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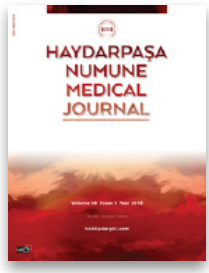

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ORIGINAL ARTICLE

Comparison of Physical Examination and Simultaneous Ultrasonography Results in Patient in whom Thyroid Gland Nodule was Diagnosed on Scintigraphy Previously and Referred to General Surgery Clinics

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Abstract

Introduction: The first step in diagnosis of thyroid nodules is physical examination (PE). <5% of the adult population has palpable nodules. However, ultrasound (US) studies revealed higher thyroid nodule prevalence. 1–3% of the nodules have malignancy risk and proper and trusted methods of diagnosis and follow-up are necessary. We compared nodules found on PE and US in terms of number and localization.

Methods: The data of 42 patients in whom thyroid nodules were diagnosed on scintigraphy, and US and PE were done at the same time between October 2002 and 2003 was analyzed retrospectively. The numbers of nodules detected on PE and US were compared. The nodules located in a different position on PE compared to that of US were accepted false positive. The nodules which were not detected on PE but on US were accepted false-negative results of PE. Mann–Whitney U-test was used for statistical analysis. True positivity on PE was considered equal to the true negativity, and sensitivity, specificity, and accuracy were calculated.

Results: PE detected 62 nodules in 42 patients (the mean: 1.47 and standard deviation [SD]: 0.63, for each patient). US detected 73 nodules (the mean: 1.73 and SD: 0.76). The sensitivity, specificity, and accuracy of PE were calculated 51.02%, 65.38, and 51.02, respectively.

Discussion and Conclusion: Having a low specificity and sensitivity compared to thyroid US, PE is not reliable on diagnosis and follow-up of thyroid nodules. US should be used combined with a careful PE.

Keywords: Physical examination; thyroid nodule; ultrasonography.

Thyroid nodules are frequently seen in population. Physical examination (PE) screenings in the areas with no iodine deficiency revealed its prevalence between 3.2 and 4.7% [1]. This increases 3–4-fold in iodine deficiency seen endemic goiter areas [2]. Nodules are more common in women [3, 4]. Iodine deficiency plays a role in nodule formation [5]. However, the importance of nodules is their cancer development risk, especially in non-functioning ones [4]. Hence, diagnosis, follow-up, and treatment of nodular goiter should be done carefully.

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PE, thyroid function tests, ultrasonography (US), scintigraphy, and fine-needle aspiration (FNA) biopsy are routinely used methods in diagnosis and follow-up of thyroid nodules.

As a gold standard, thyroid ultrasound (US) can be compared to physical treatment in terms of reliability [6].

We researched reliability of PE compared to thyroid US in this study.

Materials and Methods

A total of 42 patients (38 females and 4 males) in whom thyroid nodules were diagnosed on scintigraphy, and US and PE were done at the same time between October 2002 and 2003 was included into the study. Files of the patients were analyzed retrospectively; thus, ethical committee approval was not taken. The mean age was 50.63 (21–73) in female and 48.5 (28–68) years in male patients. All patients were taken informed consent and PE results done by a surgeon and thyroid US results done by a radiologist were compared.

The size of gland, absence or presence, location, mobility, stiffness, and tenderness of nodule were recorded on PE.

Thyroid US was performed while the patient was on supine position and radiologist was on the right side of the patient using Siemens Sonoline (Germany) US.

The numbers of nodules detected on PE and US were compared. The nodules located in a different position on PE compared to that of US were accepted false positive. The nodules which were not detected on PE but on US were accepted false-negative results of PE. Mann–Whitney U-test was used for statistical analysis.

True positivity on PE was considered equal to the true negativity, and sensitivity, specificity, and accuracy were calculated.

Results

The number of female patients was more than number of male which was correlated to previous results [3, 4]. PE detected 62 nodules in 42 patients (the mean: 1.47 and standard deviation [SD]: 0.63, for each patient). However, US detected 73 nodules (the mean: 1.73 and SD: 0.76). The numbers of nodules detected had no significant difference between PE and US ($p>0.05$).

However, the number of false-negative nodules on PE compared to US was found 24 (the 38.7% of the nodules detected on PE; the mean: 0.57 and SD: 0.83) and this result was statistically significant when compared to both PE and US ($p<0.05$). Again, 13 false-negative nodules detected on PE (20.96% of the nodules detected on PE; the mean: 0.30 and SD: 0.60) had a significant difference compared to both PE and US ($p<0.05$). Comparing the false-negative and false-positive results between each other, no significant difference was found ($p>0.05$) (Fig. 1). The number of true-positive nodules detected on PE was 25 (40.3% of nodules on PE which was also considered the number of true-negative nodules). In the light of these data, the sensitivity, specificity, and accuracy of PE were calculated 51.02%, 65.38, and 51.02, respectively. FNA of 41 patients revealed normal cells in 34, atypical cells in 4, focal Hurthle cell hyperplasia in one, and papillary cancer in two.

Discussion

Most of the thyroid nodules are silent clinically. Most are detected by the patient her/himself or on routine screening [7]. Only 20% of solitary nodules detected on autopsy studies were as big enough as being palpated on PE [7]. We found that PE might reveal significantly high false-positive and false-negative results.

Thyroid US is an objective method to measure size of nodule. It can especially show the nodules smaller than 1.5 cm which cannot be detected on PE. Studies showed that US can detect as small as 1 mm solid and 3 mm cystic nodules [8]. Our study showed PE might miss 38.8% of the nodules and it was significant (Fig. 1).

The palpation of thyroid gland is a difficult and unreliable due to platysma, cervical fascia, and strap muscle layers covering the gland [4]. Most of the nodules felt on palpation are bigger than 1.5 cm, but a careful PE might detect superficial nodules smaller than 1 cm and other nodules neighboring a solitary nodule might be palpated. It was found that the lesions palpated as solitary were multinodular in 25% of the cases and the biggest nodule was palpable to hand [9].

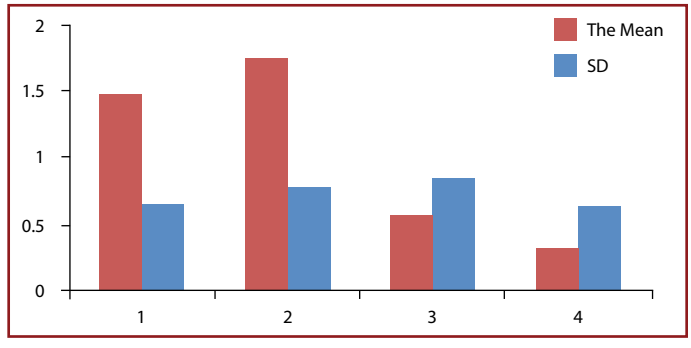

Figure 1. Graphical comparison of the mean and standard deviation (SD) of the number of nodules found on PE (1); the number of nodules on US (2); the number of false-negative (3) and false-positive nodules (4) on PE. ($P<0.05$ significant)

1-2 P value >0.05; 1-3 P value <0.05; 1-4 P value <0.05; 2-3 P value <0.05; 2-4 P value <0.05; 3-4 P value >0.05.

Again, having 20.96% false-positive results on PE compared to US showed that US imaging is certainly necessary. These false-positive or false-negative results were seen, especially in cases, in which multinodular goiter was diagnosed on scintigraphy.

US imaging can reveal if the lesion is cystic or solid [8]. The lesions smaller than 4 cm and solid component on US <1% lesions have low cancer risk [10]. The risk in mixed lesions is up to 15% [11]. A recent study also reported that cystic lesions regarded as non-diagnostic on FNA are more prone to be benign [12]. We found nodules with cystic degeneration only in one patient, but this could not be understood on PE.

US cannot discriminate benign from malignant lesions, though it can show solid or cystic structure [4]. Although the hypoechoic lesions on US are considered having higher malignancy potential, its specificity is low due to overlapping of structures. Still, cystic lesions might have also malignancy potential [11]. Recently, an ultrasonographic thyroid imaging reporting and data system has been proposed based on composition, echogenicity, margins, and echogenic foci (TR1–TR5 levels from normal gland to nodules with high risk for malignancy) and some reports pointed that this scoring system shows a good concordance with Bethesda results and can be helpful on making clinical invasive procedure decisions [13-15].

US was shown not to helpful on showing malignancy risk in follicular cancer (single, solid, and homogenous lesions) cases but to help in some non-follicular cancers [16].

This method is beneficial to follow the patients with benign or very low to low suspicious nodules [17]. Increase in size, single, solid, and big nodules necessitate FNA [17]. A recent study shown that there is a significant relevance between the size of the nodule and malignancy for single nodule, but the ratio of nodules smaller than 1 cm was lower but higher for malignant ones [18]. Thus, the importance of US is clear. We performed FNA to 41 cases and diagnosed papillary cancer in two patients in our study (0.4% of the patients) and this result correlated to incidence of thyroid cancer out of all cancer types [9].

US imaging is also helpful to detect non-palpable thyroid cancers with cervical lymph node metastases. Again, US is very important in FNA and cervical lymph node evaluation [9].

Conclusion

Having a low specificity and sensitivity compared to thyroid US, PE is not reliable on diagnosis and follow-up of thyroid nodules. US should be used combined with a careful PE. FNA should be done in all suspicious nodules.

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Conflict of Interest: None declared.

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