

## COMPARATIVE EVALUATION OF THE DIAGNOSTIC RESULTS OF FINE-NEEDLE ASPIRATION (FNA) CYTOLOGY AND PATHOLOGY IN THE ASSESSMENT OF THYROID NODULES

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### ABSTRACT

**Objectives:** Fine-needle aspiration has become an accepted and cost-effective procedure for rapid diagnosis of thyroid lesions. The routine use of Fine-needle aspiration has reduced the rate of unnecessary surgery for thyroid nodules. This study was conducted to determine the accuracy of fine-needle aspiration biopsy diagnosis

**Methodology:** During this cross-sectional study, reports of 600 fine needle aspiration cytology of the thyroid, performed during a period of 11 years (1991-2001) in departments of pathology of Shahid Rahnemoon and Shahid Sadoughi hospitals were reviewed. Pathological diagnosis were available for 28 cases. Cytological reports were classified diagnostically, and histological and cytological correlations were determined. Statistical analysis was performed with SPSS 13 and descriptive tests.

**Results:** From 600 cases (91 male, 509 female) the cytological diagnosis were as follows: 526 (87.7%) benign, 28 (4.7%) malignant, 10 (1.6%) suspicious and 36 (6%) unsatisfactory. Between benign lesions, goiter and follicular adenoma and between malignant lesions, papillary cell carcinomas were the most common. Malignant nodules were more common in females than males (4.9% versus 3.3%). We identified no false-positive results between malignant FNA and histopathology and so positive predictive value was 100%.

**Conclusions:** Fine-needle aspiration of the thyroid gland is highly accurate and has a low rate of false-positive diagnosis in case of malignant results.

**KEYWORDS:** Thyroid Nodule, FNA, Accuracy.

Pak J Med Sci April - June 2008 (Part-II) Vol. 24 No. 3 382-385

### How to cite this article:

Binesh F, Salari AA. Comparative Evaluation of the diagnostic results of Fine-Needle Aspiration cytology and pathology in the assessment of thyroid nodules. Pak J Med Sci 2008;24(3):382-5.

### INTRODUCTION

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\* Received for Publication: November 26, 2007

\* Revision Received: April 9, 2008

\* Revision Accepted: May 3, 2008

The estimated incidence of solitary palpable nodules in the adult population is about 4-6%. The prevalence of thyroid nodules varies in different parts of world.<sup>1-3</sup> The type of screening method affects the prevalence. Thyroid nodules have been reported up to 50% in autopsy records and to 97% in sonography from apparently normal thyroids.<sup>4,5</sup> Although many studies were carried out in Iran, but they were on patients referred to faculty centers

which can not be considered as epidemiologic studies.

The majority of clinically apparent thyroid nodules are benign. Physical examination alone can not distinguish between benign and malignant lesion, so additional preclinical efforts such as sonography, radio nucleotide scan and FNA are needed. FNA is now firmly established as an important first line diagnostic test in the evaluation of thyroid nodules. It provides a rapid, safe and accurate diagnosis of benign and malignant nodule.<sup>6</sup> Sensitivity and specificity of this procedure varies from 85 to 95% and it is highly dependent on FNA technique, nature of lesion (solid or cystic) smear preparation quality and pathologist's experience.<sup>7-13</sup> Now the first step in the evaluation of a thyroid nodule is FNA.<sup>14</sup> If FNA reveals a benign lesion the patient typically does not require surgical intervention, in addition suspicious or unequivocal diagnosis of malignancy helps in preoperative planning.<sup>6</sup> In Iran numerous studies were carried out about diagnostic effects of this useful procedure.<sup>15</sup> This study was conducted to determine frequency of thyroid nodule and its relationship with sex, age and finally histological and cytological correlation in the pathology department.

## METHODOLOGY

This is a cross-sectional study in which we considered reports of 600 FNA of thyroid and histopathological diagnosis of thyroidectomy performed during a period of 11 years (1991-2001) in the department of pathology. Sampling was simple. Variables considered were sex, age, FNA results (type of lesion: benign, malignant, suspicious to malignancy and inadequate specimen) and histological report

Table-I: Distribution of the thyroid nodular lesion according to FNA result

FNA result	No.	%
Benign	526	87.7
Malignant	28	4.7
Suspicious to malignancy	10	1.6
Insufficient material	36	6
Total	600	100

(benign or malignant). Results were analyzed by SPSS software and descriptive tests.

## RESULTS

Five hundred nine (84.8%) patients were female and 91 (15.2%) Male which reveals thyroid nodules were more common in female. FNA results in 87.7% were benign, the frequency of malignant lesions were less than 5% and inadequate specimens were 4% (Table-I) Three hundred twenty two out of 526 of benign nodules were goiter (61.2%). Follicular adenoma (1.5%) and thyroiditis (1.3%) were other benign nodular lesions. The most common malignant nodule was papillary carcinoma (77.86%) follicular carcinoma together with Hurthle cell carcinoma encompass 21.4% of malignant thyroid neoplasm. There was one case of metastasis carcinoma (squamous cell Carcinoma). (Table-II) malignant lesions were 3.3% in male and 4.9% in female. Benign nodules were 97% in male and 86% in female. (Table-III).

Benign nodules most commonly occurred in 30-39 years. With advancing age the risk of malignancy increased and in 70-100 years it was the most common lesion. In histological records that had malignant FNA results we identified no false positive results. So positive predictive value was 100%.

## DISCUSSION

Thyroid FNA is the first preferred method in evaluation of thyroid nodules and has high sensitivity and specificity.<sup>14</sup> In various studies the sensitivity and specificity of this test has been reported form 85-100% and 92-95%

Table-II: Distribution of the benign thyroid nodular lesion in this study

Type of benign lesion	No.	%
Goiter	322	61.2
Benign thyroid hyperplasia	41	7.8
Follicular adenoma	55	10.5
Benign cyst	11	2.1
Thyroiditis	7	1.3
Probably benign	90	17.1
Total	526	100

Table-III: Distribution of malignant thyroid nodular lesion in this study

Type of malignant lesion	No.	%
Papillary carcinoma	19	67.8
Follicular carcinoma	4	14.3
Hurthle carcinoma	2	7.1
Medullary carcinoma	1	3.6
Anaplastic carcinoma	1	3.6
Metastatic carcinoma	1	3.6
Total	8	100

respectively.<sup>7-13</sup> In a study performed by Bakhos R. et al in 625 cases of thyroid FNA (1994-2000) which included 503 women and 122 men, results were diagnostic in 87%, doubtful to malignant in 60% and not diagnostic in 7%. In comparison with histopathology false positive was 8%.<sup>9</sup> In another study performed by Chehade JM et al on 235 FNA results (211 women and 24 men) they found 204 benign, 11 doubtful one malignant lesions and specimen in 19 cases was considered inadequate.<sup>10</sup> In yet another study done by Mondell. DL, et al sensitivity, specificity and accuracy of thyroid FNA was compared with frozen section which in case of FNA was 94%, 97% and 89% and in the case of frozen section 89%, 100% and 67% respectively.<sup>11</sup>

In various studies which were performed on the results of thyroid FNA the most prevalent thyroid nodular lesion is benign nodule. Incidence of benign thyroid nodular lesion is 60-89% and malignant nodule 2.4-8%. In our study 97.7% of thyroid nodular lesion were benign and 4.7% malignant. In other studies the incidence of doubtful to malignant lesion and inadequate specimen are 2.87 and 6-31% respectively whereas our study reports figures of 1.6% and 7% respectively.<sup>6-10,15</sup> However in various studies only 20% of doubtful cases to malignancy were malignant which means that the frequency of thyroid malignancy in our community is less than 5%. The frequency of inadequate specimen is mainly dependent on FNA technique, the nature of lesion and quality of cytologic preparation.<sup>7-9</sup> We had no such problem and FNA performed well.

The most prevalent benign thyroid nodular lesion is nodular goiter which is also proved in our study as it accounted for 61.2%. The most prevalent benign thyroid nodular lesion after nodular goiter is follicular adenoma which in our study accounted for (10.5%).<sup>6,13</sup> Thyroiditis which include acute febrile Thyroiditis (1 patient), sub acute thyroiditis (4 patients) Hashimoto's thyroiditis (2 patients) accounted for 1.3% of benign lesion. The most prevalent malignant nodular lesion is papillary cell carcinoma and it's incidence has been reported from 75-85% and in our study this accounted for 67.8%. Incidence of follicular cell carcinoma has been reported 10-20%<sup>16,17</sup> and in our study the total number of follicular and Hurthle cell carcinoma was 21.4% which is more than reported in previous studies. In our study we had just one case of metastasis carcinoma which was squamous cell carcinoma.

Thyroid's nodule is more prevalent in woman and the reported incidence is more than 80%<sup>6,9,10</sup> which was confirmed in our study as well. In both men and women the most prevalent thyroid nodule is benign (96% in women and 86% in men). In this study there was no suspicious cases as regards malignancy and inadequate specimen in men. In comparison, the malignant nodule in women (4.9%) was more prevalent than men (3.3%) which is in line with previous studies.<sup>6</sup> In this study thyroid nodular lesion was most frequent at the age of 30-39 years. This means that the incidence of thyroid nodule increases with age until thirty years and then decreases. This finding is important since many studies show that the incidence of thyroid nodules increases with age.<sup>6</sup>

Malignancy increases with age but previous studies reveal the incidence of malignancy increases with age but after the age of 50, it reverts to normal.<sup>6</sup> In histopathological correlation, all the 28 patients with malignant FNA records had malignant histopathological reports, so in this study there was no false positive and positive predictive value of thyroid FNA was 100%.

## CONCLUSION

We conclude that FNA has a good sensitivity and specificity in evaluation of thyroid nodules.

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