

## Study of Complications Following Thyroidectomy for Benign Thyroid Disease

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### Abstract:

**Background:** Thyroidectomy is a very common surgical procedure. The outcome and complication rates are largely dependent on the surgeon's skill and experience. The complications may be anatomical, physiologic, or both.

**Method:** 80 (eighty) adult patients aged between 20 to 60 years having cytological and radiological evidence of benign thyroid disease were studied. Every patient underwent TSH, T3, T4, and USG of the neck and aspiration of fluid for cytological study from a suspected area. CT scan in tracheal compression patients, an indirect laryngoscopy was done under pre-operatively to assess the position of the vocal cords. Thyroidectomy was done under general anesthesia and administered by endo-tracheal intubation. Flexible strobolaryngoscopy was done when an indirect laryngoscope was inconclusive.

**Results:** Benign thyroid complications were 11 (13.7%) hyperthyroidism, 20 (25%) retro-sternal extension, 5 (6.2%) tracheal compression, 27 (33.7%) firm feel, and 17 (21.2%) adhesion. The anatomical variations were: 14 (17.5%) had anterior relation to ITA, with 2 (2.5%) had palsy, 21 (26.2%) had branching of RLN with 4 (5%) had palsy, 45 (56.2%) had RLN close to anterior entry, with 5 (6.2%) had palsy. Vocal cord palsy was highest in firm gland and least in 5 (6.2%) tracheal compressions.

**Conclusion:** It is concluded that a surgeon with skill and knowledge of the anatomy of the thyroid gland can minimize the post-surgical complications.

**Keywords:** RLN = recurrent laryngeal nerve, ITA= inferior thyroid artery, vocal cords, strobolaryngoscopy, Telangana.

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### Introduction

Thyroid surgery has become increasingly common in the population as 47 million people are affected by thyroid disorder globally. Major complications of thyroidectomy include hypocalcaemia and Laryngeal nerve palsy [1]. Benign thyroid nodules are found in 5–15% of the general population in India [2]. In 20th century, thyroidectomy became a safe and acceptable operation with the advent of general anesthesia, antisepsis, and hemostatic techniques. The outcome and complication rates are largely dependent on the surgeon's skill and experience; the extent of surgery and indication of surgery determine the various complications [3]. When complications occur, they fall into several categories, including errors of omission or commission, and they may be inevitable or totally unanticipated. They may occur during the pre-operative,

operative, or post-operative phases, and they adversely affect anatomic structures, physiological functions, or both [4]. Hence, an attempt is made to evaluate the complications following thyroidectomies in benign thyroid disease.

### Material and Method

80 (eighty) patients aged between 25 to 60 years visited to surgery department of Dr. Patnam Mahender Reddy Institute of Medical Sciences Chevella, Telangana-501503 were studied

**Inclusive Criteria:** Patients having clinical and cytological evidence of benign disease of thyroid gland were selected for study.

**Exclusion Criteria:** Patients having malignancy of thyroid, having recurrent goitre cytological suspi-

cation of malignancy and immune compromised patients were excluded from study.

**Method:** Every patient underwent clinical examination followed by thyroid hormonal assay (TSH, T3, T4) USG of neck. Aspiration of cytology was done from suspicious area. CT scan was taken in the tracheal compression; indirect laryngoscopy was done for pre-operative assessment of vocal cords.

Thyroidectomy was done under general anaesthesia administered by endotracheal intubation. All patients underwent direct laryngeal examination after extubation and indirect laryngoscopy in the post-operative period. Flexible strobolaryngoscopy was done when indirect laryngoscopy was inconclusive. The patients who were found to have defective vocal cord movements were reviewed every month for six months. Serum corrected calcium was estimated at 6 am on post-operative days and hypocalcaemia is defined as serum corrected calcium level < 8.5 mg/dl. Patients with hypocalcaemia were followed for 6 months with monthly estimation of serum corrected calcium.

The clinical manifestations considered to influence the rate of complications were the presence of tracheal compression, Mediastinal extension and hyperthyroidism. Intra-operative features included consistency of goitre, adhesion to the parathyroid soft tissue, type of external division of superior laryngeal nerve, course of RLN and its relation to inferior thyroid artery (ITA) and the number of

parathyroid glands identified and preserved. The consistency of the gland was recorded based on the subjective assessment of the surgeon and graded as firm when goitre was not yielding to pressure and difficult to refract medially.

The duration of study was June 2023 to January 2024.

**Statistical analysis:**

Complications of gland following benign thyroid, and anatomical variations were classified with percentage. The statistical data was analysed in SPSS software. The ratio of Females and males was 2:1.

**Observation and Results**

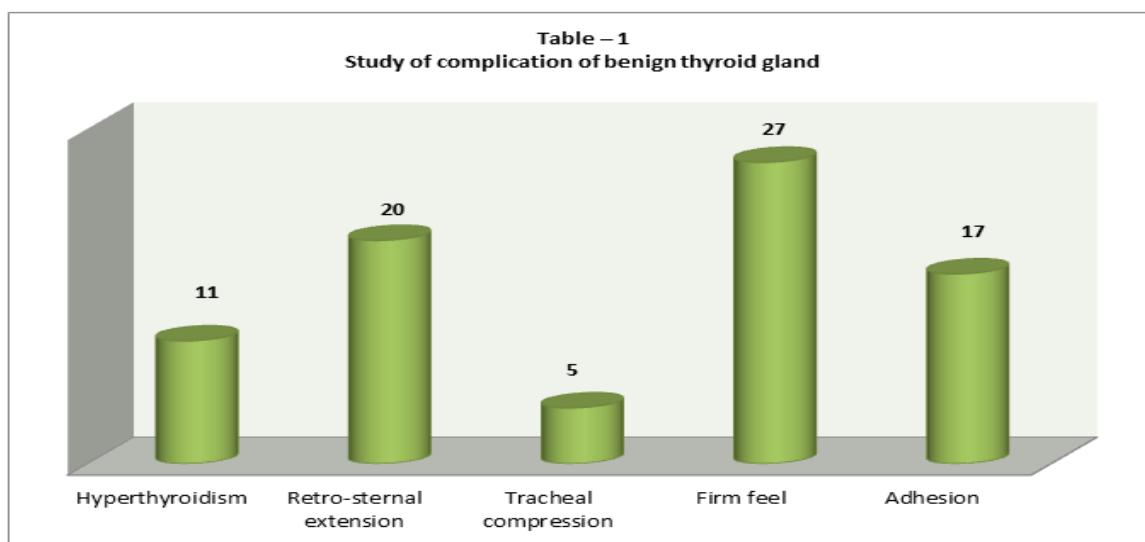
**Table 1:** Study of complications in benign thyroid gland: 11 (13.2%) hyperthyroidism, 20 (25%) retro-sternal extensions, 5 (6.2%) tracheal compression, 27 (33.7%) firm feels, 17 (21.2%) adhesion.

**Table 2:** Study of risk of palsy due to anatomical variations: 14 (17.5%) and 2 (2.5%) patients with palsy, 21 (26.2%) patients had branching of RLN and 4 (5%) had palsy, 45 (56.2%) patients had RLN close to anterior entry and 5 (6.2%) patients had palsy.

**Table 3:** Study of vocal cord palsy in different clinical manifestation: 10 (12.5%) had hyperthyroidism, 21 (26.2%) had retro-sternal extension and 4 (5%) had palsy, 5 (6.2%) had tracheal compression, 26 (32.5%) had firm gland and 4 (5%) had palsy, 18 (22.5%) had adhesion and 5 (6.2%) had palsy.

**Table 1: Study of complication of benign thyroid gland**

Sl. No	Complications	No. of patients (80)	Percentage %
1	Hyperthyroidism	11	13.7
2	Retro-sternal extension	20	25
3	Tracheal compression	5	6.2
4	Firm feel	27	33.7
5	Adhesion	17	21.2

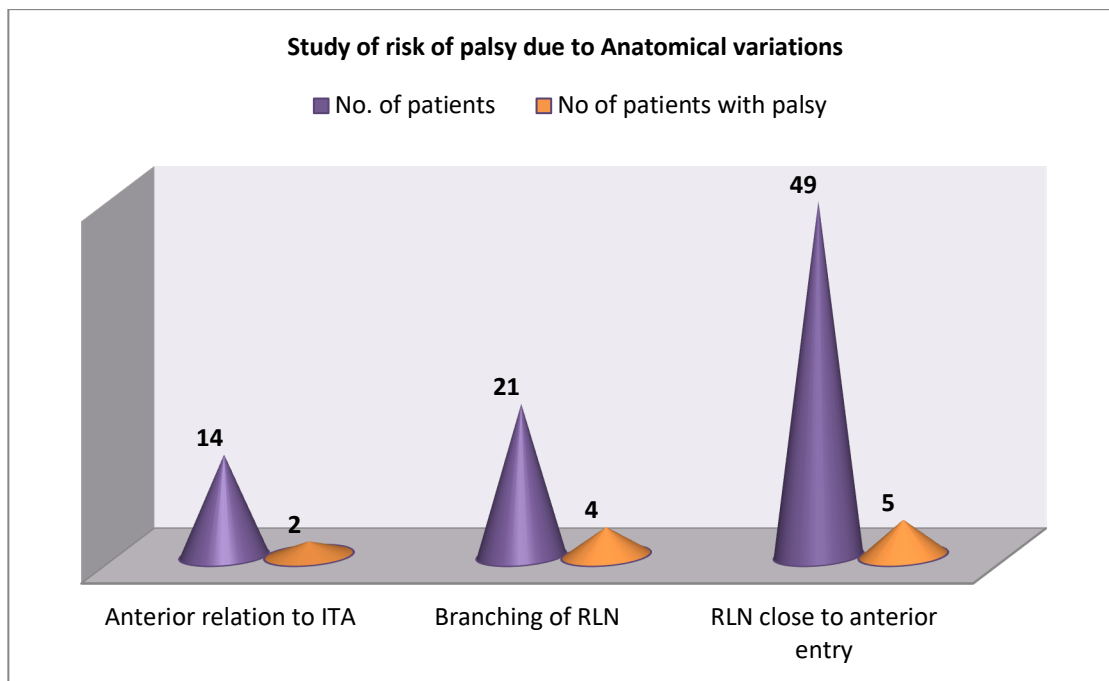


**Figure 1: study of complication of benign thyroid gland**

**Table 2: Study of risk of palsy due to Anatomical variations**

Sl. No	Anatomical Variations	No. of patients	No of patients with palsy
1	Anterior relation to ITA	14 (17.5%)	2 (2.5%)
2	Branching of RLN	21 (26.2%)	4 (5%)
3	RLN close to anterior entry	45 (56.2%)	5 (6.2%)

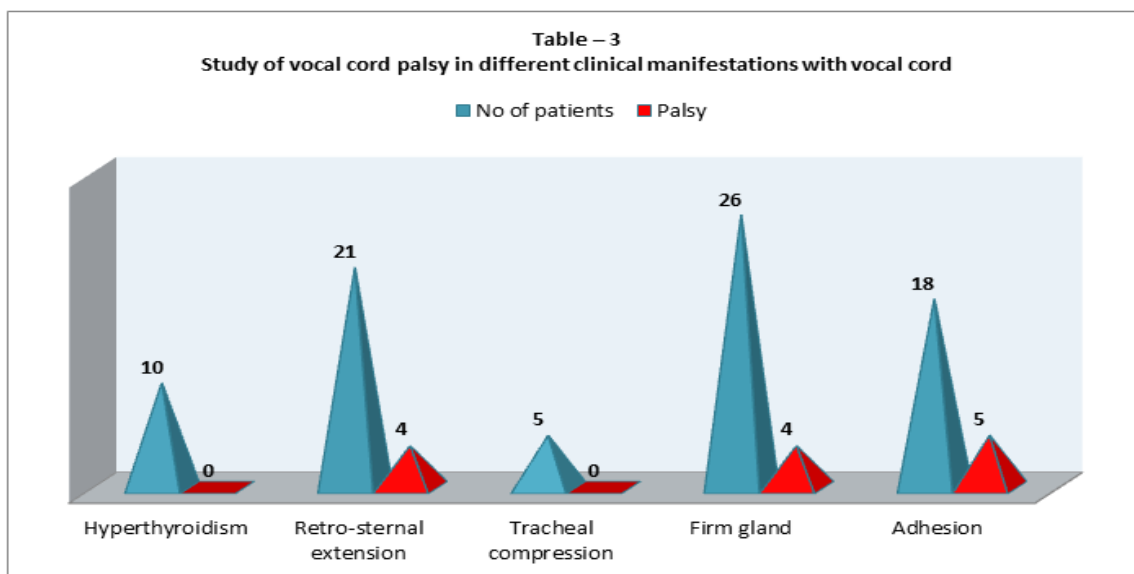
ITA = Inferior thyroid artery, RLN = Recurrent Laryngeal Nerve



**Figure 2: Study of risk of palsy due to Anatomical variations**

**Table 3: Study of vocal cord palsy in different clinical manifestations with vocal cord**

Sl. No	Clinical Manifestation	No of patients	Palsy
1	Hyperthyroidism	10 (12.5%)	--
2	Retro-sternal extension	21 (26.2%)	4 (5%)
3	Tracheal compression	5 (6.2%)	--
4	Firm gland	26 (32.5%)	4 (5%)
5	Adhesion	18 (22.5%)	5 (6.2%)



**Figure 3: Study of vocal cord palsy in different clinical manifestations with vocal cord**

## Discussion

Present study of complications following thyroidectomy for benign thyroid disease in Telangana Population. The complications of benign thyroid gland were 11 (13.7%) had hyperthyroidism, 20 (25%) had retro-sternal extension, 5 (6.2%) had tracheal compression, 27 (33.7%) had firm feel, 17 (21.2%) had adhesion (Table-1). In the study of risk of palsy due to anatomical variations – 14 (17.5%) had anterior relation to ITA, with 2 (2.5%) had palsy, 21 (26.2%) had branching of RLN with 4 (5%) had palsy, 45 (56.2%) had RLN close to anterior entry and 5 (6.2%) had palsy (Table-2). In the study of vocal palsy in different clinical manifestations with vocal cord 10 (12.5%) had hyperthyroidism, 21 (26.2%) had retro-sternal extension, 5 (6.2%), 26 (32.2%) had firm gland with 4 (5%) had palsy, 18 (22.5%) had adhesion with 5 (6.2%) had palsy (Table-3). These findings are more or less in agreement with previous studies [5,6,7]. Most common post-surgical complications include hypocalcaemia following total thyroidectomy. Complications can be life threatening if not diagnosed and treated properly.

Retro-sternal extension increase difficulty in thyroidectomy and may result into hypocalcaemia [8]. The patients with thyroiditis had hypocalcaemia. This could be due to presence of adhesions. Majority of the patients had Graves's disease, colloid goitre and oedema. Although majority of the cases are temporary and correct themselves over time, most of them still need calcium supplementation to prevent or treat the symptoms associated with hypocalcaemia (ranged from 1 to 4% even in unilateral lobotomy) [9]. It is also reported that, some surgeon administrate oral calcium supplement as a part of routine post-operative management.

This may mask the immediate onset of post-operative hypocalcaemia, tending to deflate overall incidence immediately diagnosed post-operative hypo-parathyroidism. It is believed that, injury to recurrent laryngeal Nerve (RLN) is either temporary or permanent occurred during total thyroidectomy often have more advanced diseases [10]. Hence a rate of unilateral or bilateral vocal cord palsy has to be predicted meticulously.

## Summary and Conclusion

In the present study it was observed that, transient hypocalcaemia and vocal cords palsy are common complications of total thyroidectomy. Hyperthy-

roidism seems to have an increased predisposition for hypocalcaemia. The presence of adhesions and retro-sternal extension predisposes to post-operative hypocalcaemia and vocal cord palsy. Identification of parathyroid glands, proper anatomical knowledge of neck structures will minimise the risk of injury to RLN and ITA.

## Limitation of study:

Owing to the tertiary location of the research center, the small number of patients, and the lack of the latest techniques, we have limited findings and results.

This research paper was approved by Ethical Committee of Dr. Patnam Mahender Reddy Institute of Medical Sciences Chevella, Telangana-501503.

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