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Original Research Article

Evaluation of Fine Needle Aspiration Cytology in Diagnosis of Lymph Node Lesions

Kavita Thakkar[1], Hiren Vaghela[2], Ashish Jawarkar[3], Premnath Hiryur[4]

[1]First Year PG Resident, Dept. of Pathology, Parul institute of medical sciences and *Research*, Vadodara.

[2]Assistant Professor, Dept. of Pathology, Parul Institute of Medical Sciences and Research, Vadodara.

[3]Associate Professor, Dept. of Pathology, Parul Institute of Medical Sciences and Research, Vadodara.

[4]Professor and Head, Dept. of Pathology, Parul Institute of Medical Sciences and Research, Vadodara.

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Corresponding author: Dr. Ashish Jawarkar

Conflict of interest: Nil

Abstract

Introduction: Fine Needle Aspiration Cytology (FNAC) is a simple and rapid diagnostic technique because of rapid availability of results, simplicity, minimal trauma and complications, the aspiration cytology is now considered a valuable diagnostic procedure. Lymph node swellings are one of the commonest clinical presentation of patients and it encompasses a wide spectrum ranging from inflammation to a metastatic malignancy.

Aim: The aim of this study is to evaluate the results of FNAC of lymph node lesions in our institution.

Material and Methods: This is a retrospective study of all the cases of lymph node lesions that were referred to pathology department for FNAC.

Results: In this 1-year study lymph node lesions were found in patients between ages of 1 to 80 years with male predominance. Overall, six lesions of lymph nodes were identified, namely: Reactive hyperplasia, Metastatic carcinoma, Granulomatous lymphadenitis, Suppurative lymphadenitis, Tubercular lymphadenitis and Lymphoma. All these lymph node lesions occurred at three sites, namely: Cervical, Inguinal and Axillary group of lymph nodes. Cervical group of lymph nodes were the most commonly affected site for lymphadenopathies and the most common lesion was reactive hyperplasia.

Conclusion: FNAC has significant diagnostic value in differentiating lymph node lesions and offers valuable information for planning and subsequent disease management. It is most suitable for use on outpatient basis as it is quick, safe, minimally invasive, reliable and cost effective. The statistics and pathological features encountered in present study can be compared with studies reported from India and outside. The findings should contribute in better understanding of the disease.

Keywords: Lymph node, FNAC, fine needle aspiration cytology, lymphadenopathy, lymphadenitis.

Introduction

Fine Needle Aspiration Cytology (FNAC) is considered a valuable diagnostic technique because of simplicity, minimal trauma and complications and rapid availability of results [1].

Lymph node swellings are one of the commonest clinical presentations of patients and it encompasses a wide spectrum, ranging from inflammation to a metastatic malignancy [2]. It not only confirms the presence of metastatic disease but also gives the clue regarding the nature and origin of primary malignancy [1].

The present study is undertaken to profile various lesions presenting as lymphadenopathies and compare our findings with other studies.

Aims and Objectives

The aim of this study is to evaluate the lymph node lesions in our population and compare with other studies.

Study type: Retrospective & Observational

Duration: 1st January 2022 – 25th December 2022 (1 year study).

Inclusion criteria: All patients with lymph node lesion who were referred to pathology department for fine needle aspiration cytology.

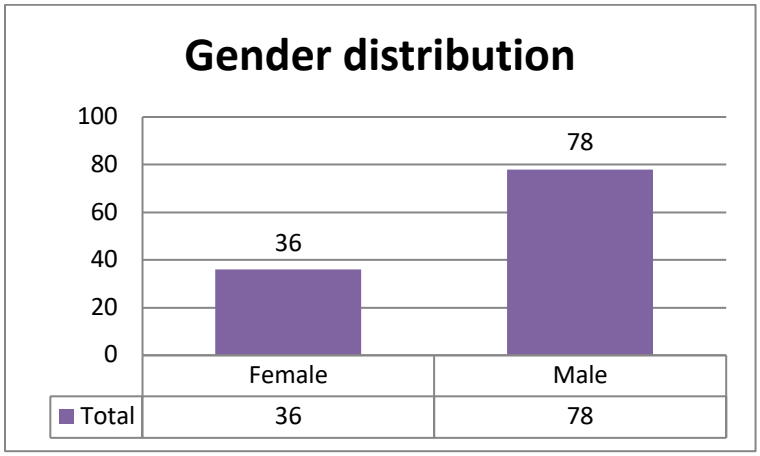
Study size: 114 cases were studied.

Methodology: In this study a total of 114 patients were selected with lymph node enlargement that were referred to Department of Pathology in Parul Sevashram hospital, Vadodara from 1st January 2022 – 25th December 2022 (1 year study). FNAC procedure was performed was performed by using a 22 – 24 gauge needle. A minimum of 0.2 cc of aspirate was taken and at least 6 slides were prepared. Three slides were fixed in alcohol and were stained by H&E and PAP stain. Two slides were air dried and were stained by Giemsa stain and one slide was reserved for Ziehl-Neelson stain for acid fast bacilli. The FNAC smears were carefully examined and studied under the microscope for arriving at a probable cytological diagnosis.

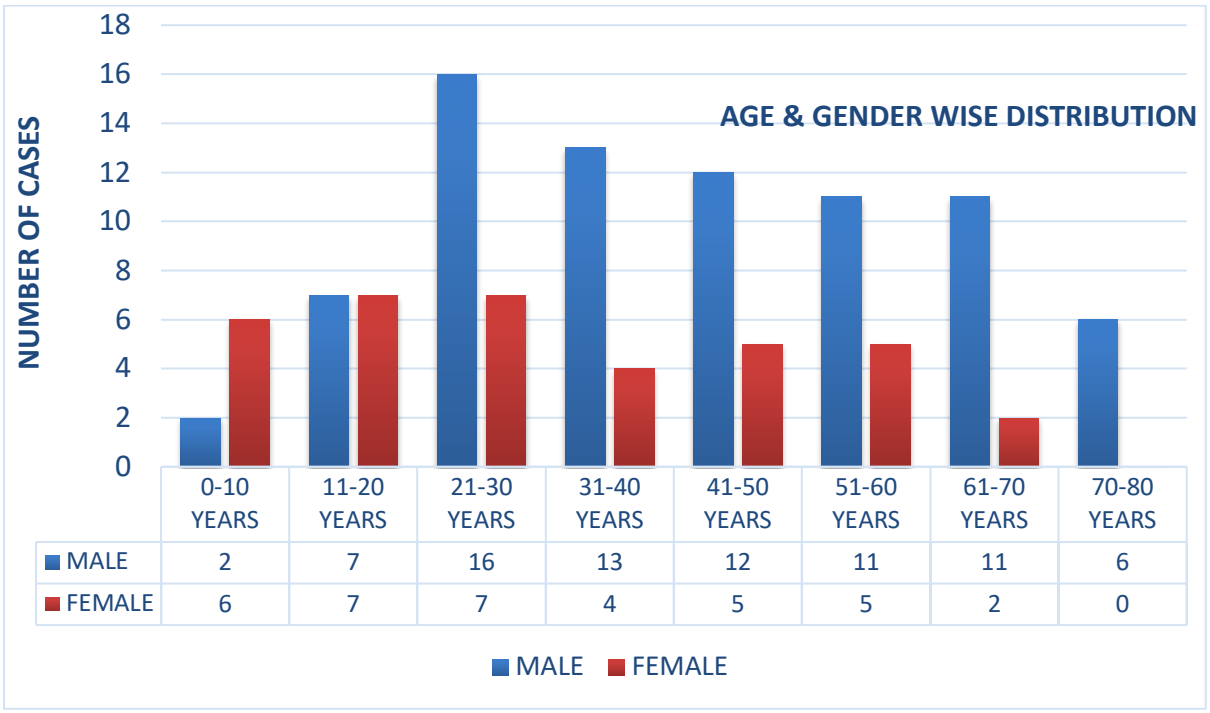
The criteria for diagnosing reactive lymphadenitis were established which included higher cellular density, polymorphic patterns of lymphocytes and presence of tingible body macrophages [2-4]. The polymorphic population comprises of lymphocytes in different stage of maturation, monocytoid B cells and plasma cells [2-5]. The lymphoid cells consist of small mature lymphocytes, both small and large cleaved cells, non-cleaved cell and immunoblasts [2-5]. The aspirate smears from lymph nodes were labelled as tubercular lymphadenitis based on the presence of caseous necrosis, epithelioid cell granulomas with or without Langhan's giant cells. Amongst 114 cases, 6 cases came out to be positive for AFB via ZN staining and were labelled as tubercular lymphadenitis [2-5].

Granulomatous lymphadenitis showed the presence of epithelioid cell granulomas but with absence of necrosis as well as giant cells. Whereas suppurative lymphadenitis exhibited polymorphs both well preserved and degenerated with necrotic cell debris and additional lymphoid cells [2-5]. Presence of cells in smears not native to lymph nodes i.e., other than lymphoid cells/ macrophages were considered as criteria for metastasis for eg: Squamous cells. Chi-square test was applied to find the association between gender and metastasis.

Results



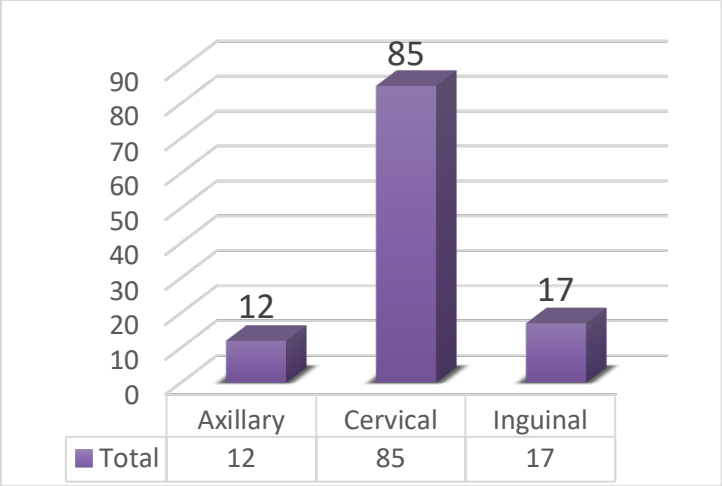
Graph 1: Gender distribution of lymphadenopathies



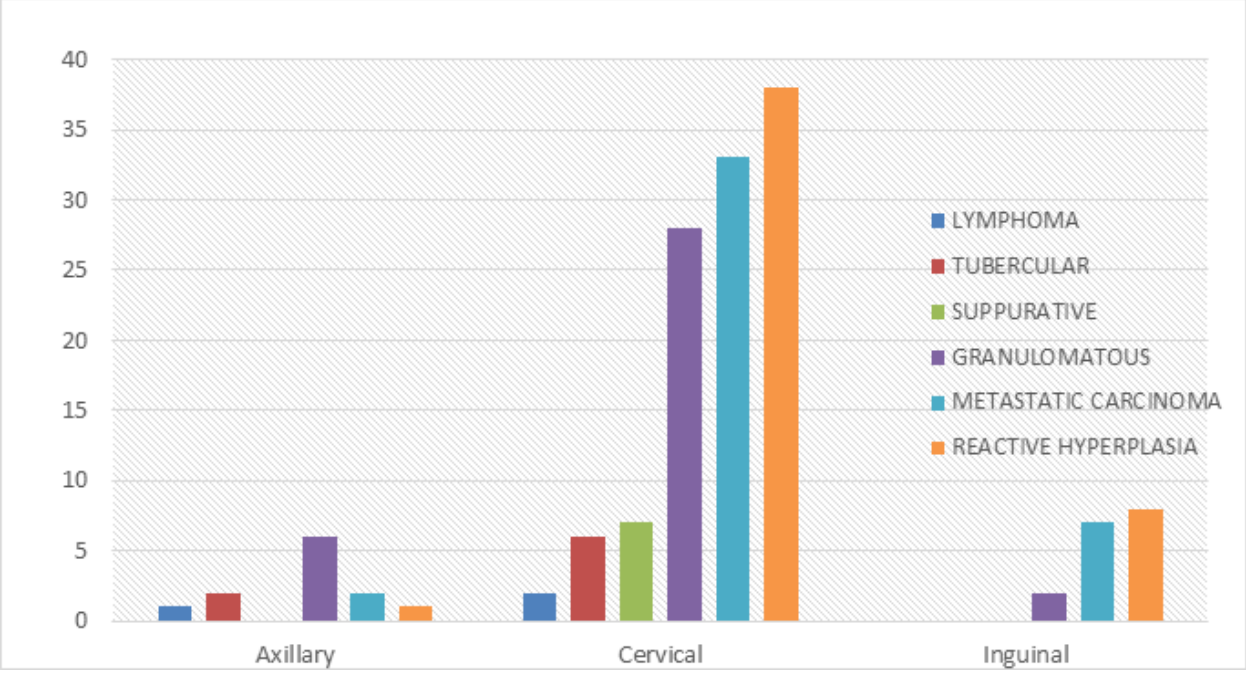
Graph 2: Age and gender wise distribution of cases

Table 1: Results on cytological examination

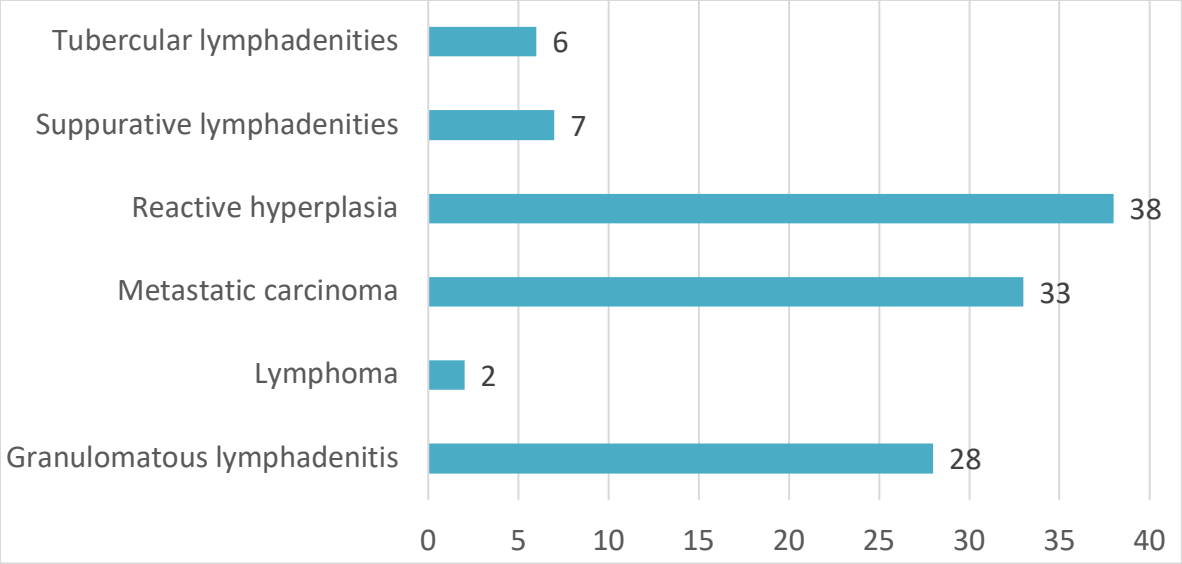
CYTOLOGICAL RESULTS	No. of cases	Percentage %
Reactive hyperplasia	38	33.30%
Tubercular lymphadenitis	6	5.30%
Granulomatous lymphadenitis	28	24.60%
Metastatic carcinoma	33	28.90%
Lymphoma	2	1.80%
Suppurative Lymphadenitis	7	6.10%
TOTAL	**114**	**100 %**



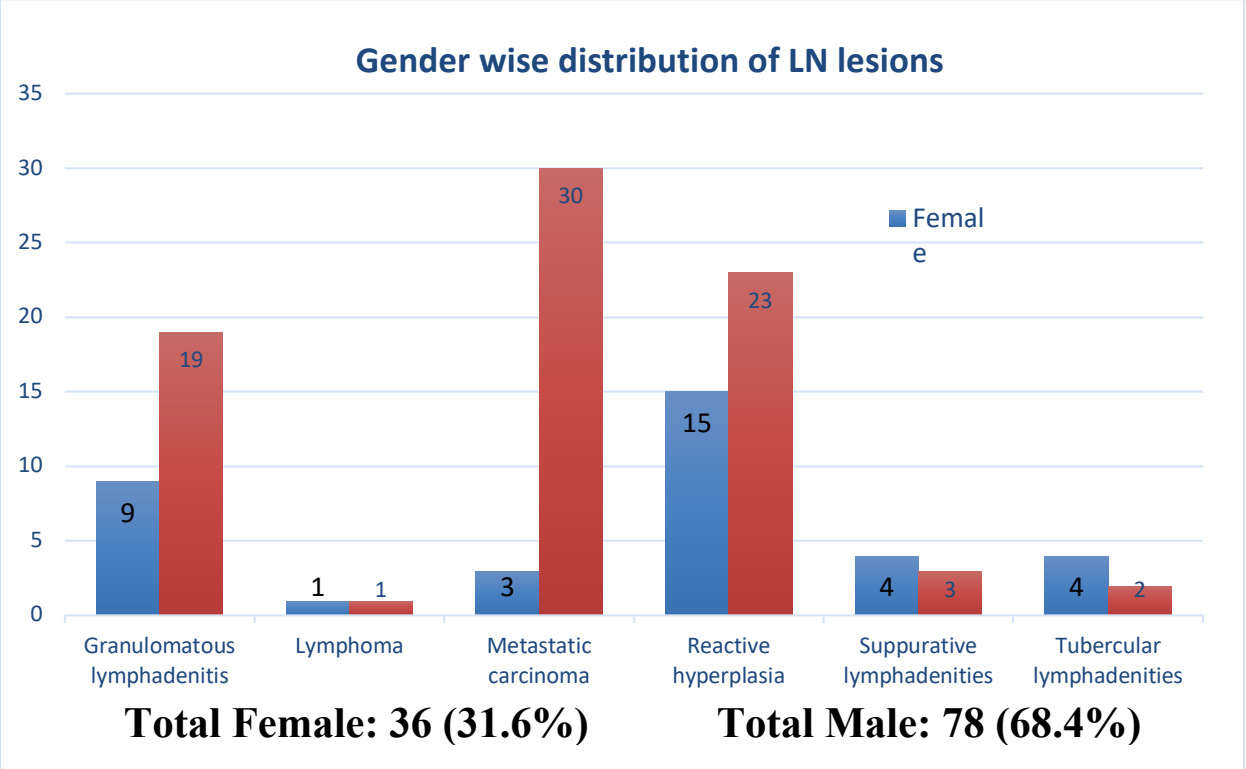
Graph 3: Site wise distribution of LN lesions



Graph 4: Site wise distribution of LN lesions



Graph 5: Frequency of different LN lesions



Graph 6: Gender wise distribution of LN lesions

In this one-year study we received a total of 114 cases of lymph node enlargement and there was male predominance with male to female ratio of 2.2:1 (See graph 1). The age range of patients was from 1 to 80 years (See graph 2).

Overall, six lesions of lymph nodes were identified, namely: Reactive hyperplasia, Suppurative lymphadenitis, Tubercular lymphadenitis, Granulomatous lymphadenitis, Metastatic carcinoma and Lymphoma (See table 1).

FNAC was performed from Cervical, Inguinal and Axillary group of lymph nodes. The commonest site of lymphadenopathy was Cervical group of lymph nodes which comprised of 74.6% of all sites and Reactive hyperplasia was the most common type of lymphadenopathy diagnosed in cervical as well as inguinal nodes, whereas, Granulomatous lymphadenopathy was the commonest lesion in axillary nodes (See graph 3 & 4).

In this study, it was found that 8 cases were in the age range of 0-10 years. 14 cases belonged to the age group between 11-20 years. 23 cases belonged to 3rd decade of life and 17 cases were found in the age range of 31-40 years as well as 41-50 years. 16 cases belonged to 51-60 years of age groups and 13 cases in the age range of 61-70 years. Only 6 cases were present in the age range of 71-80 years (See graph 2).

Out of 114 cases, 38(33.3%) cases were of Reactive hyperplasia, 33 (28.9%) cases of Metastatic carcinoma, 28 (24.6%) cases of Granulomatous lymphadenitis, 7 (6.1%) cases of Suppurative lymphadenitis, 6 (5.3 %)cases of Tubercular lymphadenitis and 2 (1.8%) cases of Lymphoma (See graph 5).

Talking about gender distribution, there were 36 cases in females out of which 15 (41.7%) were of reactive hyperplasia, 9 (25%) cases of granulomatous lymphadenopathy, 4 (11.1%) of suppurative lymphadenopathy as well as tubercular lymphadenopathy, 3 (8.3%) cases of metastatic carcinoma and 1 (2.8%) cases of lymphoma were found (See graph 6).

Out of 78 male patients presenting with lymphadenopathies, 30 (38.5%) cases of metastatic carcinoma, 23 (29.5%) cases were of reactive hyperplasia, 19 (24.4%) cases of granulomatous lymphadenitis, 3(3.8%) cases of suppurative lymphadenitis, 2(2.5%) cases of tubercular lymphadenitis and 1(1.3%) cases of lymphoma (See graph 6).

The incidence of metastatic carcinoma is 8.3% in females and 38.5% in males which yields us a very significant p value of 0.000983.

Discussion

The lymphatics form a widespread network in the body which helps in clearing out lymph through which diseases may be cleared away, however it also holds the potential for infection as well as cancer advancement [3,6]. Enlarged lymph nodes are a common presentation, accessible for FNAC and are of utmost importance in clinching the diagnosis [2,6]. It plays an important role in developing countries like India, as it is cheap, easy and a rapid diagnosing procedure with almost no complications.

The cytomorphological diagnosis given on FNAC is many times considered as the final diagnosis with no requirement of further correlation with histopathology as well as other procedures [1,4].

Table 2: Comparison of studies

Study Name	M:F ratio	Reactive Lymph adenopathy	Metastatic Lymph adenopathy	Suppurative Lymph adenopathy	Granulomatous Lymph adenopathy	Tubercular Lymph adenopathy	Lymphoma
Shakya	1.1:1	50.4%	2.8%	12.4%	10%	22.4%	2%
Mohanty	1.1:1	34.4%	18.3%	11.3%	20.3%	7.9%	3.9%
Hirachand	1.1:1	41.5%	12.3%	3%	9.2%	28%	8%
Vimal	1.2:1	33.7%	17.7%	6.4%	17.1%	11.8%	2.1%
Our study	2.2:1	33.3%	28.9%	6.1%	24.6%	5.3 %	1.8%

A large portion, 33(28.9 %) patients showed metastatic squamous cells in aspiration of enlarged LNs. On the other hand, only 2 (1.8%) cases were labelled as lymphoma with smears showing monocellular pattern comprising of lymphocytes and lymphoblasts with classical Reed-Sternberg appearance [2,3,5].

In this retrospective study, we evaluated the FNAC diagnosis of lymph node lesions and the results were comparable to other studies. We found that there was male predominance with male to female ratio of 2.2:1 which was comparable Wilkinson *et al* [7] showing 1.5:1 ratio, Vimal *et al* [4] showing ratio of 1.2:1 and Hirachand *et al* [3], Shakya *et al* [5] and Mohanty *et al* [6], all of them showing ratio of male predominance as 1.1:1.

All of the studies show that reactive hyperplasia of LN is the commonest lesion and constitute the greatest proportion (Hirachand *et al* [3] 41.5%, Vimal *et al* 33.7% [4], Shakya *et al* 50.4% [5] and Mohanty *et al* [6] 34.4%) amongst all.

Lymphoma made up the smallest proportion which was comparable to all the studies except Hirachand *et al* [3] (8%) where the presentation of suppurative lymphadenitis was the least (3%). Out of total 114 cases, 79(69.3%) cases were benign and 35(30.7%) cases were malignant lesions [8-15].

Overall, cases of reactive hyperplasia constituted the largest share, however if only male gender were to look at, metastatic lymph nodes constituted the greatest proportion. From our study age and gender wise distribution of lymphadenopathies provide us with an insight that the incidence in male patients rises rapidly in young adulthood and follows almost linear trend throughout their life. This could be due to ill-habits such as tobacco chewing, cigarette smoking and alcohol consumption, all of which are more commonly consumed by men. Furthermore, the association between gender and metastatic carcinoma is justified by highly significant p value of 0.000983 ($P < 0.05$).

In our study, the share of metastatic lymph nodes (24.6%) if highest as compared to the Shakya *et al* (2.8%) [5], Vimal *et al* [4] (17.7%), Hirachand *et al* [3] (12.3%) and Mohanty *et al* (18.3%) [6].

Cervical group of lymph nodes were the most common site of lymphadenopathy constituting 74.6% of all and reactive hyperplasia was the most common ailment diagnosed overall as well as in cervical group of lymph nodes which correlates with other studies as well (Mohanty *et al*- 66.48% [6], Vimal *et al* [4] as well as Hirachand *et al* [3]- 50.8%).

Moreover, the most common site of metastasis of malignancy was also cervical group of lymph nodes. The above-mentioned findings are comparable to studies of Shakya *et al* [5], Mohanty *et al* [6], Wilkinson *et al* [7] and Hirachand *et al* [3].

Nevertheless, our proportion of metastatic lymph nodes is quite greater than other studies since the majority of patients coming to this hospital belong to economically backward class where tobacco chewing, alcohol and beetle nut consumption is exceptionally habitual.

Conclusion

FNAC has significant diagnostic value in differentiating lymph node lesions benign as well as malignant and offers valuable information for planning and subsequent disease management [4]. FNAC is most suitable for use on outpatient basis, in peripheral hospitals and dispensaries as it is quick, safe, minimally invasive, reliable, cost effective and readily acceptable by patient which not only provides prompt diagnosis but also grabs unsuspected malignancies [4,6]. The significant p value derived by chi-square analysis between gender and

metastasis also contributes towards our understanding of lifestyle differences between both genders. The findings should contribute in better understanding of the causes of lymphadenopathies and aid in further management. Furthermore we would advise high index of suspicion in dealing with cervical lymphadenopathies as likely hood of metastasis is frequent.

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