

## Original Research Article

# Thyroidectomy: post-operative complications and management

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### ABSTRACT

**Background:** Thyroidectomy is a surgical procedure indicated as elective treatment for symptomatic thyroid swellings or neoplasms. Today most of the complications of thyroid surgery are related to either metabolic derangements or injury to the recurrent laryngeal nerve injury. Other complications include superior laryngeal nerve injury, infection, airway compromise, and bleeding. Hence, before any thyroid surgery patient must be precisely informed the possible complications and their remedies. The present study aims to evaluate post-operative complications after thyroid surgery.

**Methods:** In a tertiary care hospital based longitudinal study patients presenting with clinically and sonographically diagnosed thyroid swelling who underwent surgical intervention were enrolled in the study. These patients were evaluated for thyroid profile test, fine needle aspiration cytology (FNAC), pre-operative and post-operative indirect laryngoscopy, serum calcium level and histopathology. Intra operative and post-operative assessment was done for bleeding, hematoma, and surgical site infection.

**Results:** A total of 53 patients were enrolled. Thyroid swelling was more common in females (F: M =5.6:1) mostly presenting in 3<sup>rd</sup> and 4<sup>th</sup> decades with mean age of 38.1 years. Hemithyroidectomy was the most common procedure performed (63.6%) followed by total (27.3%) and near total thyroidectomies (5.5%). On histopathological examination most common finding was nodular goiter (49.1%) followed by multinodular goiter (28.3%), follicular adenoma (16.9%) and malignancies (5.7%). The post-operative complications after thyroidectomies were hypocalcemia (16.9%), recurrent laryngeal nerve (RLN) injury (5.7%), and surgical site infection (1.9%).

**Conclusions:** Careful evaluation of post thyroidectomy complications will help in reducing these complications and patient's safety.

**Keywords:** Thyroid swellings, Thyroidectomy, Post-operative complications, Hypocalcemia, RLN palsy

### INTRODUCTION

Diseases of thyroid are amongst the commonest endocrine disorders worldwide. Thyroid surgery is one of the most commonly performed surgery for benign and malignant conditions of the thyroid gland worldwide.<sup>1</sup> Despite being performed frequently, thyroidectomy remains a technically demanding procedure.<sup>2,3</sup> There are many vital and delicate anatomical structures in close vicinity to thyroid gland with high vascularity in neck

region which make surgery prone for complications. Specific complications after thyroid surgery such as paresis of the recurrent laryngeal nerve or hypoparathyroidism are feared since they sometimes give rise to a lifelong handicap for the patient.<sup>3,4</sup> As opposed to hemithyroidectomy, total thyroidectomy carries potential risk to all four parathyroid glands and both recurrent laryngeal nerves.<sup>2</sup> Other complications like post-operative hemorrhage, respiratory obstruction, thyroid storm could be life threatening. One of the main

challenges of thyroid surgery is therefore to cure the disease while keeping the operative complication to an absolute minimum.<sup>4</sup>

The present study aimed to assess the occurrence of various postoperative complications and their management following the different thyroidectomy procedures. Early recognition of postoperative complications with the prompt institution of treatment in reducing morbidity and providing the patient with the better chance of a satisfactory outcome.

## METHODS

This observational study was conducted in the Department of Surgery at a tertiary care hospital in central India over a period of 24 months from October 2016 to September 2018. Patients who presented with thyroid swelling and who underwent thyroidectomy were included in this study, while patients not willing for surgery were excluded. In all patients, thyroid profile (T3, T4 and TSH) was done pre-operatively and serum calcium was done pre-operatively and post-operatively after 24 and 72 hours, along with the routine haematological investigations. Indirect laryngoscopy was performed to determine the status of vocal cords and to rule out any cord palsy pre-operatively and post-operatively. Ultrasonography of neck, chest and neck X-rays, and FNAC was performed in all patients.

The patients enrolled in the study were subjected to different surgical procedures viz hemithyroidectomy, near total thyroidectomy or total thyroidectomy and type of surgical procedure to be performed was decided based on the clinical, radiological and cytological diagnosis of the goiter. In patients with nodal metastases (diagnosed on imaging and cytology), modified radical neck dissection was done. All thyroid specimens after thyroidectomy were sent for histopathological analysis. Completion thyroidectomy was performed after hemithyroidectomy when histopathology was suggestive of malignancy.

Hypoparathyroidism was considered when the calcium readings were less than 8.5 mg/dl. Recurrent laryngeal nerve (RLN) injury was termed when vocal cord palsy was seen on indirect laryngoscopy. Discharge from surgical site, raised local temperature or tenderness at surgical site was considered as surgical site infection.

## RESULTS

In this study, 53 patients of thyroid disease who underwent thyroidectomy were enrolled, out of which 45 patients were females (84.9%) and 8 were males (15.1%) with a male:female ratio of 5.6:1. Most of the patients belonged to third and fourth decade of life. The mean age was 38.1 years with a standard deviation of 10.4. The youngest patient was of 21 years and oldest being 65 years.

All patients presented with complaint of swelling in anterior aspect on neck, while 49 patients (92.5%) had no pain, 4 patients (7.5%) presented with pain along with swelling. None of these patients had any symptom suggestive of hypothyroidism or hyperthyroidism on presentation. All the patients were euthyroid at the time of surgery. Out of 53 patients, 6 patients (11.3%) were known case of thyrotoxicosis with goiter and were continuously on regular antithyroid treatment. On clinical examination, 39 patients (73.6%) were diagnosed as solitary nodule of thyroid, while 13 (24.5%) patients were diagnosed as multinodular goiter and 1 patient (1.9%) was suspected for malignancy pre-operatively.

To obtain the tissue diagnosis, FNAC was performed in all 53 patients, out of which 41 (77.4%) were suggestive of colloid nodule/nodular goiter, 8 (15.1%) were suggestive of follicular neoplasm, one (1.9%) was suggestive of medullary carcinoma, and in 3 patients repeated FNACs were inconclusive (5.6%). On comparing FNAC with histopathology of specimens, the sensitivity of FNAC was 33.3%, specificity was 100%, and the diagnostic accuracy was 96%. In this study, positive predictive value (PPV) was 100% and negative predictive value (NPV) was 95.9%.

In this study, 35 hemithyroidectomies (66%), 3 near total thyroidectomies (5.7%), 15 total thyroidectomies (28.3%) were performed. Central neck dissection was performed in one patient who was diagnosed as medullary thyroid carcinoma. Completion thyroidectomy was performed in two patients where FNAC report was follicular neoplasm in one patient and colloid goiter in one, but histopathology confirmed malignancy.

**Table 1: Distribution of the patients underwent thyroidectomy according to histopathology report.**

Histopathology diagnosis	No. of cases	Percentage (%)
<b>Nodular goiter/colloid goiter</b>	26	49.1
<b>Multinodular goiter</b>	14	26.4
<b>Follicular adenoma</b>	9	16.9
<b>Hashimoto thyroiditis with multinodular goiter</b>	1	1.9
<b>Follicular variant of papillary carcinoma</b>	1	1.9
<b>Papillary carcinoma</b>	1	1.9
<b>Medullary carcinoma</b>	1	1.9
<b>Total</b>	<b>53</b>	<b>100</b>

On histopathological analysis, benign pathology was reported in 50 patients (94.3%), out of which colloid goiter or nodular goiter was found in 26 patients (49.1%), multinodular goiter in 14 patients (26.4%), one patient (1.9%) had multinodular goiter with changes of Hashimoto thyroiditis, and follicular adenoma was observed in 9 patients (16.9%). Malignancy was detected

in 3 patients (5.7%). Follicular variant of papillary carcinoma, papillary carcinoma, and medullary carcinoma were the histopathological diagnoses in these patients (Table 1).

The post-operative complications observed were hypocalcemia, RLN injury and surgical site infection. Temporary hypocalcemia was present in 8 patients (15%), while permanent hypocalcemia was present in 1 patient (1.9%). Temporary RLN injury was seen in 3 patients (5.7%), out of which 2 patients (3.8%) had unilateral RLN injury while one patient (1.9%) had

bilateral RLN injury. Bilateral RLN injury was identified by doing vocal cord examination during extubation and tracheostomy was done. All three patients recovered post-operatively with conservative management. One patient (1.9%) who was a known case of diabetes mellitus had surgical site infection in post-operative period which was managed conservatively. Complications like thyroid storm, hematoma formation, permanent RLN injury, seroma formation, hypothyroidism, hypertrophic scar or keloid formation, or stich granuloma were not seen in any of these patients.

**Table 2: Complications seen in different type of thyroid surgeries.**

Complications	Type of thyroidectomy		
	Hemithyroidectomy (n=35)	Total thyroidectomy (n=17)	Near total thyroidectomy (n=3)
	N (%)	N (%)	N (%)
<b>Hypocalcemia</b>	0	8 (47.1)	1 (33.33)
Temporary	0	7 (41.2)	1 (33.33)
Permanent	0	1 (5.9)	0
<b>RLN Injury</b>	2 (5.7)	1 (5.9)	0
Temporary	2 (5.7)	1 (5.9)	0
Permanent	0	0	0
<b>Wound Infection</b>	1 (2.9)	0	0
<b>Total</b>	3 (8.6)	10 (58.9)	1 (33.33)

**Table 3: Incidence of hypocalcemia after different type of surgeries in literature.**

Study	Year	N	Total thyroidectomy		Near total thyroidectomy	
			Temporary (%)	Permanent (%)	Temporary (%)	Permanent (%)
Filho et al <sup>9</sup>	2005	1020	38	6.8	3.5	0
Karamanakos et al <sup>10</sup>	2010	2043	34.1	6.3	21.5	3.2
Dinc et al <sup>11</sup>	2017	408	17.9	2.4	13.7	7.5
<b>Present</b>	2018	83	41.2	5.9	33.3	0

**Table 4: Incidence of RLN injury after different type of surgeries in literature.**

Study	Year	N	Hemithyroidectomy		Near total thyroidectomy		Total thyroidectomy	
			Temporary (%)	Permanent (%)	Temporary (%)	Permanent (%)	Temporary (%)	Permanent (%)
Erbil et al <sup>13</sup>	2007	3380	-	-	1.5	0	2.3	0
Karamanakos et al <sup>10</sup>	2010	2043	-	-	1.3	0.7	1.9	1.1
Pandey et al <sup>14</sup>	2015	80	2.8	2.8	10	0	10	5
Joliat et al <sup>15</sup>	2017	451	11.4	1.3	-	-	13.4	1.3
<b>present study</b>	2018	53	5.7	0	0	0	5.9	0

Out of 35 hemithyroidectomies performed, temporary unilateral RLN palsy was observed in 2 patients (5.7%). Wound (surgical site) infection was seen in 1 patient (2.9%). Out of 17 total thyroidectomies, 7 patients (41.2%) had temporary hypocalcemia and 1 patient (5.9%) had permanent hypocalcemia. Temporary bilateral RLN was seen in 1 patient (5.9%). Out of 3 near total thyroidectomies, temporary hypocalcemia was seen in 1 patient (33.3%) (Table 2).

## DISCUSSION

Total thyroidectomy is regarded as a logical surgical process for the treatment of multinodular goiter affecting the thyroid gland and in malignancy disorder.<sup>2,5</sup> Solitary thyroid nodule of non-malignant etiology usually requires hemithyroidectomy. Complications of thyroid surgery are not uncommon and is known to occur in both specialised and non-specialised centres. Hence identifying various

post-operative complications in patient undergoing thyroidectomy at a non-specialised centre was carried out in this study.

A total of 53 patients underwent thyroidectomies in this study. There was female predominance with mean age of 38.1 years. A majority of 73% patients were clinically diagnosed as solitary thyroid nodule. The overall complication rate in this study was 26.5%. Life-threatening hemorrhage occurs in 0.3%-1% of thyroid surgeries intra-operatively. Troublesome bleeding during thyroid surgery can result from inadequate ligation of anterior jugular veins, the middle thyroid veins, the superior thyroid vessels, multiple small tributaries supplying the lower pole and isthmus, and the venous plexus that accompany the inferior thyroid artery.<sup>6</sup>

Post-operative hypocalcaemia is one of the most common complications of thyroid surgery. The incidence of post-operative hypoparathyroidism has been reported to vary from 1.6-50%.<sup>7</sup> Hypocalcemia is defined as a total serum calcium below 8.5 mg/dl (when corrected for serum albumin). It is termed symptomatic if it is accompanied with tetany, circumoral paresthesia and /or muscle spasm. Hypocalcemia can be diagnosed early by serum calcium level estimation post-operatively after 24 hours.<sup>7</sup> Temporary hypoparathyroidism has been defined as low calcium levels occurring during hospital stay and recovering within 6 months. Permanent hypoparathyroidism is one which persists for more than 6 months.<sup>8</sup>

The incidence of hypoparathyroidism depends on the type of surgery. It increases with the magnitude of operation. It is not seen after hemithyroidectomy and subtotal thyroidectomy. The incidence is far greater after near-total and total thyroidectomy. The best way to prevent hypocalcemia is by preserving the parathyroid glands maintain their blood supply. Hypocalcemia can be treated with oral or intravenous calcium supplementation with or without vitamin D.<sup>7</sup>

In the present study, hypocalcemia was seen in 47.1% patients who underwent total thyroidectomy, out of which 41.2% patients had temporary and 5.9% patients had permanent hypocalcemia. Also, temporary hypocalcemia was seen in 33.3% patients who underwent near total thyroidectomy. None of the patients who underwent hemithyroidectomy developed post-operative hypocalcemia. This is in concordance with studies done by Filho et al, Karamanakos et al, and Dinc et al (Table 3).<sup>9-11</sup>

Damage to the recurrent laryngeal nerve can be unilateral or bilateral and temporary or permanent. Recurrent laryngeal nerve injury is characterised by laryngoscopic findings of a true vocal cord which has changed from normal mobility prior to thyroidectomy to a paramedian position with partial or complete immobility following thyroidectomy.<sup>12</sup>

The permanent lesion of damaged recurrent laryngeal nerve (RLN) often manifests as an irreversible dysfunction of phonation. The frequency of this complication ranges from 0.5 to 5% in different thyroid surgery centres and increases in case of both recurrent goiter and complete thyroidectomy due to thyroid cancer. This can be prevented by deliberate identification of RLN and meticulous dissection during surgery.<sup>12</sup>

In the present study RLN injury was seen in 5.7% patients who underwent hemithyroidectomy, and all cases were temporary and unilateral. Also, in total thyroidectomy, RLN injury was seen in one patient (5.9%), which was temporary and bilateral. RLN injury was not seen in any of the patient underwent near total thyroidectomy or completion thyroidectomy. These findings are constant with different studies done by Erbil et al, Karamanakos et al, Pandey et al, and Joliat et al (Table 4).<sup>10,13-15</sup>

Surgical site infection after thyroid surgery is uncommon, the reported incidence being 0.1–2%. Post-operative infections and subsequent medications increase the length of the hospital stay and the cost compared with uncomplicated thyroid procedures.<sup>16</sup> Wound infection was seen in one patient (1.9%), who was a known case of diabetes mellitus. In a study done by Dionigi et al, wound infection was observed in 1.5% patients who underwent hemithyroidectomy and in 2.9% patients who underwent total thyroidectomy.<sup>16</sup> In a study done by Anbalagan et al, wound infection was observed in 2.9% patients who underwent hemithyroidectomy and in 4.8% patients who underwent subtotal thyroidectomy.<sup>17</sup>

## CONCLUSION

The commonest complication observed in this present study was temporary hypocalcemia and temporary recurrent laryngeal nerve injury. Total thyroidectomy was the commonest procedure where these complications were observed. However, excepting one case of permanent hypocalcemia in total thyroidectomy, there were no major complications. Hence, it can be concluded that thyroidectomies done for any thyroid pathology in non-specialized centre are also safe provided the surgeon doing it are adequately experienced..

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