

Comparison of the Rate of Thyroid Malignancies in Patient with Single Thyroid Nodules and Multi-Nodular Goiter

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Abstract

Background: Thyroid nodules are a common clinical finding and differentiating benign ones from malignant ones is a clinical challenge. The aim of this study was to compare the rate of thyroid malignancies in patients with single thyroid nodules (STN) and multi-nodular goiter (MNG).

Methods: This retrospective study was conducted on 200 patients who underwent surgical thyroidectomy, between 2008 and 2010, in Shariati hospital, affiliated with Tehran University of Medical Sciences. Data analysis performed using SPSS (version 13).

Results: Of these, 63 patients (12 male and 51 female) had STN and 137 subjects (28 male and 109 female) were MNG. The mean \pm standard deviation of age in patients with STN and MNG were 39.1 ± 7.1 and 42.7 ± 6.2 , respectively. The two groups had no significant difference in age or sex. The rate of thyroid malignancies in patients with MNG and STN were 34.4% and 36.5% respectively, showing no significance difference.

Conclusions: The study did not show any statistically significant difference between the frequency of malignant and benign nodules in single and multiple thyroid. Therefore, performing accurate pathologic assessment is recommended for all cases of thyroid nodules (MNG or STN).

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Introduction

Thyroid nodules are solid or fluid-filled lumps that form within thyroid, which are common clinical findings (1-3). The prevalence of thyroid nodule in different populations, largely depends on the method of screening and the population evaluated. It has been reported as 2-6%, 19-35%, and 8-65% by using palpitation, ultrasonography and autopsy as the screening methods, respectively (1-3). Increasing age, female sex (sex ratio, F/M: 4/1), Iodine deficiency, and history of head and neck radiation seem to increase the risk of thyroid nodules (4).

A minority of thyroid nodules have malignant changes. Based on presence of risk factors in studied population and screening method, the prevalence of thyroid malignancies in patient with thyroid nodule

varies from 4.6% to 15% (5,6), however, the incidence of new malignancy in a specific nodule has been reported very low (7). Most of the studies in this field focus on finding the risk factors and different features that differentiate this minority (8,9). Nodular disease of the thyroid is common; about 5% of thyroid nodules are malignant; the remainder represent a variety of benign diagnoses, including colloid nodules, degenerative cysts, hyperplasia, thyroiditis or benign neoplasms.

A rational approach to management of a thyroid nodule is based on the clinician's ability to distinguish the more common benign diagnoses from malignancy in a highly reliable and cost-effective manner. A comprehensive history and physical examination provide the foundation for decision making in the management of thyroid nodules. The diagnosis algorithm includes lab tests, ultrasound exam, scintigraphy, and fine-needle aspiration (FNA) biopsy.

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Thyroid Malignancies in Patient with STN & MNG

The aim of this study is to compare the rate of thyroid malignancies between patients with single thyroid nodules (STN) and multi-nodular goiter (MNG) to see if any of these groups are at increased risk of thyroid malignancies.

Materials and Methods

A retrospective descriptive study was conducted on patients referred to clinic of general surgery, Shariati hospital (an affiliated hospital to Tehran University of Medical Sciences, Tehran, Iran) between 2008 and 2010 due to palpable thyroid mass or incidental thyroid nodule; 200 patients were selected by convenience sampling method. Subjects included in this study were those underwent FNA of the dominant nodule with or without the guide of sonography, and then underwent surgical thyroidectomy or lobectomy due to the result of FNA or thyroid sonography suggestive of possible malignancy. Cases with a history of head and neck surgery or radioiodine exposure were excluded. Patients were categorized into MNG and STN according to the result of thyroid sonography.

Direct FNA was done by palpitation method, and ultrasound used only in small nodule, which were difficult to palpate, cystic nodule and nodules located posteriorly. The smears were evaluated by an experienced pathologist and diagnosis assigned as colloid, papillary carcinoma, medullary carcinoma, follicular adenoma, equivocal, no diagnosis and others.

Tissues obtained from the surgery were sent for pathology evaluation. The results were categorized as

MNG with no carcinoma, MNG with papillary carcinoma, MNG with follicular carcinoma, single colloid node with no carcinoma, single node with papillary carcinoma, single node with follicular carcinoma, single node with follicular adenoma and single node with medullary adenoma.

The demographic data and results of FNA and permanent pathology were collected by valid questionnaire. Data analysis performed by SPSS for Windows (version 13; SPSS Inc., Chicago, IL, USA).

Results

Of 200 patients selected for this study, FNA and permanent pathology results of 197 and 194 patients were available, respectively. For 191 patients both FNA and permanent pathology results had been recorded. Of 160 female patients, 109 (68.1%) and of 40 male patients 28 (70%) had MNG. The mean \pm standard deviation of age were 39.1 ± 7.1 in patients with STN and 42.7 ± 6.2 in subjects with MNG.

Categories of FNA results and final pathological reports are shown in table 1. The prevalence of each permanent pathology categories in patients with STN and MNG is shown. The prevalence of each FNA categories per each permanent pathology categories is shown that six patients with STN finally had MNG in pathologist's reports in table 2. The most prevalence of FNA result finding were 98 (49.7%), 39 (19.8), for colloid, and papillary carcinoma.

Table 1. Comparison of FNA results with permanent pathological reports in studied patients

FNA result	Permanent pathological report categories								Total
	MNG N (%)			STN N (%)					
	Colloidal	Papillary carcinoma	Follicular carcinoma	Colloidal	Papillary carcinoma	Follicular carcinoma	Follicular adenoma	Medullary adenoma	
Colloidal	86 (87.8)	-	-	12 (12.2)	-	-	-	-	98
Papillary carcinoma	-	28 (71.8)	-	-	11 (28.2)	-	-	-	30
Follicular adenoma	-	-	5 (17.9)	-	-	-	18 (64.3)	5 (17.9)	28
Medullary carcinoma	-	-	-	-	-	-	-	5 (100)	5
Equivocal	-	-	6 (85.7)	-	-	1 (14.3)	-	-	7
No diagnosis	-	6 (85.7)	-	-	-	1 (14.3)	-	-	7
Others	-	-	6 (85.7)	-	-	1 (14.3)	-	-	7
Total	86 (45.0)	34 (17.8)	17 (8.9)	12 (6.3)	11 (5.8)	3 (1.6)	18 (9.4)	10 (5.2)	191

MNG: Multi-nodular goiter; STN: Single thyroid nodules; FNA: Fine-needle aspiration

Table 2. The prevalence of each FNA categories per each permanent pathology categories

Patient categories	Permanents pathology categories								Total
	MNG (%)			STN					
	Colloidal	Papillary carcinoma	Follicular carcinoma	Colloidal	Papillary carcinoma	Follicular carcinoma	Follicular adenoma	Medullary adenoma	
STN	6 (9.5)	-	-	12 (19.0)	11 (17.5)	6 (9.5)	12 (19.0)	10 (15.9)	63
MNG	80 (61.1)	28 (21.4)	17 (13.0)	-	-	-	6 (4.6)	-	131
Total	86 (44.3)	34 (17.5)	17 (8.8)	12 (6.2)	11 (5.7)	6 (3.1)	18 (9.3)	10 (5.2)	194

MNG: Multi-nodular goiter; STN: Single thyroid nodules; FNA: Fine-needle aspiration

Discussion

The male to female ratio in this study was 1:4 and the prevalence of thyroid nodules was higher in female patients ($P < 0.05$), which is in concordance with previous studies (7,10-12); and there is no significant difference for sex or age between patients with STN or MNG ($P > 0.05$). The very high prevalence of thyroid malignancies in this study, 34.5% for MNG and 36.5 for STN, is due to the population selected from a tertiary center. Most of the patients were referred to our clinic based on thyroid sonography or FNA results in concordance with a high risk of malignancies (12-15).

Comparing the result of FNA and permanent pathology result shows that all colloidal, papillary carcinoma result of FNA is confirmed by permanent pathology showing high specificity of FNA for detecting these types of nodules which has been shown in other studies (16,17).

There were no significant differences in the prevalence of thyroid malignancy between patients with STN and MNG which is in concordance with the result of other studies, including: Frates et al. studied 1985 patients who underwent FNA of 3483 thyroid nodules and reported no significance difference in the rate of thyroid malignancies between patients with STN and multiple thyroid nodules (6). Papini et al. assessed the risk of malignancy in 494 patients with STN and MNG. The risk of malignancy was not significantly higher in solitary thyroid nodules as opposed to lesions embedded in MNG (18).

Conclusion

In summary, the results of the present study suggests that the prevalence of malignant and benign nodules in both single and multiple thyroid no statistically significant difference, so it is recommended in all cases of thyroid nodules (MNG or STN), an accurate assessment of nature pathologic be performed.

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