



## INCIDENTAL THYROID CARCINOMA - A SURGICAL DILEMMA

## General Surgery

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## ABSTRACT

The incidence of Incidental Thyroid Carcinoma (ITC) ranges from 3 to 16% in different series. Detection of thyroid carcinomas in post-operative biopsy specimens operated for benign thyroid disorders required second surgery, increasing the risk of complications. A retrospective review of 159 patients operated for benign thyroid diseases was done, after excluding the patients with pre-operative diagnosis of malignancy or suspicion of malignancy. Out of 159 patients, ITC was detected in 14 specimens (8.8%) of which 10 were papillary, 2 follicular, 1 medullary and 1 non-Hodgkin's lymphoma. No correlation of incidence ITC in relation to age, sex, pre-operative diagnosis and thyroid function was observed. Half of these patients required re-surgery. Re-do surgeries have been associated with high complication rate compared to total thyroidectomy as an initial procedure of choice. This suggests total thyroidectomy would be a valuable choice for patients operated for nodular thyroid diseases, though controversy exists.

## KEYWORDS

Incidental thyroid carcinoma, total thyroidectomy, papillary carcinoma.

## INTRODUCTION:

The diseases of thyroid are very common and present with various clinical entities, from mere biochemical derangements to nodular thyroid diseases. The treatment of thyroid diseases also varies based on clinical presentation. It includes -

- medical treatment for patients with hypo or hyperthyroidism to achieve euthyroid state
- regular follow up with clinical examination and assessment of thyroid function
- radioiodine ablation for hyperthyroidism; and
- surgical management for nodular thyroid diseases.

Thyroid carcinoma accounts for 1 to 5% of all cancers in females and less than 2% in males<sup>[1]</sup>. Although the incidence is relatively rare, it is the most common endocrine malignancy worldwide with a female to male ratio of 3:1<sup>[1]</sup>.

Incidental Thyroid Carcinoma denotes the malignant tumors of thyroid gland detected post-operatively from the biopsy specimens operated for benign thyroid diseases. The incidence of incidental thyroid carcinoma ranges from 3 to 16% in various series<sup>[2,3,4]</sup> and are mostly microcarcinomas, which refer to a malignant lesion, predominantly papillary, smaller or equal to 1cm in diameter<sup>[5]</sup>. In literature, an increase in the incidence of Incidental Thyroid Carcinoma, particularly papillary microcarcinoma, has been described<sup>[6,7]</sup>.

Ultrasound scan of neck and Fine Needle Aspiration Cytology (FNAC) of thyroid swelling are the most frequently used investigations for the diagnosis of various thyroid disorders. A meta-analysis evaluating the accuracy of ultrasound to predict malignancy in thyroid nodules found sensitivity ranging from 26% to 87%, and specificity from 40% to 93%<sup>[8]</sup>. FNAC has a mean sensitivity of 83%, a specificity of 92%, and a positive predictive value of 75%<sup>[9]</sup>. The main limitations of FNAC are the inability to distinguish Follicular and Hurthle cell carcinomas from the respective benign adenomas, the requirement of an experienced cytologist to avoid nondiagnostic punctures, and the presence of multiple nodules in a goiter<sup>[10,11]</sup>. These limitations have led to detection of carcinomas in the biopsy specimens operated for a probably benign disease which required re-surgery.

## MATERIALS AND METHODS

This study was conducted during the period between January 2014 and July 2018. All patients undergoing surgery for thyroid disorders were retrospectively analyzed and those patients operated for benign thyroid disorders after preoperative evaluation by ultrasound scan and FNAC were included in the study.

Those patients in whom preoperative FNAC was suggestive of

malignancy, follicular neoplasm and indeterminate lesions were excluded from the study.

A total of 208 patients underwent thyroid surgery during the study period, of which 159 patients were included in the study, after excluding the patients with preoperative diagnosis of malignancy or suspicion of malignancy.

The various types of surgeries performed in these patients were hemithyroidectomy, subtotal thyroidectomy and total thyroidectomy. Euthyroid status was attained in all patients before taking up for surgery. Patients in whom incidental thyroid carcinoma was detected and underwent other than total thyroidectomy, a completion thyroidectomy was done later.

The significance of incidence of Incidental thyroid carcinoma in relation to age, gender, preoperative diagnosis and thyroid functional status were evaluated by using chi-square test.

## RESULTS

Out of 159 patients who were included in the study 11 were male and 148 were female with age ranging from 16 to 70 years (mean 38.5 years). The various types of surgeries done in these patients include hemithyroidectomy in 108 (67.93%), subtotal thyroidectomy in 17 (10.69%) and total thyroidectomy in 34 (21.38%). (Table 1)

**Table 1: Pre-operative diagnosis and Surgical management.**

Pre-operative Diagnosis	Hemi Thyroidectomy No (%)	Subtotal Thyroidectomy No (%)	Total Thyroidectomy No (%)	Total No (%)
MNG	39 (24.53%)	9 (5.66%)	28 (17.61%)	76 (47.80%)
Solitary Thyroid Nodule	69 (43.40%)	6 (3.77%)	0	75 (47.17%)
Diffuse Goiter	0	2 (1.26%)	6 (3.77%)	8 (5.03%)
Total	108 (67.93%)	17 (10.69%)	34 (21.38%)	159 (100%)

Incidental Thyroid Carcinoma was detected in 14 specimens out of 159 specimens, sent for biopsy of which 12 were female and 2 were male, with age ranging from 19 to 68 years and mean age of 39.5 years. Histopathology of these specimens showed papillary carcinoma in 8 cases (57.14%), follicular variant of papillary carcinoma in 2 cases (14.28%), follicular carcinoma in 2 cases (14.28%), medullary

carcinoma in 1 case and Non-Hodgkin's lymphoma in 1 case (7.14%). Out of 14 ITC detected, 6 cases (42.85%) were microcarcinomas (tumor size  $\leq$  1cm).

The distribution of incidental thyroid carcinoma in relation to preoperative diagnosis is depicted in Table 2 and its correlation with thyroid function is depicted in Table 3

**Table 2: Incidence of incidental thyroid carcinoma in relation to preoperative diagnosis.**

Pre-operative Diagnosis	Number of cases (%)	Benign No (%)	ITC No (%)	Percentage of ITC in whole series
MNG	76 (47.80%)	69 (47.58%)	7 (50%)	(4.40%)
Solitary Thyroid Nodule	75 (47.17%)	69 (47.58%)	6 (42.85%)	(3.77%)
Diffuse Goiter	8(5.03%)	7 (4.82%)	1 (7.14%)	(0.63%)
Total	159 (100%)	145 (100%)	14 (100%)	(8.80%)
p value – 0.8994 Not significant				

**Table 3: Correlation of thyroid function with Incidental Thyroid Carcinoma (ITC)**

Thyroid Status	Benign (%)	ITC (%)	Total (%)
Euthyroid	120 (82.75%)	11(78.57%)	131 (82.39%)
Hypothyroid	23 (15.87%)	3 (21.43%)	26 (16.35%)
Hyperthyroid	2 (1.38%)	0	2 (1.26%)
Total	145 (100%)	14 (100%)	159 (100%)
p value – 0.7937 Not significant			

The distribution of incidental thyroid carcinoma in relation to age is depicted in Table 4 and its correlation with gender is depicted in Table 5.

**Table 4: Incidental Thyroid Carcinoma in relation with age group**

Age Group	Benign (%)	ITC (%)	Total (%)
< 20 Years	3 (2.06%)	2 (14.29%)	5 (3.14%)
21-40 Years	90 (62.07%)	6 (42.86%)	96 (60.38%)
41-60 Years	43 (29.66%)	5 (35.71%)	48 (30.19%)
> 60 Years	9 (6.21%)	1 (7.14%)	10 (6.29%)
Total	145 (100%)	14 (100%)	159 (100%)
p value – 0.0715 Not significant			

**Table 5: Incidental Thyroid Carcinoma in relation with gender**

Gender	Benign	ITC	Total
Male	9 (6.20%)	2 (14.29%)	11 (6.92%)
Female	136 (93.80%)	12 (85.71%)	148 (93.08%)
Total	145 (100%)	14 (100%)	159 (100%)
p value – 0.2553 Not significant			

## DISCUSSION:

Carcinomas of thyroid present frequently as nodular thyroid diseases. Thyroid nodules are very common in general population and great majority of them are benign<sup>[12]</sup>. It is estimated that 3 to 7% of world's population have palpable nodule and prevalence may increase up to 70% if patient is screened by ultrasound<sup>[13]</sup> and approximately 5% of detected nodules are malignant<sup>[14,15]</sup>.

In spite of detailed preoperative evaluation, carcinomas of thyroid are detected incidentally in postoperative biopsy specimens of some patients operated for benign thyroid diseases which has oncological significance.

The incidence of incidental thyroid carcinoma ranges from 3-16% in different series<sup>[3,4]</sup>. The incidence of incidental thyroid carcinoma in studies done by Miccoli, et.al<sup>[6]</sup>, Smith, et.al<sup>[16]</sup>, Bradley, et.al<sup>[17]</sup>, Gelmini, et.al<sup>[3]</sup> were 10.4%; 15.6%; 12%; 10.8% respectively. In an autopsy study by Harrach, et.al, the incidence of incidental thyroid carcinoma was 3 to 36%<sup>[18]</sup>. In the present study, the incidence is 8.8% which is consistent with other studies.

In this study, no significant difference ( $p > 0.05$ ) in the incidence of incidental thyroid carcinoma in patients with multinodular goiter and solitary thyroid nodule was noted. Some studies<sup>[3,18]</sup> have shown a greater incidence of incidental thyroid carcinoma in patients with multinodular goiter when compared to solitary thyroid nodule. So, multinodular goiter cannot be considered as a certain indicator of benign thyroid disease<sup>[19]</sup>.

According to this study, the correlation of age and sex in relation to incidence of Incidental Thyroid Carcinoma was not found to be statistically significant ( $p > 0.05$ ). The mean age in benign group is 38.7 years and incidental thyroid carcinoma group is 39.5 years. Similar observations were noted in other studies<sup>[3,4,16,17]</sup>.

In this study the incidence of incidental thyroid carcinoma is more in euthyroid patients compared to hypothyroid patients, but this difference is not statistically significant. No carcinoma was detected in patients operated for toxic goiter, probably because of small sample size. There is conflicting data in literature with few studies<sup>[4]</sup> having higher incidence of thyroid carcinoma in patients with toxic goiter. However, in large published series<sup>[20,21,22]</sup>, the incidence of incidental thyroid carcinoma in toxic goiter is not significantly different from nontoxic goiter, contradicting the opinion that hyperthyroidism is protective against differentiated thyroid carcinoma, as it suppresses TSH.

In this study, out of 14 patients of incidental thyroid carcinoma 10 patients were found to have papillary carcinoma. This suggests that papillary carcinoma is the commonest histological type detected as incidental thyroid carcinoma which is consistent with other studies<sup>[3,4,17]</sup>. Six (42.86%) patients had microcarcinoma (tumor size  $\leq$  1cm) and rest (57.14%) had tumor size greater than 1 cm. In this study FNAC was not done under ultrasound guidance, and only dominant nodule was aspirated, which might be the reason for higher incidence, as nondominant nodule can also harbor malignancy. Medullary carcinoma thyroid was detected in one patient and a routine preoperative measurement of calcitonin would have eliminated this possibility<sup>[23]</sup> which was not done in this study.

Subtotal thyroidectomy is preferred over total thyroidectomy in patients with benign thyroid diseases as it reduces the risk of injury to recurrent laryngeal nerve and hypoparathyroidism as suggested by some studies<sup>[24,25]</sup> and also to avoid long term replacement therapy. However, several other studies<sup>[3,26,27]</sup> have shown no significant difference in risk of nerve injury or hypoparathyroidism in patients undergoing total thyroidectomy. Also, hormonal replacement will be required in most (> 50%) patients, following limited thyroid resection<sup>[27]</sup>.

Limited thyroid resection has a chance of recurrence in the remaining thyroid tissue requiring re-surgery and it may also harbor malignancy. Redo-surgery in patients with thyroid disease have increased complication rate<sup>[27,28]</sup>, 20 times more compared to total thyroidectomy as initial procedure of choice<sup>[29]</sup>. In this study the incidence of incidental thyroid carcinoma was 8.8% and half of the patients underwent completion thyroidectomy.

These observations suggest that total thyroidectomy would be a better treatment of choice in patients with nodular thyroid disease as it will avoid complications related to re-surgery in case of recurrence or if an incidental carcinoma is reported, though controversy exists. Also, total thyroidectomy has advantage of monitoring the patients in the follow up period with regard to scintigraphy scan and thyroglobulin measurement, and also for post-operative radioactive iodine therapy if an incidental carcinoma is found, as suggested by Sakorafas et al<sup>[30]</sup>.

## CONCLUSION

Incidental thyroid carcinoma in patients operated for benign thyroid diseases is significant with its own surgical and oncological relevance. Total thyroidectomy without residual thyroid tissue would be a valuable option while treating nodular thyroid diseases as re-surgery could be avoided in many of these patients, in case of recurrence or in case of detection of malignancy, which has complication rate higher than total thyroidectomy as a primary procedure of choice.

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