

Utility of FNAC in Metastatic Lymphadenopathy.

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I. Introduction

A young adult contains up to 450 lymph nodes of which 60-70 are found in head and neck, 100 in thorax, 250 in abdomen and pelvis. Lymph nodes are particularly numerous in the neck, mediastinum, posterior abdominal wall, abdominal mesenteries, pelvis, proximal region of limb.¹

Enlarged lymph nodes are accessible for FNAC (Fine needle aspiration cytology) and are of importance to diagnose secondary or primary malignancies.² Lymph nodes harbouring malignant disease tend to be firm, non-tender, matted (i.e., stuck to each other), fixed (i.e., not freely mobile but rather stuck down to underlying tissue) and increase in size overtime.³ Palpable nodes with metastasis are significantly larger than non-palpable nodes with metastasis⁴.

FNAC (Fine needle aspiration cytology) is of considerable value in disease staging and documentation of recurrence. More than 90% of lymph node metastasis are diagnosed by initial aspiration. FNAC not only confirms the presence of metastatic disease, but also gives clue regarding the nature and origin of primary malignancy.^{5,6} Fine-needle aspiration cytology (FNAC) offers immediate preliminary diagnosis in the investigation of lymphadenopathy with minimal trauma to the patient at a considerably lower cost than surgical biopsy.^{7,8}

II. Materials And Methods

This was a retrospective study for a period of 3 years starting from June 2008 to 31 May 2011 and a prospective study of 2 years i.e. from June 2011 to 31 May 2013. The study material was taken from 710 lymph node aspirates. A detailed history, clinical examination and relevant investigations were documented. FNAC of the enlarged lymph node was performed taking aseptic precautions. The smears were stained with Maygrawald Giemsa (MGG) and Papanicolaou stain. Diagnosis was based on morphology. The cytological diagnosis was correlated with lymph node or primary tumor biopsy. The excised lymph node was processed and sections were made and Hematoxylin and Eosin staining was performed in all the excised lymph nodes. Immunohistochemistry was performed only in 15 cases, 5 cases of melanoma, 4 cases of sarcomas, 4 cases of neuroendocrine carcinoma, 2 cases of small cell carcinoma to confirm diagnosis. All the data was tabulated and statistical values were computed by using SPSS (statistical package for the social science) version 16 software.

Aims and objectives

1. to find out the spectrum of different pathological subtypes of metastases.
2. to find the utility of FNAC in metastatic lymphadenopathy by computing different statistical values.

III. Results

This study included 710 cases of metastatic lymphadenopathy. Males were 436 (61.4%) and females were 274 cases (38.59%). Male: Female ratio was 1.59:1. Thus males constituted maximum number cases of metastatic lymphadenopathy. Mean age was 56 years. Maximum no. of cases were seen in the 50 – 60 years age group followed by 60- 70 years age group. Maximum no. of aspirations were done from left supraclavicular lymph node, (39.4%) followed by right supraclavicular nodes 121 cases, right cervical nodes (12.67%), left cervical nodes (10.7%), left axillary nodes (5.77%), right axillary nodes (4.1%), right inguinal lymph nodes 3 (5.35%), left inguinal nodes (3.8%) cases, periumbilical lymphadenopathy (0.7%), retroperitoneal lymph nodes (0.28%), paraaortic node (0.1%)

Histological subtype	No.
Squamous cell carcinoma	232
Adenocarcinoma	206
Poorly differentiated ca	73
Ductal carcinoma breast	70
Small cell carcinoma	51
papillary carcinoma thyroid	20
Melanoma	15
Germ cell tumor	15
Round cell tumor	9
Neuroendocrine carcinoma	8
Pleomorphic sarcoma	7
Medullary carcinoma thyroid	2
Adenoidcystic carcinoma	2

Table 1: Distribution of cases as per histological type

Among the metastatic tumours, SCC (squamous cell carcinoma) constituted about 232/710 (32.6%) and squamous cell carcinoma was the most common pathological subtype and predominated over adenocarcinoma. Mean age for metastatic deposits of SCC was 60 years.

Primaries of SCC were from esophagus, lung, skin, alveolar buccal region nasopharynx, cervix, unknown primary. Metastatic deposits of adenocarcinoma was 2nd in distribution after metastatic deposits of SCC. Adenocarcinoma constituted 29.01% cases. Mean age for metastatic deposits of adenocarcinoma was 59 years. Primaries of Adenocarcinomas were from stomach, colon, lung, ovary, gallbladder, periampullary region, esophagus, endometrial, liver, pancreas and unknown primary was seen in few cases.

Metastatic deposits of Ductal carcinoma Breast constituted about 70/710 (9.85%) cases. Metastatic deposits of small cell carcinoma constituted 51 cases (7.2%).

Melanoma constituted about 15 cases (2.1%). Metastatic deposits of germ cell tumours constituted about 15 cases (2%). Metastatic deposits of seminoma constituted about 11/710 (1.5%) cases. Metastatic deposits of dysgerminoma constituted about 1/710 (0.1%) cases, metastatic deposits of mixed germ cell tumour constituted about 3/710 (0.4%) cases.

Metastatic deposits of Round cell tumour included total of 9 cases (1.2%), 6/710 (0.8%) cases were that of metastatic deposits of neuroblastoma, 3 (0.4%) cases were that of metastatic deposits of retinoblastoma. 7/710 (1%) cases of metastatic deposits of sarcoma. The most common type of sarcoma to involve lymph node were as: Pleomorphic rhabdomyosarcoma 3/7 (42.8% cases), Ewing's sarcoma 1/7, (14.3% case) Alveolar soft part sarcoma 1 (14.3%) case, Synovial sarcoma 1 (14.3%) case, Kaposi's sarcoma 1 (14.3%) case. Metastatic deposits of papillary carcinoma constituted 20 cases. Mean age was 43 years. Metastatic deposits of medullary carcinoma of thyroid constituted about 2/710 (0.28%) cases. Mean age was 58 years. 8/70 cases constituted metastatic deposits of neuroendocrine carcinoma in which 6 were males and females constituted 2 cases. Primaries include carcinoma stomach 3 cases, carcinoma lung 3 cases, parotid gland 1 case, carcinoma esophagus 1 case.

Metastasis of adenoid cystic carcinoma constituted about 2/710 (0.3%) cases with primaries from Salivary Gland (parotid gland). Males constituted both cases. Mean age was 55 years.

Metastatic deposits of poorly differentiated carcinoma constituted 73/710 (10.28%). Mean age was 58 years.

210 cases were available for histopathological correlation. The presumptive diagnosis by FNAC is completely correlated to the final diagnosis by histopathology in all 59 cases of reactive lymphadenitis, all 29 cases of granulomatous inflammation. Out of 51 cases which were diagnosed as NHL (Non Hodgkins Lymphoma) on FNAC, 49 cases were confirmed on Histopathology, 2 cases were diagnosed as metastatic deposits of small cell carcinoma. 1 case which on FNAC revealed blood only, was reported as reactive lymphadenitis on histopathology. 16 cases which were diagnosed as metastatic deposits of SCC were confirmed on histopathology. Out of 18 cases which were diagnosed as metastatic deposits of adenocarcinoma on FNAC, 17 Cases were confirmed on histopathology, 1 case was diagnosed as metastatic deposits of SCC on histopathology. Two cases of NHL which were diagnosed on FNAC, proved to be metastatic deposits of small cell carcinoma on histopathology.

Table2 : Cyto-histological correlation of lymph node lesions

FNAC	HISTOPATHOLOGY				Total
	Benign	HD	NHL	Metastatis	
1. Benign(89)	89				89
2.Primary Malignant					
a. Hodgkin Disease (HD) 22		22			22
b. NHL (51)			49	2	51
3.Metastatic lymphadenopathy(48)				48	48
Total=210	89	22	49	50	210

3 cases which were diagnosed as metastatic deposits of small cell carcinoma on FNAC were confirmed on histopathology. 3 cases which were diagnosed as metastatic deposits of Ductal carcinoma Breast on FNAC were confirmed on histopathology. 2 cases which were diagnosed as metastatic deposits of Neuroendocrine carcinoma were confirmed on histopathology. 1 cases which was diagnosed as metastatic deposits of medullary carcinoma of thyroid was confirmed on histopathology. 5 cases which were diagnosed as metastatic deposits of Papillary carcinoma of thyroid were confirmed on histopathology.

Statistical values were computed by using SPSS version 16 software. No. of true positives, true negatives, false positives, and false negatives are 48, 160, 0, 2 respectively. Sensitivity, Specificity, Positive Predictive value, Negative Predictive Value, Accuracy of metastatic lymphadenopathy in this study are 96%, 100%, 100%, 98.7%, 99.04% respectively.

Kappa value of metastatic lymphadenopathy in this study is 0.973. P value of metastatic lymphadenopathy is <0.0001, that is, it is highly significant.

IV. Discussion

This study included total of 710 cases of metastatic lymphadenopathy. Males were 436 (61.4%) and females were 274 cases (38.59%). Male:Female ratio was 1.59:1

Annie Wilkinson et-al (2004)¹² reported male: female ratio of 3:2, Kirti M Rathod et al (2003)¹³ reported a male: female ratio of 4:1 whereas, Ghatimagar et-al (2005)¹⁴ reported male: female ratio of 1:1.25 showing female preponderance. So the preponderance of males over females in the present study is almost in accordance with most of the above studies.

In the present study, age ranged from 1 to 90 years. Mean age was 56 years. Maximum number of cases were seen in the age group 51-60 years (206 cases, 29.01%), followed by age group 61-70 years (201 cases, 28.30%),

In **Ghatimagar et- al (2005)¹⁴** the age ranged from 24 to 86 years with mean age of 60.4 years., Incidence was seen to peak at the age range 61-70 years showing 57 cases (61%) followed by 31 cases (34%) in the age group 40-59 years.. In **Kiran Alam et-al(2005)¹⁵** study, the maximum number of aspirations were done from cervical triangle 164/221 cases (74.2%) whereas, in the present study, cervical lymphadenopathy comprised about 166/710 (23.38%) that is maximum number of cases.

In **Sumit Mitra et-al(2006)¹⁶** study, SCC constituted maximum no. of cases of metastatic lymphadenopathy. Metastatic squamous cell carcinoma constituted (79/197, 40.1%) whereas, in the present study, SCC constituted about 232/710 (32.6%) and SCC predominated over adenocarcinoma. In **Kiran Alam et al(2005)¹⁵** study, adenocarcinoma was seen in 20 cases (9.4%) whereas, in the present study, adenocarcinoma constituted about 206/710 (29.01%) cases.

In **Sumit Mitra et-al (2006)¹⁶** study, metastatic deposits of small cell carcinoma constituted about 12/197 cases (6.1%) having suspicious lesions in lung, whereas, in the present study, metastatic deposits of small cell carcinoma constituted about 51 cases (7.2%). In **Ghatimagar et-al(2005)¹⁴** study, melanoma constituted 2 cases (2%) of metastatic lymphadenopathy, whereas, in the present study melanoma constituted about 15 cases (2.1%). In **Sumit Mitra et-al(2006)¹⁶** study, only 1/197 (0.50%) case of metastatic deposits of

seminoma was reported, whereas, in the present study, metastatic deposits of germ cell tumours constituted about 15 /710 cases .In **Kiran Alam et-al(2005)**¹⁵ study, 9 (4.1%) cases were poorly differentiated or undifferentiated tumours on FNAC., whereas, in the present study, poorly differentiated carcinoma constituted 63/710 cases .In **Annie Wilkinson et-al(2004)**¹² study, round cell tumours constituted 1/50 case (2%) whereas, in the present study, total of 9 cases (1.2%) were seen.In **Khirwadkar et-al(2001)**¹⁸ study, they studied the role of fine needle aspiration cytology in 15 cases of metastatic soft tissue sarcomas involving lymph nodes, whereas, in the present study, the sarcoma constituted 7 cases. In **Ghartimagar et-al (2005)**¹⁴ study, metastatic deposits of papillary carcinoma of thyroid constituted about 2 cases (2%) whereas, in the present study, metastatic deposits of papillary carcinoma of thyroid constituted about 20/710 (2.81%) cases .In **Kiran Alam et-al (2005)**¹⁵ study, metastatic deposits of medullary carcinoma of thyroid constituted about 4/221 cases (1.8%) whereas, in the present study, metastatic deposits of medullary carcinoma of thyroid constituted about 2/710 (0.28%) cases .

In **Annie Wilkinson et-al(2004)**¹² study, 1/110 (0.9%) case constituted metastatic deposits of follicular carcinoma of thyroid, whereas, in the present study, metastatic deposits of follicular carcinoma of thyroid constituted 2/710 (0.28%). In **Kiran Alam et-al(2005)**¹⁵ ductal cell carcinoma of breast constituted about 25 cases (11.3%), whereas, in the present study, metastatic deposits of ductal carcinoma of breast constituted about 70/710 (9.85%). In **Izhar N et-al (2003)**¹⁷ study, metastasis of adenoid cystic carcinoma were seen in 6/1978(0.30%) cases, whereas, in the present study, metastasis of Adenoid cystic carcinoma constituted about 2/710 (0.3%) cases with primaries from Salivary Gland (parotid gland). In **Kiran Alam et-al(2005)**¹⁵ study, metastatic deposits of unknown primary constituted about 30/221 cases (13.57%) whereas, in the present study, metastatic deposits of unknown primary constituted about 98/710 cases (13.80%).In **Kiran Alam et-al(2005)**¹⁵ study, transitional carcinoma .**Kadir et al(2008)**²⁰ reported a case of metastatic deposits of neuroendocrine carcinoma in axillary nodes with primary in breast, whereas, in the present study, 8/70 cases constituted metastatic deposits of Neuroendocrine carcinoma.

Cytohistological correlation in case of metastatic lymphadenopathy

In **Annie Wilkinson et-al(2004)**¹² study, 45 cases were available for metastatic lymphadenopathy, where as in this study 50 cases were available for histopathological correlation.

In **Annie Wilkinson et-al(2004)**¹² study, sensitivity, specificity, accuracy, positive predictive value, negative predictive value of metastatic lymphadenopathy were 93.47%, 100%, 95.2%, 100%, 94.59% respectively, whereas, in the present study sensitivity, specificity, accuracy, positive predictive value, negative predictive value of metastatic lymphadenopathy were 96%, 100%, 99.04%, 100%, 98.76% respectively.

In **Kiran Alam et-al (2005)**¹⁵ et-al study, sensitivity, specificity and accuracy were 93.47%, 100%, 95.2%, where as in present study sensitivity, specificity and accuracy were 96%, 100%, 99.04%. These statistical values were in accordance with other studies indicating the importance of FNAC as diagnostic procedure

In **Patra et-al(1983)**²¹ PPV, NPV were 100% and 95.2% respectively and in **Russel et-al(1983)**²² PPV, NPV were 95.8%, and 93.3% respectively, where as in present study PPV ,NPV were 100 % and 98.7% respectively. Our statistical values were in accordance with other studies indicating the usefulness of FNAC as a cheap and effective diagnostic tool.

Table3: Comparison of statistical values in different studies indicating usefulness of FNAC as diagnostic tool in lymphadenopathy

Studies	sensitivity	specificity	accuracy
Annie Wilkinson et-al(2004) ⁶⁴	93.47%	100%	95.2%
Kiran Alam et-al(2005) ⁶⁸	97.9%	100%	97.9%
Kim et-al(2007) ⁷³	97.9%	99.1%	100%
Present study	96%	100%	99.04%

V. Summary And Conclusion

FNAC is of considerable value in disease staging and documentation of metastasis in known primary and occult tumours. FNAC is a reliable diagnostic tool for lymphadenopathy who are suspected for malignancy as it has less complications, is a simple invasive procedure and can be repeated easily.

Thus, FNAC bridges the gap between clinical evaluation and final pathological diagnosis in majority of cases.

So, it can be concluded that FNAC proved to be a safe, accurate, inexpensive and patient friendly in the effort to establish preoperative diagnosis

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