

ORIGINAL ARTICLE

Diagnostic Accuracy of FNAC – Fine Needle Aspiration Cytology in Thyroid Lesions while taking Histopathology as Gold Standard

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ABSTRACT

Objective: The objective of this study was to prove the efficacy of thyroid FNAC in cases benign non-neoplastic lesions and malignant lesions.

Study Design: Cross Sectional Survey

Setting: Department of Pathology (Histopathology Section), Fatima Jinnah Medical College, Lahore

Subject and Methods: Fine Needle Aspiration Cytology (FNAC) was used as a diagnostic procedure in the Department of Pathology (Histopathology Section), Fatima Jinnah Medical College, Lahore, for the past fifteen years. We have collected the data for past 4 years, (from 2003 to 2007), of FNAC and correlated with Histopathology. We included 130 cases, in which FNAC was done followed by surgery.

Results: In this study diagnostic accuracy of FNAC in cases of benign lesions was 86.95%, and it was 13.05% in cases of neoplastic lesions.

Conclusion: According to this study the efficacy of FNAC is high in cases of benign and malignant lesions except for follicular adenoma/carcinoma whose diagnosis is based on biopsy rather than cytology.

Key Words: Fine Needle Aspiration Cytology, Histopathology Correlation.

INTRODUCTION

Fine needle aspiration cytology is an important diagnostic technique for the pre-operative evaluation of the thyroid nodule.¹ FNAC is a safe quick and cost effective procedure. Thyroid nodules can be aspirated manually or under ultrasound guidance.²

FNAC has been widely accepted as an initial step in the management of thyroid nodules. It is relied upon to distinguish between benign and malignant thyroid lesions, influencing therapeutic decisions.³

However diagnostic efficacy of FNAC declines sharply in the diagnosis of follicular lesions of thyroid i.e. separating follicular adenomas with follicular carcinomas.⁴ These lesions are diagnosed as follicular neoplasms on FNAC and surgical excision is recommended for definite diagnosis.⁴ The distinction is made by demonstrating capsular or vascular invasion on histopathology.⁵

Other non-neoplastic and neoplastic lesions of thyroid have a high percentage of diagnostic-rate on FNAC.⁶

FNAC has allowed a dramatic decrease in thyroid surgeries with thyroid nodular diseases, enhancing the percentage of malignant operated nodules over 50 %⁷. The efficacy and diagnostic accuracy of FNAC is quite reliable in the hands of experienced cytopathologist and correlates well with the histological diagnosis⁸.

MATERIALS AND METHODS

FNAC of patients referred to the Pathology Department (Histopathology Section) from indoor and outdoor departments of SGRH were done. Total 130 cases were studied in a period of four years. The age range was between 18 years to 75 years, and both male and female patients were included.

FNAC was done by two, 10 cc. syringes, Precision Glide Needle B.D. Two pricks were done in each patient with back and forth movements, and then material was sucked out by outward movement of plunger. Four smears were made for each patient, air dried and stained by Giemsa's method. The adequate FNAC smears were those which contained 4-6 groups on 2 slides. The results of FNAC were interpreted as benign

lesions, follicular neoplasms, papillary carcinomas and anaplastic carcinoma. Inadequate smears were those in which very scanty aspirate was obtained after many attempts.

The surgical specimens of these patients were received after their surgeries and specimens were fixed in 10% formalin. The representative sections were taken and processed in automatic tissue processor for 18 hours. Paraffin blocks were made. 3–4 micron meter sections were made by rotatory microtome. These were stained by H&E stain. The comparison of FNAC results were done with Histopathology results.

RESULTS

We included 130 cases in which FNAC was done followed by surgery. Age range was between 18 years to 75 years. 95 were female patients and 35 were male patients. Non-neoplastic lesions were seen more as compared to neoplastic lesions. 101 cases were non-neoplastic i.e. 77.70 % and 26 were neoplastic (both benign and malignant) 20.00 % and 3 were inadequate smears. It is shown in Table 1.

Neoplastic lesions were seen less as compared to non-neoplastic lesions. 26 cases were neoplastic i.e. 20.00% out of which 16 (61.53 %) were Follicular neoplasm, 8 (30.76 %) were Papillary CA and 02 (07.69 %) were Anaplastic CA as shown in Table 2.

On FNAC 101 cases diagnosed as non-neoplastic lesions, 9 cases were lost to follow up. 92 cases were left, whose surgical specimens we received. On histopathology, 80 cases (86.95%) were diagnosed as non-neoplastic; distribution is given in Table 3. 12 cases (13.04%) were diagnosed as neoplastic.

Out of 16 follicular neoplasms on FNAC, on histopathology, 3 were follicular carcinoma and 13 were follicular adenomas. Out of 8 papillary carcinomas on FNAC, 7 were diagnosed as papillary carcinoma on histopathology; one was lost to follow up. Out of 2 anaplastic carcinomas on FNAC, both were diagnosed as anaplastic carcinoma on histopathology. It is shown in Table 4.

We identified no false positive result from malignant group and 12 false negative cases from non-neoplastic group. Analysis of FNAC results were done compared with histological diagnosis, in order to rule out malignancy on FNAC. Diagnostic accuracy of 86.95 % was found.

Table 1: Neoplastic & Non-Neoplastic Lesions on FNAC.

Lesion	No. of cases	Percentage
Non-Neoplastic	101	77.70 %
Neoplastic	26	20.00 %
Inadequate	03	02.30 %

Table 2: Neoplastic lesions on FNAC.

Lesions	No. of Cases	Percentage
Follicular Neoplasms	16	61.53 %
Papillary CA	08	30.76 %
Anaplastic CA	02	07.69 %
Total	26	20.00%

Table 3: Distribution of Non-Neoplastic Lesions on Histopathology

Lesions	No. of Cases	Percentage
MNG	37	40.21 %
Colloid Goiter	23	25.00 %
Thyroid Cyst	05	05.43 %
Granulo. Thyroiditis	04	04.34 %
Lymp. Thyroiditis	02	02.11 %
Grave's Disease	05	05.43 %
Hashimotos Thyroiditis	04	04.44 %
Total	80	86.95%

Table 4: Comparison of Neoplastic Lesions diagnosed on FNAC with Histological Diagnosis (Lesions on Histopathology)

Lesions on FNAC	Benign	Malignant	Total
Follicular Neop.	13	03	16
Papillary CA	-	06	06
Anaplastic	-	02	02

DISCUSSION

As a pre-operative investigation FNAC has a high positive rate. In our study, diagnostic accuracy in case of non-neoplastic lesions was 86.95% and in neoplastic lesions was 96.15 %. In lesions diagnosed as follicular neoplasms, follicular adenomas were 81.25 % and follicular carcinoma 18.75%. In case of papillary carcinoma diagnosed on FNAC 100 % were true positive, no false positive case was found. One patient was lost to

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follow up. Out of 2 anaplastic carcinomas on FNAC, both were diagnosed as anaplastic carcinoma on histopathology.

In the study done by Kamaljit Kaur et.al⁹ 2002, the overall accuracy was 71.1 %, while in our study in benign lesions it is 86.95 %. It varies from 79 % to 98 % in different series. In our study 100 % accuracy is seen in malignant cases on FNAC. It is similar to study done by Altavilla et.al¹⁰ 1990.

Komal Singh et.al⁷ 2013 in his study showed FNAC diagnostic accuracy rate of 96.2 %, with a sensitivity of 66 % and specificity of 100 %. In our study the diagnostic accuracy was 86.95 %, which is less than this study showing that diagnostic accuracy can vary.

Thyroid diseases are not uncommon in our hospital. Patients are also referred from small towns around Lahore.

FNAC is a sensitive and highly specific method in evaluating thyroid malignancies. FNAC of thyroid nodules is reported to have a sensitivity of 65 – 98 % and specificity of 72 – 100 %. In our study the analysis revealed sensitivity of 89 % and specificity of 95%. This shows that FNAC is specific for detecting thyroid malignancies.

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