



Original research

Thyroidectomy in high body mass index patients: A single center experience



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ABSTRACT

Background: To identify the correlation between high body mass index (BMI ≥ 25) and the risk of postoperative complications of thyroidectomy.

Methods: A comparative study between thyroidectomy performed in normal or overweight-obese patients has been performed. Postoperative outcomes, including hypocalcemia, laryngeal nerve palsy, bleeding, operation time and hospital stay, were evaluated.

Results: A total of 266 patients underwent total thyroidectomy were included. Of them, 104 patients had a BMI below 25 and 162 patients had a BMI ≥ 25 . There was no statistically significant difference in the occurrence of early or permanent hypoparathyroidism, recurrent laryngeal nerve palsy, bleeding complications, or postoperative duration of hospital stay. There was, however, a higher operative time in patients with a BMI ≥ 25 .

Conclusion: Despite the longer operative time, thyroidectomy can be performed safely in patients with a BMI ≥ 25 .

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1. Introduction

Obesity is a growing public health concern as it is associated with many co-morbidities. Furthermore, with a rising life expectancy and growing population, it is inevitable that diseases related to obesity will become more prevalent. This increasing rate of obesity is driving up medical costs, because more people are suffering from obesity-related complications such as heart disease, stroke, diabetes, and cancer. Moreover, more overweight and obese patients also undergo other surgical procedures apart from bariatric surgery itself, and there is growing interest in understanding predictors of patient outcomes. Some studies have reported a correlation between elevation of BMI and risk factor for postoperative morbidity or mortality [1,2]. More patients with high BMI are undergoing cervical endocrine procedures than ever before, and there seems to be a relationship between high BMI and some thyroid and parathyroid disorders. Obesity is associated with greater serum levels of thyroid-stimulating hormones and an increased incidence

of thyroid cancer in some cohorts. Obesity also has been reported to be associated with primary hyperparathyroidism [3–7]. Thyroidectomy has began a common procedure also in high body mass index patients. This procedure has a low mortality rate but a specific morbidity (recurrent laryngeal nerve palsy, transient and permanent hypoparathyroidism, and early postoperative hematoma) [8–10]. The aim of our study was to compare the rates of specific postoperative complications of thyroidectomy (hypocalcemia, recurrent laryngeal nerve palsy, and early postoperative hematoma) in a population having a BMI ≥ 25 with a population having a BMI < 25 .

2. Subjects and method

2.1. Patients

All consecutive patients who underwent a thyroid operation (total or partial thyroidectomy) in our department from 2007 to 2013 were included in this retrospective cohort study. BMI was calculated during the first clinical visit to our institution via weight and height measurements. BMI groupings were based on the standardized categories set by the World Health Organization as

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follows: BMI < 25 kg/m² (this group included normal and underweight patients), 25 ≤ BMI < 30 kg/m² (overweight), and BMI ≥ 30 kg/m² (obese). In this study we divided the patients into two groups: BMI ≥ 25 or <25. We excluded those patients who underwent parathyroidectomy and lymphadenectomy (recurrent laryngeal or jugular carotid) or partial thyroidectomy. A standardized operative procedure was performed. All thyroidectomies were performed under general anesthesia by two surgeons well experienced in thyroidectomy. Operative techniques were similar for the two operators: ultraligatures vascular in contact with the glandular parenchyma or installing metal clips, capsular dissection of parathyroid glands and their vascularization, identification, if possible, of the superior laryngeal nerve in the cricothyroid space and/or the upper pole, and identification of lower laryngeal nerves (recurrent nerve) until laryngeal penetration point. Monitoring of the inferior laryngeal nerve was never used in this study because the technology was not available in the structure. Total thyroidectomies were performed as appropriate. Primary clinical outcomes of interest were: rate of specific complications to thyroidectomy as postoperative hypocalcemia (transient and define), recurrent laryngeal nerve palsy (transient and define), and hematoma. The secondary endpoints were operative time and mean duration of hospital stay. Hypocalcaemia was defined as calcium levels <2 mmol/L (normal range, 2.10–2.65 mmol/L). RLN palsy (confirmed with a diagnostic laryngoscopy) and hypoparathyroidism (hypocalcaemia and low parathyroid hormone levels requiring calcium and a-calcidol supplementation) were considered permanent when persisting for more than 6 months. Postoperatively, only patients with dysphonia, dyspnea, and swallowing disorders had a laryngoscopy (nasofibroscope) to search for recurrent nerve palsy. Any recurrent laryngeal nerve palsy that was persistent at 6 months and documented by laryngoscopy was considered as permanent palsy. Follow-up information was obtained from a database and from medical records. Physical examinations, neck US, and measurements of serum thyroglobulin were performed routinely at the patient follow-ups.

2.2. Statistical analysis

Two groups were instituted and compared, including group A (BMI > 25) and group B (BMI < 25). Data were compared and statistically analyzed by the χ^2 -test or by Student's t-test using SPSS Software 16 with statistical significance set at $p < 0.05$.

3. Results

A total of 266 patients were thyroidectomized in our unit from 2007 to 2013. Based on the BMI, 7 patients (2.6%) were morbidly obese, 54 (20.3%) were obese, 102 (38.3%) were overweight, and 104 (39%) had a BMI <25.

Thus 161 patients (group A) had BMI > 25 and 105 patients (group B) had BMI < 25. Clinical and demographic characteristics of the study population were summarized in Table 1. There was no statistically significant difference between the two populations (Table 2).

Table 1
Demographic and clinical characteristic of patients.

| | Subgroup A BMI ≥ 25 n = 104 | Subgroup B BMI < 25 n = 162 | P value |
|-------------------|--------------------------------|--------------------------------|---------|
| Male gender (pts) | 65 (62.5%) | 88 (54.3%) | 0.20 |
| Age (years) | 43 ± 10.6 | 40.9 ± 11.1 | 0.11 |
| Thyroid size (ml) | 77.6 ± 44.3 | 83.9 ± 35.4 | 0.15 |
| Cancer (pts) | 29 (27.8%) | 45 (27.7%) | 1 |

Table 2
Post-operative complications.

| | Subgroup A BMI ≥ 25 n = 104 | Subgroup B BMI < 25 n = 162 | P value |
|---------------------|--------------------------------|--------------------------------|---------|
| Hypocalcemia | 2 (1.9%) | 6 (3.7%) | 0.48 |
| Transient RLN palsy | 3 (2.8%) | 4 (2.4%) | 1 |
| Final RLN palsy | 1 (0.9%) | 2 (1.2%) | 1 |
| Hematoma | 7 (6.7%) | 13 (8%) | 0.81 |

4. No one death occurred during this study period

4.1. Postoperative hypocalcemia

Among patients with a BMI ≥ 25, 6 cases of hypocalcemia were observed at 6 months against 2 patients with a BMI < 25. These diagnostics were confirmed by measuring corrected calcemia, and 8 patients required a substitutive therapy. There was no statistically significant difference between the two groups ($p = 0.48$).

4.2. Recurrent laryngeal nerve palsy

3 patients in group A (including 1 patient who presented with a bilateral paralysis) and 4 patients in group B had early recurrent laryngeal nerve palsy. There was no statistically significant difference between the two groups ($p = 1$). 3 patients had final recurrent laryngeal nerve palsy confirmed by fibroscopy (1 patients in group A and 2 in group B). Thanks to speech therapy, the voice was almost normal.

4.3. Bleeding complications

7 patients in group A and 13 in group B presented with a hematoma. There was no statistically significant difference between the two groups ($p = 0.81$). No one patient required a return to the operating room.

4.4. Operative time

Compared with normal BMI patients, patients with a BMI ≥ 25 had a higher operative time. There was a statistically significant difference between the two groups ($p < 0.001$).

4.5. Post-operative duration of hospital stay

The mean duration of hospital stay was 2.7 ± 0.8 days for all patients. It was 2.7 ± 0.7 days for patients in group A and 2.8 ± 0.6 days for those in group B. There was no statistically significant difference between the two groups ($p = 1$).

5. Pathological results

Although patients with a BMI > 25 tend to present with more papillary, follicular, and medullary cancers than patients with a BMI below 25, there was no statistically significant difference between the two groups (Table 1).

6. Discussion

It is expected, that a growing number of surgical patients will also be obese. Surgeons will find themselves increasingly having to contend not only with the physical challenges of successfully navigating around excess body tissue intraoperatively, but must also be prepared to manage the myriad of medical comorbidities that accompany obesity. Some studies have reported that high BMI

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