Section: ENT

Original Research Article

CORRELATING CLINICOPATHOLOGICAL AND RADIOLOGICAL FINDINGS IN THYROID SWELLINGS: A SINGLE-CENTRE ANALYSIS

Shraddha Pai[1], Akshata Nagaral[2], Pooja G Y[3], Arunkumar J S[4], Santosh S Garag[5]

[1]Associate Professor, Department of ENT, SDMCMS, Dharwad, India.
[2]Assistant Professor, Department of ENT, SDMCMS, Dharwad, India.
[3]Senior Resident, Department of ENT, JJMMMC, Davangere, India.
[4]Professor and Head, Department of ENT, SDMCMS, Dharwad, India.
[5]Professor, Department of ENT, SDMCMS, Dharwad, India.

Received : 22/09/2025
Received in revised form : 07/11/2025
Accepted : 26/11/2025

Keywords:
USG, FNAC, HPR, Thyroid Swelling, Methodology.

Corresponding Author:
Dr. Akshata Nagaral,
Email: akshatasn15@gmail.com

DOI: 10.47009/jamp.2025.7.6.152

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (6); 827-830

ABSTRACT

Background: Thyroid swellings present a diverse range of causes and types influenced by geographical location, lifestyle, and socioeconomic factors. The prevalence of palpable thyroid swellings ranges from 4-7%, with only 1% being malignant. Histologically confirmed malignancy is found in only 20% of thyroidectomy cases. This study aims to assess thyroid swellings through clinical examination, ultrasonography (USG), and fine needle aspiration cytology (FNAC), providing a comprehensive approach for early diagnosis and treatment. **Materials and Methods:** A retrospective observational study was undertaken at a tertiary care hospital in Dharwad, Karnataka. All the patients who underwent operative procedures like Hemithyroidectomy and Total thyroidectomy from January 2023 to December 2023 were included in the study. Following preliminary examination, we performed thyroid function tests, FNAC (Fine Needle Aspiration Cytology), and USG (Ultrasonography) pre-operatively. Histopathological examination of excised tissue was performed. Results were derived after appropriate statistical tests. **Result:** Out of 21 patients, 65% were from the second and third decades of life, with a male-to-female ratio of 1:4. All patients presented with an anterior neck swelling. The sensitivity and specificity of FNAC were 94.74% and 100%, respectively, while USG showed 89% sensitivity and 100% specificity. Among the 21 patients, two underwent total thyroidectomy, with FNAC initially indicating malignancy, which was later confirmed by histopathological examination (HPE). **Conclusion:** All cases of thyroid swellings require a thorough clinical approach supported by USG, FNAC and detailed HPE after surgery for evaluation of benign and malignant lesions. FNAC and USG are a valuable, minimally invasive and reliable tool in the preoperative assessment of patients with suspicion of malignancy.

INTRODUCTION

Thyroid gland is the only endocrine gland which is amenable to direct physical examination owing to its large size and superficial location. The cause and type of thyroid swellings vary across geographical areas, lifestyles, and socioeconomic status of people. The incidence of palpable thyroid swellings is 4-7% out of which only 1% are malignant.1 Out of all thyroidectomy cases, histologically confirmed thyroid malignancy constitutes only 20%. It can be solitary or multinodular. Ultrasonography (USG) of the neck is more accurate than clinical evaluation for diagnosing thyroid swellings. It is a safe and cost-effective method which can detect thyroid nodules as small as diameter of 1-3 mm. Although, it cannot accurately distinguish between benign and malignant lesion, there are certain sonographic criteria like micro calcification, irregular margins, and hypo echogenicity that suggest malignancy. Fine needle aspiration cytology (FNAC) is the safest, most reliable, accurate, and cost-effective way to evaluate thyroid nodules and thus, has become the gold standard method available for distinguishing between benign and malignant thyroid swellings. It provides accurate cytological information which guides us to prepare a definitive management plan with high sensitivity and specificity approaching to 96%. Bethesda system of classifying FNAC results facilitates increasing diagnosis of malignancies found in post-thyroidectomy specimens. However, certain malignancies like follicular carcinoma of

ISSN (O): 2687-5365; ISSN (P): 2753-6556

thyroid require histopathological examination as the diagnosis depends on lympho vascular and capsule invasion.[1]

Before the use of FNAC routinely, the percentage of resected thyroid swellings that turned out to be malignant were around 14% but with the use of FNAC prior to resection the rate of malignancy in the swelling exceeds 50%. The Bethesda system of classification has provided for a uniform reporting of the cytopathology of the thyroid swellings worldwide which includes six diagnostic categories.[2]

The present study was undertaken to evaluate the Clinico-Radio Histopathological profile of thyroid swelling. This will facilitate an in depth clinical understanding of the thyroid swellings and to correlate the history, clinical examination, ultrasonography of the neck, fine needle aspiration cytology reports with the post-operative histopathology reports.

MATERIALS AND METHODS

A retrospective observational study was undertaken at a tertiary care hospital in Dharwad, Karnataka. All the patients who underwent operative procedures like Hemithyroidectomy and Total thyroidectomy from January 2024 to December 2024 were included in the study. The data was collected from the hospital records of the study participants after Institutional ethical committee clearance.

Clinical history, clinical examination, routine blood investigations, thyroid function test, FNAC of the thyroid swelling, USG of the neck prior to surgical procedure of all the patients was reviewed. USG neck revealed the following characteristics like measurement, morphology, echotexture, internal vascularity, retrosternal extension, microcalcifications. FNAC was performed from the clinically palpable swelling or USG guided FNAC was performed if the swelling was not clinically palpable but had strong clinical suspicion. FNAC was reported based on the Bethesda system of classification. Histopathological reports of these patients were also studied.

RESULTS

A total 21 patients were enrolled in this study. The highest incidence was 61.9% recorded in 3rd decade of life. [Table 1] The commonest presentation was swelling in the anterior part of neck. [Figure 1]

Table 1: Age wise distribution of thyroid patients

Age group (years)	No. of patients	Percentage
21-30	2	9.52%
31-40	13	61.90%
41-50	5	23.80%
>50	1	4.76%

Gender wise distribution of the study participants showed that majority were females 17 and 4 males. (Table 2) Female predominance was noted in the results with male to female ratio being 1:4.

Table 2: Gender wise distribution of thyroid patients

Gender	No. of patients	Percentage
MALE	04	19.04%
FEMALE	17	80.95%

Thyroid status in the study population was assessed. It was observed that Maximum number of patients had euthyroid state (18 patients 85.7%) and only 3 patients were in hypothyroid state. [Table 3] Thyroxine supplementation was given according to requirement, patients were made euthyroid and then operated.

Table 3: Hormonal status of the study population

Hormonal Status	No. of patients	Percentage
Euthyroid	18	85.7%
Hypothyroid	3	14.3%%
Hyperthyroid	-	-

FNAC reports depicted 18 cases to be benign thyroid swellings which was confirmed by the HPR report. There was suspicion of malignancy in 3 cases, one for papillary carcinoma thyroid (Bethesda 5), one for follicular neoplasm (Bethesda 4) and one case was reported as atypical follicular adenoma of thyroid lymphocytic thyroiditis. In the case of follicular neoplasm, it was reported as benign adenomatoid goitre in the final HPE report. [Table 4]

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 4: FNAC and HPR of thyroid nodules co-relation

FNAC	HPR		TOTAL
	BENIGN	MALIGNANT	
BENIGN	18	0	18
SUSPICIOUS OF MALIGNANCY	1	2	3
TOTAL	19	2	21

SENSITIVITY: 94.74% SPECIFICITY: 100%
POSITIVE PREDICTIVE VALUE: 100% NEGATIVE PREDICTIVE VALUE: 98.7%

Out of 21, 17 cases where USG was reported as benign the HPR also confirmed the same diagnosis whereas in two cases where USG suspected follicular neoplasm, HPR demonstrated as adenomatoid goitre. [Table 5]

Table 5: USG and HPR of thyroid nodules co-relation

USG	HPE		TOTAL
	BENIGN	SUSPICIOUS OF MALIGNANCY	
BENIGN	17	0	17
MALIGNANT	2	2	4
TOTAL	19	2	21

SENSITIVITY: 89.4% SPECIFICITY: 100%
POSITIVE PREDICTIVE VALUE: 100% NEGATIVE PREDICTIVE VALUE: 97.4%

DISCUSSION

Thyroid nodules represent one of the common findings in the clinical practice. The causes of these are multifactorial where they range from family history to idiopathic. These nodules may be benign which may include the colloid goitre and the classic multinodular goitre. Hence most of the studies recommend that all thyroid nodules whether solitary or multinodular should undergo a thorough clinical and ultrasonographic and histopathological examination for complete evaluation of study.[3]

Many investigations are used to differentiate between benign and malignant nodule so as to avoid surgery in those who don't need it. Among these FNAC, USG AND THYROID FUNCTION TEST are commonly used in association with the clinical feature but there are drawbacks of each technique and the final answer to the problem is still elusive. The present study is undertaken to evaluate the utility of USG Neck & FNAC in preoperative diagnosis of thyroid swelling and evaluate the efficiency of USG, FNAC, TFT in differentiating between benign and malignant thyroid swelling.[3]

In comparison to other studies, this study had 62% patients belonging to the age group of 3rd decade as compared to venkatachalapathy study which had 69% patients, kapuretal study with 75% patients, and bhansali study with 70% patients in the same age group.[4,5,6]

We also studied the gender wise distribution of the study and participants showed, that majority were Females 17 and 4 males. Female predominance was noted in the results. Male to female ratio 1:4. Similar results were observed in the study conducted by Afroze et al,[7] with M: F -1: 4. Another study conducted by Keshri et al,[8] M: F was 1.233, but studies conducted by Popivanov et al,[9] and Tabaqchali et al,[10] observed higher M: F ratio. But all the studies had female predominance similar to our study. Hence, it explains that females are more affected with thyroid swelling.

In our study we studied the co-relation between findings on FNAC and findings observed on Histopathology. Out of 21 total cases 18 were benign lesions on FNAC in which 19 cases were turned out to be benign lesions on HPR. There was suspicion of malignancy in 3 cases, one for papillary carcinoma thyroid (Bethesda 5), one for follicular neoplasm (Bethesda 4) and one case was reported as atypical follicular adenoma of thyroid lymphocytic thyroiditis. In the case of follicular neoplasm (FNAC), it was reported as benign adenomatoid goitre in the final HPE report. In this study, total Malignancies according to HPE reports were 2 cases out of 21. True positive 2 malignancy on both HPE and FNAC), True Negatives 18 (benign both on HPE and FNAC), False Positive 1 (report showed malignancy on FNAC and benign pathology on HPE).

Comparing the sensitivity (Sn) and specificity (Sp) of the FNAC in our study (Sn=94%, Sp=100%) with FNAC report of other studies, we found that FNAC specificity in our study was comparable to other studies but its sensitivity in the current study was higher than Hetal H et al,[1] study (Sn=50%, Sp=96%) and same as Caplan et al study,[11] (Sn=91%, Sp=99%) and lower than Gharib et al study,[12] (Sn=98%, Sp=99%).

Sensitivity of USG in his study was 89% and specificity was 100%. In the study of Arifa et al,[3] USG findings were correlated with histopathology; sensitivity of the test was found to be 74% and specificity was 83%. The chance of malignancy is more in those nodules where USG shows solid echogenicity, presence of microcalcification in nodule and associated lymphadenopathy.

USG and FNAC shown to be more sensitive, specific and accurate together than either technique alone and are recommended in the work-up of all thyroid nodules. After thorough clinical evaluation and before reaching to the final histopathology, the radiological examination plays a crucial role in

ISSN (O): 2687-5365; ISSN (P): 2753-6556

making diagnosis in thyroid nodules choosing modality of treatment.

CONCLUSION

A comprehensive approach involving clinical evaluation, ultrasonography, FNAC, and histopathological examination is crucial for the accurate diagnosis and management of thyroid swellings. These methods, particularly FNAC and USG, are reliable and minimally invasive tools for preoperative assessment, helping to differentiate benign from malignant thyroid lesions and aiding in the selection of appropriate treatment modalities.

REFERENCES

1. Chauhan HH, Aiyer RG, Shah PC. Clinical, pathological and radiological correlation of thyroid swellings. Int J Otorhinolaryngol Head Neck Surg. 2020 Apr;6(4):708.
2. Menon SS, Tandon P, Ramaswamy B, Pujary K. A Retrospective Study to Assess the Role of Using Fine Needle Aspiration Cytology and Frozen Section in the Diagnosis of Thyroid Swelling. Indian Journal of Otolaryngology and Head & Neck Surgery. 2018 Dec;.70:471-6.
3. Khan AA, Musab S, Khan O. A retrospective study of clinico-radio histopathological assessment of solitary thyroid nodule in rural medical college India. Int J Dent Med Sci Res. 2023 Mar-Apr;5(2):519-27.
4. Venkatachalapathy TS, Sreeramulu PN, Maddineni RK. A prospective study of clinical, sonological and pathological evaluation of thyroid nodule. J Thyroid Dis Therapy. 2012; 1:2.
5. Kapur MM, Sarin R, Karmakar MG, Sarda AK. Solitary thyroid nodule. Indian J Surg. 1982; 44:174-79.
6. Bhansali SK. Solitary nodule in the thyroid gland; experience with 600 cases. Indian J Surg. 1982; 44:547-61.
7. Afroze N, Kayani N, Hasan SH. Role of fine needle aspiration cytology in the diagnosis of palpable thyroid lesions. Indian journal of pathology & microbiology. 2002 Jul 1;45(3):241-6.
8. Dr.Shyam Keshri, Dr.Shashi Kumar, Dr.Shiva Thakur. Clinico- Pathological Study of Solitary Thyroid Nodule with Special Reference to Fine Needle Aspiration Cytology. International Journal of Science and Research (IJSR), Index Copernicus Value (2015): 78.96.
9. Popivanov P, Boianov M, Temelkova N, Manolov D, Chavrakov G. Fine-needle aspiration biopsy and cytologic diagnosis in thyroid disease-a 3-year experience. Vutreshni bolesti. 2000 Jan 1;32(3):31-5.
10. Tabaqchali MA, Hanson JM, Johnson SJ, Wadehra V, Lennard TW, Proud G. Thyroid aspiration cytology in Newcastle: a six year cytology/histology correlation study. Annals of the Royal College of Surgeons of England. 2000 May;82(3):149.
11. Caplan RH, Strutt PJ, Kisken A. FNAB of thyroid nodules. Wisconsin Medi J. 1991;90(6):285-8.
12. Gharib H, Goellner JR. Fine-needle aspiration biopsy of the thyroid: an appraisal. Annals Int Medi. 1993;118(4):282-9.

ISSN (O): 2687-5365; ISSN (P): 2753-6556