



Morphological spectrum of enlarged peripheral lymph nodes on Fine Needle Aspiration Cytology: A study of 16,985 cases from tertiary care center in Uttarakhand

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Abstract

Introduction: Lymph nodes are vital part of immune system. Lymphadenopathies are one of the most common clinical presentations in patients of infections & malignancies. Peripheral lymphadenopathy is a common finding across all age groups; management is dependent on lymph node pathology. Fine-needle aspiration cytology (FNAC) is a clinical technique for diagnosis of masses. The present study was undertaken to determine the cytological spectrum in enlarged peripheral lymph nodes and to study the cytomorphological pattern of metastasis in lymph nodes.

Material and Methods: This retrospective study was conducted at the Department of Pathology, Government Medical College, Haldwani, India from January 2008 to December 2018. Demographic and other relevant data was taken from records. Slides were stained with PAP, Hematoxylin and eosin (H and E) and May-Grunwald Giemsa stain (MGG). FNAC was done. Cytological diagnosis and site of peripheral lymphadenopathy were noted.

Results: Among 16,985 cases, 39.22% cases were reactive, 33.52% tubercular, 24.60% metastatic lymph nodes, 2.60% hematological malignancies, and 0.087% cases as parasitic. Cervical lymph nodes were the commonest site for metastasis (69.01% cases). Metastatic squamous cell carcinoma diagnosed in 68.65% cases, poorly differentiated carcinoma in 26.24%, adenocarcinoma in 4.65%, and poorly differentiated squamous cell carcinoma in 0.46% cases.

Conclusion: FNAC is reliable procedure for diagnosis of peripheral lymphadenopathy. Cause of lymphadenopathy varies with the demographic differences. Metastatic lymphadenopathy is common in older age group. Age, sex, and type of metastatic carcinomas vary in different regions.

Keywords: fine-needle aspiration cytology, lymph node, lymphadenitis, reactive hyperplasia, tubercular lymphadenitis.

Introduction

Peripheral lymphadenopathy may be the first presenting sign of malignancies especially in the head and neck region. Clinical history, physical examination, and fine needle aspiration cytology

(FNAC) are fundamental in diagnosing a metastatic lymph node. The causes of lymphadenopathy vary from reactive to metastatic etiology; however, enlarged lymph nodes are considered to be metastatic in elderly patients,

unless proven otherwise. Enlarged metastatic lymph node may be the first sign of underlying malignancy with an unknown primary. Diagnosis of metastatic malignancies in the peripheral lymph node is important for staging and prognosis. The spectrum of metastatic lymph nodes varies in developed and developing countries and according to different geographical, racial and ethnical factors. Though infective pathology is still the commonest etiology, there is a considerable percentage of metastatic lymphadenopathy as well. FNAC is easy & cheap modality which can be carried out as an outpatient basis. It gives a relatively faster diagnosis regarding the cause of enlarged lymphadenopathy. The incidence of metastatic lymph node varies in India from 65.7%^[1] to 80.4%.^{[2],[3]}

The aim of the study is to find out the cytological spectrum in enlarged peripheral lymph nodes & study the cytomorphological pattern of metastasis in lymph nodes.

Materials and Methods

This retrospective study was carried out in Department of Pathology, Government Medical College, Haldwani, Nainital, Uttarakhand, India. A total of 16,985 cases of peripheral lymphadenopathy were retrieved over a period of 11 years from January 2008 to December 2018. The year wise incidence over a period of 10 years was noted. Relevant data including age, sex, and site were retrieved from records. FNAC was performed using a 23 gauge needle. An average of 2 passes and a minimum of 4 slides were made. Slides were stained with PAP, Hematoxylin and eosin (H and E) and May-Grunwald Giemsa stain (MGG). Ultrasonography (USG) guided FNAC was performed on deep-seated lesions. The cytological diagnosis was noted and divided in to major groups including reactive, tubercular, metastatic, hematological and parasitic lesions, and analyzed. The site of peripheral lymphadenopathy was noted and divided in two major sites including cervical, axillary, supraclavicular, and inguinal. Patients presented

with metastatic lymphadenopathy were divided in to various age group and common age groups were analyzed. The cytological diagnosis of metastatic lymphadenopathy was divided in to major groups including metastatic squamous cell carcinoma, metastatic adenocarcinoma, and metastatic poorly differentiated carcinoma.

Results

Out of 16,985 cases, males 9610 (56.9%) and females 7375 (43.1%) presented with lymphadenopathy. Out of total 16,985 cases, 7134 (39.22%) cases were reported as reactive, 5397 (33.52%) cases were reported as tubercular, 4017 (24.60%) cases were reported as metastatic lymph nodes, 423 (2.60%) cases were reported as hematological malignancies, and 14 (0.087%) cases were reported as parasitic (Table 1).

The incidence of metastatic lymphadenopathy has unfortunately increased successively in 11 years with 170 cases in year 2008 to 668 cases in 2018 (Figure 1)

The age of the patient with metastatic lymphadenopathy ranged from 11 to 90 years. Most common age group presented with metastatic lymphadenopathy was 61-70 years with 1581 (40.17%) followed by 1462 (37.15%) in age group of 51-60 years. An increase in the number of cases was seen with advancing age till the age group of 61-70 years (Table 2)

Among patients with metastatic lymphadenopathy, 2188 (54.46%) were males while 1829 (45.54%) were female with male: female ratio (M:F) of 1.2:1. According to site, cervical lymph nodes were the commonest site for metastasis seen in 2772 (69.01%) cases followed by 1074 (26.74%) cases in supraclavicular lymph node, 89 (2.21%) cases in inguinal lymph node, and 82 (2.04%) cases in axillary lymph node (Table 3).

A diagnosis of metastatic squamous cell carcinoma was made in 2758 cases (68.65%), followed by poorly differentiated carcinoma in 1054 cases (26.24%), adenocarcinoma in 187 cases (4.65%), and poorly differentiated squamous cell carcinoma in 18 (0.46%) cases (Table 4).

Table 1: Cytological diagnosis of 16,985 cases of lymphadenopathy (original)

Cytological diagnosis	No. of cases	Percentage
Reactive	7134	40.00%
Tubercular	5397	31.78%
Metastatic	4017	23.65%
Hematological malignancies	423	2.49%
Parasitic	14	2.08%

Table 2: Patients in different age group with metastatic lymphadenopathy .(original)

Age group	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Number of cases	-	04	42	125	520	1512	1613	189	12

Table 3: Site distribution among patients with metastatic lymphadenopathy.(original)

Site	No. of cases	%
Cervical	2772	69.01 %
Supraclavicular	1074	26.74 %
Inguinal	89	2.21%
Axillary	82	2.04%

Table 4: Incidence of various types of metastatic lesions. (original)

Sr. No.	Metastatic lesion	No. of Cases	Percentage
1	Squamous cell carcinoma	2758	68.65%
2	Poorly differentiated carcinoma	1054	26.24%
3	Adenocarcinoma	187	4.65%
4	Poorly differentiated squamous cell carcinoma	18	0.46%

Table 5: Comparison of incidence of lymphadenopathy due to different etiological factors

	Reactive	Tubercular	Metastasis	Hematological malignancies
Present study	40.00%	31.78%	23.65%	2.49%
Patra et al 1983[13]	33.0%	37.8%	14.5%	6.7%
Bhaskaran et al 1990[7]	20.86%	67.57%	5.6%	2.97%
Khajuria 2006[8]	37.2%	52.3%	3.8%	2.0%
Ahmed et al 2005[13]	53.6%	32.8%	13.6%	4.5%
Hirachand et al 2009[10]	41.55%	28.0%	12.3%	6.0%
Shrivasta et al 2014[9]	34.93%	39.33%	11.84%	2.25%
Shah PC 2016[12]	22.1%	44.8%	31.3%	1.8%
Kochar A 2012[5]	41.25	35.7%	20.3%	2.7%
Renuka V et al 2012 [6]	24.0%	52.0%	20.0%	4.0%
Bhavani C et al[11]	45.28%	42.26%	11.32%	1.13%
Somashekar S et al 2017 [14]	55.62%	23.75%	4.37%	11.26%

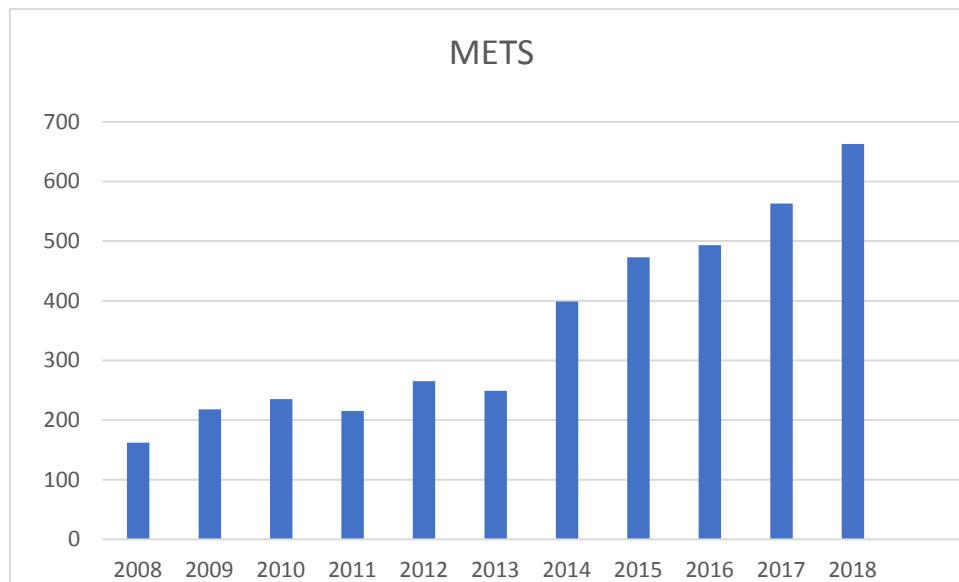


Figure 1: Year wise distribution of cases of metastatic lymphadenopathy. (original)

Discussion

FNAC has been in use for decades as the first line of investigation for enlarged peripheral lymph nodes. Not only it is valuable for the staging of the disease, it is also an effective tool for diagnosing the metastasis of occult tumors. It is a simple procedure which requires minimal preparation & has the advantage of being repeated easily. More than 90% of the metastasis in the lymph node are diagnosed initially by FNAC.^[4]

In this study metastatic cases constituted 23.65% of total cases, reactive constituted highest percentage of cases with 40.00% of cases, 31.78% being of tuberculous etiology, and 2.49% constituted hematological malignancies. The study done by Kochar et al. and Renuka et al. found the percentage of metastatic lesions nearly equal to this study with metastatic lesion constituting 20.3% and 20% respectively.^{[5], [6]} While in study done by Bhaskaran et al.,^[7] Khajuria et al.,^[8] Srivastav et al.,^[9] Hirachand et al.,^[10] and Bhavani et al.^[11] found incidence of metastatic lesions to be lower than present study with incidence being 5.6%, 3.8%, 11.84%, 12.3%, and 11.32% respectively. Shah PC et al. found the incidence of metastatic lesion to be 31.3% and was higher compared to this study.^[12] The possible reason of variation in incidence of different studies with our study could be number of subjects, different age,

gender composition and various racial, ethnic, geographic, and genetic factors.

The incidence of metastatic lymphadenopathy showed progressively increase over a time period of 10 years, except in 2011 where the incidence showed a mild decrease. Ghratimagar D et al.^[15] and Khajuria et al.^[8] et al have also shown an increasing incidence of metastatic lymphadenopathy. The increase in incidence of metastatic lymphadenopathy in this study could be due to increase in the incidence of carcinomas. An increased awareness among patients regarding swelling may be a cause but a gloomy fact from this study also comes in to light that diagnosis of carcinoma is still made in an advanced stage of metastasis. Therefore the prognosis is unfortunately poor for the patient.

In this study, most common age group presented with metastatic peripheral lymphadenopathy was 61-70 years with 1613 (40.15%) followed by 1512 (37.64%) in age group of 51-60 years. 520 (12.94%) patients were in the age group of 41-50 years. In 71-80 years, the number of cases was 189(4.70%). Younger age groups and patient with above 80 years constituted rest of the cases.

In the study done by Agarwal D et al.,^[16] 54.24% cases of lymphadenopathy were metastatic lesion in age group of 45 years and above, while incidence of metastatic lymphadenopathy was

much less in less than 45 year age group with 7.03% only. In a similar study by Janagam C et al.,^[18] maximum number of patients, i.e. (64%) were in the age group 10-39 years, followed by 29.5% patients in the age group 40-59 years. In another study by Ghartimagar D et al.,^[15] the incidence was seen to peak at the age range above 60 years showing 61% cases, followed by 34% cases in the age group 40-59 years. Hossain MK et al, also reported most of the patients to be in 41-50 years of age. Findings of all of these studies are in accordance to that of our study.^[17]

The possible reasons of 61-70 years and 51-60 years being the most common age group is advance age as a risk factor for carcinomas while 71-80 years and above constituted only 7.90% of total cases because average life expectancy in India is 65 years for male & 68 years for female,^[19] and overall patients coming of advance age is less. The number of patients presented with metastatic lymphadenopathy below 40 years constituted much less numbers of patients because of young age.

A diagnosis of metastatic squamous cell carcinoma was made in 68.65%, followed by poorly differentiated carcinoma with 26.24% and adenocarcinoma with 4.65% and poorly differentiated squamous cell carcinoma in 0.46% cases. In the study done by Agarwal D et al.,^[16] the incidence of squamous cell carcinoma was 53.12% of metastatic carcinomas followed by adenocarcinomas with 21.25%. Janagam et al.^[18] reported that in their study among neoplastic lesions, metastatic tumors were reported in 26 patients (13%) and lymphoproliferative disorder/lymphoma was reported in 4 patients (2%). In study by Ghartimagar et al.,^[15] the most common subtype of metastatic malignant tumor was adenocarcinoma. This was followed by squamous cell carcinoma. In another study by Yadav S et al.,^[20] out of 56 lymph node tumors, the most common subtype of metastatic carcinoma was squamous cell carcinoma and was observed in 45 cases. This was followed by ductal carcinoma (6 cases) and two cases of

adenocarcinoma and one case each of acute leukemia, apocrine carcinoma and malignant melanoma. In a study by Khuraijam SD et al.,^[21] squamous cell carcinoma was found to be the most common tumor type with 126 (33.1%) cases. According to site, metastasis in cervical lymph node was seen in 69.01% cases followed by 26.74% (n = 1074) cases in supraclavicular lymph node, 89 (2.21%) cases in inguinal lymph node and 82 (2.04%) cases in axillary lymph node (Table 3).

In study done by Kolawole et al., the axillary group of lymph nodes was the commonly involved by metastasis with 49% of cases while cervical group were metastatic in 14.4% of cases.^[22]

In study by Yadav S et al.,^[20] the most common site were the cervical lymph node comprising 36 cases (out of 56 cases) followed by cases from axillary lymph node, and from supraclavicular lymph nodes. Ghartimagar D et al.,^[15] reported that the most common sites were the cervical triangles comprising 45 cases (out of 58 cases) followed by 30 cases from supraclavicular nodes. Khuraijam SD et al., reported that cervical lymph nodes were the most frequently involved in 241 (63.4%).^[21]

Conclusion

FNAC is a reliable, cheap, easily repeatable simple procedure for making a diagnosis of peripheral lymphadenopathy. It is important for diagnosing metastasis of both known primary as well as for occult tumor and is therefore important in staging of the disease. Making a reliable diagnosis on FNAC is also instrumental in avoiding surgical biopsies of lymph nodes. The cause of lymphadenopathy may vary with the age, ethnic, racial & regional differences.

Metastatic lymphadenopathy is a common type of peripheral lymphadenopathy in older age group. Age, sex, and type of metastatic carcinomas vary among different regions. This study provides insight into the metastatic spectrum of peripheral

lymphadenopathies among patients of tertiary care center in uttarakhand.

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