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# Does concomitant thyroidectomy increase risks of parathyroidectomy?



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## ABSTRACT

**Background:** Concomitant thyroid pathology in patients with primary hyperparathyroidism is common. This study compares complications of patients who underwent parathyroidectomy to those who underwent parathyroidectomy with a concomitant thyroidectomy.

**Methods:** A retrospective review of prospectively collected data on 709 patients who underwent parathyroidectomy was performed. Patients who had prior thyroid or parathyroid procedures were excluded. Chi-square, Fisher's exact, Student's t-test, and Wilcoxon rank-sum tests were used to compare cohorts.

**Results:** Of the 641 patients included, 90% underwent parathyroidectomy alone and 10% underwent parathyroidectomy with a concomitant thyroidectomy. Overall, 49% had pre-operative thyroid disease and 22% of patients with thyroid disease had a thyroid procedure. When compared with parathyroidectomy alone, parathyroidectomy with a concomitant thyroidectomy was associated with longer operative times (91 min versus 57 min,  $P < 0.001$ ), increased rate of overnight stay (69% versus 17%,  $P < 0.001$ ), and increased rate of transient hypocalcemia (15% versus 3%,  $P < 0.001$ ).

**Conclusions:** Parathyroidectomy with a concomitant thyroidectomy is associated with longer operative times, increased rate of overnight stay, and increased transient hypocalcemia.

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## Introduction

The prevalence of concomitant thyroid disease in patients undergoing neck exploration for primary hyperparathyroidism has been reported to range from 17 to 84%.<sup>1-13</sup> Although thyroidectomy after parathyroidectomy is technically feasible, a number of studies have demonstrated a significant

increase in the rate of recurrent laryngeal nerve injury and hypocalcemia in the reoperative setting. These studies conclude that in patients with primary hyperparathyroidism and clinically relevant concomitant thyroid disease, the thyroid procedure should be performed at the time of parathyroidectomy to avoid the risk of operative morbidity from subsequent reoperative cervical procedures.<sup>14-18</sup>

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However, if thyroidectomy is being performed to avoid subsequent reoperative procedures in the future, the potential morbidity of a concomitant thyroidectomy at the time of parathyroidectomy requires further study. Theoretical increases in operative time and dissection necessary for thyroid and parathyroid removal may put the patient at risk for a variety of associated morbidities, including temporary and permanent hypocalcemia, recurrent laryngeal nerve injury, neck hematoma, and prolonged hospitalization. Few studies address the perioperative risks associated with simultaneous thyroid and parathyroid intervention as compared with parathyroidectomy alone.<sup>4,19</sup>

This study sought to determine the rate of concomitant thyroid disease in patients undergoing parathyroidectomy for primary hyperparathyroidism and to compare the outcomes of parathyroidectomy alone to those of parathyroidectomy with a concomitant thyroidectomy.

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## Methods

After obtaining institutional review board approval, a retrospective review of the medical records of 709 patients undergoing parathyroidectomy between September 2009 and September 2014 was performed.

Patients with secondary, tertiary, lithium-induced or familial hyperparathyroidism were excluded. Patients with a history of previous parathyroid or thyroid surgery were also excluded. Patients were grouped into two cohorts for comparison: parathyroidectomy alone and parathyroidectomy with concomitant thyroidectomy. Types of parathyroid procedures performed included both focused and bilateral neck explorations guided by intraoperative parathyroid hormone monitoring. Concomitant thyroid procedures included lobectomy or total thyroidectomy and excluded any lesser thyroid procedure.

### Preoperative variables

All patients underwent ultrasound of the thyroid and soft tissues of the neck before parathyroid procedures. Patient demographics including age and gender as well as preoperative laboratory values and ultrasound findings were recorded. Preoperative laboratory values were obtained before parathyroidectomy and included calcium, parathyroid hormone, vitamin D 25-OH, and creatinine. Concomitant thyroid disease included benign and malignant nodules, Hashimoto's thyroiditis, toxic and nontoxic multinodular goiters, and Graves' disease. A newly discovered thyroid nodule was treated in accordance to published guidelines regarding the management of thyroid nodules and cancer.<sup>20,21</sup>

### Perioperative variables

The number of parathyroid glands removed, recurrent laryngeal nerve injury, operative time, postoperative hematoma, and overnight admission were documented. For the purposes of analysis, the number of glands removed was dichotomized into one or greater than one gland removed. Recurrent laryngeal nerve injury was defined as vocal cord paralysis

documented by postoperatively laryngoscopy and persisting >6 mo. At our institution, laryngoscopy is performed selectively when a patient experiences voice changes preoperatively and postoperatively. Operative time was defined as the time from skin incision to closure. Postoperative hematoma was defined as a neck hematoma requiring a return to the operating room for evacuation. Overnight admission included patients who required either observation overnight (23 h) or admission to the hospital for more than one night.

### Outcome variables

Postoperative emergency department visits, hospital readmissions, transient and permanent hypocalcemia, and operative failures were documented. Transient hypocalcemia was defined as a postoperative calcium level of less than 8.5 mg/dL that required calcium supplementation and resolved in the immediate postoperative period allowing the patient to discontinue calcium intake. Permanent hypocalcemia was defined as the need for calcium supplements to maintain a normal calcium level in conjunction with a low or undetectable parathyroid hormone level 6 mo after parathyroidectomy. Operative failure was defined as a high calcium level above the normal range (>10.5 mg/dL) with a persistently elevated parathyroid hormone level (>70 pg/mL) occurring within 6 mo of parathyroidectomy. Operative success was defined as a calcium level of <10.5 mg/dL for at least 6 mo after parathyroidectomy. The overall mean follow-up was 8 mo (range, 0.5-56 mo).

### Statistical analysis

Statistical analysis was performed using STATA version 13.0. Patient demographics, preoperative variable, and postoperative variable were compared using chi-squared, Fisher's exact, Kruskal-Wallis, Wilcoxon rank-sum, or Student's t-test. Missing data were excluded from the analysis.

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## Results

Of the 709 patients reviewed, 641 patients met the inclusion criteria. There were 574 patients (90%) who underwent parathyroidectomy alone and 67 patients (10%) who underwent parathyroidectomy with a concomitant thyroidectomy. Patient demographics, preoperative laboratory values, and ultrasound findings are summarized in [Table 1](#). There was no difference in the median age or gender distribution between groups. There was no difference in the median preoperative calcium, parathyroid hormone, vitamin D 25-OH, or creatinine levels between groups. Overall, 311 patients (49%) were found to have concomitant thyroid disease on preoperative ultrasound. There was a larger percentage of patients with concomitant thyroid disease detected on neck ultrasound in the parathyroidectomy with a concomitant thyroidectomy group when compared with parathyroidectomy alone group (94% versus 44%,  $P < 0.001$ ). Two patients (6%) in the parathyroid with a concomitant thyroidectomy group underwent thyroid lobectomy to locate an intrathyroidal parathyroid gland.

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