International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Study of FNAC of Clinicallly Palable Thyroid Swelling with Histopathological Correlation

Dr. Jetty Sarathchandra Reddy[1], Dr. K. Suhas[2]

[1]Post Graduate, Department of General Surgery Alluri Sitaramaraju Academy of Medical Sciences Eluru – 534005, Andhra Pradesh
Email: *sarathreddyjetty9[at]gmail.com*

[2]HOD & Professor, Department of General Surgery, Alluri Sitaramaraju Academy of Medical Sciences Eluru – 534005, Andhra Pradesh

Abstract: ***Thyroid swellings are among the most common clinical presentations encountered in surgical practice. Accurate preoperative evaluation is essential to distinguish benign from malignant lesions and to plan appropriate management. Fine Needle Aspiration Cytology (FNAC) is a reliable, minimally invasive, and cost - effective diagnostic tool used as a first - line investigation in the evaluation of thyroid swellings. However, FNAC has limitations, including non - diagnostic or indeterminate results, necessitating histopathological correlation for definitive diagnosis. This study aims to assess the diagnostic accuracy of FNAC by comparing it with histopathological examination (HPE) findings in patients with clinically palpable thyroid swellings.***

Keywords: Thyroid swelling, Fine Needle Aspiration Cytology (FNAC), Histopathology, Solitary thyroid nodule, Benign, Malignant

1. Introduction

Thyroid swellings are a frequently encountered clinical condition in surgical outpatient departments. The spectrum of thyroid disease ranges from asymptomatic nodules to large swellings causing pressure symptoms or cosmetic concerns. A solitary thyroid nodule refers to a discrete lesion within an otherwise clinically normal thyroid gland and is identified both clinically and radiologically.

The prevalence of thyroid nodules in the general population is estimated to be 4–7%, with a lower prevalence of 0.2–1.2% among men. Although most nodules are benign, malignancy occurs in less than 5% of cases.

Fine Needle Aspiration Cytology (FNAC) has emerged as the preferred initial diagnostic tool due to its simplicity, low cost, safety, and high diagnostic yield. It plays a crucial role in triaging patients for surgery and has significantly reduced the number of unnecessary thyroidectomies for benign lesions. Despite its benefits, FNAC may yield inconclusive or indeterminate results in a subset of cases, necessitating histopathological examination for confirmation.

This study evaluates the diagnostic utility of FNAC by correlating its findings with histopathology, aiming to assess its sensitivity, specificity, and overall accuracy in diagnosing thyroid swellings.

2. Methodology

This is a prospective clinical study conducted on patients presenting with clinically palpable thyroid swellings at ASRAM Hospital, Eluru. Patients underwent clinical evaluation followed by Fine Needle Aspiration Cytology (FNAC). The cytological findings were classified according to the Bethesda System for Reporting Thyroid Cytopathology (TBSRTC).

Patients who underwent surgical intervention subsequently had histopathological examination (HPE) of the excised thyroid specimens. The FNAC results were then correlated with the corresponding HPE findings to determine the diagnostic accuracy of FNAC.

Inclusion and exclusion criteria were established to select appropriate study participants, and statistical analysis was performed to evaluate the sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy of FNAC compared to histopathology.

3. Discussion

Study Group Characteristics

When we looked at the demographic data in our study, we discovered that the average age group was 40.2 years old, and the majority of the cases were between the ages of 21 and 30.

Age Incidence

Previous studies such as studies done by Afroze et al in 2000 similar findings were found i. e., mean age group was 40.2 years, study done by Islam M S et al in 2010 mean age group was found to be 37.7 years, study done by Sreeramulu et al in 2012 mean age group was found to be 35.4 years.

Study	Year	Age Range (in years)	Mean Age (in years)
Sangalli et al	2006	6 - 91	47.2
Aravinthan et al	2007	26 - 59	46
Handa U et al	2008	5 - 80	37.69
Rangaswamy M et al	2011	11 - 70	40.57
Mandal S et al	2011	15 - 71	43
Present study	2021	20 - 81	40

Sex Distribution

In our study 86% of the patients were females which was similar to the findings of various other studies done on the thyroid swellings which were study by Afroze et al, Kamal et al, Sreeramlu et al and there was female patient distribution was 71.76%, 86.5%, 69% respectively.

Present Study

Gender	Frequency	Percentage
Male	7	14
female	43	86
total	50	100

Authors	Year	Female: Male Ratio
Sangali et al	2006	4.21: 1
Handa U et al	2008	6.35: 1
Mandal S et al	2011	5: 1
Present study	2021	6.14: 1

Clinical break up of Cases

After clinical examination of the case diagnosis of the patient is established based on the clinical findings. They are as follows

Diagnosis	Frequency
Multi Nodular Goitre	35
Solitary Thyroid Nodule	9
Malignancy	6

Cytological break up of Cases

Type of Swelling	Frequency
Benign	24
Malignant	21
Suspicion of malignancy	5

Cytological break up of Malignant Cases

FNAC results showed a total of 21 malignant cases, 5 suspicion of malignancy.

Of which 21 showed features of papillary carcinoma thyroid, 4 showed features of follicular neoplasm, 1 showed features of hurthle cell neoplasm.

In study previously done by Anand auti in 2012 there were 7 cases diagnosed with malignant features in FNAC. Among these cases 4 were suspected of follicular neoplasm and remaining 3 of papillary carcinoma.

Similarly, a study done by Garg et al there were total of 17 cases diagnosed with features of malignancy on FNAC of which 11 had the features of papillary carcinoma and remaining cases were suspicious of malignancy.

Papillary carcinoma thyroid	21
Follicular neoplasm	4
Hurthle cell neoplasm	1
Total	26

Cytopathological Correlation of Malignant Cases

	FNAC	HPE
Papillary carcinoma thyroid	21	23
Follicular neoplasm	4	0
Hurthle cell neoplasm	1	0

	FNAC	HPE
Papillary carcinoma thyroid	21	23
Follicular neoplasm	0	4
Hurthle cell neoplasm	0	1

In our study when FNAC was done 21 cases were diagnosed to have features of papillary carcinoma of thyroid which turned out to be malignant even on HPE.

2 other cases which were suspicious of malignancy turned out to be malignant on HPE showing features of papillary carcinoma of thyroid.

4 cases which were diagnosed with features of follicular neoplasm on FNAC turned out to be follicular adenoma.
HPE needs to be done for the cases of follicular carcinoma for confirmation of malignancy.

FNAC has a sensitivity of 91.3% in diagnosis of papillary carcinoma in our study.

Parameter	Current Study	Qureshi et al	Sinna et al	Bagga et al	Mishra et al
Sensitivity	91.3%	70%	92.8%	66%	92.3%
Specificity	81.4%	98.68%	94.2%	100%	76.5%
Positive Predictive Value	80.7%	87.5%	94.9%		75%
Negative Predictive Value	91.6%	96.15%	91.8%		92.8%
Accuracy	95.4%	95.34%	93.6%	96.2%	83.3%

Diagnostic accuracy of FNAC in thyroid swellings in comparison with histological diagnosis was 96.05 % in a study done khageswar et al in 2011

In a study done by Senthil et al in 2017 accuracy of FNAC in diagnosis of thyroid swellings in comparison with histopathological diagnosis was 91.6%. Handa et al have a similar study which revealed sensitivity of 97%.

In a study done by Shankar et al in 2017 showed accuracy of FNAC of almost 94% in comparison with the histopathology report.

Present Study	95.4%

4. Results

- From June 2019 to November 2021, prospective research comparing FNAC and HPE on 50 patients was conducted.
- Females made up the majority of the patients.
- The majority of the presenters were between the ages of 21 and 30.
- FNAC sampling is a simple approach that can be performed by skilled professionals and is more patient friendly.
- There were no complications as a result of the treatment.
- Out of 50 patients, 24 were benign, 21 were malignant, and 5 were suggestive of malignancy on FNAC.
- On HPE, 21 instances classified as malignant on FNAC were proven to be malignant.
- After cytopathological correlation, we found that 95.4

percent of the time, FNAC had a diagnostic accuracy of 95.4 %, sensitivity of 91.3 percent, specificity of 81.4 percent, PPV of 80.7 percent, and NPV of 91.6 percent.

- Another 50 patients were considered retrospectively before the duration of current study, in which FNAC showed a total of 5 malignant cases, 27 cases of multinodular goitre, 4 adenomatous goitre cases, 2 hurthle cell neoplasm, 2 follicular neoplasms, 1 case was suspicious of malignancy.
- On HPE, 13 cases were diagnosed as malignant, 20 multinodular goitre cases, 8 Hashimoto thyroiditis, 4 adenomatous goitre, 2 follicular adenoma, 2 hurthle cell adenoma, 1 toxic goitre.

5. Conclusion

When a patient goes to surgery with thyroid symptoms, FNAC is a basic and highly significant inquiry done on an outpatient basis following a clinical history and clinical examination for the patient's evaluation. It is utilised as a first line of defence in the assessment of palpable thyroid swellings.

FNAC of palpable thyroid swellings aids in the diagnosis of the swellings and is effective in subsequent thyroid swelling therapy. On FNAC, it is impossible to distinguish follicular cancer from adenoma.

For the preoperative examination of patients with palpable thyroid swellings, FNAC is a simple, minimally invasive treatment that is extremely accurate and cost effective.

When performed by competent people, the FNAC treatment is often free of difficulties, making it a safe procedure.

References

[1] Rout K, Ray CS, Behera SK, Biswal R. A Comparative Study of FNAC and Histopathology of Thyroid Swellings. *Indian J Otolaryngol Head Neck Surg*.2011; 63 (4): 370 - 372. doi: 10.1007/s12070 - 011 - 0280 – 0 https: //www.ncbi. nlm. nih. gov/pmc/articles/PMC3227838/

[2] Sengupta A, Pal R, Kar S, Zaman FA, Sengupta S, Pal S. Fine needle aspiration cytology as the primary diagnostic tool in thyroid enlargement. J Nat Sci Biol Med.2011 Jan; 2 (1): 113 - 8. doi: 10.4103/0976 - 9668.82308. PMID: 22470244; PMCID: PMC3312690. https: //pubmed. ncbi. nlm. nih. gov/22470244/

[3] Kumar, Abhay & Bhadouriya, Sunil & Narain, Prem & Chauhan, Jitendra & Bharti, Bhartendu & Singh, Jaypal. (2017). Comparative study of FNAC and histopathology of thyroid swellings, diagnostic accuracy and role in its management. International Journal of Otorhinolaryngology and Head and Neck Surgery.10.18203/issn.2454 - 5929. ijohns20174183. https: //www.researchgate. net/publication/319858378_Comparative_study_of

[4] _FNAC_and_histopathology_of_thyroid_swellings_diagnostic_accuracy_and_r ole_in_its_management Baloch ZW, LiVolsi VA, Asa SL, et al. Diagnostic terminology and morphologic criteria for cytologic diagnosis of thyroid lesions: a synopsis of the National Cancer Institute Thyroid Fine - Needle Aspiration State of the Science Conference. Diagn Cytopathol.2008; 36: 425 - 37. https: //www.researchgate. net/publication/5372148_Baloch_ZW_Livolsi_VA_Asa_SL_Rosai_J_Merino_MJ_Randolph_G_Vielh_P_Demay_RM_Sidawy_MK_Frable_WJDiagnostic_terminology_and_morphologic_criteria_for_cytologic_diagnosis_of_thyroid_lesions_a_synopsis_of_th

[5] Gupta M, Gupta S, Gupta VB. Correlation of fine needle aspiration cytology with histopathology in the diagnosis of solitary thyroid nodule. *JThyroidRes*.2010; 2010: 379051. Published 2010 Apr 18. doi: 10.4061/2010/379051 https: //www.ncbi. nlm. nih. gov/pmc/articles/PMC2956979/

[6] Machała E, Sopiński J, Iavorska I, Kołomecki K. Correlation of Fine Needle Aspiration Cytology of Thyroid Gland with Histopathological Results. Pol Przegl Chir.2018 Aug 21; 90 (6): 1 - 5. doi: 10.5604/01.3001.0012.4712. PMID: 30652691. https: //pubmed. ncbi. nlm. nih. gov/30652691/

[7] Sharma C. Diagnostic accuracy of fine needle aspiration cytology of thyroid and evaluation of discordant cases. J Egypt Natl Canc Inst.2015 Sep; 27 (3): 147 - 53. doi: 10.1016/j. jnci.2015.06.001. Epub 2015 Jul 14. PMID: 26185872. https: //pubmed. ncbi. nlm. nih. gov/26185872/

[8] Handa U, Garg S, Mohan H, Nagarkar N. Role of fine needle aspiration cytology in diagnosis and ¬management of thyroid lesions: A study on 434 patients. J Cytol 2008; 25: 13 - 7 https: //www.jcytol. org/article. asp?issn=0970 - 9371; year=2008; volume=25; issue=1; spage=13; epage=17; aulast=Handa

[9] Sidawy MK, Del Vecchio DM, Knoll SM. Fine - needle aspiration of thyroid nodules: correlation between cytology and histology and evaluation of discrepant cases. Cancer.1997 Aug 25; 81 (4): 253 - 9. doi: 10.1002/ (sici) 1097 -