International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

IJMRP

Original Research Article.

Assessment of Accuracy of Fine Needle Aspiration Cytology of Solitary Thyroid Nodule: An Institutional Based Study

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ABSTRACT

Background: FNAC of the thyroid gland is now a well-established, first-line diagnostic test for the evaluation of diffuse thyroid lesions as well as of thyroid nodules. The present study was conducted to assess the accuracy of Fine Needle Aspiration Cytology of solitary thyroid nodule.

Materials & Methods: This present study included 40 cases of solid solitary thyroid nodule. A detailed history was taken, and the patient was thoroughly examined. Fine needle aspiration cytology was performed. Thyroid surgery was performed, and specimens were examined by the same histopathologist. The statistical analysis was performed using the statistical program for social sciences.

Results: The FNAC of solitary thyroid nodule revealed that 62.96% were nodular goitre, 29.62% were benign cyst among benign lesions and 7.40% were Lymphocytic thyroiditis while 53.84% were follicular carcinoma, 30.76% were papillary carcinoma and 7.69% were Hurthle cell lesion and suspicious of neoplasm respectively. According to histopathological findings, Solitary colloid nodule were 72%, 20% benign thyroid cyst while 53.33% were follicular adenoma, 20% were colloid adenoma.45% cases were true positive, 20% were false positive, 35% true negative and 7.5% were false negative.

Conclusion: The present study concluded that FNAC of solitary thyroid nodule revealed 45% cases were true positive on comparing histopathologically. It is recommended as the first line investigation for the diagnosis of solitary thyroid nodule.

Keywords: Fine Needle Aspiration Cytology, solitary thyroid nodule, histopathology.

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Article History:

Received: 04-01-2020, **Revised:** 17-01-2020, **Accepted:** 30-01-2020

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2020.6.1.072	

INTRODUCTION

Any enlargement of the thyroid gland is called goiter. A solitary nodule is a goiter which, on clinical examination appears to be a single nodule in one lobe of the thyroid with no palpable abnormality elsewhere in the gland.[1] Thyroid nodule occurs in 4-7% of the population.[2] Malignant tumors of thyroid gland represent less than 0.5% of all cancers.[3] Although solitary thyroid nodules are common in females, they are more likely to be malignant in males.[4] Different imaging techniques are now used for pre operative diagnosis of solitary thyroid nodule like radio nucleotide scanning, high resolution ultrasonography etc. but fine needle aspiration cytology is regarded as the single and most cost-effective procedure.[5] Fine needle aspiration cytology (FNAC), being reliable, minimally invasive, cost effective, and having high sensitivity and specificity, has been applied routinely as a useful and indispensable method to diagnose thyroid lesions. FNAC has allowed a dramatic decrease in unnecessary surgeries with thyroid nodular disease, enhancing the percentage of malignant operated nodules over 50%.[6] FNAC is, however, not without limitations; accuracy is lower in suspicious cytology and in follicular neoplasms.[7] Thus the present study was conducted to assess the accuracy of Fine Needle Aspiration Cytology of solitary thyroid nodule.

MATERIALS AND METHODS

This present descriptive study was conducted in the Department of Pathology, Meenakshi Medical College Hospital and Research Institute, Kanchipuram, Tamil Nadu (India) to assess accuracy of Fine Needle Aspiration Cytology of solitary thyroid nodule. It included 40 cases of solid solitary thyroid nodule. Both male and female patients of all age groups having solitary thyroid nodule were included in the study.

Non-thyroidal neck masses, diffuse goiter, multinodular goiter was excluded from the study. The diagnostic criterion for solitary thyroid nodule was the triple assessment including clinical,

radiological and tissue diagnoses. A detailed history was taken, and the patient was thoroughly examined. The mucosal lining of upper aero-digestive tract was examined, and systemic examination was also carried out. Routine investigations were performed in all cases. Ultrasonography, radioiodine scan, thyroid function tests, computed tomography, MRI and endoscopy were done when indicated. Fine needle aspiration cytology was performed in all cases by the same cytopathologist. Thyroid surgery was performed, and specimens were examined by the same histopathologist. The statistical analysis was performed using the statistical program for social sciences (SPSS version 11).

RESULTS

The present study included 40 cases of solitary thyroid nodule. The FNAC of solitary thyroid nodule revealed that 62.96% were nodular goitre, 29.62% were benign cyst among benign lesions and 7.40% were Lymphocytic thyroiditis while 53.84% were follicular carcinoma, 30.76% were papillary carcinoma and 7.69% were Hurthle cell lesion and suspicious of neoplasm respectively. According to histopathological findings, Solitary colloid nodule was 72%, 20% benign thyroid cyst while 53.33% were follicular adenoma, 20% were colloid adenoma. 45% of cases were true positive, 20% were false positive, 35% true negative and 7.5% were false negative.

Table 1: FNAC of thyroid nodule

Diagnosis	No. of patients	Total (%)
Non neoplastic lesions		27(67.5%)
Nodular goitre	17(62.96%)	
Benign cyst	8(29.62%)	
Lymphocytic thyroiditis	2(7.40%)	
Neoplastic lesions		13(32.5%)
Follicular carcinoma	7(53.84%)	
Papillary carcinoma	4(30.76%)	
Hurthle cell lesion	1(7.69%)	
Suspicious of neoplasm	1(7.69%)	

Table 2: Histopathology of thyroid nodule

Diagnosis	No. of patients	Total (%)
Non neoplastic lesions		25(62.5%)
Solitary colloid nodule	18(72%)	
Benign thyroid cyst	5(20%)	
Ch. Lymphocytic thyroiditis	1(4%)	
Hashimoto's thyroiditis	1(4%)	
Neoplastic lesions		15(37.5%)
Follicular adenoma	8(53.33%)	
Colloid adenoma	3(20%)	
Papillary carcinoma	2(13.33%)	
Hurthle cell adenoma	1(6.66%)	
Follicular carcinoma	1(6.66%)	

Table 3: Diagnostic comparison between FNAC and histopathology for solitary thyroid nodule

Test result	N(%)
True Positive	18(45%)
False Positive	5(20%)
True Negative	14(35%)
False Negative	3(7.5%)

DISCUSSION

FNAC-based detection of solitary thyroid lesions remains challenging, in spite of tireless efforts to establish cytologic and clinical criteria for diagnosing follicular neoplasms and distinguishing between benign and malignant lesions.[8]

The FNAC of solitary thyroid nodule revealed that 62.96% were nodular goitre, 29.62% were benign cyst among benign lesions and 7.40% were Lymphocytic thyroiditis while 53.84% were follicular carcinoma, 30.76% were papillary carcinoma and 7.69% were Hurthle cell lesion and suspicious of neoplasm respectively. According to histopathological findings, Solitary colloid nodule were 72%, 20% benign thyroid cyst while 53.33% were follicular adenoma, 20% were colloid adenoma.45% cases were true positive, 20% were false positive, 35% true negative and 7.5% were false negative.

On thyroid scan, 40 patients (80%) having cold nodule were labeled as suspicious 10 patients (20%) had hot nodule. On FNAC 23 patients (46%) had benign lesion, 22 patients (44%) had indeterminate lesion and 5 patients (10%) had malignant lesions. On histopathology, 45 patients (90%) were confirmed to have benign lesions and 5 patients (10%), malignant lesions. After comparison of results of thyroid scan and FNAC with

histopathology, the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of thyroid scan were 80%, 20%, 10%, 90% and 26%, respectively whereas those of FNAC were 80%, 97.7%, 80%, 97.7% and 96%, respectively.[7]

Bagga conducted a 5-year retrospective study of FNAC of thyroid lesions during January 2004 to December 2008. The FNAC findings were correlated with the histopathologic diagnoses. Exactly 252 patients had undergone FNAC during the study, and out of that, 4 (1.6%) were inadequate for cytological assessment, 228 (90.5%) patients had benign lesions, 17 (6.7%) had lesions that were suspicious for malignancy, and 3 (1.2%) had malignant neoplasms. The correlation of the FNAC findings with the histopathologic diagnoses showed that our FNAC diagnostic accuracy rate was 96.2%, with a sensitivity of 66% and specificity of 100%.[9]

In Moosa study the yield of FNAC was as follows: sensitivity 77.7%, specificity 98.9%, positive predictive value 87.5% and negative predictive value 97.8%. [10]

CONCLUSION

The present study concluded that FNAC of solitary thyroid nodule revealed 45% of cases were true positive on comparing histopathologically. It is recommended as the first line investigation for the diagnosis of solitary thyroid nodule.

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Source of Support: Nil. **Conflict of Interest:** None Declared.

Cite this article as: Sudhir Porwal. Assessment of Accuracy of Fine Needle Aspiration Cytology of Solitary Thyroid Nodule: An Institutional Based Study. Int J Med Res Prof. 2020 Jan; 6(1): 303-05. DOI:10.21276/ijmrp.2020.6.1.072