

Original article

Comparative Study Of Fine Needle Aspiration Cytology & Histopathology In The Diagnosis Of Neck Lesions

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Abstract:

Introduction: FNAC is a quick, direct method for diagnosis of benign and malignant lesions with increasing popularity due to simplicity & rapidity. **Objective:** To study the efficacy of FNAC and its Histopathological comparison in diagnosis of neck lesions.

Material & Methods: Cross-sectional study conducted from January 2015 - July 2016 in our institute. FNAC of 126 patients with neck lesions was done, smears fixed in alcohol, stained with MGG and H&E.

Results: FNAC was done in all cases and Histopathological examination of only 105 cases was carried out. Commonest swelling was from Thyroid (46.03%), Lymph nodes (43.65%), salivary gland swellings (5.5%) & other neck swellings (4.7%). Out of 105 Histopathological reports, 94 case reports were consistent with FNAC diagnosis.

Conclusion: FNAC is a time saving, safe, easy method, with less complication & plays an important role in early diagnosis & treatment planning with an overall sensitivity, specificity and accuracy of 68.05%, 99.50%, 87.32% respectively.

Key words: F.N.A.C., Histopathology, Neck swelling

INTRODUCTION:

Neck swelling is a common condition in clinical practice routinely experienced. Most Common neck masses are of thyroid, lymph nodes and salivary gland. Less common diseases in the neck are from branchial cleft cysts, carotid body tumors, cystic hygroma, thyroglossal cysts, pharyngeal pouch abnormalities and tumours of skin appendages.¹

The advent of fine needle aspiration biopsy (FNAB) is the welcome introduction. With the help of this method which can be performed as outdoor procedure with claimed high incidence of specificity of result.² The current method for fine needle aspiration cytology was initially portrayed

by Martin and Ellis in 1930³. It was Koss in 1980 who said that "fine needle aspiration cytology is a methodology whose time has arrived" and the pathologists not adequately versed in the system will go under in pressure to provide it.⁴ Fine needle aspiration cytology is a quick, direct and safe method for acquiring material for diagnosis of both benign and malignant lesions. It causes insignificant trauma to the patient and carries practically no risk of complication. There is no evidence that the tumor spreads through the skin track made by the fine hypodermic needle used.⁵ FNAC is a time saving and easy method but the gold standard for diagnosis of a disease is histopathology. It is the most accurate method to

diagnose the disease. Lesions of neck comprised of developmental, inflammatory and neoplastic condition in thyroid gland, lymph nodes, salivary gland, and soft tissue tumors.⁶ FNAC can be both diagnostic and therapeutic in cystic swelling.⁷ The method is applicable to lesions that are easily palpable. Fine needle aspiration cytology is useful as it can separate between a benign and malignant tumor with 90% accuracy.⁸

LIMITATIONS OF CYTOLOGY:

Evaluation of the samples obtained by FNA allows evaluating cellular findings suggestive of malignancy, like anisonucleosis, nuclear membrane irregularity and nuclear enlargement. However, inflammation/causes a reactive and regenerative process leading to cellular changes undistinguishable from well-differentiated neoplasia. Moreover, certain neoplasms require histological samples for diagnosis, since tissue architecture and cell morphology are essential in these cases for accurate pathological assessment.⁹⁻¹² Experience is still insufficient and diagnostic cytological criteria need to be better defined in some less common conditions. Given the relative absence of tissue architectural patterns in smears, and given the small amount of tissue material obtainable with a fine needle, specific diagnostic conclusions cannot always be reached even when samples are adequate hence histopathology plays an important role in diagnosis of lesions.¹³

A definitive diagnosis is not always possible only by cytology, but a disease categorisation and in a majority of cases a differential diagnosis can be provided.¹⁴ Considering the advantages of this technique and the fact that still much work is to be done in this field, an attempt is made here to show the efficacy and significance of this procedure in Neck swellings.

AIM AND OBJECTIVES: To study the diagnostic efficacy of Fine needle aspiration cytology and its Histopathological comparison in the palpable lesions of neck.

MATERIAL & METHODS :

The study was conducted in the Department of Pathology, N.I.M.S. Medical College & Hospital, Jaipur. It's a cross-sectional study. The Study was time period specific i.e. from January, 2015 to July 2016. A total 126 patients were included. All patients presenting with neck swelling of both sex and of all age group were included. Patients presented with Suspected neck masses of vascular origin on clinical examination, Patients having bleeding diathesis or Inconclusive repeated FNAC were excluded.

FNAC was done, slides were stained with MGG (dry slides) & H&E stain (Wet ethanol Fixed slides) & Diagnosis was made. For Histopathology, Tissues grossing, processing was done & slide were made & stained with H&E stain & Diagnosis was made. The results of FNAC & HPE were compared.

RESULTS :

In this study, 126 cases of neck swellings were evaluated between the periods of January 2015- July 2016. Most common swelling was of thyroid (58 patients), then lymph node (55 patients), salivary gland swellings (7 patients) and other neck masses (6 patients). All cases underwent Cytological examination followed by Histopathological examination, except in 3 cases of Autoimmune thyroiditis and 18 cases of Reactive lymphadenitis in which only FNAC was performed.

Maximum number of patients were in between the age group of 21- 50 yrs i.e. 79 patients (62.69%).

Of the 58 thyroid swelling aspirates, 50 cytological diagnosis were similar to HPE diagnosis and 5 diagnosis did not match with HPE diagnosis & in 3

cases HPE was not done. 52 cases were diagnosed as nodular goitre, out of these, HPE shows 48 cases (87.27%) as nodular goitre, 2 cases (3.63%) as follicular adenoma, 2 cases (3.63%) as Hyalinising Trabecular adenoma. On FNAC 2 cases were diagnosed as follicular neoplasm, out of which, on HPE, one was diagnosed as Follicular carcinoma & second one was diagnosed as Colloid goiter (False positive). 1 cases (1.81%) was diagnosed as papillary carcinoma on FNAC which also came same on HPE.

Of the 55 lymph node swellings aspirates, 33 cytological diagnosis were similar to HPE diagnosis and 4 diagnosis did not match with HPE diagnosis. On FNAC, out of 55 cases, 37 cases were reported as Reactive lymphadenitis, but HPE of only 19 cases was done. Out of which 15 were reported as Reactive lymphadenitis, 1 case as TB lymphadenitis, 1 case as Hodgkin's lymphoma, 2 cases as Kikuchi's disease. On FNAC, 7 cases were reported as metastatic carcinoma, 10 cases as TB lymphadenitis, 1 case was reported as Non-Hodgkin's Lymphoma, also on HPE examination the same diagnosis was made.

Of the 07 salivary gland swelling, FNAC & HPE was done in all cases, cytological reports of 06 cases were same. 01 case was reported as chronic sialadenitis on FNAC which turned out to be Pleomorphic adenoma on HPE.

Of the 06 other neck swellings FNAC done in all cases and confirmed with HPE, except one where the aspirate showed inflammatory lesion, which was later confirmed as Syringocystadenoma papilliferum on HPE.

DISCUSSION:
This study was conducted from January 2015 to July 2016 in the Department of Pathology, NIMS college, NIMS University, Jaipur. Total 126 cases of neck lesions were evaluated out of which most common were thyroid swellings i.e. 58 in number, 55 cases were of lymph node swellings, 7 cases

were of salivary gland swellings and 6 cases were of other neck swelling. In the study, 88 cases (69.8%) were of female patients and 38 cases (30.15%) were of male patients. Female to Male ratio was = 2.31 : 1. Female preponderance was seen in all lesions (F : M = 2.31 : 1). Results were similar to study of S. Soni et al.¹⁵

The age of 79 patients (62.69%) was in between the age group of 21- 50 yrs. This is comparable with study done by S. Soni et al and Jamal Akhavan - Moghadam et al.^{15,16} In the study, total number of FNAC were 126, and Histopathological examination was done in 105 cases as 3 cases of thyroid swelling were diagnosed on FNAC as Autoimmune thyroiditis, & 18 cases of lymph node swelling were diagnosed on FNAC as Reactive Lymphadenitis. The maximum number of aspirations was done from Thyroid swellings (46.03%), second was from Lymph nodes swellings (43.65%) followed by salivary gland swellings (5.5%) & other neck swellings (4.7%).

FNAC of 58 thyroid swellings (46.03%) were included in this study, out of which HPE was done in 55 cases. 50 cases HPE reports were consistent with the finding of FNAC, & in 3 cases HPE was not done. Nodular goitre was the most common swelling i.e. 52 (89.65%) on FNAC, out of which HPE confirmed 48 (87.27%) cases. The diagnostic accuracy of FNAC in thyroid swellings in this study was 94.54%, the specificity has been found to be 98.03%. This is comparable with the study done by Khageswar Rout et al¹⁷. Similar accuracy ranging from 68-95 percent was reported by Schunner et al., Russ et al., Colacchio et al.^{18,19,20}

On FNAC, follicular neoplasm was reported in 2 cases, but on HPE, follicular carcinoma was reported only in 1 case & second case was misdiagnosed, which on HPE turn out to be colloid goitre. The smears was showing hypercellularity, lack of colloid material and presence of epithelial

cells in follicular pattern at some places. Since areas of adenomatous hyperplasia in goitre can give to such false reporting, this illustrates the necessity of overall clinical assessment of the patient with interpreting cytological results with HPE. Similar findings of misdiagnosis were reported by Friedman et al.²¹ The distinction depends on demonstration in tissue section of capsular or vascular invasion.

FNAC of 55 lymph node (43.65%) swellings were done, out of which HPE was done in 37 (67.27%) cases. 33 HPE reports were consistent with the finding of FNAC, & in 18 cases HPE were not done. Reactive lymphadenitis (37 cases), was most common among the lymph node swelling in which 18 (32.72%) cases diagnosed on FNAC only & remaining 15 (27.27%) cases were diagnosed as Reactive lymphadenitis on both FNAC & HPE (32.72% + 27.27% = 60%), followed by TB lymphadenitis (18.18 % + 1.8 % = 19.98%), metastatic carcinoma (12.72%), Kikuchi's disease (3.6%), Hodgkin's Lymphoma (1.8%) & Non-Hodgkin's Lymphoma's (1.8%). These results are similar to Agarwal D et al.²²

The diagnostic accuracy of FNAC in lymph node swelling in our study is 85.71%. The specificity has been found to be 100%. This is comparable with Anne R et al.²³

In the present study, tubercular lymphadenitis cytologically presented as

- 1) Epitheloid cell granuloma with/without Giant cells (Langhans) with necrosis
- 2) Epitheloid cell granuloma with/without Giant cells (Langhans) without necrosis
- 3) Only with necrosis and occasional epitheloid cells without necrosis or Langerhans cell clusters.

A definite cytologic diagnosis of TB lymphadenitis can be offered in the smears with first two patterns while the third pattern, in the absence of Ziehl-Neelsen staining, would be dismissed as non –

specific reactive lymphadenitis. These findings were similar to Arun K Gupta et al & S. Bhattacharya et al.^{24,25} In our study, out of 2 cases of lymphoma, FNAC diagnosed 1 case. One case which was missed by FNAC, was of Hodgkin lymphoma & was reported as reactive lymphadenitis on FNAC. The cause of false negative may be dominance of reactive population of cells. Similar findings were seen in study of Narang R K et al.²⁶ Gupta et al.²⁷ exclusively studied aspiration smears of lymphoma cases & mentioned that overlap among reactive hyperplasia, lymphocytic lymphoma and Hodgkin disease is possible.

The causes for false negative results are:

- Cytological examination reveals only predominantly non neoplastic cell i.e. inflammatory cell.
- R-S cell were not found.

On histological examination:-

- a) Typical lacunar cell (R-S cell)
- b) Predominantly shows mixed inflammatory infiltrate

FNAC of 7 salivary gland swellings (5.5%) were included in this study, HPE was done in all the cases. On HPE 6 cases were similar to the FNAC reports.

5 cases were of chronic sialadenitis on FNAC, but on HPE only 4 (57.14%) were diagnosed as chronic sialadenitis, & 1 (14.28%) was diagnosed as Pleomorphic adenoma of parotid gland. 2 cases were diagnosed as pleomorphic adenoma of parotid (14.28%) & submandibular gland (14.28%), on both FNAC & HPE.

Salivary gland lesions either neoplastic or non neoplastic lesion. The swelling were seen commonly in the parotid and submandibular region. Majority of diagnosis include non neoplastic lesion i.e. 57.14% and the rest 42.85% were neoplastic. The commonest non neoplastic

lesion include chronic sialadenitis (57.14%), the commonest benign tumour encountered was pleomorphic adenoma seen in 3 cases (42.84%).

Thus concluded that FNAC of salivary gland was an effective tool for diagnosis of the disease of the patient with diagnostic accuracy of 85.71%, sensitivity of 66.66% and specificity of 100%. this is near to the study of Suresh et al.²⁸

Out of total 126 cases, 06 cases were of other neck swelling, all underwent FNAC and HPE. On HPE 05 cases were similar to the FNAC reports. 02 (33.33%) case were diagnosed as epidermoid cyst on FNAC, which was same on HPE. On FNAC, 03 (50%) cases were reported as lipoma & were confirmed on HPE. & 1 (16.66%) case was diagnosed as Inflammatory lesion on FNAC, which on HPE was diagnosed as Syringocystadenoma papilliferum.

These 06 cases were divided into cystic (50%) and non-cystic.(50%). The commonest non-cystic lesion include lipoma and the commonest cystic lesion was epidermoid cyst. Pitfall in cytological diagnosis include cystic lesion i.e. Syringocystadenoma papilliferum diagnosed as Inflammatory lesion on FNAC.

Thus concluded that FNAC of other neck swelling was an effective tool in the diagnosis of the disease of the patient with diagnostic accuracy of 83.33% , sensitivity of 66.66% and specificity of 100%.

Certain limitations of the procedure in the neck region that we have encountered are:

- Distinguishing follicular adenoma from follicular carcinoma.
- Distinguishing colloid goitre from hyalinsing trabecular adenoma
- Distinguishing Inflammatory lesion from syringocystadenoma papilliferum
- Difficulty in the diagnosis of lymphomas from Reactive lymphadenitis.

An important part of fine needle aspiration is its capacity to decide the categorisation of a mass in the neck, free of making any decision as either malignant or benign growth. This is especially helpful for patient who are presenting first time with neck mass as the main finding. In our study, 126 patients were evaluated .The overall FNAC sensitivity of neck lesions was 68.05%, specificity was 99.50% and accuracy was 87.32%.

Study by Soni et al¹⁵ showed sensitivity and specificity of 83.01% & 78.94% , respectively . In this study ,59 patients were included out of which 28 cases were of neck lymph nodes, 14 cases were of thyroid, 13 cases were of salivary gland swelling & 4 cases were of other neck swelling.Study by Howlett, D.C., et al.²⁹ a total of 276 patient were studied . Neck lymph nodes ,Sensitivity & specificity on FNAC were 89% and 57%, respectively; thyroid masses, Sensitivity & specificity on FNAC were 62% and 86%, respectively; and salivary glands, Sensitivity & specificity on FNAC were 64% and 100%, respectively. It is obvious from above studies that FNAC can be performed quickly and cost effectively with minimal discomfort to patients, this procedure is widely accepted for examining most of the palpable neck lesions as the first step for diagnosis.

CONCLUSION:

Out of 126 cases, satisfactory aspiration were obtained in all the cases. The corresponding neck lesion biopsy was available in 105 cases, among which 94 cases were consistent with histopathological report thus accuracy of aspiration cytology was 87.32%. 5 cases were false negative and one case was false positive. Benign lesions were more common in 4th & 5th decade and malignant lesions were more common in 5th and 6th decade. The neck lesions were more common

in the females , female and males ratio was 2.31:1.

Of the 58 thyroid swelling aspirates ,50 cytological diagnosis were similar to HPE diagnosis and 5 diagnosis did not match with HPE diagnosis & in 3 cases HPE was not done. 52 cases were diagnosed as nodular goitre, out of these, HPE shows 48 cases (87.27%) as nodular goitre, 2 cases (3.63%) as follicular adenoma, 2 cases (3.63%) as Hyalinising Trabecular adenoma. On FNAC 2 cases were diagnosed as follicular neoplasm, out of which , on HPE, one was diagnosed as Follicular carcinoma & second one was diagnosed as Colloid goiter (False positive). 1 cases (1.81%) was diagnosed as papillary carcinoma on FNAC which also came same on HPE.

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The reason for rapidly increasing popularity of FNAC is the simplicity of the technique, the rapidity of an answer, often whilst the patient is still attending the OPD and the low cost.

It can be concluded from this research that FNAC is a time saving, easy method & can be very useful in making diagnosis. It have an important role in the early diagnosis & treatment planning with any overall accuracy of 87.32%, still the HPE examination remains the gold standard for diagnosis of a disease.

Age in years	Number of patients	%
1 -10	5	3.9
11 – 20	21	16.6
21 – 30	36	28.5
31 – 40	23	18.25
41 – 50	20	15.87
51 – 60	14	11.11
61 – 70	6	4.7

above 70	1	0.79
TOTAL	126	

Table 1: Age distribution of study participants

Site of swelling	Number of patients	%
Thyroid swellings	58	46.03
Lymph node swellings	55	43.65
Salivary gland swellings	7	5.5
Others	6	4.7
Total	126	

Table 2 : Site of swelling of the study patients

Comparison of FNAC with HPE of Thyroid		
Thyroid swelling	FNAC	HPE
Nodular goitre	52	49
Follicular neoplasm	2	-
Follicular adenoma	-	2
Follicular carcinoma	-	1
Hyalinising Trabecular adenoma	0	2
Papillary carcinoma	1	1
Autoimmune thyroiditis	3	HPE Not done
Total	58	55

Table 3 : Comparison of FNAC with HPE in thyroid swellings

Comparison of FNAC with HPE of lymph node swellings		
Lymph Node Swelling	FNAC	HPE
Reactive lymphadenitis	37	15
TB lymphadenitis	10	11
Metastatic carcinoma	7	7
Hodgkin's Lymphoma	-	1
Non-Hodgkin's Lymphoma	1	1
Kikuchi's disease	-	2
Total	55	37

Table 4: Comparison of FNAC with HPE in lymph node swellings

Comparison of FNAC with HPE of salivary gland swellings		
Salivary gland diagnosis	FNAC	HPE
Chronic sialadenitis	5	4
Pleomorphic adenoma of parotid gland	1	2
Pleomorphic adenoma of Submandibular gland	1	1
Total	7	7

Table 5 : Comparison of FNAC with HPE in salivary gland swellings

Comparison of FNAC with HPE of other neck swellings		
Types of swelling	FNAC	HPE
Lipoma	3	3
Epidermoid cyst	2	2
Inflammatory lesion	1	-
Syringocystadenoma papilliferum	-	1
Total	6	6

Table 6: Comparison of FNAC with HPE in other neck swellings

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