

What should be done in thyroid nodules less than two centimeters, ultrasonographically suspicious and cytologically benign?

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Objective: Although fine needle aspiration biopsy has a high sensitivity in thyroid nodule assessment, ultrasonography findings should not be underestimated. With this study, we aimed to evaluate cytologically benign nodules smaller than two centimeters, where ultrasonography findings were suspicious.

Material and Methods: Thirty-one patients undergoing thyroidectomy between January 2009 and January 2013 were included in this retrospectively designed study. Thyroid ultrasonography and thyroid fine needle aspiration biopsy (FNAB) results were evaluated. Ultrasonographically, all patients had multinodular tissue formation and nodules had at least one of the suspicious features (nodules with hypoechogenicity, irregular margins, absence of halo, taller-than-wide, increased vascularity and microcalcifications). Maximum size of the nodules was 2 cm. Thyroidectomy was performed in this ultrasonographically suspicious, but cytologically benign group due to clinical suspicion, cosmetic reasons or patient preference.

Results: All patients underwent a total thyroidectomy. The group consisted of 27 female and 4 male patients, with a mean age of 49.5 years. According to the final pathology reports, there were 13 (41.9%) multinodular goiters, 2 (6.4%) follicular adenomas, 1 (3.2%) Hashimoto's thyroiditis and 15 (48.3%) thyroid cancers. Patients with cancer had at least two suspicious ultrasound findings. Except five patients with papillary microcarcinoma, cancer was diagnosed in ultrasonographically suspicious nodules in all patients. The percentage of patients with benign FNAB results, but with at least two suspicious ultrasound findings of malignancy in the biopsied nodules, was 32.2%.

Conclusion: FNAB remains to be the gold standard in the management of ultrasonographically suspicious nodules smaller than 2 centimeters. Nevertheless, due to its high sensitivity, in case of presence of suspicious features on ultrasonography, we believe that thyroidectomy should be a treatment option if there is a clinical suspicion and the patient carries at least two suspicious ultrasonography findings.

Key Words: Thyroid nodule, ultrasonography, fine needle aspiration biopsy

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INTRODUCTION

Thyroid nodules are common within the general population. In the last twenty years with the wide-spread use of ultrasound and increase in detection of non-palpable thyroid nodules, thyroid nodules are diagnosed in almost 1 out of every 2 people (1). Four to seven percent of the adult population in the United States is known to have palpable thyroid nodules (2). However, only 1 out of 20 clinically defined nodules have cancer. This means that approximately 2-4 out of 100,000 people are diagnosed in a year and hence thyroid cancer constitutes 1 % of all cancers and 0.5% of all cancer deaths (3). Thyroid nodules are more common in women. The incidence increases with advancing age and reduced intake of iodine (4). Although it is known that the risk of cancer increases with increasing thyroid nodule diameter, this alone is not a criterion for the decision of surgery. In such a situation, we see that thyroid ultrasonography is crucial for determination of the treatment method (5-7).

Although fine-needle aspiration biopsy (FNA) is considered to have a high sensitivity in the evaluation of thyroid nodules, ultrasonography (US) findings should not be ignored.

In this study, we aimed to discuss the evaluation of nodules smaller than 2 cm, with a benign FNA but suspicious US features.

MATERIAL AND METHODS

The study included 31 patients who underwent thyroidectomy between January 2009 and January 2013. Informed consent regarding the operation and permission to use their data for scientific studies was obtained from all of our patients; their data were prospectively recorded in a database. These data were retrospectively analyzed. The demographic data, thyroid ultrasonography findings and pathology results were evaluated. All patients revealed multinodular tissue formation on thyroid ultrasonography. Findings that were accepted as suspicious for malignancy in nodule evaluation by ultrasonography were as follows: 1) solid, hypoechoic nodules, 2) nodules containing microcalcifications, 3) nodules with irregular borders, 4) absence of halo 5) nodule size longer than its width, and 6) increased vascularity on Doppler ultrasonographic evaluation of nodules. At least two findings suspicious for malignancy were present on ultrasonography, in all patients included in the study. The largest nodule size was 2 cm. Patients beyond this limit were not included in the study. All FNAs were performed by US. Cytology has been reported as benign in all patients. Patients were operated on for clinical suspicion of malignancy together with ultrasonography, for cosmetic reasons or due to patient preference.

Statistical Analysis

A database using Statistical Package for the Social Sciences (SPSS) version 17.5 was prepared. Averages and percentages were calculated, no further statistics was used.

RESULTS

All patients underwent a total thyroidectomy, there were 27 female and 4 male patients with a mean age of 49.5. Four patients had a family history of thyroid or other organ cancer. According to their pathology results, 13 patients had multinodular goiter (41.9%), two patients had follicular adenoma (6.4%), one patient had Hashimoto's thyroiditis (3.2%) and 15 (48.3%) patients had thyroid cancer. In the group of patients diagnosed with thyroid cancer 9 had papillary carcinoma and 6 had papillary microcarcinoma. In 5 patients who had papillary microcarcinoma and an FNA, the FNA was taken from the dominant nodule. Re-evaluation of US features of these dominant nodules showed at least two suspicious US findings, nevertheless their malignancy was detected in non-dominant nodule (s). On the other hand, in the remaining patients, the malignant nodules revealed at least two suspicious findings on US (Table 1).

In 6 patients with thyroid cancer (40% of all patients with thyroid cancer) the tumor was multicentric. Two patients had capsule invasion. Out of 4 patients known to have cancer within their family, 2 had malignancy whereas the others were reported as benign. As mentioned earlier, cancer was observed in the nodules with suspicious U.S. findings, except in 5 patients with papillary microcarcinoma. Thus, patients with at least two suspicious ultrasonographic findings for malignancy and with benign FNA of their nodule (s) revealing malignancy

Table 1. Suspicious ultrasonographic findings

1	Solid and hypoechoic nodules
2	Nodules with microcalcifications
3	Nodules with irregular borders
4	Nodules without halo
5	Taller-than-wide nodules
6	Nodules with increased vascularity

of the same nodule (-s) on pathology constituted 32.2% (10 patients) of all patients.

DISCUSSION

FNA is considered as the most reliable test in the evaluation of thyroid nodules. Nevertheless, when US guided FNAB is performed in the presence of one or more suspicious sonographic findings its sensitivity increases, and the cost is reduced (5). Although it is generally stated in the literature that nodule size is effective in making the decision of surgical treatment, it is known that nodule size alone is not necessarily an absolute reliable criteria. Surgical treatment may be considered when there is proven cancer, hyperthyroidism and for cosmetic reasons, as well as suspicious clinical, laboratory, or US findings. In every case with suspicion of cancer, an US-guided FNA should be performed regardless of the size of the nodule (6). Thyroid FNA is known to have a false positive rate of 0.5%, a false negative rate of 1%, sensitivity of 94.7 %, specificity 98.4 % and accuracy of 99% (7). However, these ratios may vary from one center to another.

In 2009, Horvath et al. (8) presented 'Thyroid Imaging Reporting and Data System (TIRADS)' similar to BIRADS data system used in breast imaging. The classification can be overviewed as below:

- TIRADS 1- normal thyroid gland
- TIRADS 2- benign disease
- TIRADS 3- high probability of benign disease (cancer risk <5%)
- TIRADS 4- suspicious nodules (malignancy rate 5-80%)
 - * 4a- malignancy probability 5-10%
 - * 4b- malignancy probability 10-80%
- TIRADS 5- high probability of malignant nodules (malignancy >80%)
- TIRADS 6- biopsy proven malignant nodules

It has been reported that this data system based on ultrasonographic evaluation may help to avoid unnecessary operations. Park et al. (9) suggested predicting malignancy of thyroid nodules by TIRADS system based on 12 ultrasonographic findings.

In addition, as the number of suspicious ultrasonographic findings in a thyroid nodule increases the likelihood of malignancy in these nodules also increase.

Presence of solid components, hypoechogenicity, microlobulation or irregular borders, microcalcifications and figure properties ("taller-than-wide shape") have been reported as suspicious ultrasonographic findings (10). According to some studies, the most important ultrasonographic findings of malignancy are border irregularity and hypoechogenicity (11), while according to others the presence of "taller-than-wide shape" is most important (12).

Most of thyroid cancers are of papillary type (75-80%) and the majority of these types of cancer are slow-growing and asymptomatic tumors. The remaining are follicular (10-20%), medullary (3-5%) and anaplastic (1-2%) types (13, 14). In our study all carcinomas were of either papillary or micropapillary type. With the growth of nodule size, the risk of extracapsular invasion and lymph node metastasis is higher in papillary type carcinoma than follicular type carcinomas (15, 16). The risk of distant metastases also increases when the size of the primary tumor reaches 2 cm. The early diagnosis of thyroid cancer reduces the risk of recurrence and mortality rate (16). Ultrasonographic features may be used to make the distinction between benign and malignant nodules in non-palpable thyroid nodules of 1-2 cm in diameter. Malignancy findings on ultrasonography or honeycomb appearance (benign feature) distinguish nodules requiring biopsy and reduce the number of unnecessary FNA procedures (17).

Study Limitations

One of the main limitations of this study is the small number of patients. However, within the given time period, in a center where approximately 550 thyroidectomies are performed annually, only this number of patients could be reached with indications mentioned in the materials and methods section. With consideration of the fact that fine-needle aspiration biopsy has a low sensitivity, not being able to perform ultrasonography in all patients by one radiologist and lack of 'interobserver' and 'intraobserver' analysis are accepted as additional limitations to this study. The application of ultrasonography, the performance of FNA and cytology evaluation may all have influenced these results.

CONCLUSION

FNA remains to be the gold standard in presence of nodules smaller than 2 cm and showing suspicious findings for malignancy on neck ultrasonography. However, in the presence of suspicious US findings, due to its high sensitivity, in case of clinical suspicion of malignancy and the presence of at least two US findings, surgical treatment should be discussed.

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