

Diagnostic Accuracy of Fine Needle Aspiration Cytology in Neck Swellings

Yadwinder Kaur Virk¹, Ekta Rani², G L Sharma³, Vijay Suri⁴, Darshan Goyal⁵, Krishna Jindal⁶

ABSTRACT

Introduction: Neck swellings are commonest incidental findings that are present in all age groups. Objective of the current research was to study the diagnostic accuracy of fine needle aspiration cytology in neck swellings keeping histopathology as gold standard.

Material and methods: This is a prospective study conducted from January 2017 to December 2017 comprising of 70 cases of neck lesions who underwent FNAC at Adesh Hospital Bathinda. Histopathological diagnosis was considered as gold standard. Efficacy of FNAC was determined in terms of sensitivity, specificity, Positive predictive value, Negative Predictive value and diagnostic accuracy.

Results: Sensitivity, specificity, Positive predictive value, Negative Predictive value and diagnostic accuracy were 83.33%, 100%, 100%, 98.46% and 98.57%.

Conclusion: FNAC should be treated as a first-line diagnostic test for neck swellings. As maximum number of cases of head and neck lesions are nonneoplastic, FNAC can avoid unnecessary surgeries.

Keywords: FNAC, Neck Swellings, Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value and Diagnostic Accuracy

INTRODUCTION

Fine Needle Aspiration Cytology (FNAC) is of great importance in neck swellings because the target sites are easily accessible, patient compliant due to its minimally invasive nature.¹ FNAC has good amount of accuracy up to 97% in the preoperative diagnosis of various neck lesions.² For the work-up of cervical masses and nodules it is particularly important because biopsy of cervical swelling should be avoided unless all other diagnostic modalities have failed to establish a diagnosis. FNAC does not give the same architectural detail as histology but it can provide cells from the entire lesion as many passes through the lesion can be made while aspirating.³ Fine Needle Aspiration Cytology (FNAC) is a simple, inexpensive and quick method used for sampling superficial masses found in the neck and is usually performed in the outpatient clinic. Minimal trauma is caused to the patient and it carries no risk of complications. Masses located in the neck, including salivary gland and thyroid gland lesions can be readily diagnosed using this technique.² In our clinical practice we encounter various types of neck swellings, the evaluation of neck mass is common clinical dilemma and condition to which an ENT clinician routinely encountered. Commonly presenting neck masses are within lymph nodes, thyroid gland and salivary glands.

Less common presenting neck masses are from thyroglossal cysts, branchial cleft cysts, carotid body tumors, cystic hygromas, pharyngeal pouch abnormalities and lumps of skin appendages. To make an accurate and effective surgical intervention, it is essential to make a preoperative assessment of the nature of these lesions. The aim of study was to find out the diagnostic accuracy of FNAC keeping histopathological diagnosis as gold standard.

MATERIAL AND METHODS

The present study was conducted at Department of Pathology, Adesh Institute of Medical Sciences (AIMSR), Bathinda, from 1st January 2017 to 31st December 2017. The study design was prospective diagnostic accuracy study. Patients of all age groups and sex with neck swellings were included in the study. However, patients with unavailability of histopathology specimen and not willing for imaging were excluded from the study.

The FNAC was performed without USG guidance in this study. The success of FNA depends on getting the sample which is adequately representative of the underlying pathology. The standard technique was followed while performing the procedure. Smears were stained with Giemsa and reported by the pathologist. The histopathology of the same patient was followed. Accuracy of FNAC considering histopathological examination as gold standard was determined according to the following equation:

$\text{Sensitivity} = \frac{\text{True positive (TP)}}{\text{True positive (TP)} + \text{False negative (FN)}}$

¹Junior Resident, Department of Pathology, Adesh institute of medical sciences and research, Bathinda, Punjab, ²Assistant Professor, Department of Pathology, Adesh institute of medical sciences and research, Bathinda, Punjab, ³Professor, Department of Radiology, Adesh institute of medical sciences and research, Bathinda, Punjab, ⁴Professor, Department of Pathology, Adesh institute of medical sciences and research, Bathinda, Punjab, ⁵Professor, Department of ENT, Adesh institute of medical sciences and research, Bathinda, Punjab, ⁶Professor, Department of Pathology, Adesh institute of medical sciences and research, Bathinda, Punjab, India

Corresponding author: Dr Ekta Rani, Department of Pathology, Adesh Institute of Medical Sciences and Research, Bathinda, Punjab, India

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Specificity = True negative (TN) / True negative (TN)+ False positive (FP)

Positive Predictive Value (PPV) = True positive (TP)/ True positive (TP) + False positive (FP)

Negative Predictive Value (NPV) = True negative (TN)/ True negative (TN) + False negative (FN)

Total accuracy = True positive (TP) + True negative (TN) / Total number of cases.⁴

RESULTS

Total number of cases were 70. Out of which 44 cases were of thyroid, 10 cases of lipomatous lesion, 07(10%) cases of lymph node, 06(8.5%) cases of cystic lesions and 03 (4.2%) cases of salivary gland. Thyroid swellings included maximum number of cases and there were (22) cases of colloid goiter followed by multinodular goiter (18) cases and 2 cases each of subacute thyroiditis and papillary carcinoma of thyroid, 10 cases of lipomatous lesion, 07 cases of lymph node included 02 cases of tuberculous lymphadenitis and 01 case each of reactive lymph node, Hodgkin's lymphoma, granulomatous inflammatory pathology, adenomatous metastatic deposits and metastatic deposits of squamous cell carcinoma. 3 cases

of salivary gland each of chronic sialadenitis, Warthin's tumor and pleomorphic adenoma. Cystic lesions included epidermal inclusion cyst, sebaceous cyst, dermoid cyst. Male patients were 41.43% and 58.57% were female patients and male to female ratio was 1:1.41.

Maximum number of the patients were in age group of 41 to 50 years (24.29%). However, 5.71% of the patients were aged < 18 years and 4.28% of the patients were aged > 60 years. The mean age was 40.23±15.13 years.

Based on FNAC, majority of the patients that is 65(92.86%), had benign lesions while malignant lesions were diagnosed in 5(7.14%) patients. Out of 65 benign cases, 22 cases of colloid goiter, 18 cases of multinodular goiter, 10 cases presented with lipomatous lesion, 5 cases of infected dermoid cyst, 2 cases of tuberculous lymphadenitis and 1 case each of epidermal inclusion cyst, granulomatous inflammatory pathology, reactive lymph node and subacute thyroiditis, lymphocytic thyroiditis, chronic sialadenitis, pleomorphic adenoma and Warthin's tumour. Malignant cases were 5 in number in which 2 cases of papillary carcinoma of thyroid, and 1 case each of adenomatous, squamous metastatic deposits and Hodgkin's lymphoma.

In this study histopathological examination revealed benign lesions in 64 (91.43%) of the patients and malignant lesions in 6 (8.57%) of the patients. Benign cases included 20 cases of colloid goiter, 18 cases of multinodular goiter, 10 cases of lipoma, 5 cases of infected dermoid cyst, 2 cases of tuberculous lymphadenitis and 1 case each of adenomatoid goiter, reactive lymph node, tuberculosis, subacute thyroiditis, lymphocytic thyroiditis epidermal inclusion cyst, chronic sialadenitis, Pleomorphic adenoma and Warthin's tumour. Malignant cases included 3 cases of papillary carcinoma and 1 case each of Hodgkin's lymphoma, metastatic deposits and metastatic deposits from squamous cell carcinoma. Table 1 shows FNAC is highly specific (100%) and has 100% PPV. With Sensitivity of 83.33%, NPV is 98.46% and 98.57% diagnostic accuracy.

| | |
|---------------------------|--------|
| Sensitivity | 83.33% |
| Specificity | 100% |
| Positive Predictive Value | 100% |
| Negative Predictive Value | 98.46% |
| Diagnostic Accuracy | 98.57% |

Table-1: Diagnostic accuracy of FNAC in Neck Swellings

| Study Group | Sensitivity |
|----------------------------|-------------|
| Kapoor et al ¹¹ | 90.47% |
| Tilak et al ¹² | 90.91% |
| Present Study | 83.33% |

Table-2: Comparison of Sensitivity of neck swellings with other studies

| Study Group | Specificity |
|----------------------------|-------------|
| Kapoor et al ¹¹ | 98.73% |
| Tilak et al ¹² | 93.18% |
| Present Study | 100% |

Table-3: Comparison of Specificity of neck swellings with other studies

| Study group | PPV | NPV |
|-------------------------------|------|--------|
| Kapoor et al ¹¹ | 95% | 97.5% |
| Fernandes et al ¹³ | 100% | 98% |
| Present Study | 100% | 98.46% |

Table-4: Comparison of PPV and NPV of our study with other studies

| Study group | Accuracy |
|-------------------------------|----------|
| Wilson JA et al ¹⁴ | 93% |
| Tilak et al ¹² | 92.73% |
| Present Study | 98.57% |

Table-5: Comparison of accuracy of FNAC in neck swellings with other studies

DISCUSSION

Neck swellings are common and carry a low, but noticeable risk of malignancy. The most important challenge is differentiating benign from malignant swellings, and precise diagnosis and management of malignant swellings in the early stages.⁵

This one year prospective diagnostic accuracy study was conducted from January 2017 to December 2017. 612 patients attended ear nose throat (ENT), Surgery and Paediatric OPD for neck swellings. After applying inclusion and exclusion criteria, a total of 70 patients were included in the present study during the study period and were studied. All the patients were investigated on FNAC which was finally compared with the histopathological findings in order to determine the diagnostic accuracy.

Epidemiological data suggests that, neck swellings are less frequent in men than in women,⁶ accordingly in the present study females outnumbered males as 58.57% of the patients were females and 41.43% were males with male

to female ratio of 1:1.41. Similar findings were reported in a study from Pokhara Nepal where 92% were females.⁷ Recently Kumar A *et al.*⁸ reported male to female ratio as high as 1: 6.02. Another study by Handa U *et al.*⁹ (2008) also reported higher male to female ratio that is, 1:6.35. The female predominance suggests that hormonal factors may be involved and the literature also says that there can be biological changes occurring during pregnancy which may increase the risk.¹⁰

Table 2 shows that our study has high sensitivity (83.33%) of FNAC in neck swellings but in comparison to studies of Kapoor et al and Tilak et al it is slightly less. The sensitivity of FNAC in the study conducted by Kapoor is 90.47% while Tilak has 90.91%.

Table 3: shows that present study has highest specificity and is in concordance with Kapoor et al study showing 98.73%, Tilak et al has slightly lower specificity 93.18%.

Table 4 shows that PPV and NPV of present study are 100% and 98.46% respectively. PPV is almost similar to Fernandes et al study, However, Kapoor's results shows 95% of PPV of FNAC. Fernandes has similar NPV with our study depicting 98% NPV while slightly low value 97.5% in the study conducted by Kapoor et al.

Table 5: shows FNAC has high accuracy (98.57%) in diagnosing neck swellings while Wilson and Tilak et al shows lower accuracy than present study but has similar percentage of 93% and 92.73% respectively.

CONCLUSION

Neck swellings are a common cause of dilemma to clinicians. Based on our observations, FNAC is more specific, sensitive and has high diagnostic accuracy. FNAC of neck swellings has become one of the most useful, safe, accurate, relatively simple, inexpensive, less time-consuming OPD procedures, virtually painless, highly patient-compliant with highly accurate dependable tool in the diagnosis of neck pathology. Though, it is not a substitute for conventional surgical histopathology but is regarded as an extremely valuable complement in diagnosis. Hence FNAC should be treated as a first-line diagnostic test for neck swellings.

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