Original Article

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Role of Fine Needle Aspiration Cytology in Primary and Metastatic Lymph node Neoplasms among Patients attended at Tertiary Teaching Health Care Hospital, Mumbai

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Abstract

Context: Lymph nodes are common sites for primaries as well for different metastatic cancers. Thus clinical recognition and urgent diagnosis of palpable lymphadenopathy is of paramount importance specially to differentiate between inflammatory lesions or metastatic or primary neoplastic tumor. *Objectives:* Role of FNAC in Primary and Secondary Lymphnode Neoplasm among Patients attended at Tertiary Teaching Health Care Centre, Mumbai. *Methods:* A retro-prospective study was carried out on the patients admitted in medical and surgical ward and from OPD with clinically diagnosed lymphadenopathy, in the department of Pathology of LTMMC & GH, Sion, Mumbai, during the period of January 2007 to August 2011. *Results:* In lymphoma group, Non- Hodgkin's Lymphoma was commonest (66.67%) followed by Hodgkin's lymphoma (33.33%). In malignant lymphoma group the diagnostic accuracy was 85.71%. In metastatic group, the commonest metastatic lesion observed was squamous cell carcinoma (65.39%) followed by undifferentiated epithelial malignancy (21.03%), and infiltrating ductal carcinoma of breast in (6.47%). *Conclusion:* Fine Needle Aspiration Cytology is logical extension of the more formalized biopsy procedure, lending itself to saving of time and cost and is convenient for both patients and physician in the management and follow up of malignant lymphadenopathies. FNAC helps in defining the tumor type, while the clinical history and investigations help in identifying the tumor site.

Keywords: Fine Needle Aspiration Cytology; Primary Lymphnode Neoplasm; Metastatic; Tertiary Health Care Centre.

Introduction

Lymph nodes are common sites for primaries as well for different metastatic cancers. Thus clinical recognition and urgent diagnosis of palpable lymphadenopathy is of paramount importance specially to differentiate between inflammatory lesions or metastatic or primary neoplastic tumor [1]. Although open biopsy with histological examination of excised tissue still remains the gold standard for diagnosis of lymph node tumors, yet FNAC (Fine Needle Aspiration Cytology) has now become an integral part of the initial diagnosis and management of patients presenting with lymphadenopathy [1]. This simple technique has gained wide acceptance since it offers a high degree of accuracy, lending the cost of hospitalization [1].

The results of FNAC compare favourably with those of tissue biopsies and in some situations the aspirate has qualities of micro biopsy. Suspicious or doubtful situations should be resolved by surgical biopsy and further by immunohistochemistry and molecular technique whenever required [1].

FNAC of lymph nodes is simple, less traumatic, reliable, repetitive, less expensive and OPD procedure. Anaesthesia is not required, hence can be applied for ambulatory, debilitated or critically ill patients where biopsy is contraindicated. As technically simple procedure, it can be easily performed at remote places in India, where trained staff is not available. It produces speedy results, hence widely accepted by patients and clinicians [2].

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FNAC of lymph nodes helps in staging neoplasms, can give clue to occult primary, can evaluate recurrent neoplasms at an early stage and helps to decide whether surgical excision for histopathological examination is indicated. It also helps clinicians for formulating line of treatment and monitoring response to therapy [3]. The exact diagnosis and subtyping of malignant lymphoma by FNAC has limitations, cytodiagnosis of Non-Hodgkins Lymphoma is confirmed by open biopsy and histological examination. While a confident diagnosis of Hodgkins disease can only be made in presence of typical RS cells in the appropriate background of reactive cells and clinical set up [4]. The aim of present study was to highlight the role of FNAC in diagnosis of primary and metastatic lesions of lymph nodes in a resource challenged environment like ours.

Materials and Methods

Selection of Patient

A retrospective and prospective study was carried out on the patients admitted in various medical and surgical ward and from OPD with clinically diagnosed lymphadenopathy, in Dept. of Pathology, LTMMC & GH, Sion, Mumbai, during the period of January 2007 to August 2011.

Methods

Before performing FNAC, lymph node examination was done and relevant clinical history was noted.

Materials required for FNAC-

1. 10 ml disposable syringe.
2. 21-23 gauge disposable needle of 38 mm long.
3. Swabs with skin disinfectants or spirit.
4. Several standard, clean, grease free glass slides (75×25×1.35 mm), which are properly labelled with slide marker.
5. Cytofixative containing a mixture of equal amount of ether & 70% ethyl alcohol or a hair spray.
6. Completed laboratory request form with full clinical details.
7. Other material- cotton swabs, gloves, sterile dressings.

Procedure / Technique

The procedure is explained to patient after selecting the site. Convenient position was given to patient depending upon the site of aspiration by which the swelling was easily palpable. The overlying skin is cleaned and the swelling was located and firmly fixed between thumb and forefinger of the free hand. The syringe was held by the outside of the pistol grip and needle tip was inserted in the swelling. By firmly closing the fist, the syringe plunger is partially retracted creating a negative pressure.

Without losing pressure or pulling the needle, the whole syringe is rotated by a movement of wrist and gently moved in and out. The cutting edge of the needle tip frees cells inside the swelling which are sucked into the fine base of needle. Using continuous negative pressure, by pulling firmly on plunger of syringe, guide the cutting tip of the needle forwards and backwards, obliquely through the firmly held swelling.

While aspirating, hub of the needle is observed for any aspirate. This is a critical step, as it is necessary to keep aspirated material in the needle and not to aspirate excessive blood, which will dilute the aspirate. Before withdrawing the needle, the negative pressure is slowly released. After the needle is withdrawn from patient, it is removed from the syringe. The syringe is filled with air and needle replaced firmly. The syringe is held vertically or slightly obliquely with the needle tip just above the surface of glass slide, then the contents of needle are blown gently on the slide. Smears are made by inverting a second glass slide over the material and as it spread pulling the slides horizontally or vertically.

Fixation and Staining

The smears are allowed to either fixed immediately by hair spray solution or are air dried. The air dried smears are stained with May-Grunwald Giemsa stain. The hair spray fixed smears are stained with Papanicolaou (Pap) stain. Microscopic examinations of the stained smear were carried out.

Design of Study

A detailed history including age, sex, duration of complaints like enlarged nodes, fever, cough and swelling at other sites etc. are noted.

All cases are broadly classified cytologically. Comparision of cytopathological and histopathological reports are done wherever possible.

Inclusion Criteria

All cases of primary and metastatic lymph node malignancies.

Exclusion Criteria

- Reactive Lymphoid Hyperplasia
- Tuberculous lymphadenitis
- Acute Suppurative Lymphadenitis
- Inadequate material

Results

Table 1 shows that age and gender wise distribution of the neo[plastic lesions of lymph nodes. Most common age group was involved (41-50 years) followed by age group of (51-60 years). Males were affected more than females.

Table 2 shows that the cervical group of lymph nodes were most commonly involved and aspirated in 161(47.49%), cases followed by submandibular 82 (24.19%) cases.

Table 1: Age and gender wise distribution of neoplastic lesions of lymph nodes

Age	0-10		11-20		21-30		31-40		41-50		51-60		61-70		71-80		81-90		Total	
Gender	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Hodgkin's disease	1	-	1	-	-	2	1	1	-	1	1	-	-	-	1	-	-	-	5	4
Non-Hodgkin's lymphoma	-	-	1	1	2	1	2	-	-	1	4	2	4	-	0	-	-	-	13	5
Hematolymphoid malignancy	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	2	1
Metastases of Squamous cell Carcinoma	-	-	1	-	7	-	21	9	40	11	47	6	36	10	10	2	1	1	163	39
Metastases of Adenocarcinoma	-	-	2	1	-	-	-	-	-	2	1	-	1	1	-	-	-	-	4	4
Metastases of Infiltrating ductal Ca	-	-	-	-	-	2	-	7	-	6	-	2	-	3	-	-	-	-	-	20
Metastases of Thyroid Ca	-	-	-	-	-	1	2	-	1	-	-	1	-	1	1	-	-	-	4	3
Metastases of poorly differentiated ca	-	-	-	-	5	1	2	3	14	10	12	4	6	5	2	1	-	-	41	24
Metastases of Small Round cell tumor	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Metastases of Nasopharyngeal Ca	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Metastases of Renal cell Ca	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2
Metastatic melanoma	-	-	-	-	1	-	-	-	-	-	-	-	1	-	1	-	-	-	3	-
Total	2	1	5	2	16	7	28	22	55	31	65	15	49	20	15	3	2	1	237	102

Table 2: Distribution of Neoplastic Lymph Node Lesions According to Site of FNAC

	Cervical	Sub-mandibular	Supra-clavicular	Axillary	Inguinal	Post-auricular	Infra-auricular	Total
Hodgkin's lymphoma	4	1	2	2	-	-	-	9
NHL	9	4	1	3	1	-	-	18
Hematolymphoid malignancy	2	-	-	-	1	-	-	3
Squamous cell Carcinoma	106	66	4	5	17	2	2	202

Adeno Carcinoma	-	1	4	1	2	-	-	8
Undiff. Epithelial malig	30	10	16	5	4	-	-	65
IDC Breast	1	-	2	17	-	-	-	20
Thyroid Ca	5	-	2	-	-	-	-	7
Melanoma	1	-	-	-	2	-	-	3
Renal Cell Ca	1	-	1	-	-	-	-	2
Nasopharyngeal Ca	1	-	-	-	-	-	-	1
Small round cell tumor	1	-	-	-	-	-	-	1
Total	161	82	32	33	27	2	2	339
Percentage	47.49	24.19	9.44	9.74	7.96	0.59	0.59	100

Discussion

In this study, majority of the cases were in the age group 41-50 years (25.37%) followed by 51-60 years (23.60%). Similarly, Ellison E et al [5], Ahmed N et al [6] and Alam K et al [7] had maximum incidence in third decade. Males (69.91%) were more commonly affected than females (30.09%) with male to female ratio of 2.32: 1. This was comparable to other studies done by B Steel et al [8], Haque MA et al [9], Alam K et al [7] who found male to female ratio as 3.5:1, 2.68: 1 and 2.4: 1 respectively.

The most common group of lymph nodes were cervical (47.49%) followed by submandibular (24.19%), axillary (9.74%) and supraclavicular (9.44%). Similar findings were observed by Bhargava P et al [10] and Alam K et al [7], with cervical lymph node involvement in 65.68% and 74.2% cases respectively. In our study inguinal lymph node involvement was (7.96%), similarly study done by K Alam et al [7] also found inguinal lymph node involvement in 4.97% cases. Malignant lymphoma mainly involved cervical nodes (48.14%). Similarly by Hehn ST et al [11] found 38% of cervical lymph nodes involved by malignant lymphoma. In our study metastatic malignancies involved most commonly cervical lymph nodes in 47.24% cases followed by submandibular group of lymph nodes in 24.91% cases. Similarly Alam K et al [7] found cervical lymph node as most commonly involved in 74.20% cases.

Out of 339 aspirates, 91.15% were diagnosed as metastatic lymphadenopathy and 7.96% were lymphoma and 0.88% were hematolymphoid malignancy. Similarly study done by Alam K et al [7], in which 80.4% were metastatic tumors of lymph node and 15.3% cases were of lymphoma. Metastatic involvement by squamous cell carcinoma was (59.98%) followed by undifferentiated epithelial malignancy in (19.17%). Comparable findings were noted by Alam K et al [7] found 67.87% cases of metastatic squamous cell carcinoma, followed by 11.31% cases of metastatic IDC breast. Bagwan IN et al [13] found 36.81% cases of metastatic squamous cell carcinoma, followed by 12.18% cases of undifferentiated epithelial malignancy. In our study 7.97% cases were of lymphoma. Gupta AK et al [14] and Bhaskaran CS et al [15], who found incidence as 2.78% and 2.98% respectively. There were 9 cases of Hodgkin's lymphoma, in which the majority of patients were young, 6 cases were below 40 years of age. Males outnumbered females with male to female ratio of 1.25:1. Cervical lymph node involvement was the commonest. Das DK et al [16] who studied 116 cases of Hodgkin's Lymphoma have also reported similar findings with male preponderance (M:F=6.7:1) and cervical lymphadenopathy as the commonest presentation. In our study among lymphoma group, 18 cases of NHL were diagnosed on cytology. Maximum cases were between 51-60 years of age with the age range being 11- 68 years and males were more frequently affected (M: F=2.6: 1). Our results match with those of Daskalopoulou D et al [17] who studied 164 lymph node aspirates from 132 patients of Non- Hodgkin's lymphoma. An age range of 5- 86 years along with a male preponderance (M:F=2:1). Leukemic lymphadenopathies are usually rare in occurrence, so as in our study with 0.88% incidence. In our study, out of 3 cases, one 61 year old male patient, and other 81 year old male patient, known case of CML in blast crisis had cervical and inguinal lymphadenopathy respectively. Kumar PV et al [18] have elucidated the difficulties in distinguishing leukemic infiltration of lymph nodes from lymphomatous involvement only on FNA smears.

In this study, metastatic malignancy (91.15%) with male predominance having M: F ratio was 2.36:1 and maximum cases were in 5th decade. Gupta AK et al [14] and Cervin JR et al [19] have observed similar findings. Alam K et al [7] also found 80.4% cases of metastatic malignant lymphadenopathies in their study.

Metastatic squamous cell carcinoma (65.37%) formed bulk of the lesions, followed by metastatic undifferentiated epithelial malignancies (21.03%).

Similarly Konar K et al [20] and Alam K et al [7] found 83.83% and 67.9% cases of metastatic squamous cell carcinoma respectively. The maximum aspirations were done from cervical lymph nodes (47.24%) followed by sub-mandibular (24.92%). Similarly Alam K et al [7] and Dhingra V et al [21] also found cervical lymph node to be most commonly involved in 74.2% and 79% cases respectively.

There were 65 cases (21.03%) of metastatic undifferentiated epithelial malignancy. Bagwan IN et al [13] and Alam K et al [7] found 12.18% and 4.07% cases of metastatic undifferentiated epithelial malignancy. Out of 309 cases of metastatic lesions, 8 cases (2.59%) were of metastatic adenocarcinoma. Alam K et al [7] and Bagwan IN et al [13] found 9.04% and 0.73% cases of metastatic adenocarcinoma respectively. Supraclavicular (4/8) and inguinal (2/8) lymph nodes were commonly involved owing to predominance of primaries from GIT. Similar findings reported by Sinha SK et al [22], who observed that malignancy of GIT and ovary most frequently metastasize to supraclavicular and inguinal lymph node.

Out of 309 cases of metastatic lesions, 20 cases (6.47%) were of metastatic infiltrating duct carcinoma of breast. Study by Alam K et al [7] comprised 11.31% cases of metastatic infiltrating duct carcinoma of breast. Most common group of lymph nodes involved were axillary group of lymph nodes seen in 17/ 20 cases, followed by supraclavicular lymph node in 2 cases. Pilloti S et al [23] and Sinha SK et al [22] have observed that axillary lymph nodes were most frequently involved in case of metastatic Ca of breast.

Out of 309 cases, 7 cases (2.06%) of metastatic thyroid carcinoma were observed. Cervical lymph nodes were involved in 5/7 cases and supraclavicular lymph nodes in 2/7 cases. Similarly Alam K et al [7] found 4 cases (1.80%) of metastatic thyroid carcinoma.

In our study, 3 cases (0.97%) were of metastatic malignant melanoma. Similarly Alam K et al [7] found 2 cases (0.90%) of metastatic malignant melanoma in their study. Inguinal lymph nodes were involved in 2 cases and cervical lymph node was involved in 1 case. Pilloti S et al [23] detected 16 cases of melanoma metastatic to axillary nodes.

There were 2 cases (0.65%) of metastatic renal cell carcinoma. In both cases, suparclavicular lymph node involvement was seen. Fernandes H et al [24] found single case of renal cell carcinoma, which was metastasizing to axillary lymph nodes. There was one case of round cell tumor (0.32%) who presented with bilateral cervical lymphadenopathy. Alam K et al [7] found 3 cases (1.35%) of round cell tumor. One case (0.32%) was seen, which was a known case of nasopharyngeal carcinoma. FNAC helped in confirmation of metastasis to anterior cervical lymph node. The findings were comparable to study done by Alam K et al [7], who found one case (0.45%) of metastatic nasopharyngeal carcinoma in their study.

Conclusion

Fine Needle Aspiration Cytology is logical extension of the more formalized biopsy procedure, lending itself to saving of time and cost and is convenient for both patients and physician in the management and follow up of malignant lymphadenopathies. FNAC helps in defining the tumor type, while the clinical history and investigations help in identifying the tumor site.

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