

Study of Diagnostic Efficacy of Ultrasound Guided FNAC Vs Conventional FNAC for Thyroid Nodule at a Tertiary Care CenterPoonam Burdak¹, Dinesh Kumar², Ajeet Gadwal³, Pradeep Kumar⁴¹Associate Professor, Department of Pathology, PDU Medical College, Churu, Rajasthan, India²Associate Professor, Department of Radio Diagnosis, SPMC, Bikaner, Rajasthan, India³Associate Professor, Department of Medicine, PDU Medical College, Churu, Rajasthan, India⁴Assistant Professor, Department of Medicine, PDU Medical College, Churu, Rajasthan, India

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Conflict of interest: Nil

Abstract:

Background: FNAC of thyroid is a minimally invasive, simple and cost effective method in the diagnosis and management of palpable thyroid lesions. As the conventional FNAC procedure is an unguided procedure, many times the quality of smear is also compromised in form of blood background or less cells or inadequate smear. Ultrasound-guided fine-needle aspiration (US-FNAC) is a relatively inexpensive, useful and relatively more sensitive diagnostic tool as compared to conventional FNAC for the evaluation of nonpalpable thyroid lesions.

Methods: All thyroid FNAC both conventional and ultrasound guided between Jan 2021 to Dec 2022 were included in the study. The smears were processed as per protocol and examined to compare the quality of smears.

Results: We received a total of 59 samples of FNAC of thyroid gland. Of these, 36 FNACs were conventional FNAC which were done without guidance (C-FNAC) and 23 FNACs were done under USG guidance (US-FNAC). There were 22 (37.29%) male patients and 37 (62.71%) females. The age of patients ranged from 13 years to 79 years with the median age of 43 years. Histological correlation is present in 12 patients (4 C-FNAC and 8 US-FNAC). Benign lesions were the most common with 57 (96.61%) cases and only 2 cases of malignant lesions were reported, with 1 case of follicular neoplasm and 1 case of Papillary carcinoma. Both the malignant lesions were reported on US guided FNAC. Out of the 36 cases that underwent C-FNAC 10 (27.78%) were given an inadequate report. In contrast, only 1 out of 23 patients (4.35%) were given an inadequate report when US-FNAC was done. The difference between the two were significant (p value = 0.025).

Conclusions: The cytological criteria for identification of a lesion are well defined. USG-guided FNAC gives an added advantage of providing a more accurate diagnosis of the lesion or the lesions in thyroid. In our study USG-guided FNAC better tissue yield and better quality of smears in comparison to conventional FNAC and improved the sensitivity and diagnostic accuracy.

Keywords: FNAC, Thyroid, Ultrasound Guided FNAC.

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Introduction

Thyroid diseases are one of the most common endocrine diseases in India [1]. It is estimated that 42 million people have thyroid diseases in India [2]. This sums out around 8.5% population of India has thyroid nodule [3]. Thyroid swelling is a common finding in ENT and surgery OPDs all over India.

Thyroid diseases can vary from innocent physiologic enlargements of the thyroid gland to small nodule to life threatening thyrotoxic crises. Thyroid nodule refers to a distinct lesion within the thyroid gland that is clinically on palpation or radiologically distinct from surrounding thyroid parenchyma.[4] The reported prevalence of nodular thyroid disease depends on the population studied

and the methods used to detect nodules. Numerous studies suggest a prevalence of 2-6% with palpation, 19-35% with ultrasound and 8-65% in autopsy data [5].

Thyroid gland neoplasms are one of the most common endocrine malignancies in the world, and worldwide it constitutes about 1% of human neoplasms.[6] Thyroid carcinoma accounts for 1-5% of all malignancies in females and less than 2% of all malignancies in males.[7] Papillary carcinoma is the most common thyroid neoplasm. Fine needle aspiration cytology (FNAC) of thyroid is a minimally invasive, simple and cost effective method in the diagnosis and management of palpable thyroid lesions.[8] FNAC is a good method

for investigating thyroid lesions however in cases of non-palpable lesions, lesions with multiple foci, there are more chances of missing the diagnosis because the procedure is blind. As the conventional FNAC procedure is a unguided procedure, many times the quality of smear is also compromised in form of blood background or less cells or inadequate smear.

Ultrasound-guided fine-needle aspiration (US-FNAC) is a relatively inexpensive, useful and relatively more sensitive diagnostic tools compared to conventional FNAC for the evaluation of nonpalpable thyroid lesions. [9]

Many previous studies [8-10] suggest that ultrasound guided FNAC (US-FNAC) may be beneficial over conventional FNAC because it affords better visualization of smaller nodules as well as solid portions of cystic nodules, in a single attempt of procedure which avoids unnecessary repeated smears and major surgery. Secondly, it provides fast and accurate results. Thus, this study was conducted to compare the smear quality and diagnostic efficacy of ultrasound guided FNAC in comparison of conventional FNAC.

Materials and Methods

This is a descriptive study carried out in the Department of Pathology, PDU Medical College, and Associated Group of Hospitals, Churu for two years from January 2021 to December 2022. All thyroid gland FNACs both percutaneous unguided and ultrasound guided FNACs received by the department during study period were included in the study.

Clinical history and relevant investigations were noted from clinical records. The smears are methanol fixed and stained with hematoxylin and eosin stain and observed under light microscope.

Smears were divided into two groups:

Group 1: Consists of patients who underwent USG guided FNAC for thyroid swelling.

Group 2: Consists of patients who underwent conventional FNAC for thyroid swelling.

All the FNACs both conventional FNAC (C-FNAC) and ultrasound guided FNAC (US-FNAC) were examined by pathologist at the department and finding were recorded in a pre-decided format. The smears were checked for cellularity, presence of blood, blood clots and only cystic fluid smears. The data was compared in both the groups and analyzed.

Inclusion criteria

- All FNAC smears received at the department of Pathology.

Exclusion criteria

- Patients without complete clinical records.
- Degenerated samples.

Statistical analysis

Qualitative variables were summarized using percentages and proportions. Quantitative variables were summarized using mean with standard deviation. sensitivity and specificity of conventional FNAC and USG guided FNAC were found out by comparing it with histopathologic examination report. Data was entered in MS Excel.

Results

We received a total of 59 samples of FNAC of thyroid gland during the study period. Of these, 36 FNACs were conventional FNAC which were done without guidance (C-FNAC) and 23 FNACs were done under USG guidance (US-FNAC). There were 22 (37.29%) male patients and 37(62.71%) females. [Table 1]The proportion of males and females was comparable in both groups. The age of patients ranged from 13 years to 79 years with the median age of 43 years. Out of the total of 59 patients who underwent FNAC, 12 patients had cyto-histological correlation. Of the 12 patients who had cyto-histological correlation, 4 underwent C-FNAC and 8 patients under went US-FNAC.

Table 1: Gender wise distribution of cases in both groups.

Type of Smear	Females	Percent	Males	Percent	Total
Conventional FNAC	23	63.89%	13	36.11%	36
Ultrasound guided FNAC	14	60.87%	9	39.13%	23
	37	62.71%	22	37.29%	59

In the present study, on cytological evaluation, benign lesions were the most common with 57 (96.61%) cases and only 2 cases of malignant lesions were reported, with 1 case of follicular neoplasm and 1 case of Papillary carcinoma. Both the malignant lesions were reported on US guided FNAC. To compare the quality of smears on conventional and ultrasound guided FNAC, the pathologist commented on presence of excess blood in background, adequacy of cells in smear

and presence of only serous fluid in smear. Out of the 36 cases that underwent C-FNAC 10 (27.78%) were given an inadequate report. In contrast, only 1 out of 23 patients (4.35%) were given an inadequate report when US-FNAC was done. The difference between the two were significant (p value = 0.025). However, we did not find statistically significant difference in presence of blood in background between two techniques. (p-value = 0.053) [Table 2]

Table 2: Comparison of quality of smear indicators in both groups.

Smear Quality	C-FNAC	Percent	US-FNAC	Percent	p-value
Bloody smears	13	36.11%	3	13.04%	0.053
Inadequate cells	10	27.78%	1	4.35%	0.025
Only serous fluid	9	25.00%	1	4.35%	0.04

Table 3: Distribution of cases based on cytological diagnosis.

S. No.	Cytological Diagnosis	No. of Cases	Percent
1	Colloid Goitre	26	44.07%
2	Nodular Goitre	19	32.20%
3	Granulomatous Thyroiditis	7	11.86%
4	Lymphocytic Thyroiditis	5	8.47%
5	Follicular Neoplasm	1	1.69%
6	Papillary Carcinoma	1	1.69%
	Total	59	100.00%

On histological examination in the cases where histopathology was sent and reports were available, 2 cases of conventional FNAC which were reported as lymphocytic thyroiditis on cytology were reported as papillary carcinoma of thyroid. However, all the cases of US guided FNAC were confirmed on histopathological examination. [Table 3] It was seen that both US-FNAC, C-

FNAC, and overall, the specificity and negative predictive value is high. Two cases of papillary carcinoma were missed among the group who underwent conventional FNAC and we observed sensitivity - 83.3%, specificity - 100%, accuracy - 96%, positive predictive value - 100%, negative predictive value - 95% in diagnosing malignancies by conventional cytology.

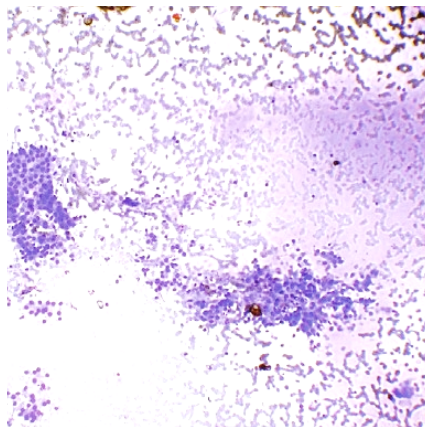


Figure 1: C-FNAC of thyroid gland showing colloid goitre

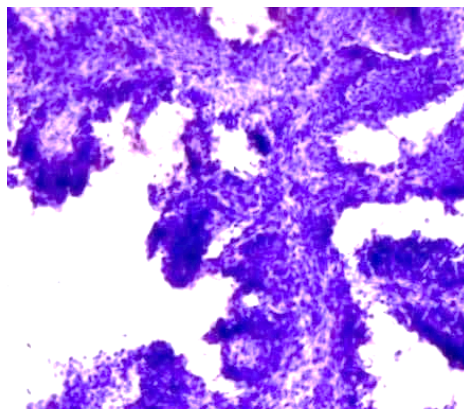


Figure 2: Ultrasound guided FNAC of thyroid gland showing papillary carcinoma.

Discussion

Fine needle aspiration cytology is accepted globally as the most important and inexpensive screening

test for diagnosis of thyroid lesions. FNAC is easy, non-invasive and quick method of diagnosis of thyroid lesions with acceptable sensitivity and specificity in multiple studies.[10,11,12,13]

Conventional FNAC is a blind procedure and depends purely upon the experience and skills of the pathologist performing it. Ultrasound-guided fine-needle aspiration (US-FNAC) is a relatively inexpensive, useful and relatively more sensitive diagnostic tool as compared to conventional FNAC for the evaluation of non-palpable thyroid lesions. [9] Many previous studies [8-10] suggest that ultrasound guided FNAC (US-FNAC) may be beneficial over conventional FNAC because it affords better visualization of smaller nodules as well as solid portions of cystic nodules, in a single attempt of procedure which avoids unnecessary repeated smears and major surgery. Secondly, it provides fast and accurate results.

In the present study we included a total of 59 FNAC smears received at our department out of which 36 were conventional and 23 were ultrasound guided FNAC. There was female predominance in our study with 22 (37.29%) male patients and 37 (62.71%) females. In the similar studies done by Saji kumar NR et al.[medip] and B.R. Ashwini et al., they also reported female predominance which is in agreement with our study.

In the present study, on cytological evaluation, benign lesions were the most common with 57 (96.61%) cases and only 2 cases of malignant lesions (1 case of follicular neoplasm and 1 case of Papillary carcinoma). Both the malignant lesions were reported on US guided FNAC. Similar to our study, Sajikumar NR et al.[14] and B.R. Ashwini et al. [10] also reported that benign cases were in majority. Likhar et al. [15] in their study of FNAC thyroid gland reported 94.4% non-neoplastic lesions and Dr. Poorva Kalsariya et al [16] reported 81% benign thyroid lesions in their study. Most of the previous studies, report benign lesions as most common lesion with few variations.

On comparing the quality of smear in both techniques C-FNAC and US-FNAC we observed that, inadequate samples were significantly more in conventional FNAC (27.78%) as compared to US-FNAC (4.35%). Danese et. al. [17] in their study reported 8.7% inadequate smears in C-FNAC whereas 3.5% inadequate in US guided FNAC. Manoj Sharma et al [18] also reported overall higher (15.19%) inadequate report with conventional FNAC as compared to sono-guided FNAC (0.58%) and the difference was statistically significant. Both the studies are in concordance with the present study. FNAC is a good tool for the screening and early diagnosis of thyroid pathology with minimal trauma to patient. Our current study shows that the quality of smear are better with sono guided technique as compared to conventional method, which is a blind technique.

Conclusion

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Thyroid lesions are common. The cytological criteria for identification of a lesion are well defined. USG-guided FNAC gives an added advantage of providing a more accurate diagnosis of the lesion or the lesions in thyroid. In our study USG-guided FNAC better tissue yield and better quality of smears in comparison to conventional FNAC and improved the sensitivity and diagnostic accuracy.

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