International Journal of Research in Medical Sciences
Upadhyay GP et al. Int J Res Med Sci. 2016 Dec;4(12):5103-5107
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20164066

Original Research Article

Evaluation of fine needle aspiration cytology as the initial diagnostic test in cases of cervical lymphadenopathy

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Received: 06 November 2016
Accepted: 12 November 2016

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ABSTRACT

Background: Cervical lymph node enlargement is common amongst the various causes of neck swelling. Proper diagnosis and early treatment is necessary for cervical lymph node disease and it is also necessary to rule out potentially curable causes as against malignancy in which the treatment is generally palliative. Fine needle aspiration cytology (FNAC) is now a day the initial investigation in most of the cases of cervical lymph node enlargement. Aims and Objectives of the study were to evaluate the sensitivity and specificity of FNAC in the diagnosis of cervical lymph node disease with an emphasis on discordant cases between the cytology and the histopathology.
Methods: Patients admitted with cervical lymph node enlargement in a tertiary hospital of western India (attached with a medical college) from October 2014 to September 2016 were prospectively studied. Detailed history, clinical examination and necessary investigations of all patients were done especially fine needle aspiration cytology and histopathology examination and inference was obtained after the diagnosis was confirmed.
Results: The cytological diagnoses were found to be malignant in 48 cases (30.6%) and benign in 109 cases (69.4%). The overall diagnostic sensitivity, specificity, positive predictive value, and negative predictive value of FNAC of cervical lymph nodes were 90.9%, 67.2%, 82.6%, and 81.3%, respectively. The overall diagnostic accuracy was 82.2%, while the overall discordance rate was 17.8%.
Conclusions: FNAC is the initial investigation of choice in the diagnostic approach to most of the cases of cervical lymphadenopathy and it has good diagnostic sensitivity and specificity.

Keywords: Cervical lymph node, FNAC, Malignancy, Tuberculosis

INTRODUCTION

Historically lymph node swelling was termed scrofula. The classic term scrofula derived from the Latin word glandular swelling. Hippocrates (460-377 B.C.) mentioned scrofulous tumours in his writing. The European kings of the middle ages referred to such swellings as "King's evil" and it was believed that royal touch, the touch of the sovereign of England or France, could cure diseases due to the divine right of sovereigns. In 1924, French historian Marc Bloch wrote a book on the history of the royal touch.[1] Lymphadenopathy is one of the commonest clinical presentations of patients, attending the outdoor clinics in most hospitals. The aetiology varies from an inflammatory process to a malignant condition.[2] In developing and under developed countries tuberculosis continues to be the most common cause of cervical lymphadenopathy caused by mycobacterium tuberculosis while atypical mycobacteria are rare. The diagnosis of metastatic tumor to the lymph node on cytological smear is crucial. This would be the sole indication for searching the primary tumor, especially in cases of occult carcinoma.[3]

HIV co-infection has considerably changed the epidemiology of tuberculosis. Tuberculous lymphadenitis

is the most common form of extra pulmonary tuberculosis in these patients. Further, it is more common than lymphoma; Kaposi's sarcoma and generalised lymphadenopathy of HIV.[4] Cervical lymph nodes is the most common site of involvement and reported in 60% to 90% patients with or without involvement of other lymphoid tissue.[5]

Surgical excision biopsy followed by histopathological examination is time consuming, costly and requires hospitalization with significant pre and post procedure complications. While fine needle aspiration cytology (FNAC) the procedure is simple, rapid, cheaper and can be performed on out-patient basis (Table 1).

Table 1: Comparison between surgical biopsy and FNAC.

Procedure	Surgical biopsy	FNAC
Diagnosis	Histopathological	Cytopathological
Anaesthesia	Yes	No
Duration of procedure	Long	short
Report available	Within few days	Within few hours
Cost	High	Low
Specimen obtained	In operation theatre	In outpatient department
Trauma and scarring	More	Little

FNAC: fine needle aspiration cytology.

METHODS

This was a prospective study conducted at a tertiary care institute in Western India (attached to a medical college) between October 2014 and September 2016 after obtaining the approval of ethical committee. Study was planned so as to enroll patients admitted to the hospital with a diagnosis of cervical lymph node enlargement. A predesigned structured Performa was used to collect information which included demographic details (age, gender, residence, smoking habit), clinical presentation (pre-existing known cardiopulmonary disease or other co morbid conditions, respiratory and other symptoms at presentation, findings on general, respiratory and systemic examination. The tests carried out for individual patients included fine needle aspiration cytology, histopathology examination and a variable combination of radiologic (e.g. Chest X-ray, thoracic CT scan), microbiological (e.g., sputum culture and examination for acid-fast bacilli), serological (e.g. human immunodeficiency virus), etc.

The patients who were diagnosed to be suffering from cervical lymph node tuberculosis based on the result of FNAC were subjected to culture and drug sensitivity testing according the prevailing guidelines of revised national tuberculosis control programme (RNTCP). Patients were treated with anti-tubercular therapy by category I and category II for drug sensitive cases and with category IV or V in case of drug resistant cases. Patients with diagnosis of malignancy were referred to oncologist and information about the nature of malignancy and its prognosis and its treatment were collected. Patients with cervical lymph node involvement due to other causes were treated accordingly. Diagnostic sensitivity, specificity, positive likelihood ratio, negative likelihood ratio, positive predictive value and negative predictive value were calculated using MedCalc Statistical Software version 16.8 (MedCalc Software bvba, Ostend, Belgium.)

RESULTS

Among the 157 studied cases with cervical lymphadenopathy that had underwent FNAC, 90 cases (57.32%) were females and 67 cases (42.68%) were males with male: female ratio of about 1.34:1. 20 cases (12.73%) were age group between 0 and 20 years. 60 cases (38.21%) belonged to the age group between 21 and 40 years. 44 cases (28.02%) were in the range of 41–60 years. 30 cases (19.1%) were in the group between 61 and 80 years. Only 3 cases (1.9%) were above the age of 81 years. The commonest site of the involved cervical lymphadenopathy was the upper deep cervical lymph nodes constituting 60 cases (38.21%) followed by involvement of the supraclavicular lymph nodes in 40 cases (25.47%).Among the remaining cases, 20 cases (12.73%), 15 cases (9.55%), 10 cases (6.4%), 7 cases (4.5%), and 5 cases (3.2%) were in lower deep cervical lymph nodes, submandibular, preauricular, mid cervical and occipital lymph nodes, respectively.

Table 2: Comparative analysis of cytological diagnoses by histopathological diagnoses in patients with cervical lymphadenopathy.

Cytopathological diagnosis	Histopathological diagnosis		Total
	Benign	Malignant	
Benign	90 (true positive)	19 (false positive)	109
Malignant	39 (false negative)	9 (true negative)	48
Total	129	28	157

The cytological diagnoses were found to be malignant in 48 cases (30.6%) and benign in 109 cases (69.4%). The cytopathological results were then compared with the histopathological diagnoses of the corresponding excised lymph nodes. As the number of benign cases were more as compared to malignant we considered the benign cases as either true positive or false positive while malignant cases were considered as true either true negative or false negative.

Table 3: Diagnostic reliability of cytopathological diagnoses of cervical lymph nodes as compared with histopathological diagnoses in patients with cervical lymphadenopathy.

Statistics	95% confidence interval (%)	Value (%)
Sensitivity	83.00 to 95.5	90.9
Specificity	53.4 to 78.7	67.2
Positive predictive value	73.9 to 88.9	82.6
Negative predictive value	66.9 to 90.6	81.3
Accuracy	75.1-87.6	82.2
Discordance	12.4-24.9	17.8

Among the 48 cytologically malignant cases, 39 cases (81.3%) were proved histopathologically to be malignant, true negative, and 9 cases (18.7%) were diagnosed histopathologically as benign, false negative. 90 cases (82.6%) out of the 109 cytologically diagnosed benign cases were proved histopathologically to be benign, true positive, and 19 cases (17.4%) were malignant by histopathology, false positive (Table 2). Accordingly, the overall diagnostic sensitivity, specificity, positive predictive value, and negative predictive value of FNAC of cervical lymph nodes were 90.9%, 67.2%, 82.6%, and 81.3%, respectively. The overall diagnostic accuracy was 82.2% while the overall discordance rate was17.8% (Table 3).

DISCUSSION

Lymphadenopathy is one of the commonest clinical presentations of patients, attending the outdoor clinics surgery, ENT and pulmonology departments. The aetiology varies from an inflammatory process to a malignant condition. Fine needle aspiration cytology (FNAC) of lymph node has become an integral part of the initial diagnosis and management of patients with lymphadenopathy due to early availability of results, simplicity, and, minimal trauma with less complication. FNAC has also been advocated as a useful method in comparison to more expensive surgical excision biopsies in developing countries with limited financial and health care resources.[7]

The diagnosis of metastatic tumor to the lymph node on cytological smear is crucial and highly reliable. This would be the sole indication for searching the primary tumor, especially in cases of occult carcinoma.[8] Most of metastatic carcinoma can be identified by their cytomorphological characteristics alone. However, there are some instances the precise diagnosis of the primary tumor remains obscure.[9] Ancillary techniques, such as immunocytochemistry, are used to overcome these difficulties and support the cytodiagnostic interpretation.[10]

The lesion arising in lymph nodes can be found in patients ranging from an early to advanced age 11. This was correlated with our findings where we found that the youngest patient in the present study was 4.5 years old and the oldest one was 82 years old, the mean age was 46 years. We observed that the peak incidence of benign lesions was in the 3rd decade while the peak incidence of malignant lesions was in the 5th decade. These findings correlated with that of Ahmad et al and Sarda et al.[12,13]

In the present study, all cases of metastatic carcinoma to the lymph nodes showed exact corroboration with the histopathology. The diagnostic accuracy of these cases was 100%. Our finding came in close comparison to most investigators who reported more than 90% accuracy rate 12, 14. Most of the studied metastatic nodes were metastatic squamous cell carcinoma followed by metastatic adenocarcinoma. Similar findings had been documented by other researchers.[12,15]

In the present study, the diagnostic accuracy of the tuberculous lymphadenitis was 89%. This result was lower than that reported by Keith et al. 16 and Ahmad et al who concluded 100% and 97.4% diagnostic accuracy, respectively.[12] Also, Al-Mulhim et al reported 93% diagnostic accuracy for such cases.[17]

The most common cytological diagnosis was Tuberculous Lymphadenitis in present study. Similar findings were observed by A B Pandav et al, A K Kochhar et al and Ruchi et al.[18-20] Tuberculous lymphadenitis is one of the most common type of lymphadenopathy in developing countries. The high rate is due to low socio-economic status, illiteracy, incomplete treatment, resistance and increased incidence

of HIV infection. However, Lakhey et al found reactive hyperplasia as the most common cytological diagnosis.[21] This difference may be due to different study population and more HIV positive cases coming to our hospital as we have ICTC (Integrated counseling and testing centre). In present study, second most common cytological diagnosis was Metastatic tumors. Similar findings were also observed by A B Pandav et al.[22] However, A K Kochhar et al 19 and Ruchi et al found reactive hyperplasia as the second most common cytological diagnosis.[23] It was may be due to different study population, genetic factors, environmental factors and habitual factors like smoking and tobacco consumption. Also, because our hospital is tertiary care centre and we get plenty of referred cases. So, we get more cases of metastatic malignancy in lymph node.

In the present study, AFB positivity was maximum with necrosis without granulomas pattern (50%) followed by epithelioid cell granulomas with necrosis pattern (43.16%). So, our findings were comparable to findings of Lakhey et al and Goswami et al Maximum AFB positivity 60% was found in cases where cheesy material was aspirated followed by purulent aspirate having AFB positivity 25% and least AFB positivity 15% was found with blood mixed aspirate.[21,24] Thus, our findings correlate with other study of Goswami et al.[24] However, Paliwal N et al and Dev Prasoon found purulent aspirate showed maximum AFB positivity.[25,26]

Prasoon D observed that the relation between granulomas and AFB was inverse.[26] Predominantly granulomatous reaction with little or no coexistent necrosis would be associated with the presence of few or no AFB, while a predominantly necrotic reaction with few or no coexistent granulomas would be expected to show more AFB. The AFB detection rate in cheesy aspirate was less than that in purulent aspirate due to more frequent presence of granulomas in cheesy aspirate. Thus, it appears that the chance of finding AFB is greater in pus or cheesy aspirate than blood mixed aspirate. Out of 157 cases of metastatic tumors, maximum cases were metastatic squamous cell carcinoma. Present findings were correlated with other studies.[18-19]

CONCLUSION

FNAC provides a reliable, safe, rapid and economical method of investigating lymph node enlargement, the accuracy of which approaches that of other diagnostic procedures. Lymph node cytology is useful for segregating lymphadenopathy cases that need further evaluation and is a valuable tool for diagnosis of neoplastic and non-neoplastic lesions. It may replace unnecessary surgical procedures in many cases. FNAC diagnosis will help the clinician to confirm or exclude the clinical differential diagnosis made at first visit of the patient to the OPD. Speedy cytological diagnosis helps the clinician to further plan the treatment. We also conclude that most of lymphadenopathies are due to non-neoplastic conditions.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Upadhyay GP, Thakker RM. Evaluation of fine needle aspiration cytology as the initial diagnostic test in cases of cervical lymphadenopathy. Int J Res Med Sci 2016;4: 5103-7.