

FNA STUDY OF 377 THYROID NODULES: A CYTO- AND HISTOPATHOLOGIC CORRELATIVE STUDY

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ABSTRACT

377 patients with single thyroid nodule who clinically were candidates for surgery, were selected from the patients that referred to the clinics of endocrinology at Namazee Hospital, Shiraz Medical School. Fine needle aspiration (FNA) was carried out without performing thyroid scan and the results were compared with histology obtained by surgery to establish its accuracy in our center, which is an area of endemic goiter. 72% were benign confirmed by surgery, 17% malignant (of which two cases were colloid goiter) and 11% (42 cases) were suspicious: of these 42 suspicious cases, 28.5% were follicular carcinoma and the rest were benign. In this study sensitivity and specificity of FNA were 91% and 97%, respectively. In conclusion, although our area is an endemic goiter area, the accuracy of FNA is comparable to iodine sufficient areas.

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INTRODUCTION

The evaluation of thyroid nodules is a problem; because both the malignant and the benign lesions will present as nodules. Fine needle aspiration study of thyroid lesions has been in practice for more than half a century in other countries.^{9,12,13,14} Since the technique is easy and safe, it can be used as a routine procedure in the office without the problem of anaesthesia.

This procedure can be repeated as many times as required so that an adequate amount of material is obtained for the diagnosis.

Since the prevalence of goiter in the southern part of Iran is very high,² we used the FNA procedure for diagnostic reliability, followed by surgery and compared the results with other centers abroad.

MATERIALS, METHODS, RESULTS

377 patients with a single thyroid nodule were selected from the patients who referred to the clinic of endocrinology

at Namazee Hospital, Shiraz Medical School. FNA was performed on these cases as the first step. No thyroid scan was carried out before FNA. Regardless of the results of FNA, patients underwent surgery and pathology reports were compared with the results of FNA. None of the selected patients refused surgery. The male to female ratio was 1: 3. The ages of the patients ranged between 19-70 yrs. The peak age ranged between 25-35 yrs.

The thyroid lesions were aspirated by syringe using 23 gauge needles. About four slides were prepared from each case, two were air dried and two were fixed in ethanol. As a routine the air-dried smears were stained by Wright-

Table I. Total cases

	No	%
Benign	270	72
Malignant	65	17
Suspicious	42	11
Total	377	100

FNA of Thyroid Nodules

Table II. Malignant lesions

	No	%
Papillary CA	58	90
Medullary	3	4
Anaplastic	3	4
Hurthle cell CA	1	2
Total	65	100

Table III. Benign non-neoplastic lesions

	No	%
Colloid Goiter	231	86
Hashimoto's Thyroiditis	36	13
De Quervain's Thyroiditis	3	1
Total	270	100

Table IV. Suspicious cases

	No	%
Follicular Adenomas	30	71.5
Follicular Carcinomas	12	28.5
Total	270	100

Giemsa and fixed smears by Papanicolaou methods. The smears were reviewed by two pathologists without the previous knowledge of clinical and histological diagnosis. Initially the smears were classified as benign, malignant and suspicious. In these 377 cases, sixty-five cases were diagnosed as malignant and the rest were benign and suspicious cases (Table I).

The smears diagnosed as malignant were reviewed carefully for morphological typing. The cytologic diagnosis was confirmed by the histopathologic diagnosis (Table II).

The benign lesions were subclassified as colloid goiter; Hashimoto's thyroiditis; and De Quervain's thyroiditis (Table III). The suspicious cases were all follicular neoplasms and they were subclassified as adenoma and carcinoma on the basis of the histologic diagnosis only (Table IV).

The overall diagnostic accuracy between benign and malignant nodules is high with a sensitivity and specificity of 91% and 97% (Table V).

According to this study the benign thyroid lesions are the most common, about 72%, and the malignant about 17%. The colloid goiter is the common benign lesion and the papillary carcinoma (90 percent) is the common malignant lesion (Figs. 1-4).

The Hurthle cell carcinoma is the rare malignant lesion. The Riedel struma was not seen in this study. The nuclear grooves were noticed in both benign and malignant disorders; so this finding is considered not to be diagnostic (unpublished data).

About 97 cases were deleted from this study because of the lack of histopathologic confirmation. Eleven cases were

Table V. Comparative Study

No of Cases	Cytology Diagnosis	Histologic Diagnosis	No of Misdiagnoses
231	Colloid Goiter	Confirmed	0
58	Papillary Goiter	56 cases were confirmed [2 cases were goiter with hyperplasia]	2
2	Anaplastic carcinoma	Confirmed	0
3	Medullary carcinoma	Confirmed	0
36	Hashimoto's thyroiditis	32 cases were confirmed [4 cases were chronic follicular thyroiditis]	4
42	Follicular neoplasms [Not differentiated between adenoma and carcinoma]	40 cases were confirmed [12 were carcinomas, 28 were adenomas, 2 were adenomatous goiter]	2
2	Hurthle cell neoplasm	Hurthle cell carcinoma	0
3	De Quervain's thyroiditis	Confirmed	0

Sensitivity: 91 percent

Specificity: 97 percent

aspirated three times. Only one patient developed neurogenic shock at the time of aspiration. Post-aspiration complications like intra-thyroid hemorrhage was not noticed in the study. Three cases showed respiratory epithelium and one case showed megakaryocytes in the smears. This complication took place because of the excessively deep penetration of the needle into the trachea and tracheal cartilage. However the patients did not have any problem after the procedure.

DISCUSSION

Thyroid aspiration cytology of various diseases was described before in detail in many papers.^{4,5,6,10,11,15} However, the correlative study of cytology and histology findings are described only in a few papers.^{10,11} In this study the cytologic diagnosis was compared with histologic diagnosis. The benign thyroid lesions were diagnosed 100% by cytology smears. The various types of benign lesions were specified correctly by FNA; but on a few occasions Hashimoto's thyroiditis was mistaken with chronic lymphocytic thyroiditis and lymphoma. However, absence of Hurthle cells and atypical cleaved lymphocytes differentiate them from Hashimoto's thyroiditis.⁵

The cytology findings of subacute thyroiditis (De Quervain's thyroiditis) are sometimes confused with tuberculosis. In these situations the clinical findings like acute onset and previous history of viral infections are in favor of De Quervain's thyroiditis. Moreover the giant cells around the colloid material are diagnostic for De Quervain's thyroiditis. Malignant lesions were diagnosed very easily by FNA cytology, except follicular and Hurthle cell carcinomas. The most common type of malignant lesions are papillary carcinomas; only two cases were misdiagnosed because of lack of typical findings like intra-nuclear inclusions and nuclear grooves. These two cases were histologically diagnosed as follicular variant of papillary carcinoma. The diagnosis of anaplastic carcinoma and medullary carcinoma are made easily on the cytology smears.³

Among the malignant lesions, follicular and Hurthle cell neoplasms are very difficult to diagnose as carcinomas on cytology smears. These cases were diagnosed as follicular and Hurthle cell neoplasms and further differentiation was made on histologic sections.

According to this study the cytology smears are divided basically as benign, malignant and suspicious. Further efforts are made to subclassify the benign lesions as adenomas, colloid goiter, Hashimoto's thyroiditis, lymphomatous thyroiditis and De Quervain's thyroiditis, and the malignant lesions as papillary, anaplastic and medullary carcinomas. The follicular and Hurthle cell carcinomas are diagnosed only by histologic sections. The suspicious cases are subjected

for excision.^{7,8}

Review of the previous literature shows sensitivity of 86% and specificity 100% according to Lowhagen,¹² the results of Ashcraft and Van Herle¹ shows sensitivity, 90% and specificity, 99%. The results in this study are very close to the above studies. Although the efficacy of thyroid FNA is not 100%; it is superior to the other available screening methods for thyroid malignancy.

REFERENCES

1. Ashcraft MW, Van Herle AJ: Management of thyroid nodules: I. History and physical examination, blood test, X-ray tests, and ultrasonography. *Head Neck Surg* 3: 216-227, 1981.
2. Azizi F, Kimiagar M, Nafarabadi MT, et al.: Current status of iodine deficiency disorders in the Islamic Republic of Iran. *EMR Health Serv J* 8: 23-7, 1990.
3. Block MA, Dialek GE, Robb JA: Thyroid nodules indeterminate by needle biopsy. *Am J Surg* 146: 72-78, 1983.
4. Chu EW, Hanson TA, Goldman JM, et al.: The thyroid gland. *Acta Cytologica* 23: 309-314, 1979.
5. Friedman M, Shimaoka K, Rao U, et al.: Diagnosis of chronic lymphocytic thyroiditis (nodular presentation) by needle aspiration. *Acta Cytologica* 25: 513-522, 1981.
6. Gardiner GW, De Souza FM, Carydis B, et al.: Fine needle aspiration biopsy of the thyroid gland: results of a five year experience and discussion of its clinical limitations. *J Otolaryngol* 15: 161-165, 1986.
7. Hadju SL, Melamed MR: Limitations of aspiration cytology in the diagnosis of primary neoplasms. *Acta Cytologica* 28: 337-345, 1984.
8. Hadju SI, Melamed MR: Limitations of aspiration cytology in the diagnosis of primary neoplasms. *Acta Cytologica* 29: 491-492, 1984.
9. Hamberger B, Gharib H, Melton LJ, et al.: Fine needle aspiration biopsy of the thyroid nodules: Impact on thyroid practice and cost of care. *Am J Med* 73: 381-384, 1982.
10. Harsoulis P, Leontini M, Economou A, et al.: Fine needle aspiration biopsy cytology in the diagnosis of thyroid cancer-comparative study of 213 operated patients. *Br J Surg* 73: 461-464, 1986.
11. Jayaram G: Fine needle aspiration cytologic study of the solitary thyroid nodule: Profile of 308 cases with histologic correlation. *Acta Cytologica* 29: 967-973, 1985.
12. Lowhagen T, Granberg PO, Lundell G, et al.: Aspiration biopsy cytology in nodules of the thyroid suspected to be malignant. *Surg Clin North Am* 59: 3-18, 1979.
13. Miller JM, Hamburger JI, Kini SR: The impact of needle biopsy on the preoperative diagnosis of thyroid nodules. *Henry Hosp Med J* 28: 145-148, 1980.
14. Rojeski MT, Gharib H: Nodular thyroid disease. Evaluation and management. *N Engl J Med* 313: 428-436, 1985.
15. Suen KC, Quenville NF: Fine needle aspiration *J Clin Pathol* 36: 1036-1045, 1983.