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Role of Fine Needle Aspiration Cytology (FNAC) in Solitary Cold Thyroid Nodule

Javaid ur Rehman Ashraf
Department of General Surgery, Services Institute of Medical Sciences, Lahore

SUMMARY

This experimental study was conducted in Department of Surgery of Services Institute of Medical Sciences, Lahore from May 2004 to October 2005 for 50 cases to compare the results of FNAC with histopathology in order to find out the role of FNAC in solitary cold thyroid nodule. Three patients had a cystic fluid on FNAC but due to residual nodule these patients are also operated. The results of FNAC and histopathology are compared. The sensitivity, specificity and accuracy of FNAC was 83.3%, 100% and 71.4% subsequently. Papillary cell carcinoma has a higher incidence as compared to follicular carcinoma. This study shown that FNAC is a good diagnostic modality to differentiate between benign and malignant solitary cold thyroid nodule.

Key words: Thyroid nodules, Fine needle aspiration cytology (FNAC), Papillary cell carcinoma.

INTRODUCTION

Thyroid nodules are one of the commonest disorder of the endocrine glands. It has been reported that their prevalence in the population upon neck examination, varies from 1 to 7%.[1] Half of these nodules are multinodular and half are true solitary nodules.[2] The discovery of a palpable thyroid nodule in a patient raises the specter of thyroid carcinoma. This is particularly so in case of truly solitary nodule.

Most of the thyroid nodules are defined are "cold" because – they do not concentrate isotope at sceintiscan in comparison to the adjacent thyroid tissue.[3] Most of the thyroid nodules are benign. But concern that such a nodule may harbor malignancy demands prompt and accurate diagnosis. Fine needle aspiration cytology is capable of providing critical information which is unobtainable by other investigations short of surgical resection. Preoperative diagnosis of cancer is helpful in the subsequent management of the patients and FNAC is the only powerful diagnostic tool preoperatively.

PATIENTS AND METHODS

This is an experimental study at Services Institute of Medical Sciences Lahore from last 1½ year May 2004 to October 2005. During last 1½ year 150 patients present with thyroid disorder in surgical outdoor. We selected only those patients who had solitary thyroid nodule and underwent FNAC and surgery. We exclude all those patients who had diffuse goiter, multinodular goiter and those who refused for FNAC. We performed FNAC in solitary thyroid nodule on outdoor basis. The procedure was facilitated by using a pistol grip holder of comedo type. Aspiration is performed by the dominant hand while the other hand immobilizes the target nodule. While suction is maintained, several passes (usually four to six) of the needle are made through the tissue, preferably with a slight change of angle on each pass. The needle is withdrawn and gentle temponade with gauze or cotton wool is applied on the puncture wound for a few minutes. The content of the needle lumen is deposited on a series of glass slides, smeared and air

dried, and stained with May Giemsa stain. The results of FNAC were determined by a experienced cytologist. Then surgical procedure was performed according to cytology report.

Results were analyzed by determining the sensitivity, specificity and accuracy of FNAC.

RESULTS

During last 1½ year (May 2004 to October 2005) 150 patients presented with thyroid disorder in surgical outdoor. In these patients about 50 patients underwent fine needle aspiration cytology for clinically solitary thyroid nodule. Fine needle aspiration cytology was performed on outdoor basis. Most of the patients are females (80%) and most of the patients are in the 2nd or 3rd decades of life with median age 32.5 years (Table 1).

Table 1: Age & Sex Distribution (n=50)

Age (Years)	Female	Male	Total
13 – 20	3	0	3
21 – 30	16	4	20
31 – 40	14	2	16
40 – 50	5	3	8
50 – 60	2	1	3
Total	40	10	50

Table 2: Results of Fine Needle Aspiration Cytology (FNAC).

FNAC Results	Number	Percent
No malignant cell seen	36	72
Malignant cell seen	5	10
Atypical cell seen	3	6
Follicular cell seen suggestive of growth	3	6
Cyst – fluid no abnormal cell seen	3	6

Results of fine needle aspiration are shown in Table 2. Papillary cell carcinoma was proved in 5 patients (10%) while follicular cells are presents in 3 patients (6%) and atypical cells are present in 3 patients (6%). Rest of the patients had benign lesion on FNAC. After surgical resection it was found that papillary all carcinoma was present in 6 patients (12%). In this 1 patient had follicular variant of papillary cell carcinoma. Follicular cell carcinoma was found in 2 patients (4%). Although on FNAC follicular cells were present in 3 patients but on surgical resection follicular carcinoma was found in 1st patient and 2nd patient in which follicular carcinoma was found the had a benign lesion on FNAC. In this benign cyst fluid aspirated on FNAC but residual nodule was operated and on histopathology these cysts were benign. So sensitivity of FNAC is 83.3% and specificity is 100% and the accuracy of FANC was 71.4% (Table 3).

Table 3: Efficacy of Fine Needle Aspiration Cytology

FNAC Results	Number	Percent
Conclusive for both benign/malignant lesion	47	94
Inconclusive	3	6
False positive	0	0
False negative	1	2
True positive for malignancy	6	12
Specificity	83.3%	
Sensitivity	100%	
Accuracy	71.4%	

Table 4: Results of Histopathology

Histopathology	Number	Percent
Benign		
Follicular adenoma	15	30
Hyperplastic colloid nodule	20	40
Benign non-specific thyroid cyst	3	6
Hurthle cell adenoma	3	6
Malignant		
Papillary carcinoma	6	12
Follicular variant of papillary CA	1	2
Follicular carcinoma	2	4
Overall incidence of cancer	9	18

DISCUSSION

The technique of fine needle aspiration cytology (FNAC) of goiter for cytological assessment was pioneered in Sweden and is now used increasingly as a first line investigation of the patient with solitary thyroid nodule. The role of fine needle aspiration cytology in solitary thyroid nodule

is more reliable because preoperative diagnosis is helpful in the subsequent management of the patients.

In this study most of the patients are female and most of the patients are in the 2nd and 3rd decades of life. Fioretti (1999)[4] also estimated that thyroid related condition were higher in women than men and more common in the 22-55 years age group and peak incidence is at 25 years.

Thyroid scan provides the functional assessment of the thyroid and categorizes the nodular into cold, hot and warm but it does not tell about the malignancy. A cytopathologist who has expertise in the area of thyroid cytology is indispensable. An experienced cytopathologist can distinguish benign thyroid nodules from malignant thyroid lesions with a high degree of certainty.[5]

Specific pathological diagnosis, including colloid goiter, papillary, medullary; anaplastic carcinoma and thyroid lymphoma can be made with confidence on the basis of their cytological appearances.[6]

In the present study FNAC was carried out in 50 patients. The sensitivity, specificity and accuracy is 83.3%, 100% and 71.4% subsequently (Table 5):

Table 5: Comparison of Different Studies

Author	Sensitivity	Specificity	Accuracy
Baphat 1992[7]	75	100	75
Chin WY 1998[8]	93	50	83
Passler et al 1999[9]	56	94	88
Siddiqui FG 2000[10]	88.8	95.4	94.3
Hussain N 2002[11]	98	95	93
Present study	83.3	100	71.4

The attraction of FNAC is that it is easily performed with inexpensive equipment in the outpatient department, it is essentially free of complication and above all it provides a reliable and accurate tissue diagnosis in a high proportion of patients. It also avoids the redo surgery due to preoperative tissue diagnosis.[12]

Suleman BA also reported that FNAC has high sensitivity as compared to ultrasound and thyroid scan and it is highly cost effective, resulting in considerable saving in resources.[13]

Most experts agree that it is extremely difficult, if not impossible, to discriminate between follicular adenoma and follicular carcinoma on cytological appearances alone, although with very considerable experience this may be possible. Overwhelming view is that confirmation of a diagnosis of follicular carcinoma is dependent upon the visualization of capsular and/or vascular invasion by the tumour.[9,10] In our own study two patient had follicular carcinoma on histopathology but on FNAC no follicular carcinoma was present. Due to capsule invasion of follicular carcinoma we do not apply FNAC for diagnosis of follicular carcinoma. The rate of false – negative results can be reduced when the aspiration and the reading are centralized and performed by experienced investigators.

CONCLUSION

Despite its limitations, there is no doubt that FNAC now represents the prime investigator in the assessment of patients with a solitary thyroid nodule, and should be employed routinely.

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The Author:

Javaid ur Rehman Ashraf
Senior Registrar
Department of General Surgery,
Services Institute of Medical Sciences,
Lahore

Address for Correspondence:

Javaid ur Rehman Ashraf
Senior Registrar
Department of General Surgery,
Services Institute of Medical Sciences,
Lahore