

A study of thyroid lesions with cyto-histologic diagnoses correlation

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Abstract

Background: Fine-needle aspiration cytology (FNAC) is widely used as a diagnostic tool to assess thyroid lesions. This study correlates FNA cytology results with histopathology findings. **Objectives:** The aim of the present study is to correlate FNAC impression with histopathology diagnoses of thyroid lesions in the dept. of Pathology, Gandhi Hospital, Secunderabad and compare our results with those of literature. **Methods:** All thyroidectomy specimens – lobectomy / total / sub-total received over a period of 3 years were reviewed and 266 patients identified for inclusion. Data were obtained for FNA diagnosis, demographics, findings on ultrasound, and histologic findings. **Results:** Among 13 patients with a carcinoma on FNAC, 11 were confirmed on final histopathology. Of 35 patients with “follicular lesion” on FNA, only 15% of cases were verified to be malignant histologically. Only 15% of the 173 cases diagnosed as benign on FNAC were found to have a carcinoma on histopathology. **Conclusion:** A diagnosis of papillary carcinoma cytologically is highly predictive of thyroid cancer. The predictive value of FNAC drops in case of follicular lesions considerably. However, we found a 15% false positive result occurring in FNAC declared benign lesions.


Keywords: Thyroid nodule; Fine-needle aspiration; Follicular lesion; Thyroid cancer.

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INTRODUCTION

Palpable thyroid nodules can be seen in 4 to 7% of the adult population. Malignancy is reported in less than 5% of thyroid nodules¹. Reliable and precise examination is needed due to this prevalence and malignancy risk. Fine-needle aspiration cytology (FNAC) is increasingly used as it is a quick, noninvasive and reliable means of detecting cancerous thyroid nodules and, in many cases, surgery can be avoided². Since FNAC was developed, the rate of thyroid surgery has decreased remarkably¹. Despite its efficacy FNAC has various drawbacks, such

as a high rate of incomplete aspiration, an inability to distinguish follicular adenoma from follicular carcinoma, and a risk of false negatives and false positives^{3,4}. The present study assessed our own technique, its limits and the means to improve it, by comparing our results with those of the literature.

MATERIAL AND METHODS

A retrospective study of 266 patients with both preoperative FNA cytology and a final histopathologic report was done for a period of 3 years in the department of Pathology, Gandhi Hospital, Secunderabad. Data were obtained for FNA diagnosis, patient age, gender, findings on ultrasound, and final histopathology findings. Thyroidectomies with no preoperative FNA reports were excluded. Samples were classified according to cytological aspects into four groups, following current guidelines¹: unrepresentative, benign, suspect or malignant. Assessment of performance indicators of FNAC in terms of screening efficacy was done by statistical analysis. The performance indicators for screening efficacy were: sensitivity (Ss), specificity (Sp),

positive predictive value (PPV) and negative predictive value (NPV).

RESULTS

Of the 266 patients in this study group there was a predominance of females, with a male-to-female ratio of 1:5.2. The median age was 43 years (range 16 to 82 years). Ultrasound findings were as follows: multinodular goiter (MNG)—21%, multiple nodules-18%, and a single nodule-62%. Bilateral thyroidectomy was performed in 90 patients (33.8%) and unilateral thyroidectomy (lobectomy) in 176 patients (66.17%). Out of the 176 patients who initially underwent unilateral thyroidectomy, 18% required completion to total thyroidectomy as carcinoma was found on histopathology of the initially resected lobe. FNA was reported as benign in 173 patients (65%), malignant (papillary, medullary carcinoma) in 13 patients (37%/05%) and as follicular lesion in 35 patients (20%) (Table1). 17% were categorized as insufficient sampling.

Table 1: Categorisation as per FNAC

Benign	Malignant	follicular	Unrepresentative
173(65%)	13 (05%)	35 / 13%	17% (45)

Benign lesions

Of the 173 patients with a benign FNAC result, 26 were found to have carcinoma on final pathology accounting for 15% false negative rate and a sensitivity of 85%.

Benign lesions on FNAC – 173;

On HP 26 / 173 were found to be malignant lesions and 147 benign lesions.

Papillary – 18,

follicular – 2,

occult carcinoma – 6.

Goiter – 114,

thyroiditis – 20,

follicular adenoma -10,

Hurthle adenoma -3

Malignant Lesions

Of the 13 patients with malignant FNAC results, 2 were found to have a benign lesion on final pathology accounting for a 15% false positive rate and a specificity of 85%.

Malignant lesions on FNAC – 13,

On HP 11 were found to be Papillary carcinomas and 2 were benign - follicular adenomas.

Follicular Lesions

Of the 35 patients with follicular lesion on FNAC, 27 (77%) had a benign final pathology and 8 (23%) had malignant pathology. Three out of 8 patients had follicular carcinoma and the remaining 5 patients had papillary carcinoma (follicular variant).

Follicular lesions on FNAC – 35.

HP diagnosis 8/35 were malignant lesions and 27 were benign.

Papillary carcinoma - 5,

follicular carcinoma - 3,

follicular adenoma - 20,

Hurthle adenoma - 3,

Thyroiditis - 4.

Unrepresentative Lesions

Unrepresentative on FNAC were – 45;

On HP: papillary carcinoma – 20, small adenomas – 20, cysts – 5.

The overall accuracy was 87.5%, the negative predictive value (NPV) of a benign FNAC was 87.6%, and the positive predictive value of a malignant FNAC was 84.6%.

DISCUSSION

FNA is the single most important diagnostic test in the initial workup of a patient with a thyroid nodule. Approximately 60% of FNACs are classified as benign (range 53% to 90%), 4% as malignant (range 1% to 10%), 17% represent insufficient sampling (range 15% to 20%), and approximately 20% are classified as follicular lesions (range 7% to 36%)^{5,6,7}. In this respect, the present study results of benign – 65%, malignant – 05%, follicular lesions – 13% and unrepresentative – 17% are corresponding with the published literature. The data from present study indicates the sensitivity, specificity, and accuracy of FNAC to be 85%, 85%, and 87.5%, respectively. These values correspond well with similar data published in recent years. Hamburger⁸ reported a sensitivity and specificity of 85% and 80%, respectively. Baloch *et al*⁹ reviewed the results of 662 FNAs and reported a sensitivity and specificity of 92% and 84%, respectively. In 1993, Gharib and Goellner¹ reviewed the results of 18,183 FNAs. Their data revealed a mean sensitivity and specificity of 83% and 92%, respectively. Other studies with smaller numbers of FNAs report accuracy rates ranging from 70% to 97%, dependent on both the skill of the individual performing the biopsy and the cytopathologist interpreting it^{9,10,11,12,13,14,15}. Follicular lesions diagnosis on FNAC is problematic because of the need for tissue, to determine capsular invasion rather than cells, for accurate and reliable determination of malignancy. The entire lobe containing the neoplastic lesion must be removed and examined for vascular or capsular invasion and cellular characteristics to prove malignancy. Chen *et al*¹⁶ reported that 87% of the frozen sections rendered no useful information and 5% gave inaccurate results from his study on usefulness of the frozen section technique in patients with follicular lesions. A few randomized prospective studies

recommended not to use frozen section in patients with follicular lesions.¹⁷ In the present study, 15% of the lesions considered as follicular lesions on FNAC were diagnosed as malignant on histopathology which is similar to the range seen in other studies (range 15% to 30%).^{1,8,9,11,12, 16,18} The category of unrepresentative samples is relatively high as seen in other studies and demands the need for more guided aspiration and improved technique.

CONCLUSIONS

FNA biopsy is essential in the assessment and management of thyroid nodules. The accuracy of FNAC in our institution compares favorably with results reported in the literature. FNAC performed and interpreted by experienced and dedicated cytopathologists have low false positive and false negative results. The efficacy of thyroid fine needle aspiration cytology is now fully established. It is a quick, noninvasive and inexpensive screening examination, detecting nodules that show malignancy. The pitfalls of cytology in thyroid pathology lies in the category dominated by follicular and oncocytic thyroid lesions in which positive diagnosis depends exclusively on histological criteria. The second limitation is the high rate of “unrepresentative” aspirates. The technique nevertheless remains useful.

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