Original Article

# Analysis of cytomorphological pattern of lymph node aspirates in head and neck region by fine needle aspiration cytology

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## Abstract

**Aim and Objectives:** To study cytomorphological characteristics of lymph node swellings in head and neck region by FNAC. **Material and Methods:** The present study was carried on lymph node swelling in head and neck region in the Department of Pathology, B.V.D.U Medical College and Hospital, Sangli. **Results:** A total of 81 lymph node aspirates were studied among which non neoplastic lesions were more common comprising of 56 (69.04%) cases than neoplastic lesions which comprised of 25 (31.06%) cases. Among non neoplastic lesions, tubercular lymphadenitis was most common which comprised of 27 (33%) cases. The most common cytological pattern observed was presence of epithelioid cell granuloma and caseous necrosis (ECG+CN) in 10 (37%) cases of tubercular lymphadenitis. Overall AFB positivity was 37% and there was a female preponderance (Z=66.34 P=0.00). Most common neoplastic lesion was metastatic tumor deposit which comprised of 21 (25%) cases. Squamous cell carcinoma was the most common histologic subtype observed in metastatic tumor deposits and was more common in males (Z= 156.8 P=0.00) with male to female ratio of 1:0.2. Malignant lymphomas comprised of 4 (4.9%) cases. One of these was Hodgkin lymphoma and three were non Hodgkin lymphoma. **Conclusion:** FNAC is a minimally invasive first line investigation for the diagnosis of lymph node swelling in head and neck Region.

**Keywords:** FNAC, Tubercular lymphadenitis, Metastatic tumour deposits, lymph node.

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## INTRODUCTION

Fine needle aspiration cytology (FNAC) is a procedure in which a fine needle (No-23-26) is used to aspirate a sample of cells from a suspicious mass for diagnostic purpose.[1] FNAC is a simple, rapid, inexpensive, cost effective, safe procedure and can be used as a routine OPD procedure for the diagnosis of various lesions. Aspiration cytology of lymph node is used as a primary method of diagnosis in reactive, infective and metastatic lymphadenopathy.[2] The present study is undertaken to analyse various cytomorphological pattern of lymph node aspirates in head and neck region by FNAC.

## MATERIAL AND METHOD

The present study on 81 patients with lymph node swelling in head and neck region was conducted in the Department of Pathology, B.V.D.U Medical college and hospital, Sangli from November 2013 to October 2015 (2 years). Required Ethical Clearance from the college and the University Committees was taken (Letter No.– BVDUM CandH/Sangli/IEC/ Dissertation 2013-14/57). After the requisite Ethical clearance, Informed consent in written was obtained separately from each study subject individual. In case of minors informed consent in written was obtained from their legal guardians. FNAC was be done on the Lymph node swellings in head and neck

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using 23–26 gauge needle. Standard clean dry grease free slides along were used. The aspirated material was spread on slide with help of another slide and then dipped into fixative immediately to prevent air drying. H and E stains was done for all specimen. Special stains like Gram stain, Zeihl Neelsen stain and Grocott' smethenamine silver (GMS) stain were employed wherever necessary. Mean and standart deviation was obtained for age(in years), Proportions and percent were calculated for qualitative characters. Standart error of difference between two proportions(Z test ) was applied. Statistical analysis was done using Microsoft Excel and SPSS22.

## RESULTS

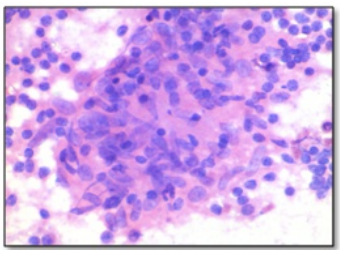
During the period of present study 85 lymph node aspirations were done. Among 85 cases those who underwent FNAC, in 81 cases aspirate was satisfactory and 4 cases were inadequate material even after repeated aspirations. Fine needle aspirations of 81 patients were finally considered in the study. The following observations were made. In the present study age of patient ranged from 2 years to 80 years. Among the 81 patients referred for FNAC, majority of the patients were in the age group of 21- 30 years i.e15 (18.7%), followed by 31-40 years i.e13 (16%). In males, maximum number of cases occurred in second decade i.e. 9 (11.1%) cases while in females in third decade i.e. 10 (12.3%) cases. Out of 81 cases 42 (51.7%) were males and 39 (49.3%) were females. Male to female ratio was 1:0.8. In present study out of the total 81 patients, 56 (69.4%) had non neoplastic lesions and 25 (30.6%) had neoplastic lesions. Tubercular lymphadenitis was the commonest lesion, accounting for 27 (33.3%) cases encountered among non neoplastic lesions followed by reactive lymphadenitis in 24 (30%), suppurative lymphadenitis in 4 (4.9%) cases and a single case of cryptococcallymphdenitis (1.2%). Among the neoplastic lesions metastatic involvement of lymph node was the commonest pathological finding detected on cytology in 21 (25.9 %) cases and lymphoma was observed in 4(4.9%) cases. Among metastatic tumor deposits metastatic squamous cell carcinoma was most common accounting for 18(22.2%) cases followed by metastatic adenocarcinoma in 3(3.7%). Among lymphomas 3 cases were of non Hodgkin lymphoma and one case was of Hodgkin lymphoma. In our study the aspirates from lymph node were diagnosed as tubercular lymphadenitis based on the presence of epithelioid cell granuloma and caseous necrosis with or without Langhan's type of giant cells in a background of lymphoid cells. Among these, 10 cases were 20 % Ziehl-Neelsen staining positive. Tubercular lymphadenitis was seen more commonly in third and fourth decades together comprising of 15 (55%) cases. Mean age was 35 years. Male to female ratio was 1:1.45. Females (Z=66.34 P=0.00) were significantly more affected than males. We grouped smears of tubercular lymphadenitisinto three categories. Smears showing epithelioid cell granuloma andcaseous necrosis, constituted predominant pattern with 10 (37%) cases, followed by only epithelioid cell granuloma only (ECG) with 9(33%) followed by caseous necrosis with or without degenerated inflammatory cells 8 (30%). The smears in this pattern showed presence of abundant viable and degenerated inflammatory cells and majority were positive for acid fast bacilli.

**Table 1:** Types of cytological features in patients with tubercular lymphadenitis

| Sr. No | Cytological pattern | No. of cases | % | AFB positivity (%) |
|---|---|---|---|---|
| 1 | Epithelioid cell granuloma and caseous necrosis (ECG+CN) | 10 | 37% | 40%(4/10) |
| 2 | Epithelioid cell granuloma only (ECG) | 9 | 33% | 11%(1/9) |
| 3 | Caseous necrosis withOr without Degenerated inflammatory cells | 8 | 30% | 62%(5/8) |
| | **Total** | **27** | **100%** | **37%(10/27)** |

**Table 2:** Cytological features of Reactive lymphadenitis

| Sr. No | Cytological features | No. of Patients | % |
|---|---|---|---|
| 1 | Polymorphous population of Lymphocytes | 24 | 100% |
| 2 | Tingible body macrophages | 21 | 87.5% |
| 3 | Lympho-histiocytic aggregates | 12 | 50% |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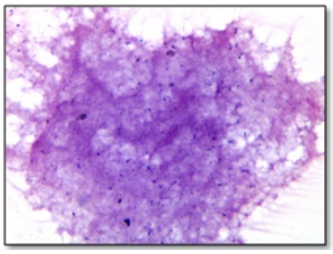
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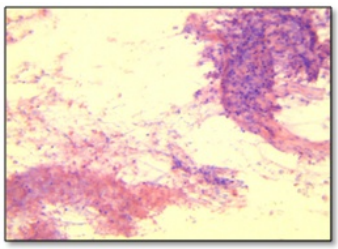
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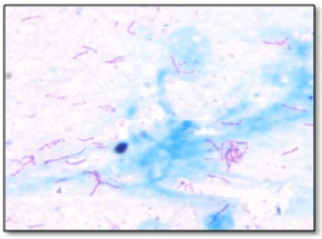
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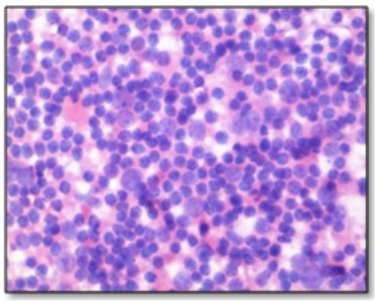
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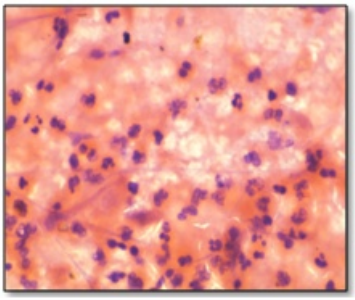
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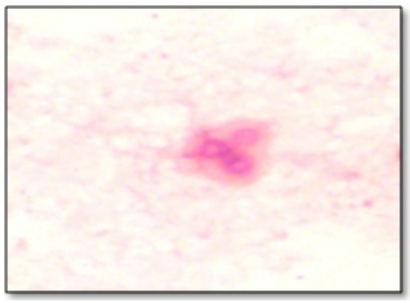
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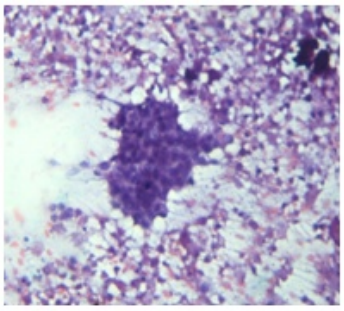
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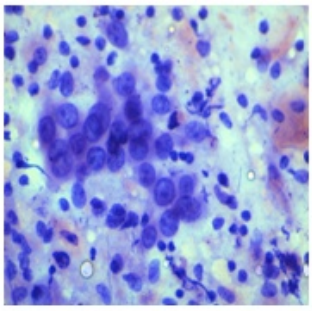
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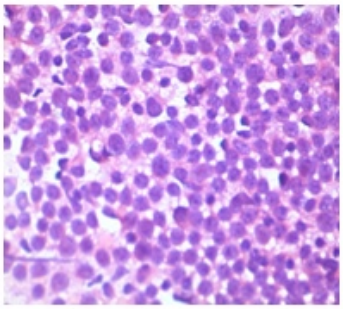
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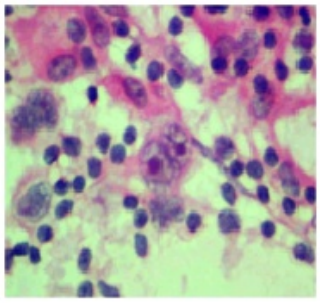
Figure 11

**Legend**

**Figure 1:** Epitheloid cell granuloma only (H and E 40x); **Figure 2:** Caseous necrosis with few degenerated inflammatory cells (H and E 40x)
**Figure 3:** Caseous necrosis and epithelioid cell granuloma (Hand E 10x); **Figure 4:** Numerous AFB in areas caseous necrosis (20% ZN 100x)
**Figure 5:** Reactive lymphadenitis; **Figure 6:** Suppurative Lymphadenitis; **Figure 7:** Cryptococcal lymphadenitis (H and E 40x)
**Figure 8:** Metastatic squamous cell Ca; **Figure 9:** Metastatic adenocarcinoma **Figure 10:** NHL – DLBCL; **Figure 11:**RS cell Hodgkins Lymphoma

In the present study majority of patients with reactive lymphadenitis were seen in the age group of 21-30 years with 7 (29%) cases followed by 11-20 years with 5 (20.7%) cases. Male to female ratio was 1:1. All the cases showed a smear composed of polymorphous population of lymphoid cells representing whole range of lymphocytic transformation from small lymphocytes to immunoblasts and histiocytes. Tingible body macrophages in 21 cases (87.5%) and Lympho-histiocytic aggregates were present in 12 (50.00%) cases. Suppurative lymphadenitis in the present study was present in majority of patients (50%) in the age group of 61-70 years. Male to female ratio was 1:1. Smears in all cases showed presence of abundant viable and degenerated polymorphs along with scattered lymphocytes and histiocytes. 20% Z-N staining for acid fast bacilli was negative in all of these cases. In present study there was one case of cryptococcal lymphadenitis. Smears examined showed cells of lymphoid series. The background showed multiple scattered encapsulated organisms of variable sizes showing budding yeast like forms.

The most common neoplastic lesion encountered in lymph node in our study was metastatic tumor deposits among which metastatic squamous cell carcinoma was the most common comprising of 18 (85%) cases. Majority of patients with metastatic squamous cell carcinoma were in the age group of 41-50 years with 7.(38.9%)cases with mean age of 52.78 years. Males were significantly more (Z= 156.8 P=0.00) affected with Male to female ratio of 1:0.29. In our study there were three cases of metastatic adenocarcinoma. All three were in age group of 51-70 years. All these three patients had come with enlargement of left supraclavicular lymph node. Among these three patients two were female and one was male. Among these one patient was a known case of

Infiltrating Ductal carcinoma, (Not otherwise specified). Other patient was a diagnosed case of gastric carcinoma. In third patient primary was occult. There were three cases in whom a diagnosis of non Hodgkin lymphoma was given on FNAC. All three patients were females in age group 60 -70 years. Smears in all three cases showed cells with high N: C ratio having round pale nuclei with multiple peripheral nucleoli and scanty cytoplasm. All three cases were followed by biopsy and IHC. On IHC large cells in all three cases expressed cluster of differentiation (CD)20, PAX 5. Mib 1 proliferative index was 80%. Large cells were negative for CD 3, Cycline D1 and terminal deoxynucleotidyltransferase (Tdt). In present study there was one case of Hodgkin lymphoma. Patient was a 22 year male. Smear in this case showed Reed Sternberg cells on a background of variable number of lymphocytes, eosinophils, plasma cells and histiocytes. This case was also followed by biopsy and immunohistochemistry. On immunohistochemistry Reed sternbergs cells expressed cluster of differentiation (CD) 30 and PAX 5. They were negative for CD 15, Leucocyte common antigen (LCA) and B cell specific octamer binding protein 1 (Bob1). So a diagnosis of Hodgkin lymphoma classic type was given.

## DISCUSSION

The age range in our study was from 2 years-80 years with mean age of 40.38 years. The mean age is comparable with observation made by Amatya *et al*[3] but it differs from that of McLean *et al*[4] and Wahid *et al*[5] probably due to variation in age composition of study subjects. Our study included 42 males and 39 females with M: F ratio being 1:0.8. The occurrence of lymph node swellings in head and neck region was more common in males as observed in studies by McLean *et al*[4], Chauhan *et al*[6] and Ishar *et al*[7]. In our study, the most common non neoplastic lymph node lesion was tubercular lymphadenitis. It comprised 33% of all lymph node lesions. Second most common non neoplastic lesion was reactive lymphadentis. Our observation were comparable to Bandopadhya *et al*[8], Khan *et al*[9] and Fatima *et al*[10]where tubercular lymphadenitis was most common non neoplastic lesion. Most common cytological pattern observed in tubercular lymphadenitis was epithelioid cell granuloma with caseous necrosis. Similar observations were made by Das *et al*[11], Vanishri *et al*[12], Guru *et al*, Laishram *et al*[13] and Hemlata *et al*[14]. Second most common cytological pattern observed in our study was epithelioid cell granuloma only. Similar observation. were made by Vanishri *et al*[12] and Laishram *et al*[13]. Variable AFB positivity by 20% ZN technique has been observed by different authors in tubercular lymphadenitis in head and neck region ranging from as low as 18.8%[15] to as high as 66.6%[16]. In our study 20% ZN stain yielded an AFB positivity of 37%. Close to this, AFB positivity was 39.7% in study by Gong *et al*.[15], 33% by Jain *et al*[17]., 34% by Laishram *et al*[13], 44% by Chand *et al*[18]., 42% by Mirza *et al* and 47% by Pahwa *et al*. In our study maximum number of AFB positivity was seen with cytological pattern of caseous necrosis with or without degenerated inflammatory cells. Similar observations were made by Das *et al*[11], Laishram *et al*[13] and Hemlata *et al*[14]. Liquefaction of caseous necrotic foci is associated with marked proliferation of tubercular bacilli and infiltration by polymorphonuclear cells is cause of maximum AFB positivity in this pattern[19,20]. Minimum AFB positivity was seen with cytological pattern of epithelioid cell granuloma only. Similar observations were made Das *et al*, Laishram*et al*[23], Chand *et al* and Hemlata *et al*. Epithelioid cells are likely to have some role in limiting the proliferation of AFB is the cause of low AFB positivity in this cytological pattern. In our study females (Z=66.34 P=0.00) were more affected than males.Higher incidence of disease among females may be due to low immunity of Indian females, particularly those belonging to low socioeconomic strata and those in reproductive age group. Paliwal*et al*[21], Khajuria *et al*[22], Narang *et al*[23], Mohapatra[24] and Janmeja also noted female preponderance in their study. In our study, reactive lymphadenitis was observed in 24(30%) of lymph node lesions and was the second most common lymph node lesion in head and neck. This finding is comparable with other workers such as Bandopadhyay*et al*[8], Khan *et al*[9] and Fatima *et al*[10] where it comprised of 20%, 28% and 16.1% of all lymph node lesions in head and neck respectively. There were 4 (4.9%) cases of acute suppurative lymphadenitis in our study which is comparable with Patra*et al*[25] and Fatima *et al*[10] where it formed 5.3% and 4.2% of lymph node lesions in head and neck region. In our study metastatic tumor deposit accounted for 25.9% of all cases of lymphadenopathy in head and neck region and was the most common cause of malignant lymph node lesions in this region. Similar finding was also noted by other workers such as Patra*et al*[25], Bandopadhyay *et al*[8], Shakya *et al*[26] and Wahid *et al* where metastatic lymphadenopathy accounted for 14.5%, 24%, 28% and 19% respectively. The present study comprised of 21 cases of metastatic deposits in lymph nodes. 18 of these cases were diagnosed as metastatic squamous cell carcinoma accounting for 85.7% of all metastatic deposits. Thus squamous cell carcinoma is the most common cytological type leading to metastasis. This finding correlates well with studies done by other workers such as Advani *et al*[27], Wilkinson *et al*[28] and Alam*et al*[29]. In our study males were affected significantly more (Z= 156.8 P=0.00) than female and majority of patients were

in the age group of 41-50 years.(38.9%) with mean age of 52.78 years. Similar observations were made by Naeimimohammad *et al* where mean age was 47.08 years and males were affected significantly more than females.[30] In the present study Hodgkin's Lymphoma was reported in 1.2% cases and Non Hodgkin's Lymphoma in 3.7% cases. This correlates well with SumitGiri*et al*[32]and Patra *et al* who reported 1.08% and 1.9% cases of Hodgkin's Lymphoma respectively. Nesreen *et al*[33]Sumyra *et al* and Wahid *et al* reported 2.6%, 2% and6% of cases of Hodgkin's Lymhoma respectively which are slightly higher than the present study. In the case of NHL, SumitGiri *et al* reported much lesser percentage of cases at 1.62% where asNesreen *et al*and Sumyra *et al* reported a higher percentage of NHL cases at 5.7% and 6.5% respectively.

## CONCLUSION

Fine needle aspiration cytology offers a simple method for diagnosis of non neoplastic and neoplastic lymph node swelling in head and neck region. The most frequent causes of lymphadenopathy are turbercular lymphadenitis, reactive lymphadenitis, and metastatic malignancies. FNAC alone can help in establishing the diagnosis in large number of cases. In certain situation it can be enough for diagnosis in proper clinical setting to avoid surgical procedure like biopsy. FNAC used to conjunction with clinical findings, radiological and laboratory investigations can be a cost effective method. In our study, the procedure was safe and complications were not reported. Hence we conclude that fine needle aspiration cytology is a highly effective diagnostic procedure in the management of patients with lymph node swelling in head and neck.

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