ROLE OF FINE NEEDLE ASPIRATION CYTOLOGY (FNAC) IN THE DIAGNOSIS OF THYROID SWELLINGS

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ABSTRACT

Objective: This study was conducted to know the validity of FNAC in the diagnosis of thyroid swellings.

Material and Methods: Total 300 cases were included in this study. All had FNAC examination as out patient procedure. Out of 300 cases, 285 were operated and specimen were sent for histopathology. Full clinical data of every patient was recorded.

Results: In 10 patients, the swelling disappeared after FNAC and didn't recur. Cytological examination showed no evidence of malignancy. These cases were labeled as simple cysts and were not operated. Five cases showed thyroiditis and were treated conservatively and improved. Rests of the cases (285) were operated and specimens were sent for histopathology . The FNAC findings of these operated cases were benign in 250 while malignant in 35 patients. Histopathologist reported these FNAC labeled 250 benign cases as (1) Benign—248 (2) Malignant—2. Similarly histopathologist reported FNAC labeled 35 malignant cases as (1) Malignant—30 (2) Benign—5 By comparing the results of histopathology and FNAC it is evident that 5 cases were falsely diagnosed as malignant and 2 cases were falsely diagnosed as benign by FNAC.

Conclusion: FNAC is safe, inexpensive and less invasive diagnostic modality with excellent patient compliance. Its routine use can make the management of thyroid swellings cost effective by avoiding unnecessary operation on conditions like simple cysts and thyroiditis. FNAC has higher accuracy (94.2% sensitivity and 94% specificity) in case of diagnosis of malignant thyroid diseases.

Key words: Goitre, FNAC (Fine needle aspiration cyst cytology) Diagnosis.

INTRODUCTION

Recently F.N.A.C has become the investigation of choice in thyroid swellings or neck swellings thought to be of thyroid origin. F.N.A.C is considered to be safe inexpensive and less invasive. It has excellent patient compliance, simple and quick to perform in the outpatient department and can be readily repeated. It is highly accurate if properly conducted with adequate material representative sampling and interpretation by experienced pathologist.[1]

This technique was first used in Sweden in 1960s, but only gained wide acceptance in the 1980s as the preferred initial test in all patients with thyroid swelling or other neck swellings thought to be of thyroid origin.[2]

Thyroid conditions that may be diagnosed with FNAC include colloid nodules, thyroiditis, papillary carcinoma, medullary carcinoma, anaplastic carcinoma and lymphoma. FNAC cannot distinguish between a benign follicular adenoma and follicular carcinoma as this distinction is dep- indent not on cytology but on histological criteria, which include capsular and vascular invasion. FNAC is less reliable in cystic than in solid swellings, often-yielding only cystic fluid with macrophages and degenerate cells. There are very few false positive with respect to malignancy but there is a definite few false negative rates with respect to benign and malignant neoplasia.[2]

MATERIAL AND METHOD

This study was conducted in Surgical Department of Postgraduate Medical Institute Hayatabad Medical Complex from 1995 to 2000 to know the validity of FNAC in the diagnosis of thyroid swelling.

Data included all cases of thyroid swellings treated in our surgical unit. Total number of cases was 300. All had cytological examination by FNAC. The collected data included present, past and personal histories, full clinical examination, laboratory investigations including thyroid profile, ultrasound of thyroid and the number of slides used for FNAC.

FNAC was done as outpatient procedure. A 25-gauge needle on a 10 ml syringe was used to aspirate from the thyroid swelling with out the use of a local anaesthetic. The aspirate was smeared on a microscopic slide, which was either dipped in 95% alcohol or sprayed with cytofix cytological fixation spray. This was then sent to the histopathology department for cytological examination using Papanicolaou or H&E stain. Total 285 patients under went surgery and various procedures were performed. These procedures were decided on the basis of clinical diagnosis and FNAC findings. Specimens of all operated cases were sent for histopathology and then compared with the FNAC findings.

RESULTS

Our study showed that thyroid swellings prevail among young people and the studied 300 cases had a mean age of 32 $\pm$ 13.5 years.

Sex distribution, which is evident from this study, confirmed that 90% were female and 10% were male.

In this study a thorough clinical assessment of every case was carried out and was recorded. On the basis of clinical findings, all these cases were divided into the following groups.

1. Discrete thyroid (solitary) swellings, both toxic and nontoxic (20 %).
2. Diffuse goiter both toxic and nontoxic (21%).

3. Multinodular goiters, both toxic and nontoxic (58%).

4. Malignant thyroid swellings (1%).

FNAC was one of the main diagnostic entity in our study and was performed on all 300 cases. FNAC findings grouped these cases into two main groups of pathologies and then each group into further subgroups as given in Table No. 1.

Pathology	No. of cases	%age
Benign	**265**	**88.34**
Hyperplastic, colloid, and degenerative goiters	250	83.34
Simple cysts	10	3.34
Thyroiditis	5	1.6
Malignant	**35**	**11.66**
Papillary Carcinoma	21	7
Anaplastic Carcinoma	4	1.33
Medullary Carcinoma	2	0.66
Malignant Lymphoma	1	0.33
Malignant cases of uncertain origin	7	2.33

TABLE – 1

Simple cysts were not operated. These cysts disappeared after aspiration and did not recur. Their cytology showed no evidence of malignancy. Similarly cases of thyroiditis were not operated and were treated conservatively.

Looking into the malignant series, cases of uncertain origin could be that of Follicular Adenoma or Follicular Carcinoma as FNAC cannot diagnosed these conditions.

After FNAC reports, 285 patients were decided to be operated. Different operative procedures were decided on the bases of clinical findings and FNAC reports. Specimen of all these cases were sent for histopathological studies Histopathology typed those 250 operated cases among the FNAC labeled benign as

(a) Benign thyroid swelling (including hyperplastic, colloidal, and degenerative) 248.

(b) Malignant thyroid swellings 2.

Similarly histopathology typed 35 patients specimens labeled as Malignant by FNAC as:

(a) Malignant thyroid swellings- 30 cases

(b) Benign thyroid swellings- 5 cases.

By comparing the results of histopathology and FNAC, it is evident that 5 cases out of 35 were falsely diagnosed as malignant and 2 cases were falsely diagnosed as benign by FNAC.

As a whole, histopathology confirmed the diagnosis of 253 benign cases and 32 malignant cases. Histopathology also typed the total 32 malignant as given in table No. 2.

Pathology	No. of cases	%age
Papillary Carcinoma	20	62.50
Follicular Carcinoma	5	15.62
Anaplastic Carcinoma	3	9.37
Medullary Carcinoma	2	6.25
Malignant lymphoma	1	3.13
Follicular Adenoma	1	3.13

TABLE – 2

This shows that FNAC labeled malignant cases of uncertain origin were ultimately confirmed by histopathology as Follicular Adenoma and Follicular Carcinoma.

Complications of FNAC were minimal. Patient did experience pain of needle prick. Skin bruises were noticed in 30 patients (10%). Similarly pain with increase in swelling size (heamatoma formation) was recorded in 20 patients (5.66%). Bruises disappeared

with in 2-3 days. Heamatoma formation was treated with analgesia and enzyme preparation like chymoral.

Besides being safe we found FNAC a cheap, cost effective and of great patient compliance. Total cost of FNAC per patient was not more than Rupees 30. Regarding compliance we asked every patient for the repetition of the test if needed, but none of the patient refused so it means that the compliance was 100%.

DISCUSSION

There are many ways to obtain tissue from thyroid gland like FNAC, capillary sampling and large needle aspirate biopsy. FNAC is the most commonly used procedure for obtaining tissue from thyroid.

In our discussion on the role of FNAC in the diagnosis of thyroid swellings we have compared our concluded results with some of the available international studies. We have found that our results are almost the same as that of the international studies.

This study has confirmed the validity of FNAC in diagnosing different pathologies of thyroid. The only fallacy is that FNAC cannot differentiate between follicular adenoma and follicular carcinoma. Our findings are very similar to that of Anderson et al[3].

We have found FNAC safe, less invasive and of great patient compliance. Patient did experience mild pain similar to that of needle prick. We did not find any complication except skin bruises in 30 patients (10%) and pain with increase in swelling size (heamatoma formation) in 20 patients (6.66%). Piroamli et al[4] recorded skin bruises in 25 patients (8.33%) and pain with increase in swelling size (heamatoma) in 10 patients (3.33%). Beside this we and Prioamli et al[5] noticed that FNAC has got a great patient compliance and non of a patient of our studies refused the test to be repeated.

It is evident in our study that FNAC is a cheap procedure. It does not require any specialized instruments. It needs only a disposable syringe, a slide and the expertise of a cytologist. It made the management of thyroid swellings very cost effective by avoiding major surgery on cases of simple cysts and thyroiditis. Cochand-Priolet et al[6] and Woeber[10] have shared the same experiences of cheap and cost effective nature of FNAC in the management of thyroid swellings in their study.

In our study we found that FNAC has played an important role in deciding the type and time of operations. In case of malignant thyroid disease, we operated upon the patients with out delay with appropriate approach. Cochand et al [6] and Anderson et al [3] both have supported our findings regarding the FNAC role in deciding the time and type of operation for each type of pathology especially tumors of thyroid. Anderson et al[3] found that the percentage of surgical interventions in thyroid malignancy was increased from 23% to 50% after the introduction of FNAC.

FNAC was positive for malignancy in 35 (11.66%) cases. Two hundred and eighty five (95%) of the studied cases had thyroid surgery and their thyroid specimens were sent for histopathology examination. Thirty out of 35 FNAC positive for malignancy were confirmed by histopathology. Thus there were 5 false positive cases. Similarly 2 out of 250 cases with FNAC negative for malignancy were diagnosed by histopathology as malignant cases, thus there were 2 false negative cases.

Our study shows higher accuracy (94.2%) if compared to that reported by Vojdodich et al[4] who found the over all accuracy to be 86%. Sensitivity and specificity values of our study were in the range of 94% which is near to the results of Anderson et al.[3] and Piroamli et al[5], who in a group of 759 cases found sensitivity and

specificity to be in 95% range.

In a retrospective study, Cochand-Priolet et al [6] found a strong relationship with FNAC and thyroid histology. Grant et al [7] reported that FNAC had discriminated benign from malignant thyroid lesions in a long term follow up study.

The findings reconfirmed the overall utility of FNAC in the differentiation of benign from neoplastic lesions and in the specific diagnosis of most types of thyroid lesions.[4,8,9]

FNAC of thyroid has been proposed as a preoperative screening method to reduce the number of patients with benign nodules referred for surgery for the sole purpose of excluding possibility of malignancy. Some authors have reported high accuracy and cost effectiveness of FNAC for identifying cancer in cases with clinical suspicion of palpable thyroid lesion [10] .However they mentioned that FNAC has some limitations that reduce its accuracy. That is when the nodule to be examined is small or barely palpable[10]. Miskin et al described the use of Ultrasound to examine the thyroid[11]. Originally Ultrasound was primarily used to distinguish between cystic and solid thyroid lesions.

Rizzatto et al.[12] first used Ultrasound guided FNAC for diagnosing thyroid nodules. In our study, ultrasound was used to determine the consistency of thyroid whether solid or cystic, but was not used as a guide for FNAC.

The coexistence of papillary carcinoma of the thyroid with nodular goiter (or, rarely with parathyroid adenoma) may complicate the clinical picture. These unusual presentations of papillary carcinoma need a high index of suspicion, especially in multinodular goiter. Adequate multiple FNAC samplings and good communication between the clinician and pathologist are needed to facilitate accurate diagnosis.[13,14,15]

CONCLUSION

In conclusion FNAC was proved to be a simple, minimally invasive outpatient procedure with high validity. It resulted in reducing unnecessary operation on the thyroid. It increased the yield of cancer (number of thyroid malignancy cases among totally operated suspected cases). FNAC, being cheap with high selectivity, could significantly reduce the cost of care. This procedure has a central role in the management of thyroid swellings and is recommended as an excellent screening test for thyroid swellings.

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