Incidence of Thyroid Cancer in Thyroid Swelling, Study of 200 Cases

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Abstract:
Objective: The incidence of thyroid cancer has rapidly increased in the United States (US) and other developed countries over the past 30 years but there is no study to find out the true incidence of thyroid cancer in Bangladesh. The aim of this study is to compare FNAC with histopathology reports and to find out the true incidence of thyroid malignancy in thyroidectomy patients presenting with thyroid swelling.

Methods: This is a prospective study of 200 thyroid swelling patients underwent thyroid surgery done at Shaheed Suhrawardy Medical College Hospital, a tertiary Care Hospital in Dhaka from July 2017 to December 2020. FNAC and histopathology reports were studied to find out the incidence of benign and thyroid malignancy among the thyroid swelling.

Results: The age of the patients ranged from 8 to 75 years. The mean age was 37.2 years. There were 156 female and 44 male patients with female male ratio 3.54:1. Diagnostic categorization of 200 thyroid swelling underwent surgery, FNAC based on Bathesda classification showed that 163 (81.5%) cases were cytologically benign, 37 (18.5%) cases were malignant category. Out of 200 cases histopathology showed 134 cases(67.0%) are benign and 66(33.0%) are malignant thyroid swelling. Among the benign lesions 96.31% are colloid goiter and among the malignant lesions 93.4% are papillary thyroid carcinoma.

Conclusion: Although FNAC is an essential diagnostic test to rule out thyroid malignancy but histopathological examination is the only way to give true incidence of thyroid malignancy among the thyroid swelling and it is observed that there is high incidence of thyroid malignancy(33.0%) among the thyroid swelling patient underwent thyroid surgery.

Key words: FNAC, Histopathology, Thyroid cancer

Introduction:
The incidence of thyroid cancer has increased dramatically during the past three decades and it is now the fastest growing cancer in women¹. Bangladesh especially North Bengal area is an endemic zone for iodine deficiency goitre and one of the aetiology of thyroid cancer is iodine deficiency. They present as
visible neck swelling which moves on

deglutition. Any patient presented with thyroid
swelling are routinely investigated for
ultrasonogram of the thyroid gland, serum TSH
and FNAC. Final diagnosis requires
morphological examination for which
histopathological examination becomes
mandatory test\textsuperscript{2}. In 1870 Rugu and his
associate Joham Vent have first advocated
surgical biopsy as an essential tool\textsuperscript{3}. The
diagnostic method of FNAC was first
published in 1883 by Leyden.\textsuperscript{4} But the
diagnosis of thyroid swellings using aspiration
cytology was first reported by Martin and Ellis
in 1930\textsuperscript{5}. FNAC, however has limitation
related to specimen adequacy, sampling
techniques, skill of performing the procedure,
interpretation of the aspirate, overlapping
cytological features between benign and
malignant follicular neoplasm and also in the
detection of some papillary carcinoma
associated with other pathology like
multinodular goiter, cystic changes\textsuperscript{6}. Mundasad et al had done a comparative study
between FNAC and histopathology and
founded that FNAC had a sensitivity(52.6%),
specificity(86.6%) and accuracy(79.1%) for
thyroid malignancy\textsuperscript{7}.

**Aims and Objectives:** This study was carried
out to see the true incidence of benign and
malignant thyroid lesions among the thyroid
swellings after histopathological examinations
following thyroidectomy.

**Methods:**
This cross sectional study was done among
patients undergoing thyroidectomy between
July 2017 to December 2020 at Shaheed
Suhrawardy Medical College Hospital,
Bangladesh. The patients were selected
consequently as and when they presented
during the study period considering inclusion
and exclusion criterias. The selected patients
were examined clinically and routine
ultrasonography, TSH, FNAC, routine
haematological investigations, Chest X-ray
ECG,CT scan if indicated were done. All
patients FNACs were done by two senior
cytologists. All surgeries were done by the
senior surgical staffs and all thyroidectomies
specimens were examined by two senior
histopathologists.

**Statistical analysis**
The data collected was analysed using SPSS
version 20 and depicted using descriptive
statistics.

**Inclusion criteria**
Patients with thyroid swelling with normal
thyroid hormone profile undergoing
thyroidectomy.

**Exclusion criteria**
Patients of thyroid swelling with hyper or hypo
thyroid function, patients with co-morbidities,
unfit for surgery, patients who refused surgery
and inoperable thyroid malignancy were
excluded from the study.

**Results:**
The age of the patients ranged from 8 to 75
years with a mean age 37.2 years (Table I)
The thyroid lesions were more common in
females than male in a ratio of 3.54:1 (table
II) Table III shows FNAC findings of 200 cases
where 163 are benign and 37 cases are
malignant lesion with benign malignant ratio
is 4.4:1. Among the benign lesions the most
common lesion is multinodular or colloid
goiter (78.5%). Table IV shows out of 37
malignant cases of FNAC finding, 94.56% is
papillary carcinoma. Histopathological
examinations of all 200 thyroidectomy
specimens showed 124 cases (62%) are
colloid goiter and 59 cases(29.5%) are
papillary carcinoma(Table V). Table VI shows
incidence of benign and malignant lesions
among 200 specimens .There are 134(67%)
benign lesions and 66(33%) malignant lesions, so approximately benign and malignant ratio is about 2:1 which is very worrying. Finally among the thyroid cancer about 93.4% is papillary carcinoma (Table VII).

**Table I :**  
*Age distribution of thyroidectomy patients (n=200)*

| Age in yrs | No. of patients | Percentage (%) |
|------------|-----------------|----------------|
| 8-20       | 7               | 3.5            |
| 21-30      | 36              | 18             |
| 31-40      | 74              | 37             |
| > 40       | 83              | 41.5           |

Mean age 37.2

**Table II :**  
*Sex distribution (n=200)*

| Sex         | No. of patients | Percentage (%) |
|-------------|-----------------|----------------|
| Female:     | 156             | 78             |
| Male:       | 44              | 22             |

Female: Male = 3.54:1

**Table III :**  
*FNAC of thyroid swelling (n=200)*

| Diagnosis                          | No. of patients | Percentage (%) |
|------------------------------------|-----------------|----------------|
| Nodular or colloid goiter          | 157             | 78.5           |
| Papillary thyroid                   | 35              | 17.5           |
| Follicular lesion                   | 4               | 2.0            |
| Lymphocytic thyroiditis            | 2               | 1.0            |
| Non Hodhkin’s lymphoma             | 1               | 0.5            |
| Medullary carcinoma thyroid        | 1               | 0.5            |

**Table IV :**  
*FNAC diagnosis of thyroid malignancy (n=37)*

| Diagnosis                          | No. of patients | Percentage (%) |
|------------------------------------|-----------------|----------------|
| Papillary carcinoma                 | 35              | 94.56          |
| Follicular carcinoma                | 0               | 0              |
| Medullary carcinoma                 | 1               | 2.7            |
| Non Hodhkin’s lymphoma              | 1               | 2.7            |

**Table V :**  
*Histopathological diagnosis of thyroid swelling (n=200)*

| Diagnosis                          | No. of patients | Percentage (%) |
|------------------------------------|-----------------|----------------|
| Colloid/MNG                        | 124             | 62.0           |
| Lymphocytic thyroiditis            | 8               | 4.0            |
| Follicular adenoma                 | 2               | 1.0            |
| Papillary carcinoma                | 59              | 29.5           |
| Hurthle cell adenoma               | 3               | 1.5            |
| Follicular carcinoma               | 2               | 1.0            |
| Medullary carcinoma                | 1               | 0.5            |
| Non Hodhkin’s lymphoma             | 1               | 0.5            |

**Table VI :**  
*Incidence of benign and malignant lesions based on histopathology (n=200)*

| Diagnosis                          | No. of patients | Percentage (%) |
|------------------------------------|-----------------|----------------|
| Benign lesions                     | 134             | 67.0           |
| Malignant                          | 66              | 33.0           |

Benign: Malignant = 2:1 (approx)
**Table VII**: 

*Incidence of thyroid cancer based on histopathology (n-66)*

| Diagnosis                      | No. of patients | Percentage (%) |
|--------------------------------|-----------------|----------------|
| Papillary carcinoma            | 62              | 93.4           |
| (including Hurthle cell adenoma)|                 |                |
| Follicular carcinoma           | 2               | 3.03           |
| Medullary carcinoma            | 1               | 1.53           |
| Non Hodgkin’s lymphoma         | 1               | 1.53           |

**Discussion**: 

The incidence of thyroid cancer has rapidly increased in the United States (US) and other developed countries over the past 30 years. Although some researchers believe this is a true increase in thyroid cancer, but this increase is due to better diagnostic testing such as ultrasonography and fine-needle aspiration biopsy, resulting in the detection of disease that is unlikely to cause symptoms or death of the patient.

Other countries have seen similar increases in thyroid cancer. From 1993 to 2011, South Korea witnessed a 15-fold increase in thyroid cancer with nearly the entire increase attributed to papillary cancers. Davies and Welch also showed, using the SEER program and data, that the rates of follicular, medullary and anaplastic thyroid cancers show no significant change from 1973 to 2002. Our study also found similar result of increasing incidence of thyroid cancer and most of which are papillary carcinoma. The most important part of our study is limitation of FNAC which includes false negative result and false positive results. Sikder had done accuracy of fine needle aspiration cytology and had found that accuracy was 90% and sensitivity was 68.75%. Bloch had done a comparison study between FNAC and histopathology and had found accuracy of FNAC was 91.6%.

In our study false positive was 7 and false negative was 27 out of 200 thyroidectomy patients and overall sensitivity were 57.8%, specificity 95%, PPV 84% and NPV 83.22%.

**Conclusion**: 

As the incidence of thyroid cancer is increased over the last decade. It is also increased in Bangladesh. Our study observed 33% cases are thyroid cancer among the thyroid swelling underwent thyroid surgery. Ultrasonography and FNAC are both essential diagnostic tool for thyroid swelling but final diagnosis to rule out thyroid cancer is surgical excision and biopsy. In our study benign to malignant ratio is about 2:1 so FNAC proven benign lesions should not left untreated.

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