcemia, and vocal cord paresis (leading to airway obstruction).³ This study will compare inpatient and outpatient procedures readmissions. It will also address comorbidities between both groups, which can impact the decision to perform an outpatient thyroidectomy vs. inpatient. This study will also analyze readmission rates according to indication for thyroidectomy to see which indications are at higher risk for complications. With this information, surgeons can better assess possibility of readmission for patients with these indications and comorbidities.

Aims and Objectives

This capstone project seeks to retrospectively evaluate trends in thyroid surgery in the United States from 2011-2016, utilizing the Nationwide Readmissions Database (NRD). This study will analyze the readmission rates according to indication for surgery, outpatient vs. inpatient procedures, and comorbidities.

Aim I: Trends in thyroidectomy readmissions based on comorbidities.

Aim II: Trends thyroid surgery readmissions of inpatient and outpatient procedures.

Aim III: Trends in thyroid surgery readmissions for indication.

Methods

This capstone project will be a retrospective chart review. Data will be provided from the National Readmissions Database (NRD) from 2011-2016. The International Classification of Diseases, Ninth Edition, Clinical Modification procedure codes 6.2, 6.31, 6.39, 6.4, 6.50, 6.51, 6.52, and 6.6 will be used to identify thyroid surgery patients aged ≥ 18 years included in the NRD from 2011-2016. As this is a retrospective health policy study of a prior existing database that does not require active participants, no recruitment or enrollment of subjects will be necessary in order to conduct this study. No consent process is necessary as the data being studied is being obtained from the Nationwide Readmissions Database which is a publicly available database of all-payer hospital inpatient stays developed by the Agency for Healthcare Research and Quality. The study population will include patients ≥ 18 years who underwent thyroid surgery at high volume hospitals. Both patients who were and were not readmitted within 30 days will be studied. The NRD is a large database that contains approximately 10% of all Thyroidectomies performed every year in the United States. Based on a preliminary search of the data, there are over 100,000 weighted Thyroidectomies during the time period of study. This is a sufficient sample size in relation to statistical power. The data was analyzed by the mentor and stored on a Encrypted Oakshare Drive, as specified by the agreement between the mentor (who is the PI), the Oakland University IRB, and the Oakland University Office of Legal Counsel. The Nationwide Readmissions Database (NRD) has a complex sampling design. Variables for Primary Sampling Units (PSUs), Strata, and Discharge Weights are included in the NRD. Descriptive analysis has been done. Univariate analysis was performed using Complex Samples T-Test for continuously measured variables while Rao-Scott Chi-Square tests will be performed for categorical variables. Multivariate predictive modeling of readmissions was done using Complex Samples Logistic Regression. Proper domain analysis and variance calculations was done as specified by the Methodology documents provided by the NRD.

Results

Elixhauser Comorbidities	Readmission	No Readmission	P-Value
Acquired Immune Deficiency Syndrome	22 (0.27%)	84 (0.06%)	0.0011
Alcohol Abuse	162 (1.92%)	910 (0.68%)	< 0.0001
Deficiency Anemias	1,003 (12.69%)	6,902 (5.14%)	< 0.0001
Rheumatoid Arthritis/Collagen Vascular Diseases	211 (2.67%)	2,586 (1.92%)	0.0174
Chronic Blood Loss Anemias	22 (0.29%)	231 (0.17%)	0.1720
Congestive Heart Failure	616 (7.79%)	3,447 (2.57%)	< 0.0001
Chronic Pulmonary Disease	1,460 (18.46%)	17,833 (13.27%)	< 0.0001
Coagulopathy	160 (2.03%)	1,271 (0.95%)	< 0.0001
Depression	813 (10.28%)	10,492 (7.81%)	0.0001
Diabetes, Uncomplicated	1,456 (18.42%)	20,305 (15.11%)	< 0.0001
Diabetes, Complicated	276 (3.49%)	2,171 (1.62%)	< 0.0001
Drug Abuse	119 (1.50%)	944 (0.70%)	< 0.0001
Hypertension	3,916 (49.53%)	56,347 (41.92%)	< 0.0001
Hypothyroidism	311 (3.94%)	1,486 (1.05%)	< 0.0001
Liver Disease	104 (1.31%)	1,354 (1.01%)	0.1426
Lymphoma	49 (0.62%)	657 (0.49%)	0.3432
Metastatic Cancer	1,197 (15.13%)	13,337 (9.92%)	< 0.0001
Other Neurological Disorders	433 (5.47%)	3,558 (2.65%)	< 0.0001
Obesity	1,284 (16.24%)	18,865 (14.03%)	0.0011
Paralysis	115 (1.45%)	678 (0.50%)	< 0.0001
Peripheral Vascular Disorders	241 (3.05%)	1,915 (1.43%)	< 0.0001
Psychoses	241 (3.05%)	2,622 (1.95%)	0.0001
Pulmonary Circulation Disorders	195 (2.5%)	1,142 (0.85%)	< 0.0001
Renal Failure	699 (8.84%)	4,641 (3.45%)	< 0.0001
Solid Tumor without Metastasis	318 (4.02%)	3,147 (2.34%)	< 0.0001
Peptic Ulcer Disease Excluding Bleeding	< 10 cases	< 10 cases	---
Valvular Disease	274 (3.46%)	3,116 (2.32%)	0.0015
Weight Loss	460 (5.82%)	1,935 (1.44%)	< 0.0001

Inpatient vs. Outpatient	Readmission	No Readmission	P-Value
Inpatient Thyroidectomy	9,406 (98.38%)	156,948 (97.89%)	0.0634
Outpatient Thyroidectomy	55 (1.62%)	3,387 (2.11%)	

Thyroidectomy Indications	Readmission	No Readmission	P-Value
Cancer of the Thyroid			
No	5,497 (57.49%)	99,182 (61.86%)	
Yes	4,064 (42.51%)	61,154 (38.14%)	< 0.0001
Simple or Unspecified Goiter			
No	9,020 (94.34%)	152,264 (94.97%)	
Yes	541 (5.66%)	8,071 (5.03%)	0.1121
Nontoxic Nodular Goiter			
No	6,899 (72.16%)	97,152 (60.59%)	
Yes	2,662 (27.84%)	63,183 (39.41%)	< 0.0001
Graves Disease			
No	9,116 (95.35%)	151,793 (94.67%)	
Yes	445 (4.65%)	8,542 (5.33%)	0.1007
Thyrototoxicosis with or without Goiter			
No	8,677 (90.76%)	144,341 (90.02%)	
Yes	884 (9.25%)	15,995 (9.98%)	0.1833
Congenital Hypothyroidism			
No	9,561 (100.00%)	160,304 (99.98%)	
Yes	< 10 cases	32 (0.02%)	0.3237
Acquired Hypothyroidism			
No	8,386 (87.71%)	142,629 (88.96%)	
Yes	1,175 (12.29%)	17,707 (11.04%)	0.0402
Thyroiditis			
No	9,091 (95.09%)	149,026 (92.95%)	
Yes	470 (4.91%)	11,309 (7.05%)	< 0.0001
Other Disorders of Thyroid			
No	9,331 (97.59%)	156,083 (97.35%)	
Yes	230 (2.41%)	4,252 (2.65%)	0.3642
Nonspecific Abnormal Results of Thyroid			
No	9,559 (99.98%)	160,304 (99.98%)	
Yes	< 10 cases	32 (0.02%)	0.9633
Complications of Surgical Procedures or Medical Care			
No	8,481 (88.70%)	151,743 (94.64%)	
Yes	1,080 (11.30%)	8,593 (5.36%)	< 0.0001
Other Endocrine Disorders			
No	8,504 (88.94%)	148,473 (92.60%)	
Yes	1,057 (11.06%)	11,862 (7.40%)	< 0.0001
Other Nutritional, Endocrine, and Metabolic Disorders			
No	6,222 (65.08%)	120,820 (75.35%)	< 0.0001

Conclusions

As expected, patients with readmission following thyroidectomy were more likely to have comorbidities present. The highest percentages being common comorbidities such as diabetes, hypertension, and chronic pulmonary disease. This is most likely due to these diseases being more common in the population. There were no major stand-out numbers for any specific comorbidity.

1.62% of readmissions for thyroidectomy were outpatient procedures vs. 2.11% of no readmissions being outpatient procedures. This shows that outpatient procedures are generally a safe option, but does not account for the difference in overall health before the procedure. Outpatient procedures in general are reserved for healthier patients with less risk of complications which could skew this data.

Cancer of the thyroid was the indication with the highest readmission rate at 42.51%. This was predicted due to cancer patients being generally more sick and therefore more likely to have complications. Also, the surgery can be more difficult to perform since tumors have unpredictable growth patterns and can be more tedious to remove.

References

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