

Correlation of the Diagnostic Accuracy of FNAC to the Clinical and Histological Diagnosis: A prospective study of 100 cases.

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A prospective analytic study was carried out in East Surgical Unit of Mayo Hospital Lahore during the year 2000 to correlate the diagnostic accuracy of FNAC to the clinical and histopathological diagnosis in cases of solitary thyroid nodules. Total numbers of patients were 100 with the male to female ratio of 13.6:3. The mean age was 38 with the predominantly involvement of left side (69%). The diagnostic accuracy of FNAC to clinical diagnosis was 77% and the diagnostic accuracy of FNAC to the histopathological diagnosis was 93%. The sensitivity of FNAC was 90.8% and specificity of FNAC was 95.1%.

Key Words: Solitary thyroid nodule, FNAC.

Solitary thyroid nodules are commonly seen in clinical practice². Thyroid nodules increase with age and are present in four to seven percent of the adult population². Autopsy studies reveal the presence of thyroid nodules in 50 percent of autopsy specimens. Ninety-five percent of solitary thyroid nodules are benign, and five percent of thyroid nodules are malignant^{3,4}. Common etiologies of the benign thyroid nodules are benign adenomas, thyroid cysts and Hashimoto's thyroiditis. Uncommon etiologies of benign thyroid nodules are sub acute thyroiditis, painless thyroiditis, unilateral lobe agenesis, or Riedel's struma. The most common types of thyroid cancers are differentiated, with papillary carcinoma accounting for 60 percent, follicular carcinoma accounting for 12%, and follicular variant of papillary carcinoma accounting for six percent of all thyroid cancers^{4,8,15}. As thyroid cancers usually present as a solitary thyroid nodule, the clinician must differentiate benign from cancerous solitary thyroid nodules. While history, examination, laboratory, thyroid hormone suppression, ultrasound and thyroid scans can all provide information regarding a solitary thyroid nodule, the only modality that can differentiate benign from cancerous thyroid nodules is the fine needle aspiration cytology^{7,9}. The purpose of this study is to correlate the diagnostic accuracy of FNAC to the clinical and histological diagnosis in the busy hospital experience. The purpose of this study is to correlate the diagnostic accuracy of FNAC to the clinical and histological diagnosis in the busy hospital experience.

Material and methods

This was a prospective study conducted at East Surgical Unit of Mayo Hospital Lahore. The study included 100 patients who presented to the out patient department during 2000 with solitary thyroid nodules. Age, sex and symptoms were noted and full examination of the thyroid gland was carried and the clinical findings were noted. Fine needle aspiration cytology was requested, which was carried out in the Pathology Department K.E.M.C. on completion of the cytological examination the patients

were admitted and after other relative investigations were operated considering the clinical findings, cytological finding and the per-operative findings. The specimens were sent after preserving in formalin solution for histopathology. The histological examination reports were collected, reviewed and correlated with the clinical and FNAC diagnosis. Those patients where cytological examination was not conclusive either due to procedure failure or due to insufficient tissue were excluded from the study.

Results

This prospective study includes 100 patients with the predominance of the female patients. 82 of these were female (82%) with remaining 18% male patients (table I & II). The mean age of these patients was 38 (range from 19 to 65).

Table I

Female.	82	82%
Male.	18	18%

Table II

Age	Mean 38	%age
Below 20	05	05%
20-40	58	58%
40-60	33	33%
Above 60	04	04%
Total	100	100%

Age incidence.

The most common side for the nodule was left, in 69 patients with the rest 21 in right side. The clinical diagnosis of benign disease was made in 81% of cases, malignant in 08% of cases and in rest of the 11% cases the clinical examination was not conclusive.

The cytological diagnoses were preventatively broken into three groups: a) benign; b) malignant; c) suspected malignancy. Group a included 87 nodules, histopathology confirmed the diagnosis of benign lesions in 76 of these nodules (true negative), 87% of diagnostic accuracy of FNAC to histopathological diagnosis in case

of benign lesions, while the rest of 11 proved malignant (false negative). Cytological examinations with group b included 05 nodules, out of these 05 nodules all were confirmed to be malignant on histopathological examination (true positive), 100% diagnostic accuracy, with no false positive results (table III & IV). Group c included 08 nodules where cytological examination revealed as follicular neoplasm or for which a histological diagnosis was required for the final diagnosis of being malignant or benign; for this reason these cases were not included for diagnostic reliability. Of these 08 nodes 05 proved to be malignant and 03 proved to be benign.

Table III

Pathology	Clinical.	FNAC	Accuracy.
Benign	81	87	93%
Malign:	08	05	62.5%
Not sure	11	08	

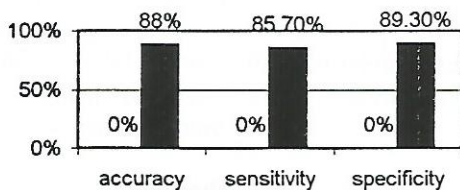
Co relation of FNAC to clinical diagnosis.

Table IV

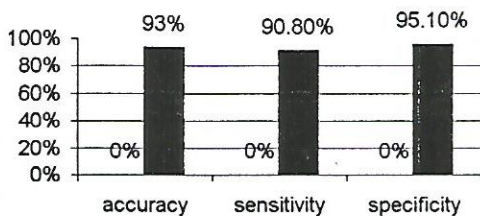
Pathology.	FNAC	Histological.	Accuracy
Benign	87	76	87%
Malignant	05	05	100%
Not sure	08	00	

Co relation of FNAC to histopathology.

On the basis of above data the diagnostic accuracy of FNAC was 93%, sensitivity is 90.8% and specificity is 95.1% as compared to the international data which showed the diagnostic accuracy of FNAC to be 88.3%, sensitivity 85.7% and specificity of 89.3%.



Diagnostic accuracy of FNAC (according to international studies).



Diagnostic accuracy of FNAC (according to our prospective study).

Discussion

The evaluation of a solitary thyroid nodule should always include history and examination. The following favor a benign thyroid nodule^{3,10}: family history of Hashimoto's thyroiditis; family history of benign thyroid nodule or goiter; symptoms of hyperthyroidism or hypothyroidism;

pain or tenderness associated with a nodule; a soft, smooth, mobile nodule; or a multinodular goiter without a predominant nodule^{2,3}. The following features of history/examination increase the suspicion of a malignant nodule: age less than 20 or greater than 70, male gender, or a nodule plus dysphagia or hoarseness. Additionally, a history of external neck irradiation during childhood; a firm, irregular and fixed nodule; presence of cervical lymphadenopathy; or previous history of thyroid cancer, increase the likelihood that a nodule is malignant^{15,17}.

Thyroid hormone levels are usually normal, and normal thyroid hormone levels do not differentiate benign from cancerous nodules^{4,15}.

Thyroglobulin levels are useful tumor markers once the diagnosis of malignancy has been made, but are nonspecific in regard to differentiating a benign from a cancerous thyroid nodule¹⁰.

Ultrasound accurately determines thyroid gland volume, number and size of nodules³; separates thyroid from nonthyroidal masses; helps guide fine needle biopsy when necessary; and can identify solid nodules as small as 3mm and cystic nodules as small as 2mm. Although several ultrasound features favor the presence of a benign nodule, and other ultrasound features favor the presence of a cancerous nodule, ultrasound cannot be used to differentiate benign from malignant nodules. And since 15 percent of cystic thyroid nodules are malignant, ultrasound determination that a nodule is cystic does not rule out thyroid cancer. Although thyroid scanning can give a probability that a nodule is benign or malignant, it cannot truly differentiate benign or malignant nodules and cannot be used as the basis for recommending treatment of the nodule, including thyroid surgery^{10,12,13}.

Thyroid fine needle aspiration (FNA) biopsy is the only method, which can differentiate malignant and benign nodules in most, but not all, cases. Several aspirates are obtained for cytological review^{5,9}.

The following thyroid malignancies can be diagnosed by FNA: papillary, follicular variant of papillary, medullary, Anaplastic, thyroid lymphoma, and metastases to the thyroid. Follicular carcinoma and Hurthle cell carcinoma cannot be diagnosed by FNA biopsy^{6,11}. Approximately 10 percent of FNAs reveal suspicious cytology. The thyroid cells on these aspirates are neither clearly benign nor malignant, but 25 percent of suspicious lesions are found to be malignant when patients undergo thyroid surgery. These are usually follicular or Hurthle cell cancers. Therefore, surgery is recommended for the treatment of thyroid nodules from which a suspicious aspiration has been obtained¹⁰. FNA is the first, and in the vast majority of cases, the only test required for the evaluation of a solitary thyroid nodule. (A TSH value should also be obtained to evaluate thyroid function.) Thyroid ultrasound and thyroid scans are rarely required for evaluation of a solitary thyroid nodule. FNA has reduced the cost for evaluation and treatment of thyroid

nodules, and has improved yield of cancer found at thyroid surgery¹⁵. While there has always been a traditional differentiation between thyroid glands with a solitary nodule and multinodular goiters, it has been shown that approximately 50% of patients with a solitary nodule on exam will have additional nodules on thyroid ultrasound. Therefore, the differentiation between solitary nodules and multinodular goiters is becoming less clear-cut, although it has traditionally been believed that the presence of a multinodular goiter reduces the likelihood that a thyroid cancer is present. However, recent studies indicate that there is an equal likelihood for developing thyroid cancer in a multinodular goiter just as in a solitary thyroid nodule. If a multinodular goiter has a predominant nodule, the predominant nodule should be biopsied.

In conclusion, FNA of the thyroid is a safe, inexpensive and effective way to distinguish a benign from a malignant nodule and usually should be the first diagnostic test performed.

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