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Clinicocytomorphological Spectrum of Lymph Node Lesions by Fine Needle Aspiration: A Retrospective Study

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Abstract

Background: The commonest clinical presentation in any out patient department is lymphadenopathy. Fine needle aspiration cytology (FNAC) is a simple, reliable, rapid and inexpensive method to diagnose various cause lymph node enlargement. *Aim*: 1. To report the incidence and to describe the various causes of lymphadenopathy. 2. To evaluate the usefulness of FNAC in etiological diagnosis of lymph node enlargement. *Materials and Methods*: We Retrospectively analyzed 306 cases of lymph node enlargement in our study from Jan 2015 to August 2016. Patients who had minimum four smears from each aspiration site were included in our study and the smears were routinely stained with Papanicolaou stain and special stains where ever necessary. *Results*: Out of 306 cases, there were 170 (55.56%) males and 136 (44.4%) were females. Cervical lymph node enlargement were found in 245 cases (80%). In our study, 85% cases were benign and 15% cases were malignant with tuberculous lymphadenitis was the commonest presentation in 166 cases (63%). Accuracy of diagnosis was more than 90% in most of the cases. *Conclusion*: FNAC is an excellent first line method in diagnosing causes of lymphadenopathy and it serves as an easy alternative to open biopsy as it can be done as an outpatient procedure.

Keywords: FNAC; Lymphadenopathy; Tuberculous Lymphadenitis; Papanicolaou Stain.

Introduction

Lymph nodes are bean shaped structures and are components of periphery or secondary lymphoid organs. They are located anatomically at constant points along the course of lymphatic vessels. There are approximately 600 lymph nodes spread throughout human body and they are mainly concentrated over neck, axilla, groin, mediastinum and mesenteries [1].

Lymphadenopathy is the commonest clinical problem which can be neoplastic or non-neoplastic origin [2]. In India, tuberculosis still constitutes the commonest cause of lymph node enlargement [3]. These enlargements can be peripheral or visceral. Peripheral lymphadenopathies are easily accessible during routine physical examination, where as visceral enlargements requires laprotomy or advanced imaging techniques for its deduction.

Dating back in history, Kun M in 1847 was the first to report the use of aspiration biopsy to recover tumor cells by needle aspiration [4]. FNAC has emerged as a simple, minimally invasive, inexpensive, bedside technique in early deduction of the cause of these enlargements. Ancillary techniques done on cytology like flow cytometry, cytogenetics, electron microscopy, cell block preparation, immunocytochemistry had further added as a tool in diagnosing these lesions [5].

FNAC is a prerequisite for various lymph node swellings and helps to differentiate neoplastic from non-neoplastic lesions thus eliminating the need of surgical intervention in simple conditions that can be managed conservatively [6].

The aim of our study was to report the incidence and to describe the various pathological spectrum of neoplastic and non-neoplastic lesions in lymph nodes and to evaluate the usefulness of FNAC in etiological diagnosis of lymph node enlargement where even today histopathological examination is considered to be gold standard.

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Materials and Methods

This Retrospective study was conducted from Jan 2015 to August 2016. There were 306 cases of peripheral lymph node cases involved in this study. Cases were referred from all clinical departments. Age, sex, site, duration were noted. Detailed clinical history and significant findings were noted. The procedure was done after detailed explanation and with informed consent of the patient or guardian.

FNAC was done using 22 or a 23 gauge needle and 10ml plastic syringe with a detachable syringe holder (Franzen handle) without any anaesthesia. Two-three passes were done in all patients and four smears were made for each site of aspiration. Two slides were fixed with 95% ethyl alcohol for cytological evaluation using Papanicolaou staining and Hematoxylin and Eosin (H& E) staining and other two were air dried with giemsa stain and with Ziehl Neelson (ZN) staining. Special stains were done where ever applicable.

Cytological diagnosis for each case was based on cytomorphology and available clinical information. Based on the cellularity, smears were categorized as of high, moderate and low cellularity. The diagnosis were categorized with 1) Tuberculous lymphadenitis, 2) Reactive lymphadenitis, 3) Acute suppurative lymphadenopathy, 4) Metastatic lymphadenopathy, 5) Lymphomas.

Tuberculous Lymphadenitis was the most common presentation and were categorized into three groups[7].

Group 1 – Granulomatous without necrosis.

Group 2 – Caseating epitheliod granuloma.

Group 3 – Necrotizing lymphadenitis.

We had an inclusion and exclusion criteria for our study.

Inclusion Criteria

All patients with palpable lymph nodes referred to our hospital.

Exclusion Criteria

1. Non lymph node sample
2. Inadequate hemorrhagic material
3. Patient undergoing radiation therapy.
4. Patients undergoing treatments for primary or secondary neoplasm in lymph nodes

Results

Total of 306 cases were aspirated over a period from Jan 2015 to August 2016, there were 170 males (55.56%) and 136 females (44.4%). Male-Female ratio was 1.25:1. Patient's age ranged from 3 to 75 years. Majority of cases belong to the age group of 20-40 years (49.1%). [Table 1].

The most common group of lymph nodes aspirated was in the cervical region. Cervical lymph node enlargements were found in 245 cases (80%). The cervical lymph node includes nodes in the posterior triangle, anterior triangle, submandibular and submental lymph nodes. The least was supraclavicular nodes in 9 cases (3%). Size of the lymph nodes varied from 0.5 to 4 cm. [Table 2].

In our study 260 (85%) cases were benign and 46 (15%) cases were malignant. In benign lesions, tuberculous lymphadenitis was the commonest presentation in 166 cases (63%). In overall study, tuberculosis constituted 54% of cases showing female preponderance with 97 cases (58.4%). We further categorized tuberculous lymphadenitis into three

Table 1:

Age(in years)	Male	Female	Total	Percentage (%)
0-20	39	30	69	22.5
2140	86	64	150	49.1
41-60	29	27	56	18.3
61-80	16	15	31	10.1
Total	170	136	306	100

Table 2:

Site	No. of Cases	Percentage (%)
Cervical	245	80
Axillary	33	11
Inguinal	19	6
Supraclavicular	9	3

groups according to its cytomorpholical patterns. [Table 3]. Of these 66 cases (39.7%) were positive for Acid-Fast Bacilli (AFB). The current study aspirates could not be subjected to culture.

The other lesions include Reactive lymphadenitis in 70 cases which constituted 26.9% of benign cases. They were mostly in the cervical region following infective or septic foci in the head and neck region. Rest of the benign lesions was granulomatous lymphadenitis, suppurative lymphadenitis and non specific lymphadenitis. [Table 4].

Acute suppurative lymphadenitis was mostly in the axillary group. Two cases had non-specific lymphadenitis were exact cause was not able to found.

We had 46 cases with malignant lymph nodes (15%). These comprised of metastatic lymphadenopathy in 65.2% (30/46) of malignant lesions, lymphomas in 32.6% (15/46) and one case of myeloproliferative lesion in the lymph node. Metastatic lesions had slight male predominance with maximum number of cases had cervical group of lymph nodes, followed by supraclavicular. The commonest metastatic lesion was squamous cell carcinoma in 56.7% (17/30) cases. Other malignant lesions included in [Table 5].

The Metastatic Squamous cell carcinoma was found to be common equally in both males and females with oral cavity was the most common primary site. The least common primary site was carcinoma penis. We had one case were primary site was not known. [Table 6].

Table 3:

Patterns	No. of Cases	Percentage (%)
Granulomatous without necrosis	37	22
Caseating epitheliod granuloma	71	43
Necrotizing lymphadenitis	58	35

Table 4:

Benign Lymphadenitis	Cases	Percentage (%)
Tuberculous	166	63.8
Reactive	70	26.9
Suppurative	13	5.0
Granulomatous	9	3.5
Non specific	2	0.8
Total	260	100

Table 5:

Cytological Diagnosis	No. of Cases	Percentage
Squamous cell carcinoma	17	56.7
Poorly differentiated Adenocarcinoma	6	20.0
Breast carcinoma	4	13.3
Small cell carcinoma lung	2	6.7
Papillary carcinoma of thyroid	1	3.3

Table 6:

Primary Site for Squamous Cell Carcinoma	No. of Cases
Oral cavity(Buccal mucosa & mandible)	6
Tongue	4
Larynx	2
Skin	2
Penis	1
Unknown	1

Table 7:

NHL Types	No. of Cases
Diffuse large B-cell	7
T-cell lymphoma	2
Mantle cell lymphoma	1
Marginal zone lymphoma	1
Burkits Lymphoma	1

The Adenocarcinoma was mostly found in gastrointestinal metastasis. We had four cases of breast metastasis with three cases of unilateral axillary lymph nodes and one case with bilateral lymph nodes, all cases found to be Invasive ductal carcinoma (not otherwise specified).

We had 15 cases of Lymphoma, 12 were Non-Hodgkins Lymphoma (NHL) and three were Hodgkins lymphoma. All the NHL cases were between 50-70 years. With diffuse large B-cell lymphoma being the most common subtype comprising 58.3% (7/12), other types [Table 7].

We had three cases of Hodgkins lymphoma, two with Mixed cellular variety and one with Cellular predominant variety.

We had accuracy of diagnosis in more than 90% of the cases correlating with histopathological examination. Our Accuracy of diagnosis was more in benign cases. In Tuberculous lymphadenitis we had 100% sensitivity and 96.4% specificity respectively. The sensitivity and specificity of FNAC in other diagnosis in our study [Table 8].

In the present study, overall sensitivity and specificity was 91.8% and 88.6% respectively.

Table 8:

Type of Lesion	Sensitivity (%)	Specificity (%)
Tuberculous Lymphadenitis	100	96.4
Reactive Lymphadenitis	97.2	92.6
Suppurative Lymphadenitis	95.6	89.3
Granulomatous Lymphadenitis	87.8	83.7
Non-specific Lymphadenitis	86.4	82.1
Metastasis	90.4	88.5
Hodgkins Lymphoma	87.3	89.2
Non-Hodgkins Lymphoma	89.6	87.1

Discussion

FNAC is a cost effective first line investigation in any case of lymphadenopathy and reduces the need for surgical biopsy. It's very sensitive and mostly helps to distinguish between benign and malignant lesions. FNAC is also an inexpensive diagnostic tool in all superficial swellings such as thyroid, breast and soft tissue tumors. Ultrasonogram and computed tomography guidance has helped a lot in obtaining cells in deeper organ and tissues through long needles and making this technique more effective [8].

In our study, majority of patients referred for FNAC were in the age group between 21-40 years with 150 cases (49.1%). Our observations were similar with Pandit AA et al 146(51.05%) [9]. We had 31 cases (10.1%) of cases in 61-80 years of age. We had no cases above 80 years. Similar results were obtained by Hafez and Tahoun and Chawala N et al [10,11]. This may be due to reduced immune response with increasing age and lymph nodes become non-palpable because of fibrosis and fatty infiltration.

The gender distribution in the present study was skewed in favor of males with 170 cases and females 136 cases, giving a ratio of 1.25:1. Hirachand et al, Sumit Giri et al and Adhikari et al had male preponderance [12,13,14].

Cervical region is the commonest site of enlargement of lymph nodes in the present study with 245 cases (80%). The results was similar with Amit et al 243 cases (81%) and Kumuguru et al 230 cases (78.6%) [15,16]. The Axillary lymph node was second commonly affected in 33 cases (11%) and the results were similar with Hirachand et al with 20 cases (15.38%) [12].

In the present study, 85% of cases were diagnosed with benign lymphadenopathy. Our results were similar with A H Khan et al with 92% of cases, Ahamed et al with 86% of cases, Chawala N et al with 83% of cases were benign [11,17,18]. Of all the benign lesions, Tuberculous lymphadenopathy constituted most majority of lesions in 166 cases (63%) with 97 females and 69 males. Female-male ratio was 1.4:1. Our results were similar with Paliwal N et al, where females compromised 53.9% of cases [19]. Malnutrition, gender inequality, poverty, low literacy rates and poor socio-economic status in our country results in more females becoming ill with tuberculosis.

In our study, the most common cytomorphological pattern was Caseating epitheliod granuloma in 71 cases (43%). Our results were similar with Rajat Gupta et al (52.5%) and Chand P et al [20,21]. We had 66 cases (39.7%) positive for Acid-Fast Bacilli (AFB). The frequency of AFB positivity in other studies varies from 2.1% - 61.7% as demonstrated by different authors [19,20,21].

The second most common category in the present study was reactive hyperplasia of lymph nodes in 70 cases (26.9%) which is comparable to study by A H

Khan et al (28%). Acute suppurative lymphadenopathy in 13 cases (5%) which is comparable to Mohapatra et al (5.8%) and Kochhar et al(4%) [17,22,23]. Granulomatous lymphadenitis was found in 7 cases (3.5%) without any caseation, it can be seen in variety of benign cases such as fungal infections, cat scratch diseases, collagen vascular disease and disease of retinoendothelial system. Similar findings were observed in Hirachand et al (9.2%) [12].

We had 46 cases (15%) with malignant lymph nodes. Our study was comparable to A H Khan et al (19%) [17]. Out of all malignant lesions, metastatic deposits comprised in 65.2% (30/46) of malignant lesions and 9.2% (30/306) and in other studies it was 6% in A H Khan et al, 14% in Abdul Nasar et al [17,24]. Metastatic lesions had slight male predominance with maximum number of cases had cervical group of lymph nodes, followed by supraclavicular. The commonest metastatic lesion was squamous cell carcinoma in 56.7% (17/30) cases. The same findings were also reported by Nesreen et al and Sumyra et al at 45.2% and 32.2% respectively [25,26]. The second highest lesion was Adenocarcinoma in 20% (6/36) cases, similar to Nesreen et a and Sumyra et al at 25.8% and 22% respectively [25,26].

The Metastatic Squamous cell carcinoma was found to be common equally in both males and females with oral cavity was the most common primary site involving buccal mucosa and mandible with 37.5% (6/16) cases, which is similar to U Chachra et al and Shrivastava et al [27,28]. The least common primary site was carcinoma penis. We had one case were primary site was not known. The highest incidence of squamous cell carcinoma in oral cavity in our country is due to Tobacco and betel nut chewing.

In the present study we had 15 cases of Lymphoma, 12 were Non-Hodgkins Lymphoma (NHL) in 3.9% (12/306) of total cases and three were Hodgkins lymphoma constituting 1% (3/306) of total cases. Our results were similar with Abdul Nasar et al, Nesreen et al and Sumyra et al [24,25,26]. All the NHL cases were between 50-70 years. With diffuse large B-cell lymphoma being the most common subtype comprising 58.3% (7/12), which is similar to Arun Roy et al [29]. We had three cases of Hodgkins lymphoma, two with Mixed cellular variety and one with Cellular predominant variety.

We had accuracy of diagnosis in more than 90% of the cases correlating with histopathological examination. Our Accuracy of diagnosis was more in benign cases. In Tuberculous lymphadenitis we had 100% sensitivity and 96.4% specificity respectively. The results were similar with Abdul Nasar et al, Adhikari et al and Nesreen et al [24,14,25]. The sensitivity and specificity was least in Granulomatous and Non-specific lymphadenitis. In the present study, overall sensitivity and specificity was 91.8% and 88.6% respectively. Sumyra et al reported 95%, Sumit Giri et al 90.3% of sensitivity in their studies. The specificity of the comparable studies Sumyra et al, Sumit Giri et al were 91% each respectively [26,13].

In the present study we had few limitations because our study was Retrospective with less number of cases limited to a particular geographical area. Our follow-up period was less. We need large number of samples to have a clear view of cytomorphological lesions in lymph nodes to establish the fact.

Conclusion

FNAC is a primary diagnostic tool which is as accurate as Histopathology and it is easy, reliable screening procedure for any lymph node enlargement.

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