Journal of Cardiovascular Disease Research

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 08, 2023

To study thyroid lesions assessed sonographically with FNAC correlation

Dr. P. Harshavardhan Reddy, Dr. Keesara Vivek Vardhan Reddy*
Assistant Professor, Mahavir Institute of Medical Sciences, Vikarabad, Telangana 501101, India
***Corresponding Author**
Dr. Keesara Vivek Vardhan Reddy
Assistant Professor, Mahavir Institute of Medical Sciences, Vikarabad, Telangana 501101, India

ABSTRACT

Introduction: The thyroid gland is classified as an endocrine gland. It is a big gland and the only one that can be examined directly clinically. By using high resolution real-time grey-scale sonography, the superficial location also aids in the examination of its normal anatomy, normal anatomical variants, and pathological situations.

Material and Methods: This cross-sectional investigation was carried out at the pathology and Radiodiagnosis departments of the Mahavir institute of Medical Sciences, Vikarabad, Telangana. The study was carried out during the period from January 2022 to October 2022. Patients having thyroid lesions on sonograms in the 10- to 75-year-old age range.

Results: In this investigation, the majority of the hypoechoic nodules were determined to be malignant nodules; however, in this investigation, malignant nodules were discovered in 83% of hypo echogenic nodules. The FNAC verified the malignancy of every instance that had been identified as such by ultrasonography. Both benign and malignant lesions exhibited isoechoic lesions. The majority of benign lesions had hyperechoic echoes.

Conclusion: Sonographic examination of thyroid lesions was conducted in this study along with FNAC correlation. It can be inferred that thyroid lesions are more common in women. The benign lesions made up all of the anechoic nodules.

Keywords: Thyroid lesions, sonography, FNAC correlation

INTRODUCTION

One type of endocrine gland is the thyroid. It's a sizable gland and the only one accessible to direct clinical inspection. It's on the skin's outer layer. Thyroid glands are easily seen since they are so close to the skin's surface. Because of its superficial location, high-resolution, real-time greyscale sonography can more accurately assess its normal anatomy, normal anatomical variants, and pathological states [1-3].

High-resolution, real-time grayscale and color Doppler sonography are both useful due to the thyroid gland's position. Thyroid pathology and normal anatomy are both brilliantly displayed by USG. Important metabolic processes controlled by the thyroid gland include cardiac output, skeletal growth, and thermogenesis. The thyroid can be most clearly visualized using high-resolution sonography. Size, margin, nodule count, and other normal/pathological anatomical aspects can be demonstrated by USG [4-6].

Clinical evaluation of the thyroid gland focuses mostly on palpation and the measurement of thyroid hormone levels. When a big thyroid lesion causes symptoms like dysphagia or hoarseness of voice, when malignant cells are found by FNAC, or when there is a hypo functional, or so-called "cold" nodule, surgical intervention may be warranted [7, 8].

Thyroid nodules are analyzed with ultrasound. Differentiating between benign and malignant nodules requires characterizing the nodule's size, location in the thyroid gland, echotexture, margins, vascularity, calcification, vascularity, accessory nodules, associated cervical nodes, and contents [9].

Thyroid nodules, thyroid mass, and diffuse enlargement of the thyroid gland are all visible on sonography and can represent either a palpable or non-palpable lesion. The lesions could be causing symptoms or not. Forty percent of patients were diagnosed with multinodular goiter, making it the most frequent pathology. Ninety percent of all cases of multinodular goiter were found in females. Colloid cysts were also more common in women, who accounted for 20% of all cases. Diffuse thyroid hyperplasia was found to affect 87% females. High frequency ultrasonography allows for the detection of even the tiniest, non-palpable lesions. Ultrasound findings such as hypoechogenicity, micro calcifications, and fuzzy & nodular margins are more likely to indicate malignancy in nodules [10-12]. Women are more likely to be diagnosed with a thyroid disorder than men. The study's goal was to compare the results of sonography and fine-needle aspiration cytology (FNAC) in the detection of thyroid lesions in individuals with thyroid diseases.

MATERIALS AND METHODS

50 patients were taken for current study. This cross-sectional investigation was carried out at the pathology and Radiodiagnosis departments of the Mahavir institute of Medical Sciences, Vikarabad, Telangana. The study was carried

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 08, 2023

out during the period from January 2022 to October 2022. Patients having thyroid lesions on sonograms in the 10- to 75-year-old age range.

Inclusion Criteria:

- Age group10-75 years
- Patients with thyroid disorder with USG showing thyroid lesion
- Patient giving consent

Exclusion Criteria

- Patients with bleeding disorders
- Patient refusal for FNAC

Study Method

Clinically symptomatic patients with abnormal thyroid hormone levels, clinically symptomatic patients with no symptoms but thyroid lesions on ultrasonography, and clinically suspected cases with no symptoms but thyroid lesions on ultrasonography were enrolled in the study after approval by the institutional ethical committee.

Sonographic Evaluation:

Color Doppler ultrasound scanners with a linear array high-frequency transducer are used for all scans alongside the Siemens Acuson X 300 and X 600. Sonographic examination was performed on patients who met the inclusion criteria of age and thyroid diseases. Thyroid enlargement, echogenicity (whether the gland is uniformly or unevenly echogenic), vascularity, and the presence or absence of a nodule can all be determined with sonography. Counting the number of nodules and determining their size is necessary if they are present. Smaller than 5-millimeter nodules were not studied. In order to better understand nodules larger than 5mm, we analyzed their echogenicity, shape, borders, contents, calcifications, and vascularity. With their knowledge and agreement, patients with thyroid lesions had FNAC.

Collection of Specimen:

A supine position is adopted, with the patient's neck fully extended. Povidone iodine is used to disinfect the skin before it is draped. The patient should not engage in any kind of intentional swallowing. After that, ultrasonography is utilized to zero in on the center of the lesion. There is no usage of USG gel. Coupling is accomplished with povidone iodine. If necessary, a local anesthetic could be given. A 10ml syringe with a needle ranging from 23 to 27 gauge is utilized. The lesion is located and its relationship to the surrounding vascular is determined after the transducer is positioned over the thyroid gland. The transducer might be parallel to the needle's path, or perpendicular to it. When the needle tip reaches the lesion, at least two aspirations are performed and tissue is recovered.

RESULTS

Patients with thyroid issues were studied for a full year in the Radiology Department. Fifty-five individuals were included in the analysis; five had hemorrhagic samples, and one declined FNAC. Fifty patients ranging in age from 10 to 75 years old participated in the study. Patients of both sexes participated in the research.

Table 1: Patient distribution

Family history of thyroid	Number	Percentage (%)
Yes	10	20.00
No	40	80.00

Table 1 shows that only 20% of persons have a positive family history of thyroid disease, whereas 80% of patients have a negative family history. This information is based on family histories of thyroid disorders.

Table 2: Patients are categorized according to the results of their thyroid function tests

Thyroid function test	Number	Percentage (%)
Normal	20	40.00
Hypothyroidism	20	40.00
Hyperthyroid	10	20.00

The thyroid function test was used to compile Table 2. All of the patients in the study group had this done to them, and the results showed that forty percent of the patients had a normal level of thyroid hormones, forty percent of the study group had hypothyroidism, and twenty percent of the study population had hyperthyroidism.

Table 3: Thyroid enlargement as a divider of patients

Thyroid swelling	Number	Percentage (%)
Yes	35	70.00
No	15	30.00

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 08, 2023

Thyroid gland enlargement, both diffuse and localized, was present in 70% of the study population, as shown in Table 3. Thirty percent of the people in this study group did not experience any swelling.

Table 4: Patient stratification according to thyroid volume

Size of thyroid gland	Number	Percentage (%)
Normal	13	26.00
Enlarged	37	74.00

According to Table 4, only 26.00% of patients had a normal-sized thyroid gland, while 74.00% had an enlarged thyroid.

Table 5: Echo texture of the thyroid parenchyma is used to stratify patients

Echo texture of thyroid parenchyma	Number	Percentage (%)
Homogenous	15	30.00
Heterogeneous	35	70.00

It was a significant outlier for sonographic diagnosis. Thirty percent of patients in the study group had echotexture of the thyroid gland parenchyma that was homogenous, while seventy percent had echotexture that was heterogeneous.

Table 6: Number of nodules in the thyroid and their distribution

Number of nodules	Number	Percentage (%)
Single	47	94.00
Multiple	3	06.00
Total	50	100.00

Table 6 shows the number of nodules in the thyroid and their distribution. The patients in this study identified with single nodule 94 % and 6 % with the multiple nodules found in the patients.

Table 7: Thyroid nodule sizes and their distribution

Size	Number	Percentage (%)
<5 mm	18	36.00
5 mm-1 cm	12	14.00
>1 cm	20	40.00
Total	50	100

Solitary or numerous nodules were classified according to their size. Nodules smaller than 5 millimeters in diameter were classified as micronodules. Out of 50 patients, 18 had micronodulations (36%), 12 had nodules between 5 mm and 1 cm (14%), and 20 had nodules greater than 1 cm (40%) in this study.

Table 8: Thyroid nodule distribution according to echogenicity

Echogenicity	Number	Percentage (%)
Anechoic	10	20
Hypoechogenic	10	20
Isoechogenic	20	40
Hyperechogenic	10	20
Total	50	100.00

Thyroid nodules greater than 5 millimeters were classified according to their echogenicity. Among the 50 patients with nodules larger than 5 mm, 10 had anechoic nodules, 10 had hypoechogenic nodules, 20 had isoechoic nodules, and 10 had hyper echogenic nodules, for a total of 40% isoechoic and 20% hyper echogenic.

Table 9: Thyroid nodule distribution according to pathology

Contents	Number	Percentage (%)
Predominantly solid	21	42.00
Predominantly Cystic	19	38.00
Comet tail artifact	10	20.00
Total	50	100.00

Nodules are classified as either mostly solid, predominantly cystic, or with comet tail artifact, depending on their composition. Only nodules larger than 5 mm were taken into account.

Thyroiditis, diagnosed in 40.3% of patients, was followed by colloid goiter, detected in 27.4% of patients as the most prevalent lesion found on USG. One-fifth of the patients had multinodular goiter. Papillary carcinoma, medullary carcinoma, adenomatous nodules, and MNG with thyroiditis accounted for the remaining lesions.

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 08, 2023

DISCUSSION

Participants in our study included people who had been referred for thyroid evaluation based on any of the following criteria: clinical symptoms AND abnormal thyroid hormone levels; clinical symptoms AND normal thyroid hormone levels; and clinical suspicion BUT no specific symptoms. In this study, the positive predictive value of ultrasound for detecting thyroiditis was 92.5% when compared with USG diagnosis and FNAC [13, 14]. Micronodulation on sonography has been shown to be helpful in the diagnosis of diffuse lymphocytic thyroiditis, with a positive predictive value of 94.7%, as demonstrated by Yeh *et al*. In their series, Venkatachalapathy *et al*. observed that FNAC had an overall sensitivity of 81.3% for benign lesions. When it came to identifying thyroiditis, ultrasonography showed an 86.2% sensitivity and a 90% specificity. In this analysis, we focused on the effects of micronodulations and enhanced vascularity in the thyroid parenchyma [15-17].

Detecting medullary cancer had a 100% positive predictive value, while papillary carcinoma had a 66% positive predictive value. The diagnostic accuracy of ultrasound for adenomatous nodule is 94%. Colloid goiter had a 94% positive predictive value, while MNG was 100% accurate [18].

In his research, Vikas *et al*. found that ultrasonography of the thyroid had an overall sensitivity of 83.3% for detecting cancerous nodules. Based on the sonographic data, ultrasound was found to have a sensitivity of 80% and a specificity of 75% in detecting malignant nodules in this investigation. Detection of multinodular goiter by ultrasonography was found to be highly sensitive in this investigation [19, 20].

Ultrasound and FNAC confirmed the nodules to be benign in 71.8% of individuals with well-defined smooth edges. According to Moon *et al*.'s research, more benign nodules than malignant ones had clearly defined edges. In this investigation, anechoic nodules made for 31.25 percent. USG and FNAC confirmed that all of these anechoic nodules were harmless. Antti *et al*.46 conducted a study in which 253 patients were randomly assigned to undergo thyroid ultrasonography screening; of these, 69 patients were diagnosed with thyroid lesions and were thereafter followed for 5 years. Even after 5 years of monitoring, USG and FNAC revealed that all of the anechoic nodules were harmless. Without any treatment, several of the lesions had already vanished [21, 22].

Similar research by Pedro Weslley *et al*. on 106 nodules demonstrated hypo- echogenicity in 90.5%, no calcification in 59.4%, and tiny calcification in 26.4% of papillary carcinomas, suggesting that the vast majority of hypoechoic nodules are malignant. According to the results, 83% of hypoechogenic nodules were cancerous. Ultrasound and FNAC both agreed that all the instances were indeed cancerous. Benign and malignant lesions alike exhibited isoechoic characteristics. Hyperechoic lesions were the norm for benign tumors [23-25].

In this analysis, benign conditions accounted for 95% of the cases and malignant ones for only 5%. A total of 1232 patients were included in the investigation by Bonovita *et al*. Only approximately 3–7% of these patients had malignant cases; the rest had benign lesions. Ankush Danadia *et al*.'s study of 100 cases in Gujarat showed 66 benign cases, 8 malignant cases, and 26 indeterminate cases on USG; similarly, our study found 60 benign cases out of 62 patients. However, one case was hypoechoic with comet tail artifact and well-defined margins, and this was diagnosed as papillary carcinoma on FNAC. Two of the initially benign cases (out of 66) were found to be malignant upon further examination using FNAC [26-28].

In a comparable study by Ankush Danadia *et al*, the margins of the nodules were well defined and smooth in 78.7 percent of patients and poorly defined in 23.6 percent. Malignant nodules have a well delineated spiculated border. The researchers found that spiculated edges were present in 66.6% of malignant nodules [29-31].

A study conducted on 3200 patients by Mary C.Frates *et al* over a period of eight years found that solitary nodules larger than 1cm have an elevated probability of being malignant. The ultrasound-identified malignant nodules in this study all exceeded 1 cm in size, and 66.6% of the nodules were isolated. FNAC analysis also revealed the malignancy of these tumors. Ahuja A *et al*. found that one hundred percent of patients with comet tail artifact had negative FNAC results. Comet tail artifacts were shown to be benign by FNAC in 31.4% of individuals in this investigation [30-32].

CONCLUSION

Sonographic assessment of thyroid lesions was correlated with fine-needle aspiration cytology in this investigation. The results could suggest that women are more likely to develop thyroid cancer. There were no malignant tumors among the anechoic nodules. Thyroiditis, multinodular goiter, and medullary cancer are just a few of the benign illnesses that ultrasound excels at identifying. Small nodules of papillary carcinoma can be difficult to distinguish from small nodules of colloid carcinoma in some circumstances. Most cases of thyroid cancer are of the papillary variety. Compared to FNAC, ultrasound is a noninvasive and superior method for studying the thyroid gland as a whole. Ultrasound is the most accurate imaging method for describing a nodule's size, shape, location, and composition. There were around 95%

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 08, 2023

benign lesions and 5% malignant ones. In cases where numerous nodules were found on a thyroid ultrasound assessment was used to pinpoint the suspicious nodule, and fine needle aspiration was performed with ultrasound guidance.

Funding: None
Conflict of interest: None

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ISSN: 0975-3583,0976-2833 VOL14, ISSUE 08, 2023

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