Section: Radio-Diagnosis

Original Research Article

A STUDY ON EVALUATION OF CORRELATION BETWEEN FNAC AND ULTRASONOGRAPHY OF NECK IN PATIENTS WITH THYROID LESIONS

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ABSTRACT

Background: Thyroid swelling is a common clinical presentation that can be indicative of benign or malignant conditions, necessitating accurate diagnostic modalities for effective management. Fine-Needle Aspiration Cytology (FNAC) is a minimally invasive procedure that provides cytological analysis, crucial for differentiating between benign and malignant thyroid lesions. Ultrasound of the neck (USG) complements FNAC by offering detailed morphological assessment of thyroid nodules, aiding in the precise localization and characterization of lesions.

Materials and Methods: this prospective study was conducted over 1-year period in the Department of Radiology, Katuri Medical College, during which 75 patients with thyroid lesions were included.

Results: the study population was a female predominant one. Most of the patients were aged between 21 – 30 years. Most of the patients had hypothyroidism. Most of the swelling were soft in consistency, were >10 mm in size, involving either of the lobes (solitary). FNAC was able to detect both malignant and benign lesions which USG thyroid gland couldn't.

Conclusion: The confluence of morphological data derived from USG and cellular insights obtained from FNAC enables clinicians to make judicious decisions regarding the management of thyroid nodules. This integrative diagnostic strategy is instrumental in the early detection of thyroid malignancies, informing treatment protocols, and optimizing patient prognoses. Hence, the correlation between FNAC and USG findings is fundamental to the efficacious evaluation of thyroid nodules, ensuring precise diagnosis and superior patient care.

Keywords: FNAC, Ultrasonography, Thyroid Lesions.

INTRODUCTION

Thyroid lesions, encompassing a spectrum from benign nodules to malignant neoplasms, present a prevalent clinical conundrum necessitating meticulous evaluation for optimal therapeutic intervention. The thyroid gland, an endocrine organ with a butterfly configuration situated anteriorly in the neck, orchestrates metabolic regulation via hormone secretion. Thyroid nodules, representing localized enlargements within the glandular tissue, exhibit an increased prevalence with advancing age.[1]

Despite the predominance of benign etiologies, a subset of these nodules harbors malignant potential, thus underscoring the imperative for precise diagnostic methodologies to discriminate between benign and malignant entities. Fine-Needle Aspiration Cytology (FNAC) and ultrasonography (USG) constitute the cornerstone diagnostic modalities in this context.[1,2]

FNAC entails the aspiration of a minuscule sample of cells from the thyroid nodule using a fine-gauge needle, subsequently subjected to cytopathological examination to ascertain the cellular characteristics of the lesion. Ultrasonography, employing high-frequency sound waves, generates intricate imaging of the thyroid gland, delineating the nodule's dimensions, morphology, echotexture, and vascularity. The correlation between FNAC results

and USG findings is pivotal for the precise diagnosis and management of thyroid lesions.[2,3]

Ultrasonography can identify sonographic features suggestive of malignancy, including micro-calcifications, irregular or spiculated margins, marked hypo-echogenicity, and increased intra-nodular vascularity. The presence of such sonographic hallmarks typically necessitates FNAC to confirm the diagnosis cytologically. In contrast, nodules exhibiting benign ultrasonographic features, such as anechoic or predominantly cystic composition and spongiform appearance, may not mandate FNAC. The diagnostic sensitivity and specificity of FNAC are significantly augmented when integrated with USG, culminating in more accurate diagnostic outcomes. The technique of USG-guided FNAC, enhances the precision of cytological sampling. This synergistic approach mitigates the risk of false-negative results and procedural risks, thus ensuring comprehensive sampling of even diminutive or deeply situated nodules.[2-5]

The primary objective of this study is to correlate findings of FNAC with ultrasound appearance of thyroid lesions in patients presenting to a tertiary center.

MATERIAL AND METHODS

A cohort of 75 patients was selected for the present study, which is a cross-sectional study conducted at the Departments of Pathology and Radio-diagnosis of Katuri Medical College, India. The study period was of 1-year duration, i.e., from March 2023 to Feb 2024. All patients aged 18 years and above with clinical features of thyroid lesions on ultrasound examination were included in this study. Patients with history of bleeding disorders and patients who refused to give consent were excluded from the study.

A detailed history was taken with special emphasis on duration of symptoms, any family history of thyroid malignancies, and any history of hypo or hyperthyroidism. A thorough general and systemic examination was done. Local examination of the thyroid lesion was done to assess the size, texture and presence of any lymphadenopathy.

Ethical committee approval was taken prior to the start of the study. A written informed consent was taken from all the patients.

Ultrasound scanners with high-frequency transducers were used to assess thyroid morphology, vascularity, nodules, and echogenicity. Nodules larger than 5 mm were evaluated for additional characteristics, including vascularity, calcifications, morphology, boundaries, contents, and echogenicity. FNAC was performed on patients with thyroid lesions after obtaining informed consent. Patients were placed supine with their necks fully extended, and the skin was prepared with povidone-iodine. The lesion was located via ultrasonography without ultrasound gel, using povidone-iodine for coupling. Local anesthesia was administered as needed. A 10 ml syringe with a 23 to 27-gauge needle was used to aspirate tissue samples, with the transducer positioned to visualize the lesion and its surrounding vasculature. At least two aspirations were made to obtain tissue samples once the needle reached the lesion.

All data was entered into Microsoft excel sheet and analyzed.

RESULTS

75 patients with thyroid lesions were included in this cross-sectional study.

Out of the 75 patients, 10 patients had a positive family history of thyroid lesions while the rest 65 patients had no significant family history. Most of the patients were hypothyroid. Most of patients were euthyroid (52%). 46.7% of the patients had swelling since 6-12 months. 50.6% of the patients had a soft consistency of swelling. 81% had a solitary thyroid nodule. 48% of the patients had lesion of >10mm in size.40% of the patients had iso-echoic lesions on USG neck. [Table 1]

FNAC was able to detect all patients with being and malignant lesions. [Table 3]

Table 1: Age and gender wise distribution of patients

Age	Total no. of patients	Total no. of females	Total no. of males
<20 years	3	3	0
21-30 years	25	21	4
31-40 years	18	15	3
41-50 years	15	11	4
51-60 years	9	6	3
>60 years	5	3	2
Total	75	59	16

Table 2: Characteristics of thyroid nodule

Characteristic		No. of patients
Thyroid function test	Euthyroid	25 (33.3%)
	Hypothyroid	39 (52%)
	hyperthyroid	11 (14.7%)
Duration of swelling	0-6 months	23 (30.6%)
	6-12 months	35 (46.7%)
	>12 months	12 (16%)
Consistency of swelling	Firm	22 (29.3%)
	Hard	10 (13.3%)

	soft	38 (50.6%)
Distribution of thyroid nodules	Single	61 (81.3%)
	Multiple	14 (18.6%)
Nodule size	<5 mm	23 (30.6%)
	5-10mm	16 (21.3%)
	>10mm	36 (48%)
Echogenicity of thyroid nodules	Anechoic	10 (13.3%)
	Hypoechoic	12 (16%)
	Isoechoic	30 (40%)
	Hyperechoic	23 (30.6%)

Table 3: type of thyroid lesion by ultrasonography and by FNAC

	Ultrasonographic findings	FNAC findings	total
Benign- inflammatory lesions	48 (64%)	49 (65.3%)	49 (65.3%)
Benign- non- inflammatory lesions	12 (16%)	14 (18.6%)	14 (18.6%)
Malignant lesions	5 (6.7%)	7 (9.3%)	7 (9.3%)

DISCUSSION

This prospective study was conducted to correlate the findings of Fine-Needle Aspiration Cytology (FNAC) with the ultrasound appearance of thyroid lesions in 75 patients presenting to a tertiary center over a one-year period, focusing on the diagnostic value of both methods.

The study cohort comprised 75 patients, predominantly female (59 females, 16 males). The age distribution indicated the highest number of patients (25) were in the 21-30 years age group. The demographic data suggests a higher prevalence of thyroid lesions among younger to middle-aged females, aligning with studies by Rathod et al6, Langer et al,[7] and Gupta et al.[8] The reason could be attributable to the presence of estrogen receptors on thyroid gland in females.[9]

The majority of patients (46.7%) reported a duration of swelling between 6-12 months. 50.6% had a soft consistency of swelling. This is in accordance with study done by Vyas et al.[10] The predominance of solitary thyroid nodules (81.3%) and larger nodules (>10mm in 48% of patients) highlights the clinical characteristics typically observed in thyroid lesion presentations. This is in accordance with studies done by Gupta et al,[11] and Bise et al.[9]

Ultrasound findings revealed that 40% of the patients had isoechoic lesions, with 30.6% presenting hypoechoic nodules. This distribution of echogenicity aligns with the expected ultrasound appearance of various thyroid pathologies. Hypoechogenicity is suggestive of malignancy while hyperechogenicity is suggestive of benign pathology predominantly. This finding was in accordance with studies done by Prasad et al,[12] and Avinash et al.[13]

The study found a significant correlation between ultrasound and FNAC findings. Specifically, benign inflammatory lesions were identified in 64% (ultrasound) and 65.3% (FNAC) of patients. Benign non-inflammatory lesions were found in 16% (ultrasound) and 18.6% (FNAC). Malignant lesions were detected in 6.7% (ultrasound) and 9.3% (FNAC).

The ability of FNAC to detect all benign and malignant lesions suggests high diagnostic accuracy. FNAC is a critical tool in differentiating between benign and malignant thyroid lesions, which is essential for determining the appropriate clinical management. The relatively higher diagnostic accuracy is similar to studies done by Prasad et al,[12] Bise et al,[9] and Avinash et al.[13]

CONCLUSION

The findings from this study emphasize the complementary roles of ultrasound and FNAC in the evaluation of thyroid lesions. Ultrasound provides valuable morphological details, while FNAC offers cytological confirmation. This study underscores the importance of correlating ultrasound findings with FNAC results in the evaluation of thyroid lesions. The high diagnostic accuracy of FNAC in identifying both benign and malignant lesions highlights its crucial role in clinical practice. Future studies could focus on larger cohorts and include long-term follow-up to further validate these findings and enhance our understanding of thyroid lesion management. By integrating detailed clinical assessments, ultrasound imaging, and FNAC, clinicians can make more informed decisions, leading to better patient outcomes. This study contributes valuable data to the ongoing efforts to optimize the diagnostic approach to thyroid lesions.

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