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ORIGINAL ARTICLE

A Study of 558 Cases of Cold Thyroid Nodules, 1991-1999; Comparison to a Decade Earlier

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Although thyroid nodules are usually benign, malignancy must always be ruled out. Many efforts have been made to find malignant nodules and reduce the number of unnecessary operations. In this study, our aim was to examine, after the more extensive use of fine needle aspiration (FNA), whether the incidence of cancer finding has been increased.

Materials and Methods: We studied retrospectively the medical records of the patients who were operated during 1991 through 1999 in the university hospital setting. Age, sex, FNA and complete pathologic reports, and whether the lesion was multinodular or a solitary nodule, were studied. The results were then compared with those of a previous study performed in the same center a decade earlier.

Results: Patients' age was 39±12.7 year with benign nodules, and 45±15 year with malignant lesions (P<0.001). The frequencies of pathologic lesions were: multinodular goiter, 59.5%; thyroid cancer, 30.5%; thyroid adenoma, 7.7%; and thyroiditis, 2.3%. There was no relationship between being multinodular or single nodule on one hand, and malignancy on the other. The prevalence of colloid nodular goiter in a study performed a decade earlier was 81.8%; thyroid cancer 10.2%; adenomas 6.5%; and thyroiditis 1.5%. FNAs were done for 50% in the present study, whereas this was done only in 10% of patients in the earlier study.

Conclusion: It seems that the more widespread use of FNA is an important reason of significant increase in cancer finding.

Key Words: Thyroid nodule, Colloid nodular goiter, thyroid cancer, Fine needle aspiration

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Introduction

Thyroid nodules are common in clinical practice. Most are benign and only 5% are malignant.[1,2] Often, however, thyroid cancer manifests as a palpable neck mass or a thyroid nodule. The clinician must be able to distinguish between the majority of benign lesions, which require only medical management, and the less common malignant thyroid nodules, which necessitate surgical treatment.[1,3]

In making this distinction, several clinical features must be considered. Although many tests, including isotope scanning, ultrasonography, and CT scan have been used, none has the diagnostic accuracy of thyroid fine-needle aspiration (FNA) for the evaluation of thyroid nodules. In this study, we analyzed the results of thyroidectomies performed for thyroid nodule(s) to find whether the rate of

cancer finding had improved after widespread use of FNA.

Materials and Methods

Patients were identified by searches through medical records of Vali-Asr Hospital, Tehran. All had confirmed histopathologic diagnoses of thyroid specimens. We found 558 patients, who were operated on for a cold thyroid nodule during the period 1991-1999. The following information was collected and analyzed: patients' age and gender, clinical presentation, thyroid scan and function tests, FNA results, and nodule histology. Most of the patients were from Tehran; only a few were from other parts of Iran. The data were then analyzed by χ^2 and t tests in SPSS.

Results

Age

The mean age±standard deviation (SD) was 41±13.6 years, with the minimum of 8 years and the maximum of 76. The mean±SD age of with individuals benign nodules was 39±12.7 years and that of the malignant ones was 45±14.8 years. The mean age for the malignant cases was significantly more than the benign ones ($p<0.0001$). Notably malignancy after 50 years of age was more probable ($p<0.01$). Relative frequencies and percentages of malignant and nonmalignant nodules for each decade of patients' ages are illustrated in table 1.

Sex

The patients included 427 females (76.5%) and 131 males (23.5%). The mean age of females was 40.6±14 and that of males 42±15.4 years. There was no statistical relationship between sex of the patients and histopathologic diagnoses of nodules (malignant or benign) ($p=0.08$).

Location of the nodules

There was no statistical relationship between histopathologic diagnoses of nodules (malignant or benign) and their locations ($p<0.1$).

Table 1-Relative and absolute frequencies of thyroid nodules for each decade of patients' ages, and percentages of malignant and non-malignant lesions

Age group	Number of cases	Malignant (%)	Non-malignant (%)
1-10	2	100	0
11-21	26	80.8	19.2
21-30	108	75	25
31-40	161	71.4	28.6
41-50	121	74.4	25.6
51-60	91	65.0	35.0
61-70	41	43.9	56.1
71-76	8	12.5	87.5
Total	558	69.4	30.6

Isotopes scan reports

In 287 (51.4%) out of 558 patients who had thyroid scans, 252 (87.8%) had multinodular goiters, and 35 (12.2%) solitary thyroid nodules. 73.4% of multinodular goiters were benign, and 26.6% of them malignant. Of 35 cases of solitary thyroid nodule, 77% were benign and 23% malignant. No statistical relationship was found between malignancy and benign nature of nodule on the one hand, and solitary or multinodular goiter on the other.

Fine needle aspiration

Of all the patients whose medical records were studied, 278 (49.8%) were examined by FNA before surgery. The results reported were benign in 135 (48.6%), suspicious in 87 (31.3%), positive in 24 (8.6%), and non-diagnostic in 32 (11.5%) of cases.

Histopathologic diagnosis.

Of 558 cases, 388 (69.5%) were benign, and 170 (30.5%) malignant. The most common histopathologic lesion (59.5%) was colloid nodular goiter. The prevalences of the histopathologic nature of the operated nodules are illustrated in table 2. The mean age for colloid nodular goiter was 39±12 years in women, and 39.5±15 years in men; which was not statistically significant. This was equally true for adenoma. Of 170 malignant nodules, 70% were papillary carcinoma, 13% follicular carcinoma 9% medullary carcinoma, 3% Hurtle cell carcinoma, 2.5% anaplastic carcinoma 1.7% lymphoma, and 0.5% had insular carcinoma.

Table 2. Frequency of pathologic types of lesions in the operated cases

Pathologic type	Number	Percent
Nodular colloid goiter	332	59.9
Follicular adenoma	34	6.1
Hurtle cell adenoma	9	1.6
Papillary carcinoma	121	21.7
Follicular carcinoma	21	3.8
Hurtle cell carcinoma	5	0.9
Anaplastic carcinoma	4	0.7
Medullary carcinoma	15	2.7
Insular carcinoma	1	0.2
Chronic lymphocytic thyroiditis	5	0.9
Hashimoto's thyroiditis	8	1.4
Lymphoma	3	1.5
Total	558	100

Discussion

Thyroid nodules are common in clinical practice, and their prevalence depends on the method used for screening and the population evaluated. The prevalence of thyroid nodules has ranged from 3.2–7% in the general population in different reports from iodine sufficient areas.[4-7] Thyroid nodules have been estimated to be 2.5 times more frequent in iodine deficient areas in comparison with iodine sufficient areas.[8]

The histopathologic categories of thyroid nodules vary according to the time of report and methods used for diagnostic evaluation. Veith et al studied 503 patients selected for thyroidectomy because of some degree of nodularity of the thyroid.[9] The pathological distributions of the nodules were following: adenomatous goiter 60%, true adenomas 26%, carcinomas 9%, and thyroiditis 5%. Belfiore et al. studied 5637 patients from

1980 through 1990; 4176 were from iodine sufficient and 1461 from iodine deficient areas.[8] Of the 762 patients who underwent thyroidectomy, 32.7% (259 cases) had thyroid cancer. The overall rate of cancer was 4.6% in the study.

In a study in our hospital during the years 1979 through 1989, 81.7% of all nodules were colloid nodular goiter, 10.2% carcinoma, 6.5% thyroid adenomas, and 1.5% thyroiditis.[10] The frequencies of various pathologic entities among surgical specimens in the present and previous study are illustrated in table 3. The most common malignancy in both studies was papillary carcinoma, and its relative prevalence during two decades was the same.

The approach to management of thyroid nodules has changed continually during the last years. Changes in diagnostic strategies are the most important reason underlying the results. FNA is the diagnostic modality of choice, while formerly thyroid scanning was the first diagnostic approach to any thyroid nodule. The reported specificity is 92% (72-100%) and sensitivity 83% (65-98%).[11] The number of unnecessary operations has decreased sharply from 25% to 50% after routine use of FNA.[12] At the Mayo clinic, FNA biopsy has resulted in a 25% decrease in the number of thyroidectomies for nodular goiters, and the percentage of thyroid carcinomas found among surgical specimens has increased from 14 to 39%.[13,14] Similar studies have confirmed the above results.[15-17] The percentage of thyroid carcinoma increased from 10% to 30% among surgical specimens in the present study compared with our previous study.[10] In the previous study only 10.9% of patients had FNA biopsies; in 84 patients who underwent surgery based on the results of the FNA, 4 out of 55 with a report of a benign lesion proved to be malignant. Ten out of 29 patients with a cellular lesion on FNA had thyroid malignancy on pathological examination.[10] In the present study 50% of operated patients had FNA biopsies.

Table 3. Comparison of the frequencies of various pathologic entities before (1979-1989) and after (1990-1999) FNA application

Pathologic type	Present Study No (%)	Previous Study No (%)
Nodular colloid goiter	332 (60.0)	625 (81.7)
Thyroid carcinoma	167 (30.5)	78 (10.2)
Thyroid adenoma	40 (7.7)	50 (6.5%)
Lymphoma	3 (1.5)	-
Thyroiditis	16 (3.8)	12 (1.5%)
Total	558 (100)	765 (100)

The average false-negative rate from several series reviewed by Gharib and Goellner[13] and Caruso and Mazzaferri[17] was 5% (1-11.5%) and the average false-positive rate was 2.9% (0-7.7%).[13] In the present study, in 135 cases with benign FNA results, 24 cases (20%) proved to be malignant after surgery. Meanwhile, of 24 cases with positive FNA results 25% proved to be benign in the histopathologic examination. Despite higher rates of false positive and false negative FNA results in this study, the rate of cancer findings increased dramatically. Aspiration biopsy of a thyroid nodule, although a relatively simple procedure, should be performed only by an experienced operator.

There is controversy about the relationship between malignancy and multi- or mononodularity of thyroid tumors. Mazzaferri indicated that uninodular and multinodular thyroids are not as discrete as once con-

sidered; hence, the risk of malignant activity in both may be similar.[18] In this study the rate of thyroid cancer was 30% in the operated nodules. No statistically significant correlation was found between the prevalence of malignancy and sex, mono- and multinodularty of lesions.

Although only half of our patients had an FNA biopsy, the rate of cancer finding increased significantly. This led to appropriate patient selection in need of surgical treatment and overall savings in the cost of medical care.

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