



Retrospective Analysis of Patients Undergoing Total Thyroidectomy for the Last Three Years in a Tertiary Care Hospital

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: The incidence of thyroid disorders has increased in the past decade in South India and the increase may be attributed to the phenomenon of overdiagnosis. The thyroid gland secretes hormones, which have various metabolic effects in the body. Most commonly the patients with thyroid disorders present with symptoms of hyperthyroid, hypothyroid and at times, though euthyroid, they may develop a swelling in the neck that has been caused by a goiter (single/multiple), thyroiditis, Grave's disease, or thyroid carcinoma. In these conditions where there is an associated hyperthyroid or hypothyroid state, it is essential for the consulting physician to provide appropriate management with the aim of bringing the thyroid gland to a euthyroid state prior to further surgical methods. These benign and malignant conditions are initially medically managed but, surgical interventions are indicated sometimes. Total thyroidectomy, subtotal thyroidectomy, partial thyroidectomy, hemi thyroidectomy are the most common surgical procedures performed. Among these procedures, the total thyroidectomy procedure has been gaining an increase of incidence in the past decade.

Objectives: The aim of the study is to analyze the indication rate of various conditions requiring total thyroidectomy surgery, to analyze the most affected age group and sex and to know if the incidence rate coincides with the known international standard. The post-operative complication incidence is also analyzed.

Materials and Methods: This is a retrospective study conducted over a period of three years at Department of General Surgery, Saveetha Medical College, Thandalam.

Results: The study shows an increased occurrence between 21-40 years old age group, mostly affecting the female population. Nodular goiter is the most common indication for total thyroidectomy surgery, carcinomas are the second most common. Among carcinomas, papillary is the most common type observed in this study.

Conclusion: Total thyroidectomy is effective in treating several thyroid disorders and the risk of recurrence in subtotal, partial or hemi thyroidectomy outweighs the risk of complication during surgery in total thyroidectomy.

Keywords: Goiter; Grave's disease; overdiagnosis; thyroid carcinomas; thyroiditis.

1. INTRODUCTION

The thyroid gland is a butterfly-shaped organ composed of right and left lobes connected in the midline by the isthmus and is located at the anterior side of neck [1]. Thyroxine (T4) and triiodothyronine are two essential metabolic hormones produced by the thyroid gland (T3). Thyroid stimulating hormone (TSH) is secreted by the anterior pituitary gland, which is stimulated by thyrotropin releasing hormone (TRH) secreted by the hypothalamus, which regulates thyroid function. Calcitonin, a hormone involved in calcium metabolism, is also released by the thyroid gland. Iodine is essential for the thyroid gland for the appropriate levels of hormones to be secreted. Iodine is a mineral that is mostly found in marine foods or in the form of iodized salt. [2].

Hypothyroidism and hyperthyroidism are two common disorders of the endocrine system throughout the world [1]. In the past decade the incidence of thyroid disorders has increased by 20% [3]. Studies show that the incidence rate of thyroid carcinoma is higher in regions with higher access to diagnostic tests such as thyroid ultrasonography and fine needle aspiration biopsies [4].

Benign conditions of the thyroid gland are thyroid nodule (unilateral/ bilateral), thyroid adenoma and hyperplasia, toxic goiter, thyroiditis, which are indications for total thyroidectomy [1,3]. Malignant conditions of thyroid gland include papillary carcinoma, follicular carcinoma, medullary carcinoma, anaplastic carcinoma, and small cell carcinoma.

Total thyroidectomy is the treatment of choice for patients with malignant thyroid disease [5]. Anatomic findings like nodules or organomegaly should prompt further investigations using microscopic examination, laboratory tests and if

indicated invasive procedures such as a FNAC due to the alarming incidence of thyroid carcinoma in South India [1,6].

The thyroid has extensive lymphatic drainage involving multiple levels of lymph nodes, including but not limited to the prelaryngeal, pretracheal, paratracheal, retropharyngeal, retroesophageal, internal jugular lymph nodes, and since the chances of metastasis is high, nodal lymphadenectomy is combined with total thyroidectomy if indicated [7]. The aim of the study is to evaluate the incidence of corresponding indications for total thyroidectomy.

The operative complication of total thyroidectomy is hematoma formation, the post-op complications are transient/mild hypocalcemia and recurrent laryngeal nerve injury. Several surgeons around the world prefer the total thyroidectomy to subtotal thyroidectomy due to the chances of recurrence in subtotal thyroidectomy. By primarily performing total thyroidectomy, the multifold risk of complications of a subtotal thyroidectomy such as second neck exploration surgery, as well as the anaesthetic risk and time delay before further surgery, are avoided.

2. MATERIALS AND METHODS

This is a retrospective analysis study conducted at the department of general surgery, Saveetha Medical College, Thandalam, Chennai. The research was conducted after receiving approval from the Institutional Review Board. The study included data from August 2018- August 2021. The study group included patients who had undergone total thyroidectomy surgery for various indications. Data such as demographic details, history of drug intake and medical conditions, history of previous surgery or radiation, thyroid profile, imaging studies of the neck, fine needle aspiration cytology,

histopathological results with the surgical specimen, confirmation of diagnosis that indicated total thyroidectomy, incidence of post-operative complication were taken into account. The data collected was consolidated and analyzed. The results were tabulated and presented as tables, bar diagrams and pie charts below.

3. RESULTS

3.1 Age Distribution

As demonstrated in Table 1 and Fig. 1, the data analyzed show that the age group most commonly affected is 20-40 years old, followed by the age group of 40-60 years old. The adolescent and older age group are less commonly affected with conditions that indicate a total thyroidectomy.

3.2 Sex Distribution

As demonstrated in Table 2 and Fig. 2, there is a female preponderance in the overall occurrence of thyroid disorders.

3.3 Causes of Thyroidectomy

According to Table 3 and 4, Fig. 3 and 4, multinodular and single nodular goiter accounts to about 82% and thyroid carcinoma accounts to about 13% among conditions for which total thyroidectomy was indicated and performed for. Thyroidectomy was indicated predominately for benign conditions compared to that of malignant conditions. Among the thyroid carcinoma, papillary carcinoma was the most common carcinoma, and the diagnosis was reconfirmed by histopathological examining of the surgical excised portion.

3.3.1 Post op duration of stay and complications of surgery

According to Table 5 and Fig. 5, post op duration of stay was less than 7 days in the majority of the cases. Three complications were seen following surgery. 2.6% had hypoparathyroidism, 0.89% had recurrent laryngeal nerve injury leading to palsy, and 0.89% had to be endotracheal intubated (Fig. 6).

Table 1. Age distribution

Age	No. of. patients (Frequency, n=112)	Percentage (%)
<20	3	2.6%
21-49	52	46.4%
41-60	46	41.07%
>60	11	9.82%

Table 2. Sex distribution

Sex	No. of. Patients (Frequency, n=112)	Percentage (%)
Male	11	10%
Female	101	90%

Table 3. Causes of thyroidectomy

Causes of thyroidectomy	No. of. Patients (Frequency, n=112)	Percentage (%)
Grave's disease	2	1.78%
MNG	83	74.01%
SNG	9	8.035%
Thyroiditis	3	2.67%
Thyroid carcinoma	15	13.39%

Table 4. Types of thyroid carcinomas in the study sample who underwent total thyroidectomy

Types of thyroid carcinomas	No. of. Patients (Frequency, n=15)	Percentage (%)
Follicular	5	33.33%
Papillary	8	53.33%
Medullary	1	6.67%
Other	1	6.67%

Table 5. Incidence of complications post operatively

Complication of surgery	No. of. Patients (Frequency, n=112)	Percentage (%)
Hypocalcemia	3	2.6%
Recurrent laryngeal nerve palsy (unilateral)	1	0.89%
Endotracheal intubation (case of retrosternal goitre)	1	0.89%

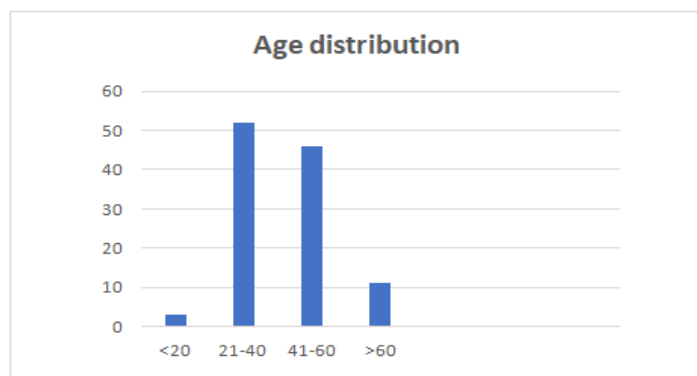


Fig. 1. Age distribution

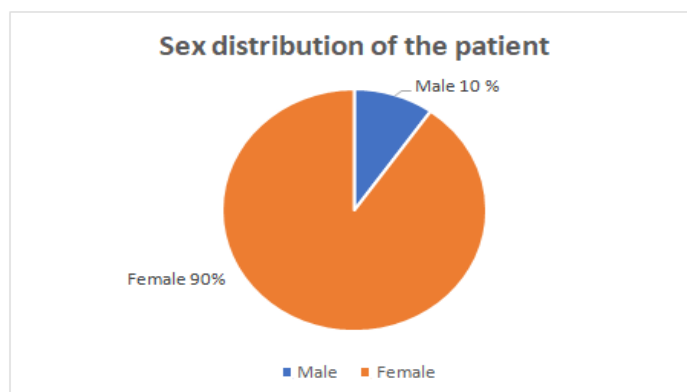


Fig. 2. Sex distribution

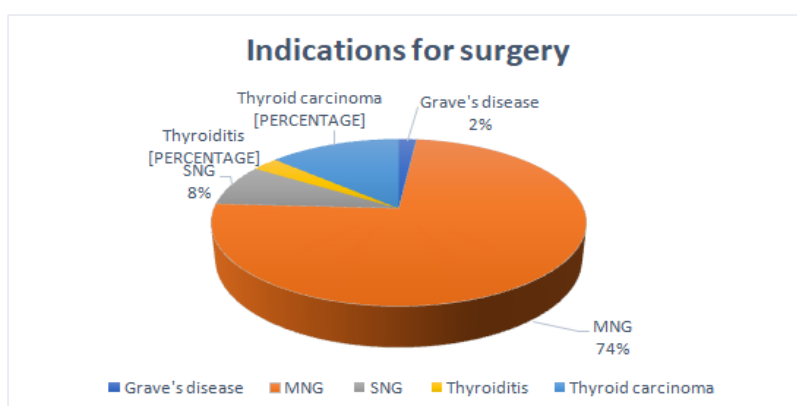


Fig. 3. Indications for surgery

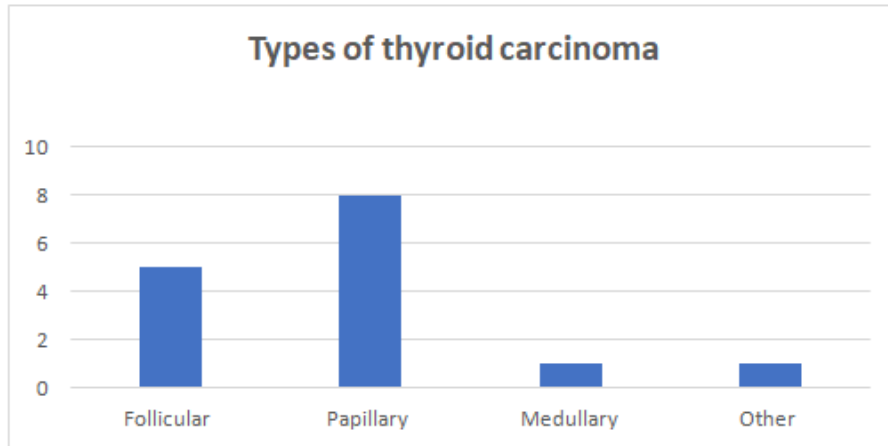


Fig. 4. Types of thyroid carcinomas in the study sample who underwent total thyroidectomy

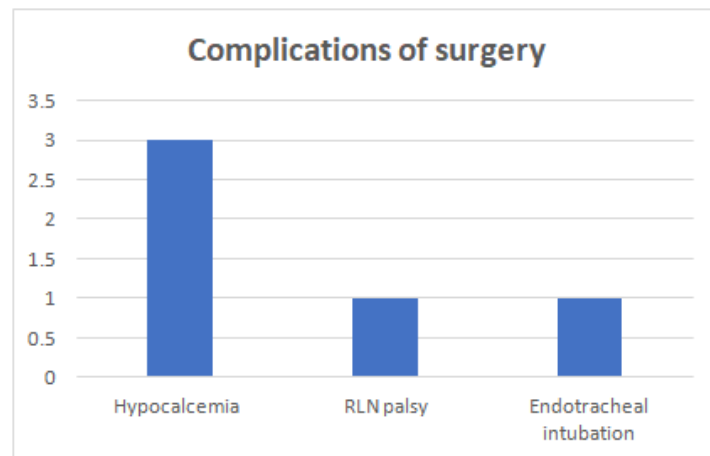


Fig. 5. Incidence of post-operative complication

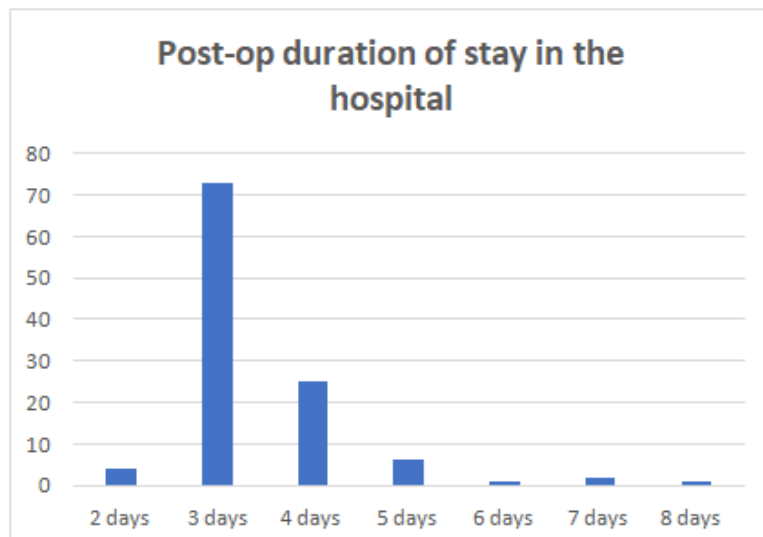


Fig. 6. Incidence of complications post operatively

4. DISCUSSION

During the study period of three years, the number of patients who had undergone a total thyroidectomy is 112. The age group affected was maximum between 20-40 years, middle aged group which coincides with studies conducted by Orhan Glimoglu and Murat Akgdg [8]. The ratio of F:M affected is 9:1, the female preponderance in the study is enormous and corresponds with studies conducted by G. Mohandhas and D. Mallinga showed a similar age and sex distribution among patients who underwent thyroid surgery for various benign and malignant conditions [2]. Because of the presence of oestrogen receptors in thyroid tissue, females are more likely than males to develop any type of goiter [9]. Studies show that patients with polycystic ovarian syndrome were found to have higher level of TSH than females without polycystic ovarian syndrome. There is a high prevalence of goiter among polycystic ovarian syndrome patients and their USG pattern appear compatible with the diagnosis of autoimmune thyroiditis [10]. The preponderance in middle age and female sex corresponds to a study conducted by Ayhan Koyunchi [11]. Total thyroidectomy is an indication for several benign (60%) and malignant conditions (40%) [1]. Out of the 112 patients who underwent total thyroidectomy, 74% had a multinodular goiter. Among the 83 who presented with a multinodular goiter, some patients presented with retrosternal extension, colloid goiter, nodular goiter, associated with secondary thyrotoxicosis, adenomatous goiter, associated with mixed connective tissue damage. Thyroid carcinoma was the second most common indication for total thyroidectomy in this study group, accounting to about 13%. Thyroid carcinomas were diagnosed using FNAC and HPE with surgical samples. Papillary carcinoma is the most common carcinoma, followed by follicular and then medullary carcinoma. There were three cases that were exclusively thyroiditis, out of which 2 had hashimoto's thyroiditis.

In a study conducted by Katz and Bronson showed that the indications for total thyroidectomy was 19% Grave's disease, 62% nodular goiter, 19% malignancy [12]. Similar to these results, our study shows that the indications for total thyroidectomy was majorly contributed by nodular goiter 82%, followed by thyroid carcinoma 17%. The incidence of total thyroidectomy being indicated for Grave's

disease is in our study is 1.7% and thyroiditis constitutes about 2.7% and is relatively low compared to a study by Karthikeyan P and Muthu S which showed that grave's disease to contribute 15% and thyroiditis by 12% [13]. The patients with signs of malignancy with nodal spread (3 patients with papillary carcinoma) were managed with total thyroidectomy with central node compartment dissection or lateral cervical/neck node dissection or modified radical neck dissection depending on the involvement of one side or both followed by with radioactive iodine therapy. For the patient who presented with retrosternal goitre was managed with total thyroidectomy with a collar bone incision. The associated complications of surgery are mild hypocalcemia, recurrent laryngeal nerve palsy and endotracheal intubation (in the case of retrosternal goitre). Apart from malignant conditions there were several indications for total thyroidectomy in patients presenting with benign conditions with pressure symptoms, ophthalmoplegia, palpable nodules, cosmetic reasons, suspicious areas on USG/FNAC, patient's preference of total thyroidectomy over hemithyroidectomy.

The surgeries being performed by skilled surgeons have inflicted on the reduced post-operative complication rate, which showed that the incidence of mild hypoparathyroidism which causes transient hypocalcemia is 2.6% and is similar to the study conducted by Gough and Wilkinson which showed an incidence of 2.2% [14]. The incidence of recurrent laryngeal nerve palsy is 2.2% and is similar to the study conducted by Karthikeyan P and Muthu S [13]. The patient with retrosternal goitre underwent endotracheal intubation due to tracheal compression, following which the patient was extubated. The three patients who had complications of transient hypoparathyroidism were managed with calcium and Vit D supplements, The patient with the complication of unilateral recurrent laryngeal nerve injury was identified two days following the surgery by indirect laryngoscopy. Cord mobility was assessed, after receiving complaints of change in voice (hoarseness). After counselling the patient on the complication of RLN injury the patient opted for conservative management as he did not wish to undergo any further procedures. Post-operative duration of stay for a total thyroidectomy surgery is usually less than 7 days, the patients are followed up periodically following discharge.

5. CONCLUSION

In the South Indian population, thyroid disorders are a common manifestation of endocrine illness. Young females seem to be affected with thyroid diseases more commonly. Benign conditions predominate over malignancies undergoing total thyroidectomy in this population due to clinical/radiological indications, patient's preference for total thyroidectomy compared to that of hemithyroidectomy. When performed by a skilled surgeon, this is a safe and effective surgery.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

All authors hereby declare that this study was conducted after obtaining approval from the Indian Review Board (IRB) and has been performed in accordance with ethical standards.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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