A Comparative Study between Total and Subtotal Thyroidectomy for the Management of Graves' Disease

Thesis

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Hany Hassan Zakaria

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List of Abbreviations

Abbr.	Title
ATDs	: Antithyroid drugs
BMR	: Basal metabolic rate
DITs	: Diiodotyrosines
FDG	: Fluoro-2-deoxy-D-glucose
FDGPET	: 18F-fluorodeoxyglucose positron emission tomography
FNA	: Fine-needle aspiration
MITs	: Monoiodotyrosines
MMI	: Methimazole
NIS	: Na+/I- symporter
SD	: Standard deviation
T3	: Triiodothyronine
T4	: Thyroxine
TBG	: Thyroxine-binding globulin
TBPA	: Thyroxinebinding prealbumin
Tg	: Thyroglobulin
TRF	: Thyrotropin-releasing factor
TSH	: Thyrotropin
TSH-R	: Thyroid-stimulating hormone receptor (TSH-R)
RAI	: Radioiodine
TX	: Thyrotoxicosis
IRCAs	: Iodinated radiographic contrast agents
IOP	: Iopanoic acid

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ABSTRACT

Background: Graves' disease is an autoimmune disease that causes the thyroid to overproduce and over-secrete thyroid hormones. This results in hyperthyroidism and can cause a wide variety of symptoms to occur. **Aim of the work:** This study is conducted to compare total vs subtotal thyroidectomy in the management of Graves' disease as regards control of the disease, incidence of recurrence and postoperative complications. **Patients and Methods:** This is a prospective study which included 40 patients with primary thyrotoxicosis (Graves' disease) and was conducted in Ain Shams University Hospitals and Dar El Shefa Hospital. The Graves 'disease was diagnosed on the basis of clinical symptoms and signs, serum level of thyroid hormones and thyroid stimulating hormones, neck ultrasound and thyroid scan. **Results:** The present study showed statistically insignificant difference between both groups as regard need for Eltroxin by using Fisher exact test. No significant difference as regards other variables. Relapse occurred in 2 cases of subtotal group and these 2 patients needed radio active iodine ablation. **Conclusion:** This study confirmed that total thyroidectomy is being increasingly adopted for patients requiring surgical treatment for Graves' disease, based on a comparable surgical risk and the lack of recurrence, as well as the questionable ability of subtotal thyroidectomy to maintain euthyroidism. **Recommendations:** Further studies on large scale of patients are needed to confirm these results.

Key words: Grave's disease, autoimmune disease, thyroid, total thyroidectomy, euthyroidism

Introduction

Graves' disease is the most frequent cause of hyperthyroidism. It is an autoimmune condition caused by thyroid stimulating antibodies that bind to the thyroid stimulating hormone receptors on thyroid follicular cells. It is characterized by symmetric diffuse goiter and hyperthyroidism ***(Waber et al., 2006).***

It can be treated by antithyroid medication, radioactive iodine, or surgery. One of the advantages of radioablation is that it is relatively inexpensive and safer for debilitated patients, who may be poor surgical candidates. Its major disadvantage is that it can take 4–6 months to achieve euthyroidism ***(Gittoes and Franklyn, 1998).***

Anti- thyroid drugs are generally well tolerated, but they have a latent period of 2–6 weeks before symptom relief and they must be given over an extended period of time, around 1–2 years, to achieve long-term remission. Recurrence of hyperthyroidism may be as high as 69% after 6 months of therapy. Furthermore, long-term remission with antithyroid drug therapy is unlikely in patients with large goiters and those with severe hyperthyroidism ***(Tallsteclt et al., 1996).***

Thus, surgery is an important treatment option for Graves' disease. Subtotal thyroidectomy has been advocated as the standard treatment for Graves' disease because of the

assumed lower risk of complications compared with total thyroidectomy, and also because it provides the chance to avoid thyroxin therapy ***(Weber et al., 2006).***

However, the long-term results of subtotal thyroidectomy are not as good as originally thought, owing to the difficulty to determine the ideal size of the gland to be left, the high incidence of recurrence, and the high incidence of complications if a redo operation is needed ***(Gaujoux et al., 2006).***

Consequently, recent studies published have concluded that total thyroidectomy is being increasingly adopted for patients requiring surgical treatment for Graves' disease, based on a comparable surgical risk and the lack of recurrence, as well as the questionable ability of subtotal thyroidectomy to maintain euthyroidism ***(Ku et al., 2005).***

Aim of the Work

This study is conducted to compare total vs subtotal thyroidectomy in the management of Graves' disease as regards control of the disease, incidence of recurrence and postoperative complications.

Embryogenesis

Normal Development

The thyroid gland is the first of the body's endocrine glands to develop, on approximately the 24th day of gestation. The thyroid originates from two main structures: the primitive pharynx and the neural crest. The rudimentary lateral thyroid develops from neural crest cells, while the median thyroid, which forms the bulk of the gland, arises from the primitive pharynx ***(Takanashi et al., 2015).***

The thyroid gland forms as a proliferation of endodermal epithelial cells on the median surface of the developing pharyngeal floor. The site of this development lies between 2 key structures, the tuberculum impar and the copula, and is known as the foramen cecum. The thyroid initially arises caudal to the tuberculum impar, which is also known as the median tongue bud. This embryonic swelling develops from the first pharyngeal arch and occurs midline on the floor of the developing pharynx, eventually helping form the tongue as the two lateral lingual swellings overgrow it ***(Takanashi et al., 2015).***

The foramen cecum begins rostral to the copula, also known as the hypobranchial eminence. This median embryologic swelling consists of mesoderm that arises from

the second pharyngeal pouch (although the third and fourth pouches are also involved). The thyroid gland, therefore, originates from between the first and second pouches ***(Takanashi et al., 2015).***

Descent of the Thyroid Gland

The initial descent of the thyroid gland follows the primitive heart and occurs anterior to the pharyngeal gut. At this point, the thyroid is still connected to the tongue via the thyroglossal duct. The tubular duct later solidifies into a cord of cells that will form the follicular elements. The proximal segment retracts and subsequently obliterates entirely, leaving only the foramen cecum at the posterior aspect of the tongue ***(Guerra et al., 2014).***

A pyramidal lobe of the thyroid may be observed in as many as 50% of patients. This lobe represents a persistence of the inferior end of the thyroglossal duct that has failed to obliterate ***(Guerra et al., 2014).***

Descent of the thyroid gland carries it anterior to the hyoid bone and, subsequently, anterior to the laryngeal cartilages. As the thyroid gland descends, it forms its mature shape, with a median isthmus connecting the two lateral lobes. The thyroid completes its descent in the seventh gestational week, coming to rest in its final location immediately anterior to the trachea (Defective embryogenesis of the thyroid gland as