

Diagnostic Accuracy of Fine Needle Aspiration Cytology (FNAC) in the Diagnosis of Lymph Node Malignancies

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Volume 2 Issue 7-2019

Received Date: 02 Dec 2019

Accepted Date: 20 Dec 2019

Published Date: 26 Dec 2019

2. Keywords: Fine needle aspiration; Malignancies; Lymph node; Low economic setting

1. Abstract

1.1. Introduction: FNAC can play an important role in diagnosing secondary or primary malignancies of enlarged lymph nodes as they are easily accessible. FNAC serves as a cost effective procedure, simple to perform with almost no complications. The aim of this study was to assess the cytomorphology of various malignancies affecting the lymph nodes and highlight the role of FNAC's of lymph nodes in the diagnosis of suspected and unsuspected lymph node malignancies.

1.2. Materials and Methods: This analytical prospective study carried out for a period of one year. FNAC of lymph nodes was performed using standard procedure. Smears were stained and cases reported as malignant or suspicious of malignancy were further analysed.

1.3. Results: During the study period there were 335 lymph node aspirates out of a total of 1750 FNAC s done (19.4%). Among these there were 124 cases (37%) meeting the criteria. There was male predominance, cerviacal group was the commonest lymph node group involved. Squamous cell carcinoma was the commonest malignancy (90%), upper aerodigestive tract being the commonest primary site. Histopathological correlation was available in 87 cases giving 100% accuracy for diagnosing malignancy.

1.4. Conclusion: FNAC of lymph nodes is a very useful and simple tool in the diagnosis of lymph node malignancies. It may be the only simple and sensitive tool in the diagnosis of metastatic lesions in the lymph nodes and can also help to detect occult primary malignancies.

3. Introduction

In the early 20th century, Martin and Ellis are considered to be the founders of modern needle aspiration techniques currently known as Fine Needle Aspiration (FNA). Today, FNA is considered an important cytologic technique with sufficient diagnostic accuracy for all the palpable and deep lesions. The use of Fine Needle Aspiration Cytology (FNAC) in the investigation of lymphadenopathy has become an acceptable and widely practised minimally invasive technique, which is safe, simple, rapid and relatively pain-free. Lymph node aspiration has a very important role in the diagnosis of malignant lymphadenopathies especially in a developing country like ours where the cost of hospital stay and surgical procedures cannot be borne by the patient. The results of FNAC are comparable with those of tissue biopsies

and in some situations the aspirate has equal characteristics of a micro-biopsy. In a few instances, FNAC may even be superior to the other techniques in practice as multiple passes sample wider areas and there is better preservation of cells due to lack of artifacts emanating from tissue fixation, processing and cutting.

Enlarged lymph nodes may be of various aetiologies ranging from reactive, inflammatory to malignant conditions. Malignancies of lymph nodes in our country are predominantly metastatic in nature followed by primary lymphomas. Although histopathology is the gold standard for diagnosis of lymphoma, FNAC may be initial tool forevaluation as these are the easily accessible sites. This is true in particular in developing countries like India.

4. Materials & Methods

This was an analytical prospective study carried out in the Department of Pathology (Cytology section) of a tertiary care centre for a period of one year from May 2018 to April 2019. FNAC from all cases with enlarged lymph nodes were included in the study from all ages, both sexes and any site of the body. Non neoplastic lymph nodes and cases where aspiration materials are unsatisfactory were excluded.

After obtaining an Informed consent from the patient, the FNAC procedure was performed using a 23 gauge needle attached to 10 ml syringe. Aspirated material was spread on multiple slides. Some slides were fixed immediately in methyl alcohol. After fixation the slides were stained with Papanicolau stain and the dry smears stained by May Grunwald Giemsa (MGG) stain. All the FNAC slides were then examined under light microscope for the following cytomorphological parameters i.e. cellularity, cell type, cellular pattern, cellular atypia and background. Cases diagnosed as malignancies were further studied and a correlation with histopathology wherever available was analyzed. Diagnostic accuracy, sensitivity &, specificity were calculated.

5. Results

During the study period there were 335 lymph node aspirates out of a total of 1750 FNAC s done (19.4%). Among these, there were 124 cases (37%) meeting the criteria.

Among the 124 studied cases, 81 cases were males and 43 cases were females with male: female ratio of 1.8:1. Commonest age group was found to be in 5th and 6th decade followed by 7th decade (Table 1).

Age Group	Frequency	Percentage
0-10	0	
11-20	0	
21-30	3	
31-40	10	
41-50	21	
51-60	48	
61-70	28	
71-80	11	
81-90	3	
Total	124	100

Table 1: Age Distribution of metastatic lesion

The commonest site was cervical lymph nodes constituting 84

cases (68%) followed by involvement of the supraclavicular in 21 cases and Axilla in 13 cases (Table 2). Ninety percent of these were reported as Metastatic carcinomas. Lymphomas constituted to 10% (Table 3).

Site	Frequency	Percentage
Cervical	84	68
Supraclavicular	21	17
Axillary	13	10
Inguinal	6	5
Total	124	100

Table 2: Distribution of number of cases according to site of lymphadenopathy

Cytodiagnosis	Number of cases	Percentage
Metastatic SCC	55	44.3
Metastatic Adenocarcinoma	26	21.0
Metastatic poorly differentiated carcinoma	16	13.0
Non Hodgkins Lymphoma	8	6.3
Hodgins Lymphoma	5	4.0
Metastatic Papillary Carcinoma	6	4.8
Metastatic Medullary Carcinoma	2	1.6
Metastaic melanoma	2	1.6
Other carcinomas	3	2.4
Total	124	100

Table 3: Cytologic diagnosis of 124 cases

Squamous cell carcinoma was the commonest diagnosis offered (44.3%). Cytologically smears from squamous cell carcinoma showed sheets and clusters of discohesive cells with hyperchromatic nucleus and dense cytoplasm. Keratinised cells had orangeophilic cytoplasm (Fig 1). Commonest lymphnode involved was cervical group with a common primary of upper aerodigestive tract. Adenocarcinoma smears had cells in glandular or papillary pattern with vesicular nucleus, prominent nucleolus and thin vacuolated cytoplasm (Fig 2). Axillary group was the common lymph node group involved with a primary from breast carcinoma. Papillary carcinoma of the thyroid was found to involve cervical group of lymph nodes.

Smears from Non Hodgkins Lymphoma showed sheets of monotonous atypical lymphoid cells (Fig 3). These patients mostly had generalised lymphadenopathy. Smears from Hodgkins

lymphoma had polymorphous population of lymphoid cells with an admixture of plasma cells and eosinophils along with occasional Reed Sternberg cells (Fig4).

For 87 cases, histopathology was available either from the lymph node or from primary sites either before the lymph node was subjected to FNAC or after the cytological diagnoses. Cytological diagnoses of Metastatic carcinoma or Lymphoma showed 100% correlation with histopathology. Primary site was known in 78 cases. 44 cases from upper aerodigestive tract, 13 from breast, 6 from GIT, 10 from thyroid, 5 from lung.



Fig 1: Atypical squamous cells in squamous cell carcinoma metastasis

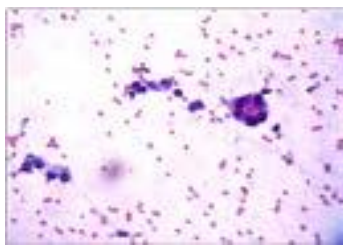


Fig 2: Neoplastic cells in glandular pattern in adenocarcinoma metastasis



Fig 3: RS cells in a background of polymorphous lymphoid cells in Hodgkins Lymphoma

6. Discussion

Lymphadenopathy refers to the nodes that are abnormal in size, consistency or number. It is a clinical manifestation of regional or systemic disease. The clinical management of patients with enlarged lymph nodes varies with factors such as age, the presence of known infection and previous medical history. It can arise either from benign or malignant causes depending upon the geographical condition and socioeconomic set up.

Lymph node aspirates constituted to 19.4 % of total FNAC s

performed in the department. Of these, majority were nonneoplastic (63%). Malignancies constituted to 37%. Most of the studies from developing countries like India have reported benign conditions causing lymphadenopathy. Woike et al reported 81.8% benign conditions and 18.2% malignant conditions of lymphadenopathy [1]. However studies from other countries report higher incidence of malignant causes of lymphadenopathy [2].

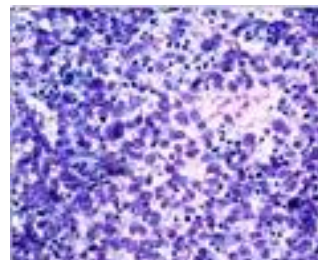


Fig 4: Monotonous neoplastic lymphoid cells in NHL

Wilkinson et al and others in their study found that 90% of malignancies affecting the lymph nodes were due to metastasis³. Similar incidence was observed in our study too.

In our study, cervical group of lymph nodes were the common site and squamous cell carcinoma was the common type of malignancy. Primary was most often from oral cavity. All these observations are similar to the study done by Wilkinson et al [3]. Axillary group of lymph nodes were enlarged in patients with breast carcinoma or Non Hodgkins Lymphoma. Therefore diligent search for primary in the breast has to be done while diagnosing metastatic carcinoma of axillary nodes [4].

Diagnostic accuracy of FNAC for metastatic malignancy is very high and comparable to histopathology. The diagnostic accuracy of FNAC in metastatic disease varies from 87% to 97.9% and for lymphomas is 82% [1,3,5]. Alam et al have reported 97.9% diagnostic accuracy, 97.9% sensitivity and 100% specificity for metastatic lymphadenopathy [6]. Mustafa et al also reported 96.29% diagnostic accuracy for metastatic malignancy [6]. Our study showed 100% diagnostic accuracy in picking up malignancy. The improved diagnostic ability of FNAC in the diagnosis of malignant lesions of the lymph nodes is probably due to a combination of factors such as the increased use of the technique, better and easier availability of reference material of similar studies, and increased experience of the trained observers over the years [5].

The interpretation of an FNAC has an impact on the overall management of a patient and allows for appropriate early planning of treatment; however sampling and interpretation errors may

occur. Although open biopsy followed by histological examination of excised lymph node still remains the standard practice for diagnosing lymph node neoplasia, yet FNAC does constitute one of the most common indications for metastatic lymphadenopathy. FNAC can easily confirm the metastatic nature of disease and even provide clues to the site of the primary tumor [7, 8]. Keen attention to subtle morphologic changes may help in reaching the right diagnosis in most cases. Repeat FNAC also can easily be done where the initial diagnosis is not clear or when the cellularity is low, and it should always be evaluated with other clinical findings and relevant investigations. FNAC can further differentiate between non neoplastic and neoplastic lesions; moreover it can even separate the benign lesions from the malignant ones. Therefore FNAC plays a significant role in the management of patients and can reduce many unnecessary surgeries [8, 9].

The diagnosis given on the cytological material is often the only diagnosis accepted and sometimes there is no further correlation with histopathology, especially in cases of advanced malignancies. The clinicians may be in for a surprise where FNAC can provide clues for occult primaries in cases where malignancies were not suspected. FNAC can also be used to assess staging of primary residual and recurrent lymphoid malignancies. Therefore FNAC plays a significant role in the management of patients and can reduce many unnecessary surgeries.

7. Conclusion

FNAC is a simple and sensitive tool in the diagnosis of primary and metastatic malignancies of the lymph nodes and can also help to detect occult primary malignancies.

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