

A Retrospective Evaluation of Safety of Anesthesia During Thyroidectomy In Biochemically Hyperthyroid Individuals at a Tertiary Care Centre

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ABSTRACT

Background: Hyperthyroidism affects approximately 2% of women and 0.2% of men. Conventional preoperative preparation of patients who are to undergo thyroidectomy includes administration of ATDs before surgery. The present study was conducted for assessing safety of anesthesia during thyroidectomy in biochemically hyperthyroid individuals.

Materials and Methods: There were 100 subjects who were divided into two groups of 50 each. Group 1 comprised of 50 euthyroid subjects and Group 2 comprised of 50 hyperthyroid subjects. The severity of thyrotoxicosis was classified into three arbitrary categories based on FT3 levels: mild, moderate, and severe. Statistical analyses were performed utilizing SPSS software.

Results: In this study, there were 100 subjects, of which 50 subjects belonged to the euthyroid group and 50 subjects belonged to the hyperthyroid group. Intraoperative tachycardia was observed in 25 subjects of thyrotoxic group and 20 subjects of euthyroid group. Intraoperative beta-blocker was required by 25 thyrotoxic subjects and 7 subjects of euthyroid group. 9 thyrotoxic subjects needed postoperative care and only 2 subjects of euthyroid group required postoperative care. Mean duration of anaesthesia and mean duration of surgery in thyrotoxic subjects was 132.6 minutes and 129.4 minutes, respectively. The mean duration of anaesthesia and the mean

duration of surgery in euthyroid subjects was 121.6 minutes and 122.9 minutes, respectively.

Conclusion: The execution of thyroidectomy for mild to moderate biochemical hyperthyroidism by an experienced thyroid surgeon and anesthetist is associated with an increased use of intraoperative beta-blockers; nevertheless, no significant differences have been noted in mortality rates, length of postoperative hospital stay, or intraoperative markers indicative of thyrotoxicosis.

Keywords: Thyroidectomy, Biochemical, Anaesthesia.

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INTRODUCTION

Hyperthyroidism affects approximately 2% of women and 0.2% of men.¹ In the Philippines, thyroid disorders and goitre are highly prevalent. The 2008 Philippine Thyroid Disorder Prevalence Study (PhilTiDeS 1) showed that the prevalence of overt hyperthyroidism was 0.61%, while that of subclinical hyperthyroidism was higher at 5.33%.² There are 3 methods of treatment for Graves' disease in current practice: surgery, RAI therapy and ATDs. Thyroidectomy is preferentially performed in patients with compressive symptoms or large goitres; relatively low uptake of radioactive iodine; suspected or documented thyroid malignancy; concomitant hyperparathyroidism; moderate to severe active Graves' ophthalmopathy; allergies, intolerance, non-compliance or

adverse drug reactions to ATDs; and unwillingness to undergo RAI therapy.³

Thyroidectomy is performed after achieving a euthyroid state to prevent the occurrence of thyroid storm post-operatively.^{3,4} Conventional preoperative preparation of patients who are to undergo thyroidectomy includes administration of ATDs before surgery. A euthyroid state is usually achieved in 4 to 6 weeks.⁵ In cases complicated by severe adverse reactions to ATDs, preoperative preparation can be difficult, and in rare instances, unorthodox.⁵ Hence, the present study was conducted to assess safety of anesthesia during thyroidectomy in biochemically hyperthyroid individuals.

MATERIALS AND METHODS

There were 100 subjects who were divided into two groups of 50 each. Group 1 comprised of 50 euthyroid subjects and Group 2 comprised of 50 hyperthyroid subjects. Patients diagnosed with hyperthyroidism and scheduled for elective thyroidectomy were identified through hospital coding systems and an endocrine surgery database. Those classified as thyrotoxic had preoperative test results indicating biochemical hyperthyroidism, which was defined by elevated levels of free triiodothyronine (FT3) or free thyroxine (FT4), along with suppressed thyroid-stimulating hormone (TSH) levels (i.e., TSH values falling below the lower detection limit of the assay). In contrast, patients undergoing

medical treatment who presented with normal thyroid hormone levels or subclinical hyperthyroidism (characterized by normal FT3 and FT4 levels with low TSH) were classified as euthyroid. The severity of thyrotoxicosis was categorized into three distinct levels based on FT3 concentrations: mild (FT3 levels between 6.8 and 9.9 pmol/l, up to 1.6 times the upper limit of the reference range), moderate (FT3 levels from 10 to 19.9 pmol/l, 1.6 to 3 times the upper limit of the reference range), and severe (FT3 levels exceeding 20 pmol/l, more than 3 times the upper limit of the reference range). Statistical analyses were conducted using SPSS software.

Table 1: Baseline characteristics of the hyperthyroid and euthyroid groups

Variable	Group 1 (Euthyroid)	Group 2 (Hyperthyroid)
Age (years)	32.5	34.8
Gender		
Males	12	10
Females	38	40

Table 2: Outcomes for the thyrotoxic and euthyroid groups

Variable	Thyrotoxic group	Euthyroid group
Mean duration of postoperative stay (days)	2	2
Intraoperative tachycardia	25	20
Intraoperative beta-blocker	25	07
Postoperative care	09	02
Duration of anaesthesia (minutes)	132.6	121.6
Mean duration of surgery (minutes)	129.4	122.9

RESULTS

In this study, there were 100 subjects, of which 50 subjects belonged to the euthyroid group and 50 subjects belonged to the hyperthyroid group. The mean age of the subjects of euthyroid group was 32.5 years and the mean age of the subjects of hyperthyroid group was 34.8 years. There were 12 males and 38 females in the euthyroid group. There were 10 males and 40 females in the hyperthyroid group.

The mean duration of postoperative stay for the thyrotoxic and euthyroid subjects was 2 days. Intraoperative tachycardia was observed in 25 subjects of thyrotoxic group and 20 subjects of euthyroid group. Intraoperative beta-blocker was required by 25 thyrotoxic subjects and 7 subjects of euthyroid group. 9 thyrotoxic subjects needed postoperative care and only 2 subjects of euthyroid group required postoperative care. Mean duration of anaesthesia and mean duration of surgery in thyrotoxic subjects was 132.6 minutes and 129.4 minutes, respectively. The mean duration of anaesthesia and the mean duration of surgery in euthyroid subjects was 121.6 minutes and 122.9 minutes, respectively.

DISCUSSION

Hyperthyroidism is associated with hemodynamic changes, including increased cardiac output, cardiac contractility and heart rate, and decreased peripheral resistance that are related to both the direct cardiostimulatory effects of thyroid hormones and increased oxygen consumption.⁶

It is for these reasons that proper treatment is required. Thyroidectomy is one of the treatment options for hyperthyroidism. However, thyroid crisis, injury to the recurrent laryngeal nerve, parathyroid injury, and postoperative bleeding are serious complications that are closely related to the adequacy of preoperative preparation.⁷ The goal of preparation is to achieve a euthyroid state.^{7,8} Conventionally, this can be achieved by administration of ATDs, typically using PTU or MMI. Patients are usually rendered euthyroid in 4 to 6 weeks using these medications.^{4,8-12}

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CONCLUSION

The execution of thyroidectomy for mild to moderate biochemical hyperthyroidism by an experienced thyroid surgeon and anesthetist is associated with an increased use of intraoperative beta-blockers; nevertheless, no significant differences have been noted in mortality rates, length of postoperative hospital stay, or intraoperative markers indicative of thyrotoxicosis.

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