

Original Research Article

Analysis of FNAC in diagnosis of lymphadenopathy-a retrospective study from a regional cancer centre, Cuttack, Odisha

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ABSTRACT

Background: Lymphadenopathy is one of the most common clinical presentations and major causes of morbidity. Thus, clinical recognition and urgent diagnosis is of paramount importance. So, we aimed to analysis the diagnostic role of fine needle aspiration cytology (FNAC) in superficial lymphadenopathy in a regional cancer centre, Odisha, India.

Methods: A total 1129 cases were retrieved from the hospital record retrospectively from the patients who had presented with superficial lymphadenopathy from January 2015 to December 2015.

Results: Out of 1129 lymphadenopathy cases, 671 (59.43%) were male and 458 (40.56%) were female with male to female ratio 1.46:1. The age of the patients ranged from 4 years to 83 years with mean age 48.57 years. The most common site was observed in cervical lymph node 493 (43.66%) followed by submandibular lymph nodes 198 (17.53%) and supraclavicular lymph nodes 172 (15.23%). 584 (51.27%) were malignant and 545 (48.27%) were benign. Reactive hyperplasia was most common 318 (58.34%) among benign cases where as metastatic squamous cell carcinoma was the most common 261 (50.77%) among malignant lesions. By FNAC all benign lesions were correctly diagnosed, and primary sites of malignancy identified in 442 (85.59%) cases. Cyto-histo correlation was done in 399 cases. The overall diagnostic accuracy of FNAC was found to be 93.98%, sensitivity 93.88%, specificity 94.64%, positive predictive value 99.8% and negative predictive value 71.62%.

Conclusions: FNAC is a highly sensitive and specific tool for early detecting primary malignancy and metastatic lesions. Many inflammatory lesions can be treated based on FNAC alone.

Keywords: Cervical lymph node, Fine needle aspiration cytology, Lymphadenopathy, metastatic squamous cell carcinoma

INTRODUCTION

Lymphadenopathy is one of the most common clinical presentations with variable etiologies and one of the major cause of morbidity.¹ In developing countries, infective lymphadenopathy is quite common, mostly due to high prevalence of tuberculosis. However, still a large percentage of lymphadenopathies in adults turn out to be

malignant.² Malignancies in lymph nodes in our country are predominantly metastatic in nature with an incidence varying from 65.7-80.4% and lymphomas range from 2-15.3% among lymph nodes aspirated from all sites.³ Thus, clinical recognition and urgent diagnosis of palpable lymphadenopathy is of paramount importance to differentiate between inflammatory lesions or malignant lesions (metastatic or primary neoplastic tumour).

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 in comparison to more expensive surgical excision biopsies in developing countries with limited financial and health care resources. It almost offers an accurate diagnosis for reactive lymphoid hyperplasia, infectious disease, granulomatous lymphadenitis and metastatic lesions.⁴ Although histopathological examination is considered to be gold standard in diagnosis especially in lymphomas, FNAC maybe the only tool for diagnosis and further management of the patients in metastatic malignancy as it provides clues for occult primaries.³ Study was undertaken to evaluate the diagnostic role of fine needle aspiration cytology in superficial lymphadenopathy in a regional cancer centre, Odisha, India.

METHODS

A total 1129 cases were retrieved from the hospital record retrospectively from the patients who had

presented with superficial lymphadenopathy and subsequently advised for FNAC of the lesion in A. H. Regional Cancer Centre, Cuttack over a period of 1 year from January 2015 to December 2015. All the relevant clinical details of the patients were noted. FNAC procedure was carried out using a 10ml syringe equipped with 21 or 23 gauge needles. The aspirated material was smeared onto four slides in each case. Two slides were immediately immersed in 95% ethanol and routinely stained by hematoxylin and eosin stain and Papanicolaou stain. Inadequate smears were excluded from the study. The study was approved by the ethics committee of the institution.

RESULTS

During the study out of total 1129 lymphadenopathy cases, 671 (59.43%) were male and 458 (40.56%) were female with male to female ratio 1.46:1. The age of the patients ranged from 4 years to 83 years with mean age 48.57 years (Table 1).

Table 1: Age and sex distribution.

Age group	Total (n=1129)		Benign (n=545)		Malignant (n=584)	
	M	F	M	F	M	F
0-10	12	21	11	20	1	1
11-20	32	25	18	6	14	19
21-30	17	24	16	8	1	16
31-40	112	105	48	64	64	41
41-50	141	132	72	80	69	52
51-60	185	89	64	40	121	49
61-70	96	49	40	16	56	33
>71	76	13	36	6	40	7
TTL	671	458	305	240	366	218

M-Male, F-Female

Table 2: Lymph node involvement in different pathological condition.

Lymph node	Total	Total (n=1129)		Total benign	Total benign (n=545)		Total malignant	Total malignant (n=584)	
		M	F		M	F		M	F
Cervical	493	343	150	196	124	72	297	219	78
Supraclavicular	172	96	76	78	48	30	94	48	46
Submandibuar	198	127	71	130	73	57	58	54	14
Submental	20	20	-	8	8	-	12	12	-
Axillary	133	16	127	63	7	56	80	9	71
Inguinal	70	48	22	53	33	20	17	15	2
Preauricular	15	13	2	11	9	2	4	4	-
Postauricular	8	6	2	4	3	1	4	3	1
Other	10	2	8	2	-	2	8	2	6

M-Male, F-Female

The most common site was observed in cervical lymph node 493 (43.66%) followed by submandibuar lymph

nodes 198 (17.53%) and supraclavicular lymph nodes 172 (15.23%). Distribution of different lymph node

groups from which FNAC was done is shown in (Table 2). Out of total, 584 (51.27%) were malignant and 545 (48.27%) were benign. In benign cases the age ranged from 4 years to 83 years with mean age was 44.84 years,

where as in malignant cases, age ranged from 12 years to 80 years with mean age 51.57 years. Male predominance was observed in both categories.

Table 3: Distribution of cytological diagnosis in different lymph node areas.

	Total	M	F	CX	SC	SM	SMN	AX	ING	PA	PRA	OTH
Reactive hyperplasia	318	189	130	104	40	93	6	37	32	3	3	-
Superlative lesion	79	66	13	12	9	31	1	9	12	1	4	-
Granulomatous lesion	132	81	52	77	23	6	1	12	7	-	4	2
LCH	8	5	3	2	6	-	-	-	-	-	-	-
Histoplasmosis	8	6	2	1	-	-	-	5	2	-	-	-
Hodgkins lymphoma	8	5	3	5	-	-	-	1	2	-	-	-
Non-hodgkins lymphoma	62	42	20	36	6	4	2	5	6	-	1	2
Metastatic squamous cell carcinoma	261	189	72	156	48	46	7	2	-	2	-	-
Metastatic adeno carcinoma	97	56	41	72	12	8	1	-	-	2	-	2
Metastatic poorly differentiate adeno carcinoma	26	8	18	7	5	6	1	-	-	-	3	4
Metastatic malignant melanoma	3	2	1	-	-	-	-	-	3	-	-	-
Metastatic germ cell tumor	7	7	1	1	-	-	-	-	6	-	-	-
Metastatic papillary ca.thyroid	29	8	19	8	17	4	-	-	-	-	-	-
Metastatic spindle cell sarcoma	4	3	1	2	2	-	-	-	-	-	-	-
Metastatic meobmian carcinoma	3	2	1	2	-	-	1	-	-	-	-	-
Metastatic duct cell carcinoma (breast)	84	2	82	8	4	-	-	72	-	-	-	-

CX-cervical, SC-Supraclavicular, SM-Submandibular, SMN-Submental, AX-Axillary, ING-Inguinal, PA-Preauricular, PRA-Postauricular, OTH-Other (Intraabdominal), M-Male, F-Female

Among benign cases, reactive hyperplasia was most common 318 (58.34%) followed by granulomatous lesion 132 (24.22%), Superlative lesion 79 (14.49%), Langerhans cell histiocytosis (LCH) 8 (1.46%) and histoplasmosis 8 (1.46%) (Figure 1a, b, c, d) while in malignant lesions, metastatic lesions were most common 514 (88.1%) followed by primary lymphoid neoplasm 70 (11.98%). Out of various metastatic lesions, metastatic squamous cell carcinoma was the most common 261 (50.77%), followed by metastatic adenocarcinoma 97 (18.87%) and metastatic duct cell carcinoma (breast) 84 (16.34%). In primary lymphoid neoplasm, 8 (11.42%) were Hodgkin lymphoma and rest 62 (88.57%) were Non-Hodgkin lymphoma (Fig 2.a, b, c, d). Males were predominating in all except metastatic duct cell carcinoma (breast) (Table.3).

In 442 (85.59%) cases, primary sites of malignancy identified by FNAC while primary site was unknown in the remaining 72 (14%) cases. In 399 cases, the results obtained on FNAC were compared with the histopathological diagnosis of the corresponding excised lymph node. The overall diagnostic accuracy of FNAC was found to be 93.98%, sensitivity 93.88%, specificity

94.64%, positive predictive value 99.8% and negative predictive value 71.62%.

DISCUSSION

Lymphadenopathy is the term to describe the conditions in which lymph nodes become abnormal in size, consistency, and number. Lymphadenopathy as a clinical manifestation of the regional or systemic disease serves as an excellent clue to the underlying disease. It can arise either from benign or malignant causes depending on the geographical condition and socioeconomic setup.⁵ It has been observed that lymphadenopathy can be seen in patients ranging from very early to advance age with various etiology.⁵

In our study, the youngest patient presented lymphadenopathy was observed in 4-year female and oldest was 88 years males with mean age 48.57 years. Males were predominated with male: female ratio 1.46:1. This finding was similar with the previous study.^{5,6} Some other studies found a slight female predominance with male: female ratio 1:1.2.^{5,7}

Studies from India and other developing countries shown benign disorders were more common than malignant disorders.⁵ According to current results, malignant disorders were more common (51.27%) than benign disorders (48.27%). This finding was consistent with the study done by Steel et al, who found that the majority of their cases (59%) were malignant and (34%) were benign.⁸ They attributed the cause to the fact that the western countries, where their study was carried out, show predominance of malignant lesions over the benign conditions. Although in eastern country where most of the cases are due to infections and tuberculosis, the predominance of malignant cases in the present study, attributed to the fact that the study was carried out in a regional cancer centre.⁴

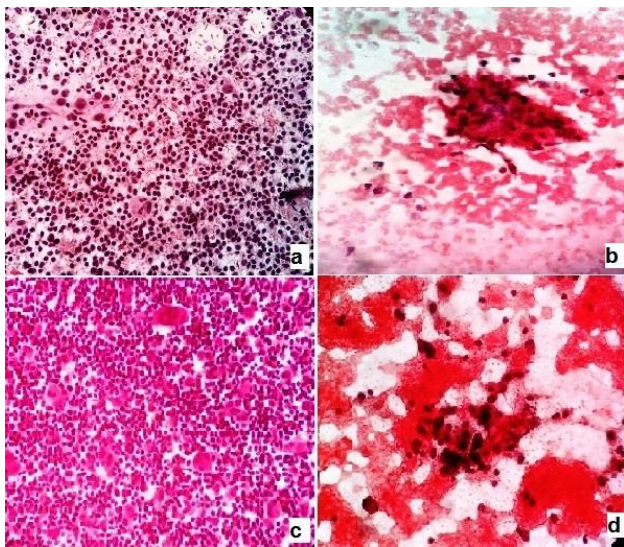


Figure 1: 1a) reactive hyperplasia of lymphnode showing lymphoid cells in different stages of maturation along with other inflammatory cells. 1b) granulomatous lymphadenitis showing clusters of epithelioid cells. 1c) LCH of lymph node showing histiocytes, numerous eosinophis, giant cells. 1d) metastatic malignant melanoma in lymph node showing hyperchromatic pleomorphic dark cells containing melanin pigment in their cytoplasm.

The results of this study showed that the peak incidence of benign lymphadenopathy was observed in 4th decades while the peak incidence of malignant lesion was in the 5th decade which is similar with study done by Ahmad et al.⁹ Mitra et al stated that the incidence of malignancy rose steadily through the age groups to greater than 95% in patients above 60 years of age.¹⁰

In this study, among benign lesion, reactive lymphadenitis was responsible for maximum number (58.34%) of patients seeking clinical attention followed by granulomatous lesion (24.22%).¹¹ An Indian study done by Gupta et al showed a high granulomatous lymphadenopathy (59%) whereas el Hag et al, showed higher reactive lymph nodes (59%) followed by

granulomatous lymphadenitis (47%).¹² Tuberculosis is seen as the most common cause of granulomatous inflammation in South East Asia and in developing countries. Tuberculosis was more common in male in our study, where as other studies showed more common in females (75%) as compared to the males (25%).¹³

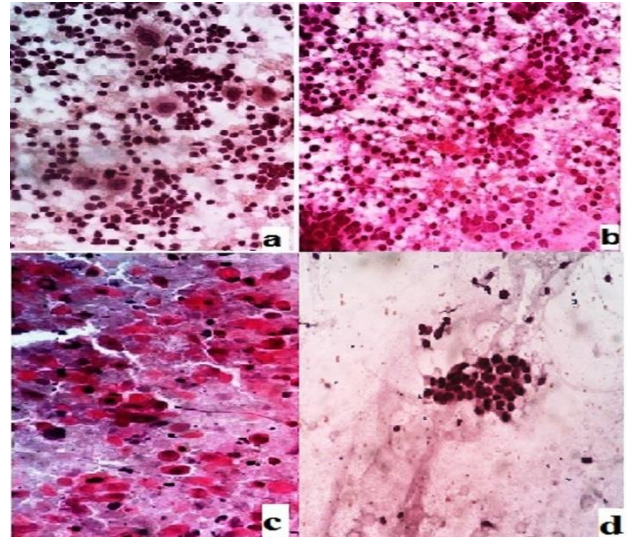


Figure 2: 2a) Hodgkins lymphoma showing RS cells (mononuclear, multilobulated, typical) with polymorphous background. 2b) NHL showing monotonous lymphoid cells arranged diffusely. 2c) Metastatic squamous cell carcinoma showing polygonal squamous cells having hyperchromatic pleomorphic nucleus. 2d) Metastatic invasive duct carcinomatous cells to axillary lymph node.

Agarwal et al, found the commonest cause of lymphadenopathy in pediatric age group was reactive hyperplasia (70.9%) while tuberculosis lymphadenitis was the predominant cause in adolescents and middle-aged patients (40.8%).^{14,13}

Same result was observed in our study. In the present study lymphomas constituted only 6.2% of lymphadenopathies of which Hodgkin's lymphoma constituted 11.42% and NHL constituted 88.57% of cases.

In other study, Non Hodgkins lymphoma was the commonest malignant lesion observed 76.9% followed by Hodgkin lymphoma (15.4%).¹⁵ In malignant process lymph nodes (90%) were more involvement by metastatic disease rather than lymphomas. This result is consistent with the other Indian studies.³

The results of the present study showed that the peak incidence of metastatic lesion was observed in 3rd to 6th decades, age ranged between 10 years to 83 years with mean age 52.69years. This result is similar with the previous study who showed that the maximum lesion was

in 4th to 6th decade age ranged 1½year to 95year with mean age of presentation being 53.6year.⁹

The results of the present study showed that males were more affected by metastatic lesion with male: female ratio 1.73:1. Indian studies shown the higher result by whereas foreign authors have been reported lower results.¹⁶⁻¹⁸ Ghartimagar et al, reported the incidence of metastasis to be more common in females than males with a male to female ratio of 1:1.25.¹⁹

In most of studies, it has been observed that cervical lymph node involvement is most predominant in both benign and malignant disease process, possibly due to their proximity to anatomical passages of the body that is constantly exposed to environmental infectious agents. Cervical lymph nodes also drain lymphatic of a very large part of the body, including those of head and neck, thorax and some abdominal organs. Likelihood of their involvement by metastatic processes is thus correspondingly high.^{2,3} Ojo et al, found axillary nodes to be most common site of involvement followed by cervical lymph nodes.²⁰ In another study supraclavicular lymph nodes were found to be involved in majority (50.5%) of cases followed by cervical (19.9%) and axillary lymph nodes (15%).²

The results of this study showed that squamous cell carcinoma as the most common metastatic malignancy followed by adenocarcinoma and poorly differentiated carcinoma, which was in agreement with other study.² But in some other studies adenocarcinoma (40.91%) was the most frequent metastatic lesion encountered, followed by squamous cell carcinoma (27.27%) and breast carcinoma (9.09%).⁵

Males had high risk for metastatic squamous cell carcinoma followed by metastatic adenocarcinoma which was comparable with Betsill et al.²¹

In our country, an accurate, early and timely accessibility as to the cause of lymphadenopathy is of considerable importance due to high prevalence of acute and chronic infective disorders and rapidly increasing incidence of neoplastic diseases. FNAC not only confirms the presence of metastatic disease but also gives clues regarding the nature and origin of primary tumor.²² 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.²

By FNAC and other clinical data, primary site could be identified in 442 (85.59%) cases, while primary site was unknown in the remaining 72 (14%) cases. In other study primary site was identified in about 90% of cases, while in another study, primary site was identified in 59% of cases.^{23,24}

Wilkinson et al reported head and neck (particularly, mouth, larynx and pharynx) as the most common primary site in metastatic SCC, whereas Ghartimagar et al, found lung, stomach, colon and rectum as the most common primary sites for metastatic adenocarcinoma.^{3,19}

In present study the most common primary site of metastatic SCC was mouth probably due to the use of multiple tobacco products while the most common primary site of metastatic adenocarcinoma was stomach.

The results of the present study showed that the overall diagnostic accuracy of FNAC was 93.98%, sensitivity 93.88% and specificity 94.64% which was in agreement with the other studies.^{4,5,9} The sensitivity and specificity of FNAC in metastatic tumors in our study was 100% and it was in agreement with other studies.⁴

CONCLUSION

The high accuracy, sensitivity and specificity of FNAC confirm that preoperative cytology is a useful quick reliable diagnostic modality specific tool for early detecting primary malignancy and metastatic lesions. Many inflammatory lesions can be treated based on FNAC alone. It is suitable for developing countries with limited financial and health care resources by which in the hands of an experienced person can minimize the economic burden and avoid the need for excision biopsy.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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