



## Evaluating the Consistency of the FNA Test in Pathologically Proven Nodules of Thyroidectomy

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### ABSTRACT

*Fine Needle Aspiration (FNA) is a selective diagnostic technique for the evaluation of non-toxic thyroid nodules. Thyroid FNA results are either undiagnosed or suspicious and indeterminate in 20-30% of cases. Therefore, this study seeks to determine the consistency of the FNA test in pathologically proven nodules of thyroidectomy. This is a descriptive cross-sectional study carried out on a total of 73 candidates for thyroidectomy who had been admitted to Imam Ali Hospital. A census sampling method has been used in this study. The FNA samples and pathology samples were evaluated and the consistency of the FNA test in pathologically proven nodules were compared. The SPSS software was used for data analysis. The mean age of the patients was  $40.1 \pm 12.9$  years. 23.3% of the participants were male and 76.7% of them were female. The malignancy rate in the pathology was 65.8% (48 cases) and 53.4% (39 cases) in the FNA. Of the 48 positive cases, the FNA pathology diagnosed 35 cases (72.9%) as positive and 13 cases (27.1%) as negative. Of the 25 negative cases, the FNA pathology diagnosed 21 cases (84%) as negative and 4 cases (16%) as positive. Sensitivity, specificity, positive and negative predictive values of FNA in malignancy diagnosis were 72.92, 84, 89.74, and 61.76%, respectively. The results show that FNA does not have a high sensitivity in the diagnosis of malignancy, but has good specificity and the use of other diagnostic methods before the operation of thyroid nodules seems necessary.*

**Key words:** FNA, Pathology, Thyroid Nodule

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### INTRODUCTION

Thyroid nodule is a common clinical finding the prevalence of which is estimated to range from 3 to 7 percent based on tactile examination. However, when examined further by ultrasonography, its prevalence can range from 20 to 76 percent in the general population, which is similar to autopsy data [1, 2]. Since only 5% of the thyroid nodules are malignant, the surgical removal of each thyroid nodule is neither accepted nor practical. Fine needle aspiration (FNA) is

widely accepted as a selective diagnostic technique for the evaluation of non-toxic thyroid nodules, and its primary purpose is the triage of patients in order to identify patients who need surgery and to decide about the proper surgical procedure. Depending on the type of lesion, Thyroid FNA can have a screening diagnostic role. As a diagnostic method, the FNA aims to identify papillary and other malignant tumors [3]. Cytology cannot differentiate between Hurthle cell lesion and Follicular cancers from other benign tumors because it does not have the ability to detect infiltration into the capsule and vessels; Hence, Thyroid FNA is considered a screening method for identifying Hurthle cell and follicular cancers. In other words, the FNA examines

whether the nodule in question has a risk of Hurthle cell or follicular cancer [2, 4]. However, in the best conditions, the results of thyroid FNA is non-diagnostic or suspicious and indeterminate in 20-30% of cases, and the risk of cancer in this group varies from 5% to 75%. [5].

The major limitation of thyroid FNA is due to the ambiguous cytological characteristics of benign and malignant follicular neoplasms, Hurthle cell, hyperplastic nodules, and follicular strains of papillary cancers. Therefore, diagnostic thyroidectomy is usually recommended in cases where the FNA results are suspicious or indeterminate [5]. Unfortunately, there is still no clinical, imaging, and cytological approach before surgery, based on which to definitely determine which patient needs a thyroidectomy. With all these restrictions, thyroid FNA is considered the most accurate preoperative diagnostic procedure in thyroid nodule [6].

However, this evaluation is based on separate studies of well-known institutions and centers, and other data from the studies of some large important centers have shown less accuracy of thyroid FNA than what was predicted by many major European and American centers. Hence, if the thyroid FNA is not sufficiently reliable, it can be considered an ineffective method which cannot prevent unnecessary surgeries of most thyroid nodules and will impose a high cost on the health system [6].

Therefore, considering the studies previously conducted in this area, we seek in the present study to evaluate the consistency of the FNA test in pathologically proven nodules of thyroidectomy.

#### MATERIALS AND METHODS

This descriptive cross-sectional study was conducted on candidates for thyroidectomy who had been admitted to Imam Ali Hospital of Zahedan, Iran.

The inclusion criteria included being a candidate for thyroidectomy and having FNA. The exclusion criteria included patient's lack of cooperation on the continuation of the study and incomplete records of the patients.

The study population consisted of all patients with thyroid nodules who undergo thyroidectomy.

It was anticipated that 50 patients would be included in the sample, and 20 older patients with past records would be added to them, which would comprise a total of 100 patients to be studied, and finally as many as 73 patients were surveyed in this study with regard to the number of patients admitted there.

The data were collected through an information form and were analyzed using the SPSS software and displayed in tables and graphs.

#### RESULTS

The mean age of the patients was  $40.1 \pm 12.9$  years. 23.3% of the participants were male and 76.7% of them were female. The malignancy rate in the pathology was positive in 65.8% (48 cases) and negative in 34.2% (25 cases). The malignancy rate in the FNA was positive in 53.4% (39 cases) and negative in 46.6% (34 cases).

Of the 48 positive cases, the FNA pathology diagnosed 35 cases (72.9%) as positive and 13 cases (27.1%) as negative. Of the 25 negative cases, the FNA pathology diagnosed 21 cases (84%) as negative and 4 cases (16%) as positive. Therefore, the indices of sensitivity, specificity, positive and negative predictive values of FNA in malignancy diagnosis were calculated as 72.92, 84, 89.74, and 61.76%, respectively (Table-1).

**Table 1: Determination of the consistency of the FNA test in pathologically proven nodules of thyroidectomy**

Pathology FNA	Positive	Negative	Total
Positive	35 (72.9)	4 (16%)	39 (53.4%)
Negative	13 (27.1)	21 (84%)	34 (46.6%)
Total	48 (65.8%)	25 (34.2%)	73 (100%)

#### DISCUSSION AND CONCLUSION

Thyroid FNA is known as a pre-operative standard test used to detect papillary carcinoma and other cancers. It is thus expected to have a lower false negative ratio so that its sensitivity to thyroid cancer diagnosis can increase. False negatives are those which are positive in histopathology but which are reported as negative in the thyroid FNA. Different degrees of sensitivity (35-98%) and specificity (48-100%) have been reported for Thyroid FNA in previous studies [2, 6].

The rate of malignancy was 65.8% in the pathology and 53.4% in the FNA in present study. The sensitivity of FNA for diagnosis of malignancy was 72.9%, its specificity was 84%, its positive

predictive value was 89.7%, and its negative predictive value was 61.7%.

A study was conducted by Gürkan Dumlu *et al.*, in 2013 on 298 patients. Non-diagnostic or benign thyroid nodules were observed in 76.8% of the patients. Follicular, malignant or suspected malignant neoplasm was observed in 23.1% of the patients, which was lower than our study due to the difference in the statistical population of the two studies. They studied all patients with nodule, while we studied only patients with suspected malignancy in FNA [7].

In addition, the most common pathology of surgical cases included nodular goiter (36.6%) and papillary cancer (35.6%). Nodular goiter was prevalent in Bethesda Group 1, while papillary cancer was more common in Bethesda Group 3 [8].

The positive FNA results in a study by Lew *et al.* included 147 cases (18%) of malignancy, 255 cases (32%) of benign disease, 358 cases (45%) of indeterminate diseases, and 37 cases (5%) of non-diagnostic diseases. The overall malignancy in the final pathology was 369 (46%) out of 797 patients. In general, the false positive rate and the false negative rate were 2% and 8.6% respectively, while they were 16% and 27.1% in our study respectively. The reason for the lower false positive and negative ratios of Lew *et al.*'s study was its large sample size [9].

Riazi *et al.*, carried out a prospective study in 2012, in which they evaluated the data obtained from 198 consecutive patients who had undergone thyroidectomy and had the results of pre-operative thyroid FNA. 172 patients (86.9%) who had undergone thyroidectomy had benign lesions and 36 patients (13.1%) had malignant lesions in histology, which indicated a lower rate of malignancy than our study. In total, 158 patients (79.8%) had benign lesions in thyroid FNA, which was 46.6% higher than our study. Moreover, sensitivity was (53.48%), specificity was (98.1%), positive predictive value was (82.35%), and negative predictive value was (92.5%) [2].

In comparison with our study, it has a lower sensitivity, but a higher level of specificity. Siadati *et al.*, conducted a study in 1394, in which they compared the diagnostic value of FNA and the pathological findings in the diagnosis of thyroid

nodules. As many as 225 patients were studied. FNA showed a sensitivity of 60%, a specificity of 96%, a positive predictive value of 65%, and a negative predictive value of 95% in the diagnosis of malignant thyroid nodules [10].

Bahar *et al.*, conducted a study in 2013 on a total of 2002 patients with thyroid nodule, including 210 men (10.5%) and 1792 women (89.5%). The female gender in this study was 76.7% higher than that in our study. The results of cytology showed that 1598 (79.8%) cases of the disease were benign, which is greater than the rate shown in our study. Of the total number of patients examined, 217 cases had their thyroidectomy specimens available for histopathological examination, of which 153 cases (70.5%) were benign and 64 cases (29.5%) were malignant [11]. In present study, the FNA's sensitivity in finding the malignant thyroid nodules was 81.2% and its specificity was 1.75%. This method has higher sensitivity and lower specificity than our study, which has a sensitivity of 72.9% and a specificity of 84%. Therefore, thyroid biopsy is still a good way of predicting thyroid malignancy.

### Conclusion

The results show that FNA does not have a high sensitivity in the diagnosis of malignancy, but has relatively good specificity and the use of other diagnostic methods before the operation of thyroid nodules seems necessary.

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### Conflict of Interest

The authors declare that they have no conflict of interest regarding the manuscript.

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