Section: Pathology

Original Research Article

BATTLE OF SUPREMACY: USG GUIDED FNAC OF THYROID LESION VERSUS CONVENTIONAL FNAC: AN INSTITUTION-BASED STUDY IN EASTERN INDIA

Pratyusha Bhattacharjee[1], Sneha Bhagat[2], Papiya Majumdar[1], Soumik Chatterjee[3], Aindrila Mandal[2]

[1]Assistant Professor, Department of Pathology, KPC Medical College and Hospital, Kolkata, West Bengal, India
[2]Senior Resident, Department of Pathology, KPC Medical College and Hospital, Kolkata, West Bengal, India
[3]Post Graduate Resident, KPC Medical College & Hospital, Kolkata, West Bengal, India

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Corresponding Author:
Dr. Sneha Bhagat,
Email: drsnehabpath@gmail.com

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Abstract

Background: Thyroid lesions have become challenging for clinicians in recent years. With an increase in the trend of thyroid cancers worldwide, it is essential to screen all thyroid lesions via Ultrasound (USG) followed by fine needle aspiration cytology (FNAC), a minimally invasive procedure to estimate the risk of malignancy and minimize needless surgeries. Ultrasound-guided FNAC allows accurate localization of lesions, usually missed in conventional FNAC, directing the needle to the lesion and reducing the need for repeat aspirations. The objective is to assess the efficacy of USG-guided FNAC vis-à-vis conventional FNAC for precisely diagnosing and categorizing thyroid lesions taking histopathology as the gold standard. **Materials and Methods:** The study included 186 patients with thyroid swellings who underwent conventional or ultrasound-guided FNAC as advised by the clinician followed by a cytological examination. Findings were compared with the final histopathological diagnosis. **Result:** Thyroid lesions are more common in the age group 21- 40 years with female preponderance. USG-guided FNAC had a sensitivity of 94.62% while that of conventional FNAC was 69.1%. The positive predictive value of USG-guided FNAC was deduced as 98%. **Conclusion:** Although the conventional method of FNAC is technically less challenging, ultrasound-guided FNAC must be considered a better tool as it has more sensitivity and a higher positive predictive value. It also corroborates with histopathological diagnosis in the majority of cases owing to accurate localization and aspiration of the lesion.

INTRODUCTION

Thyroid lesions have become very challenging for clinicians in recent years. Globally, in 2020, the age-standardized incidence rates of thyroid cancer were 10 per 100,000 women and 3 per 100,000 men. According to Globocan India (2020), thyroid cancer is the 19th most common cancer with more than 20,000 cases diagnosed annually.[1]

Although palpable thyroid nodules are found in only 5% of adult women and 1% of men, the prevalence of thyroid lesions is much higher (20% to 70% of adults), due to increased detection of non-palpable nodules by imaging studies.[2]

It is essential to screen all palpable as well as non-palpable thyroid nodules via ultrasound (USG) to assess the risk of malignancy. Early diagnosis of malignant thyroid nodules is coveted, because of good post-surgical prognosis Surgical removal of all thyroid nodules is practically not possible, so Fine needle aspiration cytology (FNAC) plays a pivotal role in determining malignant thyroid lesions thereby guiding the clinician. [3-5]

FNAC is a well-known diagnostic tool that is an affordable, reliable, time-saving, and minimally invasive procedure used as a first line in the screening of thyroid lesions by which one can minimize needless surgeries. [4,5]

The aspiration can be conventional or ultrasound-guided. Although conventional FNAC is technically less challenging, ultrasound (USG) guidance provides an edge, in ascertaining the position of the needle and its accurate placement inside the thyroid lesion. Consequently, it has been perceived that USG-guided FNAC reduces the number of unsatisfactory FNAs, and improves accuracy. For these reasons, ultrasound guidance is preferred for

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non-palpable nodules, nodules that have a significant cystic component (>25%), and nodules that were previously aspirated and yielded an unsatisfactory sample.[5,6]

This study aims to assess the sensitivity of USG-guided FNAC vis-à-vis palpation-guided FNAC for precisely diagnosing and categorizing thyroid lesions taking histopathological diagnosis as the gold standard.

MATERIALS AND METHODS

An institutional-based descriptive study was conducted in the Pathology Department of a medical college in eastern India for a period of 2years, after getting ethical clearance from the Institutional Ethics Committee. All patients attending the outpatient department of ENT and Surgery within the study period having clinically and ultrasonographically diagnosed thyroid lesions were included after informed consent. Conventional FNAC or USG-guided FNAC of the thyroid lesions was done, as advised by the clinician.

The procedure was done under aseptic conditions. The aspirate was then spread on the clean glass slides and fixed with 95% alcohol and by air dry technique. The smears were then stained with Papanicolaou (Pap) and Leishman-Giemsa stains. Both conventional and USG-guided FNAC cases were reported by pathologists.

Radiological findings were available in all the cases for correlation. Categorization was done based on the guidelines and standard nomenclature for interpretation of thyroid nodules as suggested by The Bethesda System For Reporting Thyroid Cytopathology (TBSRTC) which includes: -

CAT- I: Nondiagnostic or Unsatisfactory

CAT-II: Benign

CAT-III: Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance

CAT- IV: Suspicious for a Follicular Neoplasm or Follicular Neoplasm (specify if Hürthle cell type)

CAT-V: Suspicious for Malignancy

CAT- VI: Malignant

Histopathological diagnoses of all the patients undergoing surgery were noted. Data were coded and entered in Microsoft Excel and analysis was done by SPSS version 22.0 (Statistical Product for Services Solutions).

RESULTS

A total of 186 patients were studied for a period of two years. Their relevant clinical details and laboratory parameters were thoroughly analyzed. 92 of them underwent conventional FNAC. 94 patients were subjected to USG-guided FNAC.

The age group distribution table [Table 1], shows that most of the thyroid lesions were frequently seen between 21- 40 years, total cases being 128 out of 186 (68.8%). Female preponderance was a total of 135 cases out of 186 patients (72.5%), mostly in the age group 21-40 years [Figure 1].

As per thyroid profile studies in all patients, 7% of them were hyperthyroid, 34% were hypothyroid and 59% belonged to euthyroid state [Table 2].

In all the cases with Lymphocytic thyroiditis (23), their biochemical profile was studied, and 16 of them showed Anti TPO positivity.

Following the clinical presentation and ultrasound findings assessed, 145 (78%) patients presented with diffuse thyroid swelling whereas 30(16%) of them had solitary thyroid nodules [Table 3]. Cystic thyroid lesions were found in 9 (4.83%) patients and 2 cases were solid–cystic lesions [Table 3].

Out of 92 patients who underwent Conventional FNAC, 12 (13%) were reported to be Inadequate in congruence with The Bethesda System [Table 4]. In contrast, only 5 out of 94 cases (5.3%) were reported to be Inadequate when USG-guided FNAC was done [Table 5]

For conventional FNAC, 70 (76%) cases were diagnosed to be benign (CAT - I), and of them, 3 cases were histopathologically confirmed to be carcinoma [Table 4]

Whereas, in USG-guided FNAC, 72 cases were categorized under benign (CAT-II), only 1 case was confirmed to be of papillary carcinoma taking histopathology as the gold standard [Table 5]

Hence, the sensitivity of USG-guided FNAC was 94.62%, which is superior to conventional FNAC (69.1%) [Table 6,7].

The positive predictive value of conventional FNAC in the present study was derived to be 83% (Table 6), while that of USG-guided FNAC was deduced as 98% [Table 7].

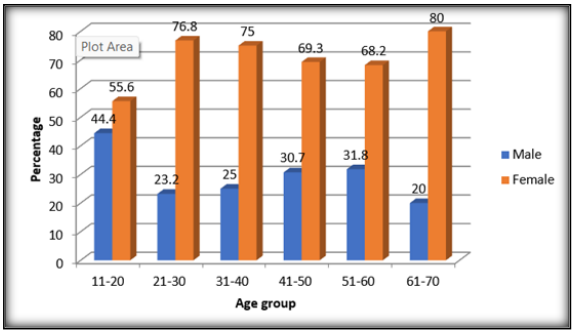

Figure 1: Age & sex distribution of thyroid lesions

Table 1: Age- sex distribution of thyroid lesions.

Age (years)	Male	Female	Total cases of thyroid lesions
11-20	8	10	18
21-30	13	43	56
31-40	18	54	72
41-50	4	9	13

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51-60	7	15	22
61-70	1	4	5
Total	51	135	186

Table 2: Distribution according to thyroid function test

Thyroid function test	No. Of cases	percentage (%)
Hyperthyroid	13	7
Hypothyroid	63	34
Euthyroid	110	59
Total	186	100

Table 3: Distribution according to clinico-radiological diagnosis

Clinico- radiological diagnosis	No. Of patients	Percentage %
Diffuse thyroid swelling	145	77.9
Solitary thyroid nodule	30	16.12
Solid cystic lesion	2	1.07
Cystic lesion	9	4.83
Total	186	100

Table 4: Cytological diagnosis of conventional FNAC with their corresponding histopathology

Cytopathological diagnosis via conventional FNAC	Total number of cases (n=92)	TBSRTC* category	Histopathological diagnosis
Inadequate	25	I	Colloid goitre - 19
			Lymphocytic thyroiditis - 6
Lymphocytic thyroiditis	14	Ii	Lymphocytic thyroiditis – 12
			Papillary carcinoma – 1
			Follicular carcinoma-1
Colloid goitre	26	Ii	Colloid goitre- 21 papillary carcinoma - 5
Colloid goiter with papillary hyperplasia	17	Ii	Multinodular goitre - 13
			Papillary carcinoma- 4
Follicular neoplasm	3	Iv	Follicular adenoma- 2 Follicular carcinoma- 1
Medullary carcinoma	1	V	Medullary Carcinoma- 1
Papillary carcinoma	6	V	Papillary carcinoma- 6

Table 5: Cytological diagnosis of USG guided FNAC with their corresponding histopathology

Diagnosis by USG guided FNAC	Total number of cases (n=94)	TBSRTC* category	Histopathological diagnosis
Inadequate	5	I	Colloid goitre- 3
			Lymphocytic thyroiditis- 1
			Multinodular goitre - 1
Lymphocytic thyroiditis	12	II	Lymphocytic thyroiditis- 12
Colloid goitre	48	II	Colloid goitre- 48
Colloid goiter with Papillary Hyperplasia	12	II	Multinodular goitre- 11 Papillary carcinoma -1
Follicular neoplasm	8	IV	Follicular adenoma-6 Follicular carcinoma-2
Medullary Carcinoma	1	V	Medullary Carcinoma-1
Papillary Carcinoma	8	V	Papillary Carcinoma- 8

*TBSRTC- The Bethesda System for Reporting Thyroid Cytopathology

Table 6: Cytological diagnosis of conventional FNAC with their corresponding histopathology

Result of conventional FNAC	Histopathological confirmation		
	Diagnosis confirmed	Diagnosis not confirmed	Total
Disease diagnosed	56	11	80
Disease not diagnosed	25	0	25
Total	81	11	92

Table 7: Cytological diagnosis of USG guided FNAC with their corresponding histopathology

Result of USG guided FNAC	Histopathological confirmation		
	Diagnosis confirmed	Diagnosis not confirmed	Total
Disease diagnosed	88	1	89
Disease not diagnosed	5	0	5
Total	93	1	94

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DISCUSSION

Thyroid lesions are more common in females than in males, predominantly in the age group of 21-40 years, which was noted in the present study likewise suggested by Sharma M et alin their study.[7] Other workers also reported similar age and sex preponderance to this study. [8,9]

The sensitivity of conventional FNAC in the present study was derived to be 69.1% which correlates well with studies done by Jalan S et al and Senna EA et al.[10,11]

The cytological finding suggested that CAT – II comprised of cases in abundance;142 out of 186 in both types of FNAC and other CAT- IV & V comprised lesser numbers, 11 and 16 cases respectively. Similar findings were quoted in a study by Kumari K A et al.[12]

Following the final histopathological report of this study, it was concluded that 155 cases were proved to be benign while 31 cases were diagnosed as malignant, the most common malignant entity being papillary carcinoma, similar to the study findings of Mondal S K et al.[13]

The sensitivity of USG-guided FNAC was deduced to be 94.62% and had a positive predictive value of 98%. Comparable findings were documented by Kumari KA et al, Senna EA et al and Sajikumar NR et al in their studies.[11,12,14]

A study done by Cesur M et al also concluded comparable findings. USG-guided FNAC is superior to conventional FNAC for obtaining adequate material and accurate cytologic evaluation.[15-19]

It has been observed that clinical analysis and USG examination along with FNAC are considered the foremost tool for the evaluation of a thyroid nodule. This approach has also led to a decrease in the number of unnecessary thyroidectomies for thyroid swellings. [15,19-21]

CONCLUSION

Although the conventional method of FNAC is technically less challenging, ultrasound-guided FNAC must be considered a better tool as it has more sensitivity and a higher positive predictive value.

It also corroborates with histopathological diagnosis in the majority of cases owing to accurate localization and aspiration of the lesion.

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