

# Study of Thyroid Lesions by Fine Needle Aspiration Cytology and its Correlation with Thyroid Function Test

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## ABSTRACT:

**Introduction:** Fine needle aspiration cytology (FNAC) of the thyroid gland has been widely and successfully utilized for diagnosis. Assessment of thyroid pathology is even more informative if correlated with thyroid function tests (TFT). This study aims to compare the efficacy of fine needle aspiration cytology with thyroid function tests in different thyroid lesions. **Methods:** A descriptive study was carried out among the patients who presented with thyroid swelling visiting Department of Ear Nose Throat (ENT) of Lumbini Medical College and Teaching Hospital (LMCTH) from June 2012 to February 2013. The study population were selected on random basis. A total of fifty patients involved in the study and were sent to Department of Pathology for FNAC and TFT. **Results:** Most of the cases (44%) of thyroid swelling were from 21 to 40 years of age. Among them, 86% were females. Out of total respondents, 48% were found to be colloid goiter. 70% findings of FNAC and TFT were in accordance. **Conclusions:** The findings of FNAC and TFT were found to be significantly associated (P value <0.05).

**Keywords:** fine needle aspiration • hyperthyroidism • hypothyroidism • thyroid function test

## INTRODUCTION:

FNAC of the thyroid gland is now well-established, first line diagnostic test for the evaluation of thyroid lesions with the main purpose of confirming the type of thyroid lesion and thereby, reducing unnecessary surgery.<sup>1</sup> Although there is a large body of world literature claiming the accuracy and usefulness of thyroid cytology, there is also evidence showing possible limitations and pitfalls of this procedure.<sup>2,3</sup> In view of this, we compared cytomorphological details with Thyroid Function Test (TFT). We scrutinized the cases showing any discrepancy in cytology findings with TFT with aim

of establishing possible causes of the errors.

## METHODS:

A descriptive study was conducted among 50 patients who presented with swelling in the thyroid region in the Department of ENT of Lumbini Medical College and Teaching Hospital (LMCTH) during June 2012 to Feb 2013. They were then sent to Pathology Department for TFT and FNAC. The procedure was explained to the patient and verbal consent was obtained prior to performing the procedure. These patients were subjected to FNAC using 23/24-gauge needle and 10 cc sterilized and disposable plastic syringes after taking all aseptic precautions.<sup>4</sup> All slides were stained by Wright method and thyroid function test was performed by clia.<sup>5</sup> Diagnosis of cytological smears were done according to standard criteria defined by Sidaway.<sup>6</sup> Cases with cytological and thyroid function tests disparity were selected and were re-evaluated for the detection of possible causes of failure. Necessary descriptive statistics (percentage, frequency) including inferential statistics (Pearson  $X^2$  test) to compare the association between categorical data

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were calculated using SPSS 16. P-value <0.05 was regarded as statistically significant.

**RESULTS:**

Among the total thyroid swelling cases, 86% were female and 14% were male (Table 1). 44% of thyroid swelling cases were from the age group of 21 to 40 years (Table 2). 58% and 42% patients had nodular and diffuse swelling respectively (Table 3). Among the FNAC results, 48% colloid goiters were found in study population (Table 4). 70% of thyroid function test results (T3, T4 and TSH) were in accordance to cytomorphological study (P value <0.05) and 30 % of results were not in accordance (Table 5).

**DISCUSSION:**

FNAC is an inexpensive, simple and rapid method of obtaining pathological diagnosis that is particularly suitable for use in the resource-poor setting.<sup>7</sup> The numerous diagnostic procedures currently available improve the anatomic, pathologic, radiologic and functional assessment of the thyroid swelling but may also lead to unjustified increase in cost with little practical gain, if not used rationally. As most of the hospitals lack some of these ancillary diagnostic investigations, FNAC is still regarded as the single most accurate and cost-effective procedure. It is well known that a thyroid function results varies according to the different thyroid lesions. It can

Table 1: cross tabulation of sex and TFT

|       |        | Function                   |                               |           |                 |                                |                   |                           | Total<br>N=50 ( %) |
|-------|--------|----------------------------|-------------------------------|-----------|-----------------|--------------------------------|-------------------|---------------------------|--------------------|
|       |        | Primary<br>Hyperthyroidism | Subclinical<br>Hypothyroidism | Euthyroid | T3<br>Toxicosis | Subclinical<br>Hyperthyroidism | Not<br>Conclusive | Primary<br>Hypothyroidism |                    |
| Sex   | Male   | 2                          | 1                             | 3         | 1               | 0                              | 0                 | 0                         | 7(14%)             |
|       | Female | 8                          | 3                             | 13        | 0               | 2                              | 15                | 2                         | 43(86%)            |
| Total |        | 10(20%)                    | 4(8%)                         | 16(32%)   | 1(2%)           | 2(4%)                          | 15(30%)           | 2(4%)                     | 50(100%)           |

Table 2: Age distribution of patients

| Age          | Number of patients<br>(N=50) | Percentage<br>(%) |
|--------------|------------------------------|-------------------|
| 10-20 years  | 3                            | 6%                |
| 21- 40 years | 22                           | 44%               |
| 41- 60 years | 21                           | 42%               |
| 61- 80 years | 4                            | 8%                |

range from hypo to hyperthyroidism, euthyroidism to subclinical hypo- and hyperthyroidism.

In the present study, out of 50 cases of thyroid lesions, the findings of FNAC and TFT were in correlation with each other in 35 (70%) cases. In 15 (30%) cases, the findings of FNAC were not in accordance with TFT. Out of 24 cases of colloid

Table 3: Cross tabulation between swelling and TFT

|          |         | Function                   |                               |           |              |                                |                   |                           | Total<br>n=50 |
|----------|---------|----------------------------|-------------------------------|-----------|--------------|--------------------------------|-------------------|---------------------------|---------------|
|          |         | primary<br>hyperthyroidism | subclinical<br>hypothyroidism | euthyroid | t3 toxicosis | subclinical<br>hyperthyroidism | not<br>conclusive | primary<br>hypothyroidism |               |
| Swelling | nodular | 6                          | 2                             | 12        | 0            | 1                              | 7                 | 1                         | 29(58%)       |
|          | diffuse | 4                          | 2                             | 4         | 1            | 1                              | 8                 | 1                         | 21(42%)       |
| Total    |         | 10(20%)                    | 4(8%)                         | 16(32%)   | 1(2%)        | 2(4%)                          | 15(30%)           | 2(4%)                     | 50(100%)      |

Table 4: cross tabulation between FNAC and TFT

|                       |  | Function                   |                               |           |                 |                                |                   |                           | Total<br>N=50(%) |
|-----------------------|--|----------------------------|-------------------------------|-----------|-----------------|--------------------------------|-------------------|---------------------------|------------------|
| FNAC results          |  | Primary<br>Hyperthyroidism | Subclinical<br>Hypothyroidism | Euthyroid | T3<br>Toxicosis | Subclinical<br>Hyperthyroidism | Not<br>Conclusive | Primary<br>Hypothyroidism |                  |
| Colloid goiter        |  | 3                          | 1                             | 9         | 0               | 1                              | 10                | 0                         | 24(48%)          |
| Thyroiditis           |  | 4                          | 1                             | 1         | 0               | 1                              | 4                 | 2                         | 13(26%)          |
| Graves disease        |  | 1                          | 0                             | 0         | 1               | 0                              | 0                 | 0                         | 2(4%)            |
| Papillary carcinoma   |  | 2                          | 0                             | 2         | 0               | 0                              | 0                 | 0                         | 4(8%)            |
| No opinion possible   |  | 0                          | 1                             | 1         | 0               | 0                              | 0                 | 0                         | 2(4%)            |
| Infected thyroid cyst |  | 0                          | 1                             | 0         | 0               | 0                              | 0                 | 0                         | 1(2%)            |
| Follicular neoplasm   |  | 0                          | 0                             | 2         | 0               | 0                              | 0                 | 0                         | 2(4%)            |
| Hurthle cell neoplasm |  | 0                          | 0                             | 1         | 0               | 0                              | 1                 | 0                         | 2(4%)            |
| Total                 |  | 10(20%)                    | 4(8%)                         | 16(32%)   | 1(2%)           | 2(4%)                          | 15(30%)           | 2(4%)                     | 50(100%)         |

goiter, FNAC and TFT results were in correlation in 21 (87.5%) cases and findings were not in correlation in 3 (12.5%) cases. Similar findings were found in thyroiditis. The FNAC findings were well in correlation with TFT in ten (76.9%) cases and in accordance in three (23.1%) cases.

There are few studies that focused on cytomorphology and serologic correlation. Singh N. conducted a study of 150 cases in Jawaharlal Institute of Postgraduate Medical Education and Research Centre, which reported that fireflares and macrophages in FNAC correlates positively with hyperthyroidism with p values of 0.002 and 0.005 respectively.<sup>8</sup> Results from our study also reflect the similar picture. Chehade JM conducted a study at University of Florida, College of Medicine found that there was a high degree of concordance between serological and cytological findings of lymphocytic thyroiditis in people with nodular colloid goiter.<sup>9</sup> Similarly Luiz HV reported a case of thyroid tuberculosis under FNAC along with thyroid function which was consistent with subclinical hyperthyroidism that subsequently evolved into hypothyroidism.<sup>10</sup> One of the most difficult aspects sometimes is to correlate cytomorphological details with that of TFT when

the findings do not correlate with each other as in our study 30% of cases were discordant. FNAC can effectively diagnose thyroid lesions and the like malignant tumor of thyroid endocrine system- Papillary carcinoma. Unfortunately, this is not always the case; the diagnosis of thyroid lesions and their clinical management is highly dependent upon many variables such as: the physical characteristics of thyroid lesion, operator experience (i.e., the individual performing FNAC and interpreting the cytomorphology) and thyroid hormone replacement therapy.<sup>11-15</sup>

## CONCLUSION:

There were significant correlations of results between TFT and FNAC although, some discordance was found between these two parameters. In spite of the high levels of awareness about performing TFT and FNAC, the level of awareness could not be matched by a corresponding high level of utilization by these tests. FNAC and serological evaluation demonstrate cost advantage and high accuracy, benefits patient's care and cost-containment efforts in the centers with limited diagnostic facilities.

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