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Original Research Article

Reliability of FNAC as a diagnostic tool in lymphadenopathy

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ABSTRACT

Background: Fine needle aspiration cytology is a first line investigation modality for the evaluation of cervical lymphadenopathies. Cervical lymphadenopathy is one of the most common clinical presentations affecting all age groups. Fine needle aspiration cytology is a first line investigation modality for the evaluation of cervical lymphadenopathies. Cervical lymphadenopathy is one of the most common clinical presentations affecting all age groups.
Methods: This study was carried out in the Department of Pathology of Government Medical College Thiruvananthapuram over a two year. Out of 1020 aspirations 122 cases where identified and included in the study. All the diagnosis obtained by fine needle aspiration cytology was correlated with histopathology.
Results: The age of the patients ranged from seven years to seventy-eight years in which 44% were males and 56% were females. Incidence of non-neoplastic lymph node lesions was common during 2 to 4 decades. Incidence of neoplastic lymph node lesions was common during 4 to 6th decade. Reactive change and Tuberculosis were seen more common in females whereas Non-Hodgkin's lymphoma and metastatic tumors were more common in males. The overall accuracy of lymph node lesions in our study was found to be 90.98%, sensitivity 84 % and specificity 95.8%.
Conclusions: Our study concluded that FNAC is simple, quick, minimally invasive technique to diagnose lymphadenopathy. The overall accuracy of lymph node lesions in our study was found to be 90.98%, sensitivity 84% and specificity 95.8%. Findings in this study are comparable and consistent with studies conducted elsewhere. The limitations of FNAC are that only positive results have clinical significance. The limitations have to be taken into account while interpreting the smears and skill has to be gained by constant practice.

Keywords: Cervical lymphadenopathy, Fine needle aspiration cytology, Metastatic diseases, Non-Hodgkin's lymphoma, Tuberculosis

INTRODUCTION

Fine needle aspiration cytology in the evaluation lymph node lesions is a simple important diagnostic tool.[1] FNAC is a first line investigation modality for the evaluation of cervical lymphadenopathies.[2] Lymphadenopathy is one of the commonest clinical presentations of patients attending outpatients' departments of most hospitals. The etiology of lymphadenopathy varies from reactive hyperplasia, granulomatous lesions, lymphoma and metastatic diseases.

FNAC has been advocated as a useful method in comparison to more expensive surgical excision biopsy in developing countries with limited resources.[3] The use of fine needle aspiration cytology in the investigation of lymphadenopathy has become an acceptable and widely practiced safe simple rapid and minimally invasive technique.[4] The present study was undertaken to assess

the diagnostic yield of FNAC and to correlate the result of FNAC with histopathological diagnosis.

METHODS

The study was conducted at Pathology Department, Medical College, Thiruvananthapuram over a period of 2 years. Out of 1020 lymph node aspirations done in the Cytology Department Medical college Thiruvananthapuram a total of 122 cases were identified and included in the study where both cytology and biopsy material were available for review. Cytological and histopathological diagnosis was compared among 122 patients who underwent excisional biopsy. Cases were collected at random without giving any preference to age sex or any other criteria.

Under aseptic precautions aspiration of lymph nodes was preformed using 22/23-gauge needle and 10 cc syringe. Two to three smears were taken out of which one was air-dried for Geimsa staining when necessary and others were fixed in 95% ethyl alcohol for papaniculaou staining. The histopathology of the excision biopsy specimens was studied and final histopathology report compared with FNAC reports to assess the accuracy of cytological diagnosis. The study was approved by the ethics committee of the institution. Statistical analysis was done using Epi-info software. A positive cyto histopathological correlation was taken as true positive where as cyto histopathological disagreement was either false positive that is cytology positive and histopathology negative or false negative that is cytology negative and histopathology positive. Cases where cytology smears were negative and corresponding biopsy also did not reveal any pathological lesion were taken as true negative. Histopathology was the gold standard.

RESULTS

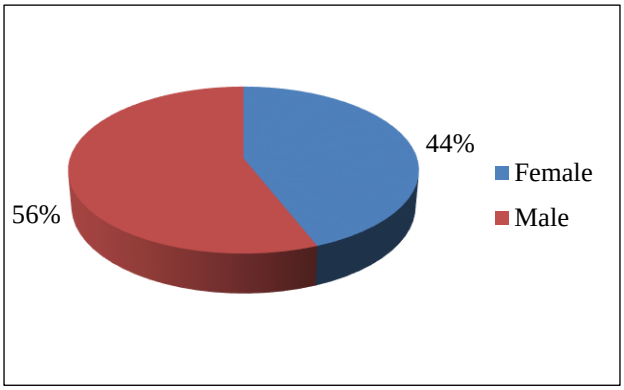

Figure 1: Sex distribution in study population.

This study analyzed 122 cases of lymphadenopathy. The age of patients ranged from seven years to 78 years in which 44% were male and 56% were females. Incidence of non-neoplastic lymph node lesions was common during second to fourth decade.

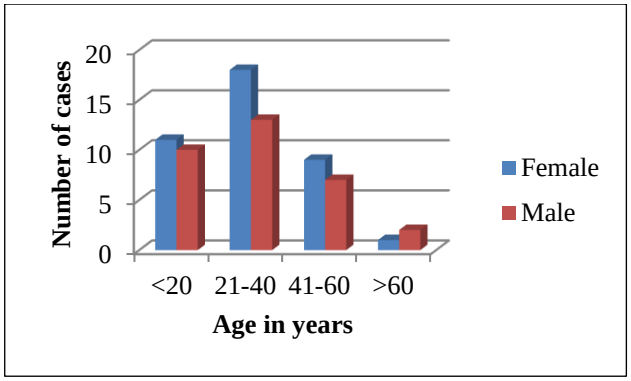

Figure 2: Age and sex distribution of patients with non-neoplastic lymph nodes.

Incidence of neoplastic lymph node lesions was common during fourth to sixth decade.

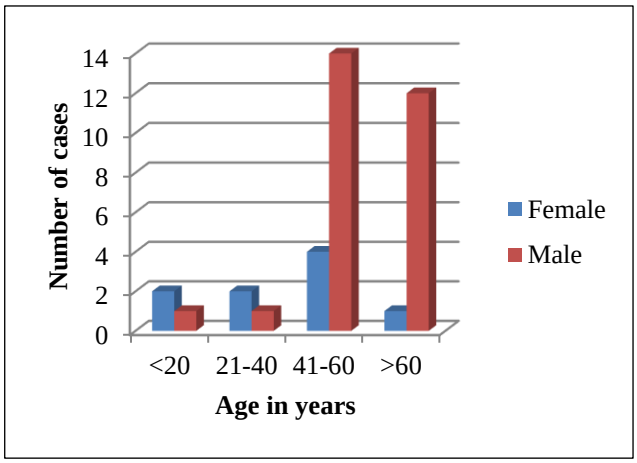

Figure 3: Age and sex distribution of patients with neoplastic lymph nodes.

This was the distribution of lymph node lesions obtained in our study.

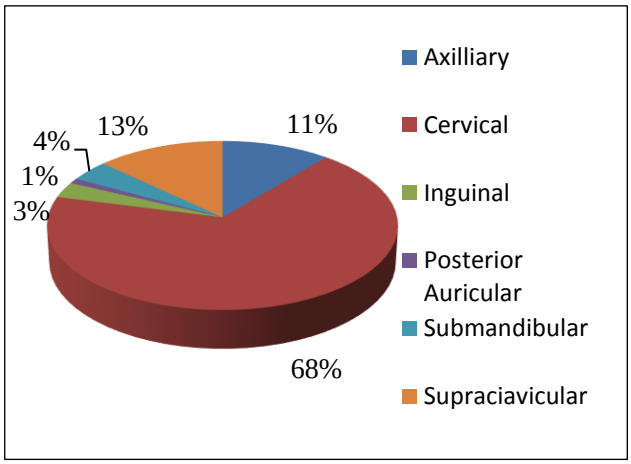

Figure 4: Anatomical distribution of lymph nodes in the present study.

This chart shows comparison between histopathology and cytological diagnosis.

Among the non-neoplastic lymph node lesions Tuberculous lymphadenitis (59%) was the commonest followed by reactive change (40%) and filarial lymphadenitis (1%) among the neoplastic lesions the commonest was lymphoma, metastasis and plasmacytoma (2%).

The overall sensitivity and specificity of FNAC in this study is 84% and 95.8% respectively. The overall accuracy in reactive change lymph node is (79.2%) tuberculous lymphadenitis (71.42%), lymphoma (78%) and metastasis (89%).

Table 1: Comparison between histopathological and cytological diagnosis.

Histopathological diagnosis	Total number of cases	Correct diagnosis by FNAC	Incorrect diagnosis by FNAC
Reactive change	29	26	3
Tuberculous lymphadenitis	41	23	18
Filarial lymphadenitis	1	0	1
Suppurative lymphadenitis	1	0	1
Lymphoma	29	23	6
Metastasis	20	16	4
Plasmacytoma	1	0	1
Total	122	88	34

Table 2: Statistical results of FNAC.

Statistical	Percentage
Sensitivity	84%
Specificity	95.8%
Positive predictive value	93.3%
Negative predictive value	89.6%
Percentage of false positive	4.1%
Percentage of false negative	16%
Overall accuracy	90.98%

DISCUSSION

FNAC is a commonly used diagnostic approach in the investigation of lymphadenopathy. It offers immediate preliminary diagnosis in the investigation of lymphadenopathy with minimal trauma to the patient at a considerable lower cost than surgical biopsy.[5,6]

The present study done over a period of two years includes 122 patients who presented with peripheral lymphadenopathy to the Cytology Department of Medical College, Thiruvananthapuram. Out of 122 lymph node lesions 88 cases were correctly diagnosed, sensitivity was 84%, specificity 95.8%, positive predictive value 93.3%, negative predictive value 89.6% and diagnostic accuracy was 90.98%.

Among the lesions 77 cases were non-neoplastic and 45 cases were neoplastic. The most common group of lymph nodes affected in our study was cervical lymph nodes 68% followed by supraclavicular 13%, axillary 11%, submandibular 4%, inguinal 3% and post auricular 1%. Cervical lymph nodes were commonly involved in our study which was comparable with the findings of other workers.[7]

Reactive change and Tuberculosis were seen more common in females whereas non-Hodgkin's lymphoma and metastatic tumors were more common among males.

Out of 39 cases of reactive change 26 cases were correctly diagnosed. In seven cases, the histopathological diagnosis was caseating granulomatous lesion consistent with Tuberculosis. This may be due to sampling error. In two cases, histopathological diagnosis was non-Hodgkin's lymphoma diffuse large cell cleaved and in another malignant lymphoma diffuses mixed small and large cell type. Sensitivity was 89% and specificity was 72%. Steel BL et al, had claimed that the ability to distinguish reactive process and lymphoma by FNAC is significantly lower.[8]

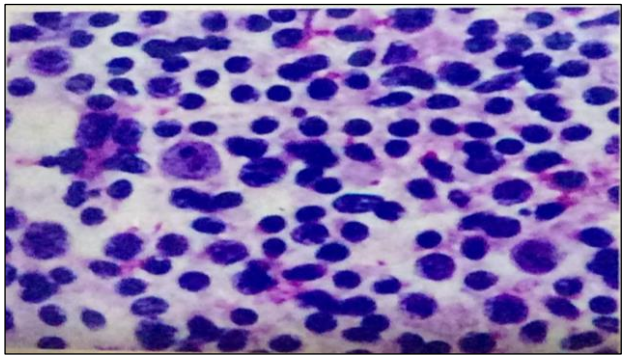

Figure 1: Aspiration cytology of reactive change lymph node of polymorphous population of cells.

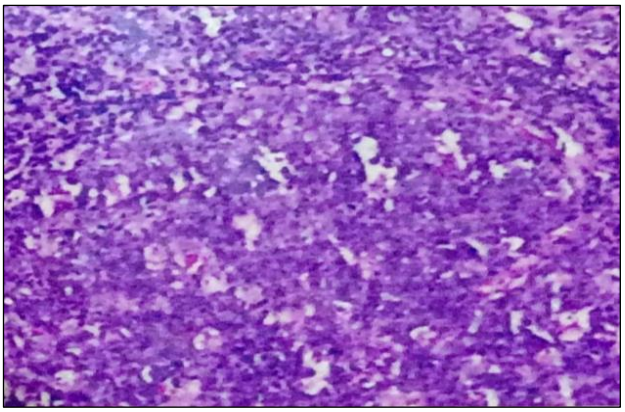

Figure 2: Histopathology of reactive change lymph node showing germinal centre with tingible body macrophages.

It provides long lasting and virtually permanent solution due to its non-dependence on hardware and implants. Cost of equipment and availability of surgical expertise are the only impediments to this promising treatment modality.

Tuberculous lymphadenitis accounted for 26 cases (20.49%). Out of 26 cases histopathology proved to be caseating granulomatous lesion in 24 cases. In one case, the histopathological diagnosis was anaplastic large cell lymphoma in which the malignant cells were missed due to the predominance of epithelioid cell clusters. In the second case, the histopathology was metastasis from an undifferentiated carcinoma which was masked by the predominance of necrotic material. In the present study, the accuracy was 71% with low sensitivity 54% and high specificity of 91%. Bailey et al and Nousairy A in their studies have mentioned that Tuberculosis is the most common disease in developing countries.[9,10] FNAC is a reliable tool for diagnosing this pathology.[11]

Necrotizing lymphadenitis constituted only 5 cases and 4.1% of total lymph node lesions. Among 5 cases of necrotizing lymphadenitis four cases were diagnosed on histopathology as caseating granulomatous lesions consistent with Tuberculosis. In one case histopathology offered was Hodgkin's lymphoma nodular sclerosis. The diagnosis was missed as there were no specific findings to suggest this diagnosis. Such case requires a very high index of suspicion to suggest diagnosis.

A total of 27 cases of malignant lymphoma (22.13%) were studied during the period which included 23 cases of non-Hodgkin's lymphoma and 4 cases of Hodgkin's lymphoma. Among the 23 cases of NHL 18 cases were correctly diagnosed. The role of FNAC in the initial diagnosis and sub classification of primary lymphoid malignancy is still controversial and the cytological diagnosis of lymphoma on FNAC is still often followed by tissue biopsy in most cases.[12]

Our study included 4 cases of Hodgkin's Lymphoma out of which 2 were correctly diagnosed. In two cases which were incorrectly diagnosed was Non-Hodgkin's lymphoma of T cell origin, the polymorphous cell population was the cause of error in this case. Kumari and Rajalakshmi attributed the absence of any cytomorphologic features of either Hodgkin's and Non-Hodgkin's lymphoma on cytology to the focal involvement of lymph node by the disease that may not be aspirated due to sampling error. This sampling error is a particular hazard in Hodgkin's lymphoma nodular sclerosis sub type possibly because of the fibrosis that interferes with the cell yield.[13]

In the present study, there were 17 cases of metastatic nodal disease out of which 14 were correctly diagnosed. Metastasis from squamous cell carcinoma accounted for nine cases out of which 8 cases were correctly diagnosed. In one case, the diagnosis was caseating granulomatous lesion. We believe the wrong cytological diagnosis could be due to rather deep staining of nuclei of epithelioid cells and the presence of a few keratinized squamous cells due to improper sampling. The Hajdu ST Et al and Vit E also reported squamous cell carcinoma as the most common metastasis in lymph node followed by adenocarcinoma.[14,15] The other metastatic lesions in our study were metastasis from carcinoma breast which were all correctly diagnosed.

One case which was diagnosed as metastasis from small cell anaplastic carcinoma was diagnosed as Non-Hodgkin's lymphoma diffuse large and small cell on histopathology. Other metastatic lesions in our study were poorly differentiated adenocarcinoma. Metastasis lesions comprised 13.9% of all cases and showed accuracy of 89%, sensitivity 80% and specificity 96%.

A good way to become familiar with diagnostic criteria in lymph node is to prepare imprints from as many fresh specimens as possible including those from normal tissue, inflammatory lesions, benign and malignant tumors. In the evaluation of lymph node aspirations, the adequacy and satisfactory technical quality of preparation must be ensured. Papanicolaou stain should be combined with at least one other stain whenever possible so that the advantage of each may be appreciated and correlated in the same sample.

CONCLUSION

FNAC is a simple quick and inexpensive diagnostic technique with minimal trauma and high specificity. The overall accuracy of lymph node lesions in our study was found to be 90.98%, sensitivity 84% and specificity 95.8%. Findings in this study are comparable and consistent with studies conducted elsewhere. The high accuracy, sensitivity and specificity of FNAC confirm that preoperative cytology is a useful quick reliable diagnostic modality and is suitable for developing countries. However, a close cooperation between a

committed and trained cytopathologist and an experienced clinician is essential to obtain the maximum benefit from the procedure. The overall accuracy in our study was more in lymphoma (78%) and metastatic diseases (89%). The limitations of FNAC are that only positive results have clinical significance. The limitations have to take into account while interpreting the smears and skill has to be gained by constant practice.

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Ethical approval: The study was approved by the institutional ethics committee

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