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Gender and Age Distribution of Thyroid Nodules using Imaging Diagnostic and Management Modalities in Albania; Our data

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Abstract
Purpose: The purpose of this study was to evaluate gender and age distribution and the importance of imaging modalities in the evaluation and management of thyroid nodular disease in Albania nowadays.
Material and method: The study analyzed the results of 310 patients (N=257 women; N=53 men), assessed at U. O. Clinic, American Hospital and Hygiea Hospital, Tirana, Albania during one year period; May 2015 – May 2016. The average age in the sample was 45.6 years. Thyroid nodules were found in 221 cases (185 females and 36 males). The patients had a standard ultrasound (US) of the thyroid; scintigraphy (SC) and ultrasound-guide fine needle aspiration biopsy (US-FNAB) when indicated.
Results: The study shows that nodular disease of the thyroid was found in 84 % of women patients, and in 16 % of men patients. The largest presence of nodules was at the age group of 41-49 years. Moreover, this survey showed that ultrasound can help to distinguish nodules that are definitely benign and those with suspicious features that may require further investigation under FNAB. Some statistically significant connections were found between ultrasound characteristics and FNAB.
Conclusion: Females were vast majority of patients as in regards of gender with 84 % of total sample population in the study of 310 subjects. And group age of 41-49 years old were more affected. Ultrasound and other imaging modalities are reliable methods for diagnosis and management of thyroid nodules, including patients' selection to undergo through FNAB. SC was indicated to evaluate the functional features of a nodule, especially in the presence of a low TSH value. In Albania these modalities are now used by many trained medical staff thus offering quality medical service to our patients over all.
Keywords: Thyroid nodule, malignant, ultrasound, FNAB
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Introduction

According American Thyroid Association (ATA) thyroid nodule is defined as a discrete lesion within the thyroid gland that seems to be a frequent finding in clinical practice. They are more common in females and their prevalence increase with age and reduced iodine intake.[1,2,3] Most nodules are benign, but between 3 and 7% of cases are found to be malignant.[4] The clinical relevance of thyroid disease is related to the exclusion of thyroid nodule malignancy. Imaging plays a key role in the diagnosis and characterization of thyroid diseases. Ultrasound (US) has become an important diagnostic tool due to its high sensitivity for detecting nodules and also the sonographic features can be used to determine the need for further investigation.[5] Moreover, US is the modality of the first choice for evaluating thyroid nodules owing to its widespread availability, low cost, and lack of ionizing radiation.[6] However diagnostic accuracy depends on the ability of the operator therefore the most reliable results are obtained in specialized medical centers with experienced staff. On the other hand, in addition to morphological information obtained by US, thyroid scintigraphy (SC) is used to visualize active thyroid tissue. Based on imaging results, SC test can identify hot nodules and cold nodules according to their radionuclides uptake compared to normal tissue. According to well-established guidelines, thyroid nodules with suspicious sonographic features require the use of fine-needle aspiration cytology (FNAC) to exclude malignancy. FNAC is a safe and minimally invasive method for the evaluation of thyroid nodules. Although, it can be problematic in patients with multinodular goiter or in those with difficult to access lesions.[7,8,9]

The evidence about thyroid nodular abnormalities in Albania is insufficient, as we do not have yet a national disease registry. Based on this, the aim of this study is to describe the distribution of thyroid nodules according to age, gender and also to evaluate the important role of imaging modalities especially ultrasound, in the diagnosis of thyroid nodules.

Methods

A cohort study was conducted during May 2015-May 2016 at U. O. Clinic, American Hospital and Hygiea

Hospital, Tirana, Albania. During this period of time were involved 310 patients who presented at our service suspected for thyroid disease. All patients underwent ultrasound examination followed by FNAC and SC when they were indicated. Patients included in this study were referred from endocrinologists, family physicians, gynecologists and other physicians as well, and ultrasound was realized and interpreted by an experienced radiology imaging medical staff. Also, was taken into consideration demographic characteristics including gender and age.

All the data used in this report were analyzed using SPSS (Statistical Package for Social Sciences, Version 15.0). The comparison of proportions for categorical variables was enabled through the Chi-square test. A value of $p \leq 0.05$ was considered statistically significant in all cases.

Results

From the overall number of patients (310) involved in our study: 257 (84%) were females and 53 (16%) males range from 18-80 years. Of these patients, 221 resulted in thyroid nodules (185 females and 36 males). *Chart 1*, shows the percentage of males and females diagnosed with thyroid nodules. It is clearly presented the ratio of 5.2:1 (F/M) at our study population.

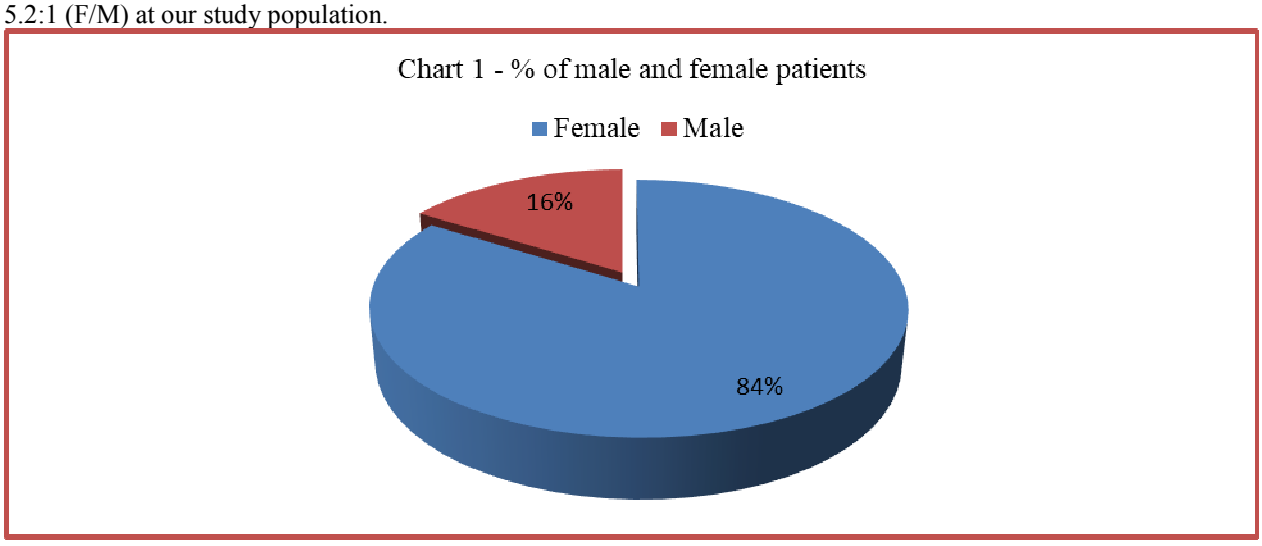
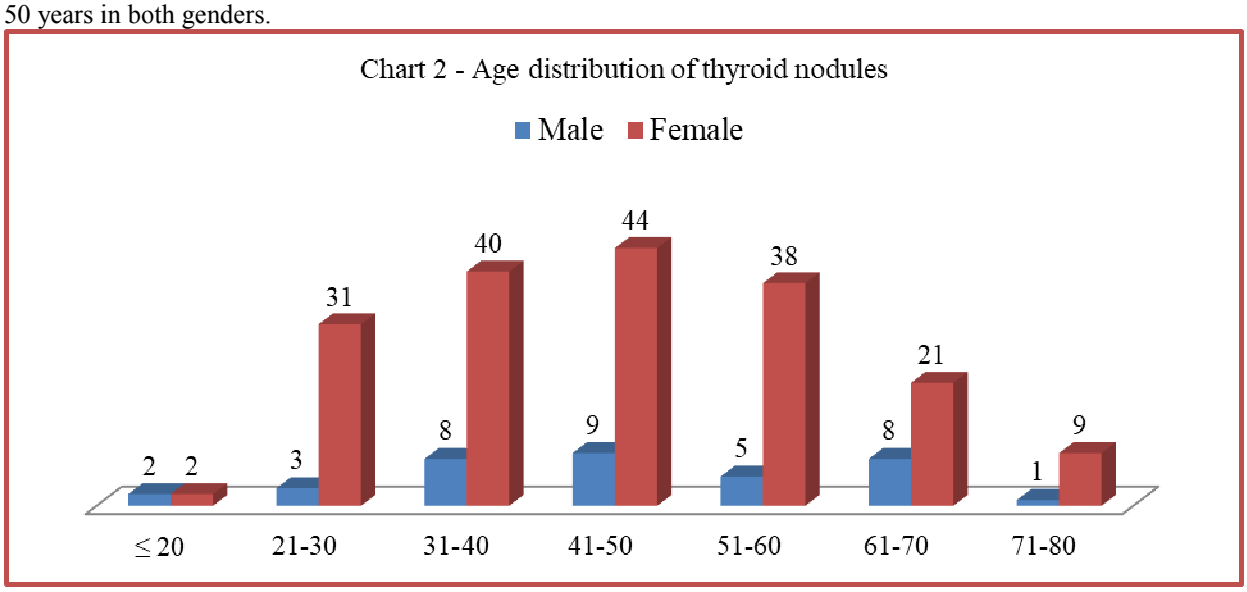


Chart 2, depicts the age distribution of thyroid nodules, where the highest percentage was in the age of 41-50 years in both genders.



All patients at our study went through ultrasound inspection, which gives a clear diagnosis on 63.8% (N=141) of cases without need of any other diagnostic imaging modalities. 36.2 % (N=80) of patients with low TSH levels, undertake also SC test to evaluate the possibility of an autonomously functioning thyroid nodule using iodine-123 (123-I) or pertechnetate scintigraphy. Fine needle aspiration cytology (FNAB) was performed in 15.8 % (N=35) patients and was diagnostic in 31 of them. There were 4 false-negative results and no false-

positive results for malignancy exclusion.

Table 1, illustrates the relation between ultrasound characteristics and thyroid nodule malignancy.

Table 1/ US features	Benign **(N=202)**	Malign **(N=19)**	P-value
Echotexture			p=0.005
Hypoechoic	67	13	
Iso/hyperechoic	135	6	
Consistency			p= 0.025
Solid	165	19	
Cystic	37	0	
Size			p=0.125
>1 cm	86	8	
<1 cm	116	11	
Vascularization			p=0.000
Internal vascularity	36	11	
Peripheral vascularity	166	8	

According to these results, solid nodules were more associated with malignant lesions than benign lesions ($p<0.05$). Other statistically significant characteristics of malignant nodules were hypoechoic echotexture and internal vascularity ($p<0.05$). On the other hand, there is no statistical difference between nodule size and thyroid malignancy ($p>0.05$).

Discussion

According to available data, this study is one of the few reports on gender and age distribution of thyroid nodules, conducted in Albania. Also, this report includes a brief summary of the evaluation of thyroid nodules using ultrasound, fine-needle aspiration cytology, and scintigraphy.

Our study shows the prevalence of thyroid nodules was approximately 5 higher in women than in men (84% vs 16% resp.). This frequency has shown an age-related increase and peaked in individuals 41-50 years old. Our results were comparable to previous studies suggesting that females and adults over 40 years were risk factors for thyroid nodules.[10, 11, 12]

Regardless of the benefits of US use in thyroid nodules evaluation, the existing literature has shown none of the single US findings have been able to differentiate benign from malignant lesions; however, suspicious findings can help differentiate nodules that are definitely benign and suspicious nodules that may require FNAC.[13] Many findings such as hypoechogenicity, solid echotexture, internal vascularity, microcalcifications, ill-defined margins have shown correlation with malignant nodules.[14] In the present study, hypoechogenicity, solid lesions, and internal increased vascularity were also explored and were shown to be associated with malignancy, which is well correlated with most studies done previously. [15, 16, 17, 18]

Our study may have some limitations. All patients included in our analysis were referred due to a known or suspected thyroid nodule so these data do not evaluate the prevalence of thyroid nodularity in a general population. Another limitation is our sample size of malignant cases which is too small, only 19 participants had the malignant nodule. Thus, not all suspicious ultrasound features could be studied. These limitations may serve as clues to point out the need for further investigation in the future.

Conclusions

In summary, females were vast majority of patients as in regards of gender with 84 % of total sample population in the study of 310 subjects. And group age of 41-49 years old were more affected. Ultrasonography provides a very essential, safe, and fast tool in the detection and effective management of thyroid nodules, especially when it is done by a well-experienced radiologist. Ultrasonological characteristics and other imaging modalities can also predict the malignancy of thyroid nodules, determine this way the need for biopsy – FNA. In Albania these modalities are now used by many trained medical staff thus offering quality medical service to our patients over all. However more national studies with larger population should take place, supported by government programs as thyroid disease is not only an isolated nosology but also it affects the whole human anatomic systems in a way thus affecting patients wellbeing and medical service as well.

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