



The Relationship Between American College of Radiology Thyroid Imaging Reporting and Data System (ACR TIRADS) and Fine Needle Aspiration Cytology (FNAC) ; in Geriatric Thyroid Pathologies

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Abstract

Introduction: The world population is getting older with each passing year. Thyroid cancer is the most common endocrinological cancer and its incidence is increasing in all populations. Although the increase in prevalence has been attributed more to the increased use of imaging methods and to the higher sensitivity of ultrasonography (USG) by some authorities, there are also studies suggesting a real increase. In our study, it was aimed to examine the USG and fine needle aspiration cytology (FNAC) results of thyroid nodules in the geriatric age group and to discuss them in the light of the literature.

Methods: Files of 129 geriatric patients with thyroid nodules detected in the University Of Health Sciences Adana City Training and Research Hospital between 2018 and 2020 were retrospectively analyzed. The USG characteristics of the patients were categorized by scoring according to the ACR TIRADS system. FNAC diagnoses were grouped according to the Bethesda classification.

Results: According to the ACR TIRADS grading, 4 patients (3.1%) were benign, 58 patients (45%) were not suspicious, 38 patients (29.5%) were mildly suspicious, 25 patients (19.4%) were moderately suspicious, and 4 patients (3.1%) were highly suspicious. In our study, although USG provided very valuable information in the approach to thyroid nodules, no relationship was found between TIRADS in the geriatric age group and FNAC results in our study ($p=0.117$).

Conclusion: We think that the approach to thyroid nodules in geriatric patients requires closer follow-up not only with USG data but also with clinical and history-based findings.

Keywords Thyroid nodule · Ultrasound/imaging · Thyroid pathology · Gerontology · Thyroid cytology/FNA

Introduction

Thyroid cancer is the most common endocrinological cancer and its incidence is increasing in all populations. Although the incidence of thyroid cancer in the USA increased by

approximately 240% from 3.6 to 8.7 per 100,000 between 1973 and 2002, disease-specific death rates remained stable. (0.5 in 100,000). Although the increase in prevalence has been attributed more to the increased use of imaging methods and to the higher sensitivity of ultrasonography (USG) by some authorities, there are also studies suggesting a real increase.[1].

Thyroid ultrasonography should be performed by an experienced radiologist using at least 7.5 MHz linear ultrasound transducer probe (e5). Thyroid volumetry should always be done. Any thyroid nodule should include the following criteria on USG: size (3-dimensional diameters), echogenicity (hypoechoic, hyperechoic, anechoic, normoechoic, complex echoic), cystic areas, micro or macrocalcifications, presence of a hypoechoic rim surrounding the nodule (halo), nodule borders, structure (asymmetry),

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vascularization. High risk criteria for malignancy on USG: hypoechogenicity, border irregularity, absence of halo, presence of microcalcification, transverse long configuration in transverse view), increased intranodular vascularity.[2].

Fine needle aspiration cytology (FNAC) is considered to be the most important and primary diagnostic tool for the evaluation and diagnosis of thyroid lesions regardless of the age of the patient. It has worldwide application due to its simplicity, safety and cost effectiveness.[3] Fine needle aspiration biopsy (FNAB) is the gold standard in the diagnosis of thyroid nodules in the presence of clinical indication. FNAB result is also a determining factor in determining the surgical strategy. According to the literature, the sensitivity of thyroid FNAB varies between 65% and 99%, and the specificity varies between 72% and 100%. These results of FNAB may be affected by operator efficiency, diagnostic difficulty, and classification of suspicious lesions.[4].

It is known that the number of thyroid nodules also increases with age. Goiter and multinodularity are more common in the elderly. There is a direct relationship between the age of 65 and over and the malignant potential of thyroid nodules. Also, thyroid tumors tend to be larger and have more advanced stages and more aggressive features in elderly patients. Follicular histology, vascular invasion, and extrathyroidal enlargement were more common in geriatric patients. Larger size, higher lymph node frequency, and distant metastasis at diagnosis and persistence / recurrence of thyroid carcinoma have been reported in several studies in geriatric patients. Survival is known to decrease with age, and it is reported that it decreases to 92% in young adults and 48% in patients over 70 years old.[1].

In autopsy series, thyroid malignancy rates in humans are up to 20%. Comorbidity and multiple drug use increase the surgical risk, especially in the geriatric population. Innovations are needed in the follow-up of patients in this group. In our study, it was aimed to examine the USG and FNAC results of thyroid nodules in the geriatric age group and to discuss them in the light of the literature.

Materials and Methods

The files of 129 geriatric patients with thyroid nodules were analyzed retrospectively in the Ear Nose Throat (ENT) clinic of University Of Health Sciences Adana City Training and Research Hospital. In our study, the USG characteristics of the patients were categorized by scoring according to the American College Of Radiology Thyroid Imaging Reporting And Data System (ACR TIRADS). According to this; In ACR TIRADS scoring, the nodule has internal structure (1 point if it has a mixed (solid + cystic) internal structure, 2 points if it is solid), echogenicity (1 point if hyper

or isoechoic, 2 points if hypoechoic, 3 points if markedly hypoechoic), shape (pre- 3 points if the posterior diameter is greater than the mediolateral diameter), border features (2 points if it has lobule or irregular contours, 3 points if it extends beyond the thyroid). According to the echogenic focus content of the nodule, 1 point is added if there is macrocalcification, 2 points if there is peripheral calcification and 3 points if it has microcalcification (all at once if it contains more than one echogenic focus type). Spongiform nodule scores 0. Accordingly, in terms of malignancy; 7 points and above highly suspicious, 4–6 points moderately suspicious, 3 points mildly suspicious, 2 points not suspicious, 0 points are considered benign.

FNAC diagnoses were grouped according to the Bethesda classification. According to this Non-diagnostic or unsatisfactory, 2- Benign, 3- Atypia of undetermined significance or follicular lesion of undetermined significance, 4- Follicular neoplasm or suspicious for a follicular neoplasm, 5- Suspicious for malignancy, 6- Malignant.

The risk stratification of the patients according to their ACR TIRADS score and the FNAC results were compared statistically.

Written informed consent was obtained from all patients and approval of the ethics committee was obtained for our study. (University Of Health Sciences Adana City Training and Research Hospital Clinical Research Ethics Committee with the decision number 1061, meeting number 65, date 09.09.2020).

Statistical Analysis

In the analysis; Normal distribution control of continuous variables was evaluated with Shapiro-Wilk statistics. Variables compatible with normal distribution were examined using two independent groups t-test to examine the differences between groups. Mann-Whitney U test was used to compare two independent groups that did not comply with the Normal Distribution. Chi-Square test was used for variables in a categorical structure. Mean \pm standard deviation values were given for numerical variables in summary statistics, while frequencies and percentages were used for categorical variables. Statistical significance level was taken as $p < 0.05$. All analyzes were made with IBM SPSS 21 package program trial version.

Results

In our study, there were a total of 129 patients, 44 (34.1%) male and 85 (65.9%) female. Although the ages of the patients varied between 65 and 88, the average was 71.19 ± 5.24 .

Thyroid nodule sizes monitored on USG were a minimum of 1 cm and a maximum of 5 cm, with an average of $2.60 + 1.03$. 53 (41.09%) of the nodules undergoing FNAB were in the right lobe, and 76 (58.91%) were in the left lobe. Of the 53 nodules in the right lobe, 41 are female, 12 are male; 44 of 76 nodules in the left lobe, 44 were female and 32 were male.

In thyroid function tests of the patients, serum T4 value was found to be minimum 0.4 maximum 2.4 mean $0.84 + 0.25$, TSH values minimum 0 maximum 49 mean $1.98 + 5.85$. (Table 1)

There was no statistically significant difference between gender groups in terms of age, tumor size, T4 and TSH variables. ($p > 0.05$). (Table 2)

According to the ACR TIRADS rating, 4 patients (3.1%) were benign, 58 patients (45%) were not suspicious, 38 patients (29.5%) were mildly suspicious, 25 patients (19.4%) were moderately suspicious and 4 patients (3.1%) were highly suspicious. (Table 3)

Among the FNAC diagnostic groups, 27 patients were non-diagnostic, 87 patients were benign, 2 patients were suspected of hurthle cell neoplasia, 10 patients were atypia of uncertain significance, 2 patients were suspected of follicular neoplasia, and 1 patient had malignant cytology. (Table 4)

In our study, although USG provided very valuable information in the approach to thyroid nodules, no relationship was found between ACR TIRADS in the geriatric age group and FNAC results in our study. ($p = 0.117$)

Discussion

A thyroid nodule is a separate lesion that occurs in the thyroid gland and is radiologically separated from the thyroid parenchyma. The primary tool in the evaluation of thyroid nodules is USG. It has been shown that 50–60% of thyroid nodules can be detected in USG scans in healthy individuals.[1, 2]The main radiological evaluation of thyroid nodules is always performed by ultrasonography. Considering the prevalence of nodules in the society, deciding which nodule is benign and which nodule is malign is among the most common problems encountered by the radiologist. When the literature in the field of imaging is examined, it is noteworthy that there are many publications on the characterization of thyroid nodules and new ones are constantly being added.[4].

Thyroid nodules are seen 4 times more in women than men, and its prevalence increases with age and low iodine intake.[5] In our study, it was seen approximately 2 times more in women.

Dellal et al. compared the USG features of malignant thyroid nodules in 109 geriatric and 824 non-geriatric patients, and the only difference seen in their study was that malignant nodules of geriatric patients had lower peripheral hypoechoic halo, but this difference was not statistically significant.[1].

Guidelines have been developed for USG imaging to allow thyroid nodules to be used in the identification and classification of malignancy risk. These guides include the TIRADS. In the study conducted by Richman et al. on 314 patients with 404 thyroid nodules in 2020; According to TIRADS, it has been reported that 22% of malignant nodules do not require FNAB at the first encounter, and therefore ACR TIRADS may cause thyroid cancer to be overlooked in the pediatric group. In addition to histopathological differences in the pediatric population, due to a higher rate of cancer, ACR TIRADS was insufficient to predict malignancy.[4].

In 2019, Trimboli et al. reported a significant relationship between EU TIRADS and FNAB results in a 3-center study with 1058 thyroid nodules and 495 patients. EU TIRADS reported that thyroid nodules showed high performance in differentiating malignancy, negative predictive values were high and the number of unnecessary FNABs significantly decreased.[6] In other study the sensitivity and specificity were 60.28% and 98.05% respectively. False positive rate was 1.95% and false negative rate was 39.72%. The positive predictive value was 90.1% and negative predictive value was 89.35%. The accuracy of FNAB in differentiating benign from malignant thyroid lesions was 89.46%. FNAB was not applied to nodules < 1 cm since there were no suspicious US findings such as hypoechoic appearance, presence of microcalcification, presence of irregular border, absence of halo. All nodules > 1 cm were evaluated with FNAB.[7].

In our study, no relationship was found between TIRADS and FNAC results in the geriatric age group. ($p = 0.117$) Biopsy decision should not be made based solely on USG data. Considering the high probability of malignancy in this age group, a biopsy decision should be made considering the patient's history and clinic.

As a result, we think that the approach to thyroid nodules in geriatric patients should be followed up more closely not only with USG data but also with clinical and history-based findings. FNAC should be performed regardless of age in patients with indication.

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Declaration

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Conflict of interest The authors have no conflicts of interest to declare.

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