

Thyroid Lesion Assessment in Rural Settings by Fine Needle Aspiration Cytology and its Comparison with Ultrasonographic Examination**Gupta Anil Kumar¹, Chauhan Sachin¹, Goel Shikha^{2*}, Gupta Isha³, Rathore Renu⁴, Singh Deergha²**¹Associate Professor, Department of Pathology, NC Medical College, Israna, Panipat Singh²Assistant Professor Department of Pathology, NC Medical College, Israna, Panipat³Professor & HOD, Department of Pathology, NC Medical College, Israna, Panipat⁴Senior Resident, Department of Pathology, NC Medical College, Israna, Panipat

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Abstract:

Thyroid swellings are common all over world, ranging from 4-8% to 8.5% in India. Most of thyroid swellings are benign in nature but malignancy does occur in 5-15% cases. Therefore, early diagnosis and precise risk assessment are crucial in managing thyroid lesions especially in rural areas. Fine needle aspiration cytology (FNAC) is essential for cell diagnosis based on "The Bethesda system of reporting Thyroid Cytology" (TBSRTC) 1. Ultrasonography of thyroid lesion is an initial investigation for risk assessment of various thyroid lesions; and evaluated as per "Thyroid imaging recording and data system" (TIRADS1). In our study all thyroid cytology reports were evaluated in conjunction with USG findings. Our study show female preponderance (93.33%) with involvement of younger age group of 20-40 years (53.3%) . In our study all USG findings of TIRADS II were correctly diagnosed as colloid goitre, TIRADS III group had different cytological diagnosis as per TBSRTC; 2 were diagnosed as non-malignant and remaining 04 were upgraded to higher grade on cytology. Therefore USG findings in TIRADS III need to be evaluated more closely by cytology to identify the proper cytologic diagnosis. Studies are in favour of use of FNAC in thyroid lesions, especially in solitary thyroid nodules.

Keywords: Thyroid lesions, Ultrasonographic examination, Fine Needle Aspiration Cytology, Rural areas.

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Introduction

Worldwide, clinically thyroid swelling is found in 4–8% population and about 8.5% of the general population in India [2]. Majority of thyroid swellings are benign; 5-15% cases are malignant and require further evaluation [3,4] Thyroid nodules are more common in women compared to males ;but are found to be more aggressive in males with higher risk of malignancy [5]. Early diagnosis and its accurate risk assessment are crucial in managing thyroid lesions.

Thyroid nodule is defined as a focal well-defined area of altered echogenicity, distinct from surrounding normal thyroid parenchyma in Ultrasonogram (USG). USG is an initial investigation in a euthyroid nodule; and evaluated based on "Thyroid imaging recording and data system" (TIRADS), a risk stratification classifying various thyroid nodules [1].

Fine needle aspiration cytology (FNAC) is essential for a cellular diagnosis and further clinical management of thyroid lesions. Cytological smears

are categorised based on "The Bethesda system of reporting Thyroid Cytology" (TBSRTC) [1] .The aim of present study was to evaluate cytologic diagnosis of thyroid lesion in conjunction with prior USG evaluation in rural area.

Material and methods:

This is a retrospective study conducted at Department of Pathology, NC Medical College, Israna, Panipat and included patients with thyroid lesion, evaluated by both FNAC & USG. A total of fifteen Patients were found to have evaluation by both USG and FNAC during Jan2023 to Aug 2023 in this study. All patients prior to FNAC, were counselled and informed consent obtained. Their demographic & clinical data were recorded from the relevant documents. USG of thyroid lesions helps to differentiate solid from cystic lesions as well to know the anatomy and nodularity of gland and to differentiate findings suggestive of benign vs malignant lesions. USG of thyroid lesion were evaluated according to the TIRADS stratification.

TIRADS 1: Benign, TIRADS 2: Not Suspicious, TIRADS 3: Mildly Suspicious, TIRADS 4: Moderately Suspicious, and TIRADS 5: Highly Suspicious. With all aseptic precautions FNAC was done in cytology section of pathology department by using 23 gauge needles. Cytological smears prepared from aspirated material and stained with Giemsa /Leishman stain. A cytological diagnosis was made. FNAC reports of all such patients from thyroid lesions were evaluated according to “The Bethesda system of reporting Thyroid Cytology” (TBSRTC). Bethesda I- (nondiagnostic), Bethesda II (Benign), Bethesda III (Atypia of undermined significance (AUS)/ follicular lesion of undetermined significance (FLUS), Bethesda IV (follicular neoplasm (FN)/suspicious for follicular neoplasm (SFN)),

Bethesda V (suspicious for malignancy), and Bethesda VI (malignant).

Result

In this study, 15 patients with thyroid lesions fulfilled our inclusion criteria and been evaluated for both USG as well FNAC. All patients were from rural areas. Average age of patients was 44.2 years; age ranges from 22 years to 80 years. 8 (53.33%) patients were in age group of 20 to 40 years while remaining 7 (46.67%) patients belonged in age group beyond 40 years of age.

Almost all patients were females except one; had a female predominance of 14 (93.33%) females and 1 (7.67%) male patient. (Table 1 & Fig 1).

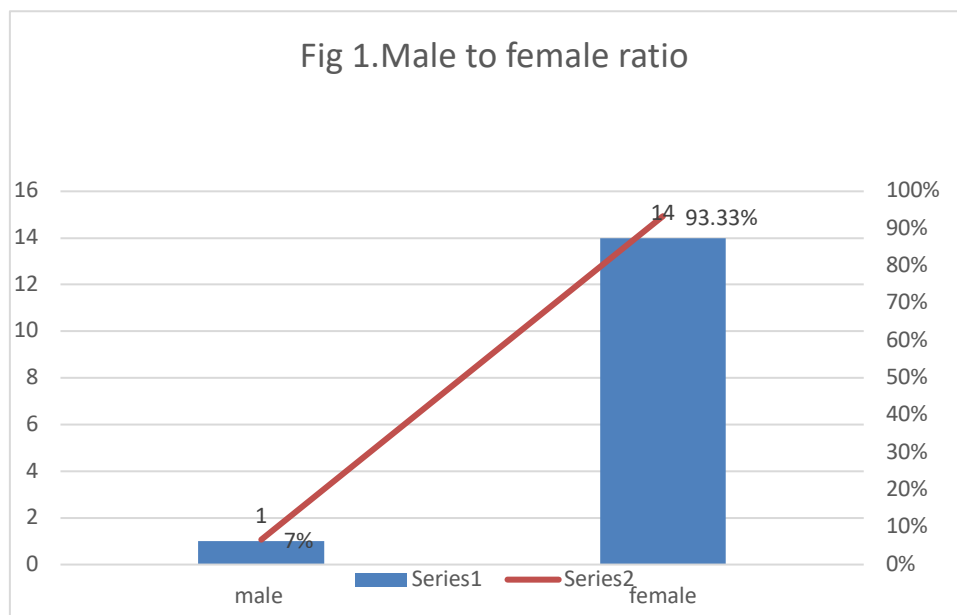


Figure 1: Male to female ratio of thyroid patients

Table 1: Comparison of USG diagnosis (TIRADS) vs FNAC diagnosis (TBSRTC)

S No	Age In years	sex	USG evaluation TIRADS	FNA Cytology Diagnosis TBSRTC
1	38	Female	III	IV.Follicular Neoplasm
2	52	Female	II	II. Colloid nodule
3	30	Female	II	II. Nodular colloid goitre
4	40	Male	IV	VI.Malig.papillary ca
5	80	Female	II	II.Nodular colloid goitre
6	60	Female	III	V.Malignant
7	53	Female	III	V.Malignant
8	53	Female	III	V.Thyroid neoplasm
9	34	Female	II	II.Colloid goitre
10	60	Female	IV	VI.Poorly differentiated carcinoma
11	49	Female	III	II.Lymphocytic thyroiditis
12	31	Female	III	II.hashimoto thyroiditis
13	22	Female	II	II.Colloid goitre
14	37	Female	II	II.Nodular colloid goitre
15	24	Female	II	II.Nodular colloid goitre

USG findings of thyroid lesions were classified as per TIRADS category; all lesions were further evaluated cytologically through FNAC and classified as per TBSRTC (Table 1). In our study, all USG findings categorized as TIRADS II were correctly diagnosed as colloid goitre. However, the TIRADS III group (mildly suspicious) had different cytological diagnoses as per TBSRTC – two out of six were non-malignant, while the remaining four were upgraded to TBSRTC IV or V. This highlights the importance of close cytological evaluation for TIRADS III cases to establish the proper cytologic diagnosis per TBSRTC guidelines. TIRAD IV (suspicious for malignancy) on thyroid USG was made in 2 patients and later on categorised as TBSRTC VI (poorly differentiated carcinoma-1, and papillary carcinoma-1). Studies support the use of FNAC in thyroid lesions,

particularly solitary thyroid nodules. Finding abundant colloid, regular spacing, and size of follicles in cytology can help differentiate between macrofollicles and microfollicles; as microfollicular lesions have a higher malignant potential. Cytological diagnosis made on FNAC and the distribution of cases in various TBSRTC categories is as follows: I (nondiagnostic- 0%), II (benign-60%), III (AUS/FLUS- 0%), IV(FN/SFN- 6.6%), V(SM- 20%), and VI(malignant-13.3%). The majority of the patients (n=7, 46.6%) were diagnosed as colloid goitre (fig 2), followed by malignant/neoplasm (n=6, 40.0%) and thyroiditis in 2 (13.3%). Out of 06 thyroid malignancy, one was diagnosed as follicular neoplasm (Fig 3), one as papillary carcinoma (fig 4) and one was poorly differentiated carcinoma. Three neoplasms cytologically could not be categorised.

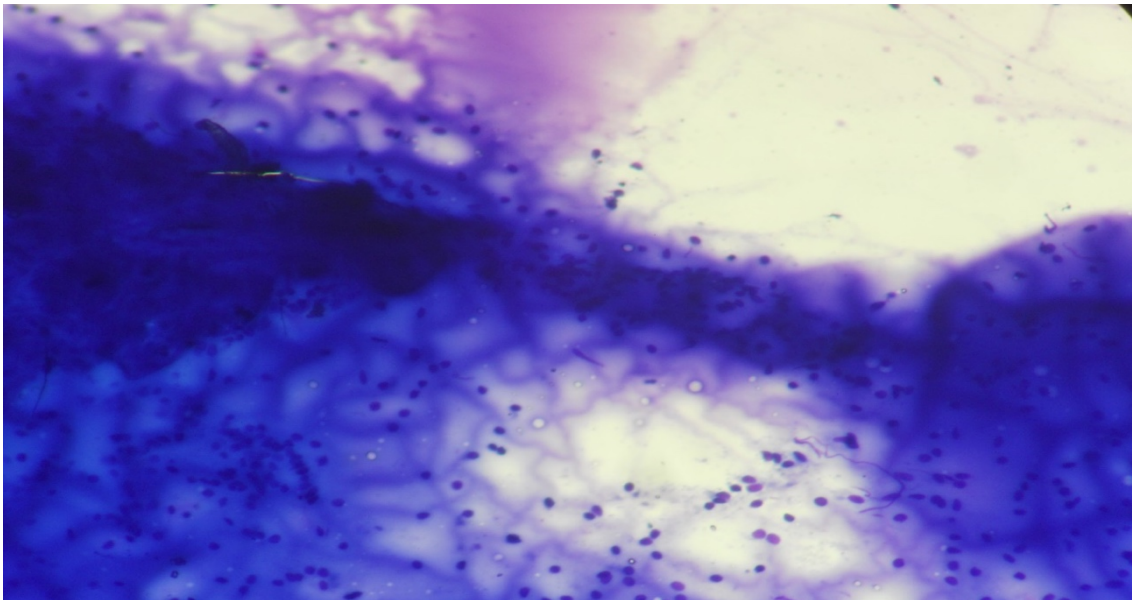


Figure 2: Colloid goitre (TBSRTC grade II)

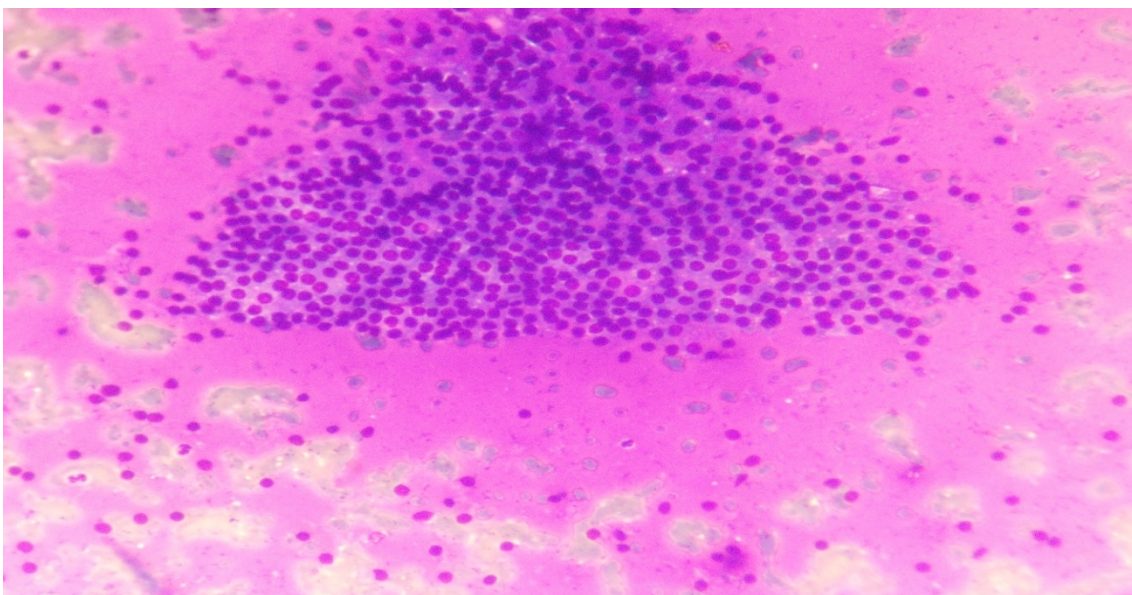


Figure 3: Follicular Neoplasm (TBSRTC grade IV)

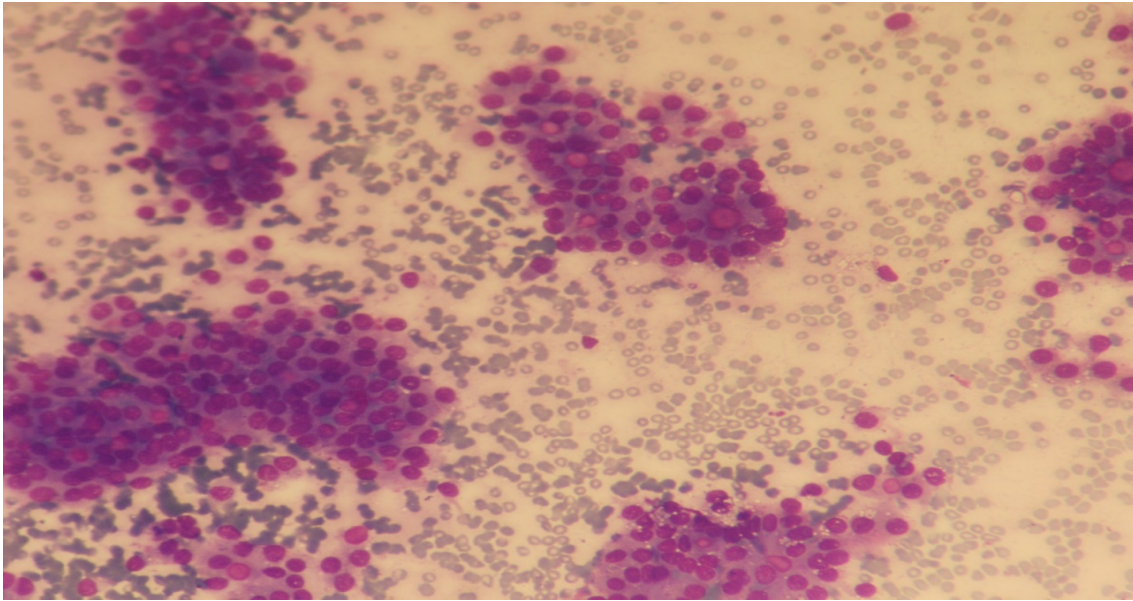


Figure 4: Papillary Carcinoma (TBSRTC grade VI)

Follow-up search was done through hospital records and available data with pathology department. Final histopathological diagnosis was available only in one patients; been operated at our centre and conforming the cytologic diagnosis of papillary carcinoma in one patient.

Discussion

Euthyroid nodule was commonly seen in females compared to males in this study, suggestive of female predominance and was almost 93.33% of total study population. Young patients in age group of 20-40 years are presented more thyroid lesion (53.3%) compared to older age group of more than 40 years of age (46.7%)The results appeared similar with earlier published literature where majority of the cases were reported from 21 to 40 years of age [6].

The limitation of FNAC includes false-negative result and false positive results. Various comparative study showed accuracy between FNAC and histopathology vary from 91.6% to 93% [7,8], and had similar findings with a sensitivity of 97% in FNAC [9]. Thus, FNAC is an adjunct to clinical diagnosis and not a replacement [10].

The ultrasound appearances of benign thyroid lesions show hypoechogenicity as most common features and vary significantly with the sequence of events in their formation like colloid accumulation, necrosis, haemorrhage, fibrosis, scarring and calcification. USG is useful in detecting the exact location in relation to anatomical structures, its extent and consistency .In our study all USG findings of TIRADS II were correctly diagnosed as colloid goitre, TIRADS III group had different cytological diagnosis as evaluated by TBSRTC – 2 out of six were diagnosed as non-malignant and remaining 04 were upgraded to TBSRTC IV or V.

Therefore TIRADS III need to be evaluated more closely by cytology to identify the proper cytologic diagnosis as pr TBSRTC. Studies are in favour of use of FNAC in thyroid lesions, especially solitary thyroid nodules [11]. Findings of abundant colloid, regular spacing, and size of follicles in cytology are helpful in differentiating between macrofollicles from microfollicles; as microfollicular lesions have higher malignant potential [12].

Conclusion

Both FNAC and USG are highly sensitive, but FNAC demonstrates greater specificity. In patients with TIRADS III findings, benign thyroid cytology cannot definitively rule out malignancy and should be further evaluated for confirmation. Suspicious indeterminate results represent a zone of uncertainty that can benefit from further cytological assessment and, if necessary, resolution through surgical resection and biopsy. FNAC emerges as a safe, cost-effective, outpatient procedure capable of accurately differentiating various thyroid lesions, particularly when compared to USG. While FNAC cannot replace conventional surgical histopathology, it plays a vital role in diagnosing thyroid swellings when used in conjunction with USG, significantly enhancing primary healthcare facilities in rural areas, particularly for thyroid lesions. USG-guided FNAC has gained popularity and has substantially improved the diagnostic accuracy of thyroid lesions [13,14].

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