

Original Research Article

A prospective study of ultrasonographic and FNAC correlation of thyroid pathology

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Abstract

Introduction: Fine Needle Aspiration Cytology (FNAC) of the thyroid gland is a well established first-line diagnostic test for the evaluation of diffuse thyroid lesions as well as thyroid nodules. It is found to be the most useful line of investigation than other investigations like ultrasonography (USG), thyroid function test (TFT), thyroid scan and serologic studies.

Material and methods: Prospective study of minimum 100 cases was carried out with thyroid lesions that underwent USG thyroid and FNAC during the period of 1st January, 2014 to 31st December, 2014 were included.

Results: Radiologically, 70% cases were diagnosed as benign thyroid lesion, 7% as malignant and 23% were diagnosed as indeterminate. While on FNAC, 83% were benign thyroid lesions and 6% were malignant, 8% were follicular neoplasm and 3% were given indeterminate which were confirmed by histopathological examination.

Conclusion: In the present study, we had concluded that FNAC is superior to USG for the diagnosis of thyroid lesions.

Key words

Fine Needle Aspiration Cytology (FNAC), First-line diagnostic test, Ultrasonography (USG), Thyroid lesions.

Introduction

Fine Needle Aspiration Cytology (FNAC) of the thyroid gland is a well established first-line diagnostic test for the evaluation of diffuse thyroid lesions as well as thyroid nodules with the main purpose of confirming benign lesions and thereby, reducing unnecessary surgery. Superficial location of the thyroid gland allows excellent visualization and evaluation of its normal anatomy and pathologic condition by high resolution real-time grey scale sonography. It is also well known that high resolution ultrasound is useful diagnostic imaging modality for detection of thyroid nodule. But FNAC is found to be the most sensitive line of investigation than other investigations like ultrasonography (USG), thyroid function test (TFT), thyroid scan and serologic studies. FNAC leads to early diagnosis and aids in the treatment of thyroid lesions. FNAC has good amount of accuracy up to 97% in the preoperative diagnosis of various thyroid lesions. This has been claimed by various authors [1-7]. Correlation of cytopathological diagnosis is possible with USG diagnosis or with histopathological diagnosis if surgical excision is performed. The aim of the present study was to compare between fine needle aspiration cytology and ultrasonographic findings of thyroid lesions and to find out the accuracy of FNAC in the diagnosis of thyroid pathology.

Materials and methods

Prior approval of Sumandeep Vidyapeeth Institutional Ethics Committee had taken. Prospective study of minimum 100 cases was carried out who had attended Cytology Department of Dhiraj Hospital with thyroid lesions during the period of 1st January, 2014 to 31st December, 2014 were included. Comparison had made between cytological and ultrasonographic findings of each case. All the patients were recorded for their demographic features, that is, age, sex, and address. History of present illness with regard to symptoms and duration was recorded. They were examined for the signs related to the thyroid swelling. All

routine investigations and serum T3, T4, and TSH levels were performed by Radioimmunoassay (RIA), (normal range of T3, 2.5–5.8 pmol/L, T4, 11.5–23.0 pmol/L, and TSH, 0.2–4.0mIU/L). FNAC was performed at cytology clinic using a 22-gauge needle attached to a 10 ml syringe [8-14]. Cytological diagnosis was categorized into three groups: Benign thyroid lesions, Indeterminate (suspicious) for malignancy, Positive for malignancy. The cases were operated and evaluated for histopathological changes. The results of thyroid scan, fine needle aspiration cytology, and histopathology were compared. All these information were collected and data was analysed statistically.

Results and Discussion

Thyroid gland is unique among endocrine organs as it is the largest endocrine gland in the body and the first to develop in fetal life. Even after 100 years, thyroid gland has been the subject of intense research and considerable attention due to the vast array of developmental, inflammatory, hyper plastic and neoplastic disorders which are exceedingly common in clinical practice [15]. The workup of any patient requires full and appropriate clinical evaluation (Biochemical, Immunological, USG, Radioisotope and Imaging evaluation) before the decision to perform thyroid cytology is undertaken. Thyroid cytology can provide a definite diagnosis of malignancy, with tumor type, enabling appropriate therapeutic surgery in one stage. FNA cytology is the most accurate and cost-effective method of evaluating thyroid nodules, although ongoing research is being done on variable methods including genetic studies [16-18]. In our study regarding comparison between USG findings and FNAC of thyroid lesions following were the results.

Age distribution

In the present study, most of the patients (35%) were in 30-39 years age group, the youngest being 12 years old and the eldest 65 years old. (**Table – 1**)

Table – 1: Age incidence.

Age group (years)	No. of patients	Percentage
10-19	2	2
20-29	29	29
30-39	35	35
40-49	11	11
50-59	14	14
60-69	09	09
>70	00	00

Gender distribution

In the present study, 70% patients were female and 30% were male. The male to female ratio was 1:2.5. In study by I. S. Nam Goong, et al. [19], 78% patients were females and 22% males which were comparable to our study.

Clinical presentation

All the 100 patients presented with clinical thyroid enlargement, either in the mid line or on the lateral aspect. Clinical diagnosis of patients was Solitary thyroid nodule (29%), Diffuse thyroid swelling (38%), Multi-nodular goiter (20%), Cystic lesion (10%) and Malignant thyroid lesion (3%) as per **Table - 2**.

Table – 2: Clinical diagnosis.

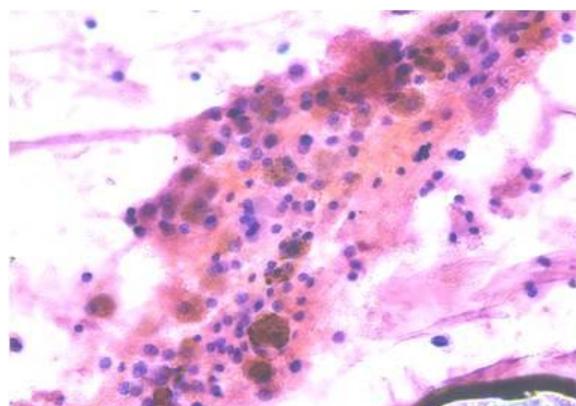
Clinical diagnosis	No. of patients	Percentage
Solitary thyroid nodule	29	29
Diffuse thyroid swelling	38	38
Multi-nodular goiter	20	20
Cystic lesion	10	10
Malignant thyroid lesion	03	03

Cytological diagnosis

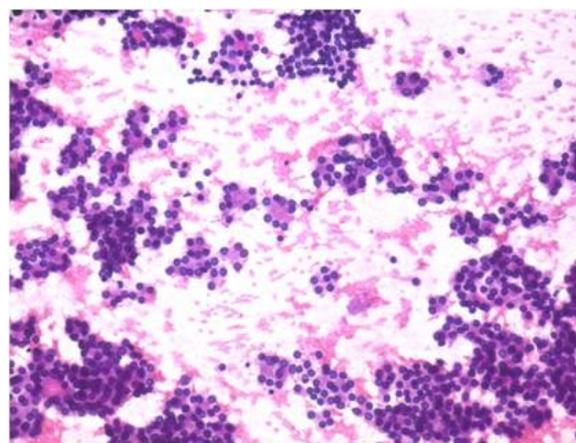
Out of 100 cases, 83% were benign and other lesions (colloid goiter, colloid cyst, chronic lymphocytic thyroiditis) and 6% were malignant, 8% were follicular neoplasm and 3% were given indeterminate. The most common thyroid

pathology was colloid goiter (60%) (**Microphotograph – 1**) followed by colloid cyst (17%), Follicular neoplasm (8%) (**Microphotograph – 2**), and chronic lymphocytic thyroiditis (6%). Out of 6 malignant cases, 1 (16.67%) seen in male and 5 (83.3%) seen in female with wide age distribution between 30-70 years. Papillary carcinoma (**Microphotograph – 3**) seen in 4 (66.67%) cases and anaplastic carcinoma (**Microphotograph – 4**) in 2 (33.33%) of cases.

Microphotograph – 1: Hemosiderin laden macrophages in colloid goiter with cystic degeneration (4X, H&E Stain).



Microphotograph – 2: Micro follicles in repetitive manner in Follicular neoplasm (4X, H&E Stain).

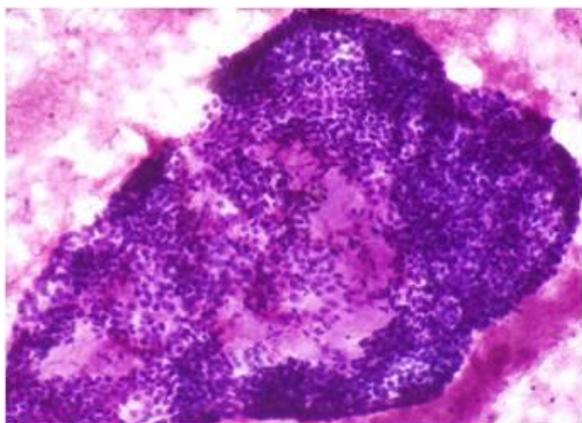


Histopathological diagnosis

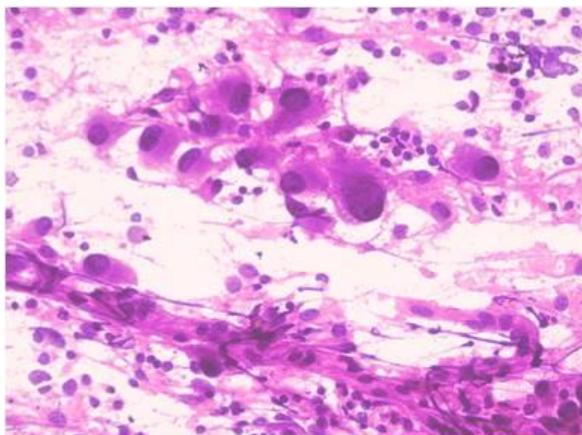
On histopathological examination, out of the 8 cases of follicular neoplasm, 5 cases were diagnosed as follicular adenoma, 1 case as

follicular carcinoma and 2 cases diagnosed as hyperplastic nodules. The cases of papillary carcinoma and anaplastic carcinoma were confirmed histologically.

Microphotograph – 3: Sheet of epithelial cells with anatomical edge in Papillary carcinoma (4X, H&E Stain).



Microphotograph – 4: Cluster of highly pleomorphic plump cells in Anaplastic carcinoma thyroid (10X, H&E Stain).



USG diagnosis

Radiologically 73% cases were diagnosed as benign thyroid lesion, 4% as malignant and 23% were diagnosed as indeterminate. (Table – 3) Study done by Frates MC, et al. [20] noted that the presence of any calcification within nodule raises the likelihood of malignancy. In particular micro calcification in a predominantly solid nodule is associated with approximately three-fold increase in cancer risk as compared with

solid nodule without calcification. In our study because of the presence of micro calcification radiologically 4 cases were given as malignant with possibility of papillary carcinoma. On FNAC, 4 cases were diagnosed as papillary carcinoma. In our study 68 cases showed comet tail artefact on USG. Out of them 65 cases showed cytomorphology of benign thyroid lesion and 3 cases showed indeterminate thyroid lesions. (Table – 4, Table - 5) On histopathological examination out of these 3 cases, 2 cases showed follicular adenoma and 1 case showed histology of follicular carcinoma. But the study by Wong KT, al. [21] also showed all 100% patients with comet tail artefact proved to be benign by FNAC. Although thyroid FNA cytology has some limitations in cases of suspicious, inadequate, and indeterminate cytology but in our study FNAC was more accurate than USG of the thyroid lesions. Basharat R, et al. [22] in 2011 done comparison of fine needle aspiration cytology and thyroid scan in solitary thyroid nodule which had concluded that Fine needle aspiration was a significantly better than thyroid scan to diagnose different thyroid lesions.

Table – 3: Radiological diagnosis of thyroid lesions.

Radiological diagnosis	No. of patients	Percentage
Benign thyroid lesion	21	21
Goiter	25	25
Diffuse thyroid enlargement	24	24
Malignant thyroid lesion	07	07
Indeterminate lesion	23	23

Conclusion

High resolution grey scale ultrasound has emerged as an initial imaging modality of choice for the evaluation of patients with thyroid enlargement but in present study we had concluded that FNAC is superior to USG for the diagnosis of thyroid lesions.

Table – 4: Distribution of subjects by benign and malignant lesions FNAC and histopathology.

Classification	FNAC	Histopathology
Colloid cyst	17	17
Multi nodular colloid goiter	30	30
Colloid goiter	30	30
Chronic lymphocytic thyroiditis	06	06
Follicular lesions (neoplasm)	08	-
Follicular adenoma	-	05
Diffuse hyperplasia	-	03
Hyperplastic nodule	-	01
Follicular carcinoma	-	02
Papillary carcinoma	04	04
Anaplastic carcinoma	02	02
Indeterminate	03	--

Table – 5: Comparison of thyroid scan and FNAC with histopathology.

Classification	FNAC	Histopathology	Thyroid scan
Benign and all other lesions	91	92	73
Malignant	06	08	04
Indeterminate	03	--	23

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