

# A Prospective Study of Incidence of Hypothyroidism after Hemithyroidectomy in a Tertiary Care Hospital in North Odisha

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## ABSTRACT

**Background:** The risk of hypothyroidism after hemithyroidectomy is variable and not well studied. Our aim was to evaluate the incidence of post-hemithyroidectomy hypothyroidism and identify possible risk factors which indicate whether patients require thyroid function monitoring after surgery. **Methods:** This study was conducted amongst 60 patients who had undergone hemithyroidectomy in the Department of Surgery, F. M Medical College, Odisha from Jan 2018 to April 2019. Thyroid hormone test were done to determine the incidence of hypothyroidism. The incidence of hypothyroidism was analyzed. **Results:** We observed that 15% of cases developed overt and 5% developed sub-clinical hypothyroidism following hemi-thyroidectomy. Maximum number of cases was diagnosed within 18 weeks of surgery. **Conclusion:** Incidence of hypothyroidism following hemithyroidectomy in our study is high amounting to 20% which includes both sub-clinical as well as overt cases. Overt cases being treated with Levothyroxine and subclinical cases had been followed up carefully.

**Keywords:** Hemi-thyroidectomy, Hypothyroidism, Thyroid Stimulating Hormone, F T3(Free tri-iodothyronine), FT4 (Free Thyroxine)

## INTRODUCTION

The development of hypothyroidism following hemithyroidectomy is a known complication of thyroid surgery. It reportedly develops in 5.6–48.9% of patients who undergo hemithyroidectomy, and this value varies according to the follow-up period and follow-up strategy.<sup>[1]</sup> Given that the incidences of well-known complications of hemithyroidectomy, including laryngeal nerve injury, postoperative bleeding, and wound infection, are approximately 1%, it seems that postoperative hypothyroidism may represent the most common complication of hemithyroidectomy.<sup>[2]</sup> However, its clinical significance has been underestimated as it is not an acute complication. Thyroid hormone replacement therapy, used for the management of hypothyroidism has definite long-term adverse cardiovascular and skeletal side effects like increased heart rate, atrial fibrillation, and osteoporosis.<sup>[3]</sup> Most studies have primarily focused on the incidence of risk factors for hypothyroidism

development, and used a relatively short follow-up period. However, the measurement of thyroid function at a relatively early stage after hemithyroidectomy, without any further follow up, may increase the likelihood of detecting only a transient compensating TSH elevation.<sup>[4]</sup> Thyroid hormones are very much essential for survival.<sup>[5]</sup> Their deficiency produces slowing of general metabolic processes of body resulting in serious systemic diseases and complications. There are so many causes of hypothyroidism like congenital enzyme deficiency for synthesis of thyroid hormones, auto-immune disorders, hypothalamic/pituitary disorders, metabolic diseases (amyloidosis, haemo-chromatosis) head and neck irradiation, radio-iodine ablation, surgical operations on thyroid, drugs (such as tyrosine kinase inhibitors, iodides, sulfonamides, anti-thyroid drugs, lithium, amiodarone, cytokines & goitrogenes etc).<sup>[6]</sup> But, diagnosis of hypothyroidism is mostly made by TFT (Thyroid function test) which includes estimation of free thyroxine (FT4), free tri-iodothyronine (FT3) and Thyroid stimulating hormones(TSH) in the serum although there are certain clinical features like growth retardation, weight gain, muscle cramps, fatigue, hoarseness of voice, menstrual disorders in females, enlargement of thyroid, puffiness of face, carpal tunnel syndrome, loss of hairs, delayed tendon

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jerks which create high degree of suspicion in the mind of clinicians.<sup>[7]</sup> An elevated level of TSH in presence of low FT4 establishes the diagnosis of hypothyroidism. But in sub-clinical hypothyroidism, a normal FT4 level is usually found in addition to elevated TSH.<sup>[8]</sup> Hypothyroidism developing after hemi-thyroidectomy (ie excision of affected thyroid lobe, isthmus and pyramidal lobe) is an under-appreciated entity.<sup>[9]</sup> This condition can very well be diagnosed by careful medical history, thorough clinical examination and routine TFT from a reliable laboratory. Early detection of potentially hazardous post-operative complications will prevent further progress of hypothyroidism as well as recurrent thyroid disease in the contra-lateral lobe.<sup>[10]</sup> Our aim was to establish an appropriate follow-up strategy in patients who underwent hemithyroidectomy, we consider it paramount to not only identify the actual incidence and predictors of hypothyroidism development following hemithyroidectomy, but to also understand its natural clinical course. Therefore, in the present study, we aimed to determine the incidence of hypothyroidism that developed after hemithyroidectomy.

### MATERIALS AND METHODS

This study was conducted in the Department of Surgery, F. M Medical College, Odisha from Jan 2018 to April 2019 in which total number of 60 patients above the age of 15years who had undergone hemi-thyroidectomy with pre-operatively normal thyroid function test (TFT) were included. Patients below 15 years and above 80 years of age, pre-op diagnosis of hypo/hyper thyroidism, thyroid malignancy and history of taking medicines known to alter thyroid hormones/TSH level were excluded from the study. TFT (FT3, FT4 & TSH) was routinely performed in all cases included in the study at 12 weeks, 18 weeks and 24 weeks following hemithyroidectomy. Patients with serum TSH value more than 6 micro IU/ml with clinical features were diagnosed as hypothyroid. Those having normal FT4 (Table No-1) with raised TSH level (more than the higher limit of reference range) were termed as sub-clinical hypothyroidism and were carefully followed up for developing overt hypothyroidism.<sup>[3]</sup>

**Table 1: Reference range of thyroid function test**

Test	Reference values
FT3	3.10-6.80 pmol/l
FT4	12.0-22.0 pmol/l
TSH	0.27-4.20 micro IU/ml

### RESULTS

Out of 60 numbers of patients undergoing hemithyroidectomy, 9(15%) patients developed overt hypothyroidism and 6 (10%) patients developed sub-clinical hypothyroidism. [Table 2]

Thus total number of patients who developed hypothyroidism (over and sub-clinical) were 15 (25%). In our study, females predominated (75%) over males and patients in the age group of 15 years to 40 years were more prone to develop hypothyroidism. [Table 3 & 4]

**Table 2: No & Percentage of cases of hypothyroidism after hemi-thyroidectomy**

Diagnosis	No. of cases & percentage			Total
	12 weeks post-op	18 weeks post-op	24 weeks post-op	
Subclinical Hypothyroidism	1	4	1	6 (10%)
Overt Hypothyroidism	2	5	2	9(15%)

**Table 3: Sex distribution among hypothyroid patients**

Sex	No. of patients	Percentage.
Male	15	25%
Female	45	75%

**Table 4: Age distribution among hypothyroid patients**

Age (yr)	No. of patients	Percentage
14-40	34	56.6%
41-80	26	43.4%

### DISCUSSION

The incidence of hypothyroidism after hemithyroidectomy in several studies ranges between 11 and 43 %.<sup>[11]</sup> In our study, we found 26.1% of the cases with subclinical hypothyroidism and 3% with clinical hypothyroidism. The only statistical trending feature we found, as a risk for hypothyroidism, was the volume of the preserved thyroid lobe.

Some studies found that preoperative TSH level as the most important predictor for the development of post-hemithyroidectomy hypothyroidism.<sup>[12]</sup> In a Brazilian series of 85 patient who underwent hemithyroidectomy, 27 showed hypothyroidism (31%), being the presence of the antithyroperoxidase antibody (50% vs. 20%, p< 0,05) and a preoperative TSH level above 2.5 mIU /mL (65% vs. 23.5%, p< 0,05) the main risk factors . In another series of 71 patients who underwent lobectomy with hormonal dosage after five weeks, subclinical hypothyroidism was present in 35% of the patients and clinical hypothyroidism in 12%.<sup>[13]</sup> In our study there was no statistical significance between genders, as other articles reported,<sup>[14]</sup> nonetheless, we must consider that male patients are in a smaller number. There is a association between the presence of thyroiditis, as evidenced by lymphocytic infiltration of the gland on histopathology and postoperative hypothyroidism. Autoimmune thyroiditis compromising the remnant lobe is a frequent cause of functional thyroid failure, mainly in elders, who underwent a lobectomy.<sup>[15]</sup> We

did not perform a systematical dosage of the anti thyroid antibodies, however, the histopathological finding of thyroiditis in our series did not show statistical significance of hypothyroidism. Although it is still a major controversial issue,<sup>[16]</sup> some authors understand that hormonal changes may occur later, which would suggest a larger follow up period.<sup>[17]</sup> In fact, being thyroiditis a progressive pathology, it is possible that a later hormonal dosage may show statistical significance. On the other hand, we found a tendency for hypothyroidism in patients with smaller remnant lobe mass, which shows conformity with other articles.<sup>[18-21]</sup> Lang et al.” considered that there is a significant inverse association between the preoperative contralateral lobe’s volume and hypothyroidism risk after hemithyroidectomy. In their study, together with a higher preoperative TSH level and fewer ipsilateral nodules, a smaller body surface area measured by preoperative ultrasonography independently predicted hypothyroidism.<sup>[22]</sup>

## CONCLUSION

In our study, total incidence of hypothyroidism following hemithyroidectomy is 25% which includes overt (15%) and sub-clinical (10%) hypothyroidism. Hormone replacement therapy by Levo-thyroxine in appropriate dosage is recommended in all cases of overt hypothyroidism to prevent further complications. However, sub-clinical hypothyroid cases require prolonged follow-up.

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