

Original research article

Evaluation of cytomorphological patterns on lymph node aspiration: A hospital-based study

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Abstract

Background: Enlargement of lymph nodes (lymphadenopathy) is a very frequent presentation in patients of all age groups. Fine needle aspiration cytology (FNAC) is a rapid, simple and valuable diagnostic tool in the evaluation of patients with lymphadenopathy.

Aim: The aim of the study was to evaluate the cytomorphological patterns on FNAC of enlarged lymph nodes in a tertiary care hospital during the period from June 2021 to May 2022.

Materials and Methods: A total of 470 patients who presented in the cytology section of the Department of Pathology, Tezpur Medical College and Hospital for FNAC of enlarged lymph nodes and whose smears were adequate for cytological evaluation were included in the study.

Results: During the course of the study period, 495 patients with enlarged lymph nodes who underwent FNAC were examined out of which smears of 470 patients were found to be adequate for evaluation and thus were included. In the study, male patients constituted 53.6% and female patients 46.3%. The age of the patients ranged from 6 months to 85 years. The majority of the cases were benign (90.8%). Cervical lymph nodes were involved in the majority (77.4%) of patients. Granulomatous lymphadenitis comprised the maximum number of cases (47.4%), followed by reactive lymphadenitis (30.8%). 39 cases of metastatic and 4 cases of Non-Hodgkin lymphoma were found among the malignant cases.

Conclusion: FNAC is a quick, easy, safe, and inexpensive diagnostic tool for determining the pathology of enlarged lymph nodes.

Keywords: Lymphadenopathy, FNAC, granulomatous lymphadenitis, reactive lymphadenitis

Introduction

Enlargement of lymph nodes (lymphadenopathy) is a very common and frequent presentation in people of all age groups attending the outpatient department ^[1]. A palpable lump or swelling is a cause of great anxiety to the patients. Fortunately, the majority of cases of lymph node enlargement are benign ^[2] and can be treated conservatively. The spectrum of conditions affecting the lymph nodes is also very wide ranging from inflammations and infections to malignancy. These conditions elicit reactions within the lymph nodes leading to enlarged lymph nodes.

The FNAC technique was first introduced in the early 20th century by Greig and Grey ^[3]. FNAC is a simple, convenient, quick, less invasive and cost-effective first-line diagnostic tool with high accuracy ^[4]. FNAC has been extensively used in establishing the diagnosis of mainly superficial masses and lesions in various sites of the body and is most convenient for outdoor patients ^[5]. An excisional biopsy of a clinically significant lymph node swelling is traditionally favoured as a diagnostic procedure for a variety of infectious and neoplastic disorders ^[6]. Cytological evaluation by performing FNAC provides the treating physician with the advantage to go for conservative treatment in contrast to more aggressive surgical procedures.

This study was undertaken with the objective to evaluate the cytological patterns of various lymphadenopathies and to determine the frequency of various lymph node lesions by fine needle aspiration procedure on patients referred to with enlarged lymph nodes.

Materials & method: This retrospective study was carried out in the Cytopathology section of the Department of Pathology, Tezpur Medical College and Hospital, Sonitpur, Assam, India during the period from June 2021 to May 2022. A total of 495 patients with lymphadenopathy who were referred from various departments were included in the present study.

Out of these, aspirates from 25 patients were haemorrhagic, and hence no opinion was possible and hence were excluded from the study group. The remaining 470 cases comprised our study group. Written consent was taken from every patient and the study was undertaken after taking permission from the institutional ethical committee.

FNAC procedure was performed under aseptic conditions after taking the clinical history, physical examination and basic investigations of the patients. FNAC was performed on patients using 22/24 gauge needle attached to 10 cc disposable syringes as per standard operating procedure [6]. The materials obtained by FNAC of enlarged lymph nodes were smeared on clean grease-free glass slides; air dried for May Grunwald Giemsa (MGG) staining and 95% ethyl alcohol fixed smears for Papanicolaou (Pap) stain. Ziehl-Neelsen staining was done as and when deemed necessary. Deep-seated lesions were aspirated under a CT scan and ultrasound guidance. The aspirated fluids from cystic lesions were centrifuged and smears prepared from the sediments and stained by the above methods. All slides were mounted after staining and studied under the microscope. All FNAC slides were examined by two pathologists independently and a diagnosis was made on the basis of cytomorphological features.

Ethical approval: The study protocol and the subject information were reviewed and approved by the Institutional Human Ethical Committee, Tezpur Medical College & Hospital vide letter number 115/2022/TMC&H dated 29/11/2022.

Result: A total of 495 cases of lymphadenopathy referred for FNAC during the study period from June 2021 to May 2022 in the cytology section of the Department of Pathology, Tezpur Medical College and Hospital were analyzed. Out of these, 470 cases yielded adequate materials and were included in our study.

The age of the patients ranged from 6 months to 85 years. The mean age was 30.2 years. The youngest patient was diagnosed with reactive lymphadenitis and the oldest patient had metastatic squamous cell carcinoma. The maximum number of cases was observed in the age group of 21-30 years with a male-to-female ratio of 1.15:1.

The most common site of lymphadenopathy observed was the cervical group of nodes (77.4%) followed by the axillary group of lymph nodes (10.6%).

Granulomatous lymphadenitis was the most common cause of enlarged lymph nodes in our study constituting 47.4% of total cases. Reactive lymphadenitis was the second most common cause of lymphadenopathy (30.8%) followed by suppurative lymphadenitis (8.5%). Among the malignant cases, 39 cases of metastatic carcinoma and 4 cases of non-Hodgkin's lymphoma were associated with lymphadenopathy.

Granulomatous lymphadenitis was diagnosed by the presence of epithelioid granuloma with or without necrosis. Ziehl-Neelsen staining for acid-fast bacilli was done in the 223 cases of granulomatous lymphadenitis. 73 cases (32.7%) showed acid-fast positivity.

Reactive lymphadenitis was diagnosed by the presence of a polymorphous population of lymphoid cells with tingible body macrophages. This was the second predominant diagnosis comprising 145 cases (30.8%). Suppurative lymphadenitis was diagnosed by the presence of neutrophilic sheets in the aspirate in a background of necrotic debris. This was seen in 40 cases (8.5%). Metastatic malignant deposits were diagnosed based on their cytomorphological details and clinical history. Metastasis was seen in 39 cases (8.3%). The majority of the metastatic deposits were of squamous cell carcinoma (53.8%), followed by adenocarcinoma (38.4%). 2 cases of poorly differentiated carcinoma and one case of Papillary carcinoma of thyroid were among the 39 metastatic cases.

The present study also included 12 cases of chronic non-specific lymphadenitis comprising 2.5% of cases. Necrotic Lymphadenitis was marked by the presence of abundant necrotic material only and was seen in 7 cases (1.4%).

Discussion

FNAC is a simple, quick, inexpensive, relatively safe and valuable diagnostic tool for establishing a diagnosis in cases of enlarged lymph nodes and masses in various sites [1, 7, 8, 9, 10, 11, 12]. FNAC has diminished the need for excision of enlarged lymph nodes, especially in granulomatous and reactive lymphadenitis. It is a very useful tool, especially in developing countries with limited financial and healthcare resources.

In our present study, 470 aspirates obtained by FNAC of enlarged lymph nodes of various regions were examined under the microscope after proper staining.

Aspirates were found to be benign in 427 cases (90.8%) and malignant in 43 cases (9.1%). In our study, the maximum number of cases were observed in the 21-30 year age group constituting 27.2% of cases and a slight male predominance was observed with a male-to-female ratio of 1.15:1 which correlated with other studies [1, 8, 9, 10, 13, 14, 15, 16].

In our study, the youngest patient was 6 months old and the oldest patient was 85 years. These figures are close to those observed by others [1, 19, 20].

The majority of the patients in our study had cervical lymphadenopathy (77.4%), followed by the axillary

group of lymph node enlargement (10.6%). Cervical lymphadenopathy followed by axillary lymph node involvement was also observed by other studies [1, 7, 9, 17, 20, 22]. This may be due to the fact that reactive lymphadenitis is most common in the cervical region.

In our study, granulomatous lymphadenitis (including tubercular) was the most common cause of lymphadenopathy, comprising 47.4% of cases where majority of the cases presented with cervical lymphadenopathy. Similar findings were also reported by other studies [16, 17, 18, 19, 23, 24, 25, 26, 33, 35]. However, this finding is contradicted by a few studies [1, 7, 10]. This discrepancy may be because the majority of our patients were tea garden workers with a low socioeconomic status where the prevalence of tuberculosis is high.

Reactive lymphoid hyperplasia was the second most cause of lymphadenopathy in our study comprising 30.8% of cases which is supported by the findings of other studies [16, 17, 19, 23, 24]. The majority of reactive lymphadenitis is self-limited or subsides after a course of antibiotics.

Suppurative lymphadenopathy was observed in 8.5% of cases which is in concordance with other studies [1, 7, 16, 19, 23, 24].

Metastatic lymphadenopathy was diagnosed in 8.3% of cases. Out of these, metastatic squamous cell carcinoma was the most common type followed by adenocarcinoma. Similar findings were observed by others [27, 28, 29, 34]. However, a study by Ghartimagar D *et al.* [31] observed a higher incidence of adenocarcinoma. Squamous cell carcinoma (SCC) particularly head & neck SCC is very prevalent in this region. This may be the reason for the higher incidence of metastatic SCC in our study.

The present study consisted of 2.5% cases of Chronic Non-specific lymphadenitis which correlates with the finding of other researchers [7, 22]. However, Gayathri *et al.* [1] observed 18.5% cases of chronic Non-specific lymphadenitis. Chronic nonspecific lymphadenitis is a diagnosis of exclusion when all the specific and reactive causes of lymphadenitis are excluded. Moreover, there may be interobserver variation in these cases.

Necrotic lymphadenitis was observed in 1.4% of cases which is similar to the findings observed by Duraiswami *et al.* [5].

4 cases of lymphoma were detected in the present study and all of them were Non-Hodgkin lymphoma. This finding is supported by other studies [1, 7, 17, 18, 19, 22, 23, 26, 27].

Conclusion

Lymphadenopathy is a very common clinical finding in patients of all age groups. The causes of lymphadenopathy may range from self-limiting reactive lymphadenitis to highly fatal metastatic lymphadenopathies. FNAC being a simple, rapid and safe outdoor procedure has proved to be very useful, owing to its high sensitivity and specificity.

Table 1: Age and Sex distribution of cases of lymphadenopathy

Age	Male cases	Female cases	Total (%)
0-10 years	30	23	53 (11.2%)
11-20 years	39	25	64 (13.6%)
21-30 years	56	72	128 (27.2%)
31-40 years	45	50	95 (20.2%)
41-50 years	52	28	80 (17.0%)
51-60 years	9	7	16 (3.4%)
61-70 years	12	10	22 (4.6%)
>70 years	9	3	12 (2.4%)
Total	252	218	470(100%)

Table 2: Involvement of different lymph node regions

Lymph node groups	No of cases	Percentage (%)
Cervical	364	77.4%
Axillary	50	10.6%
Inguinal	29	6.1%
Abdominal	20	4.2%
Mediastinal	07	1.5%

Table 3: Different lesions diagnosed based on cytomorphological features

Cytological diagnosis	No of cases	Percentage (%)
Granulomatous	223	47.4%
Reactive	145	30.8%
Suppurative	40	8.5%
Metastatic	39	8.3%
Chronic non-specific	12	2.5%
Necrotic	07	1.4%
NHL	04	0.85%

Table 4: Acid Fast Positivity

Granulomatous lesions	AFB Positive	AFB positive percentage (%)
223	73	32.7%

Table 5: Different Types of Metastatic Lymphadenopathies

Metastatic deposits (39 cases)	No of cases	Percentage (%)
Squamous cell carcinoma	21	53.8%
Adenocarcinoma	15	38.4%
Poorly differentiated Ca	02	5.1%
Papillary carcinoma (Thyroid)	01	2.5%

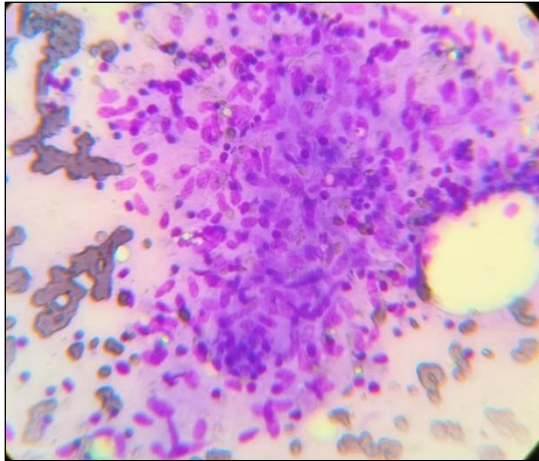


Fig 1: Aspirates showing granulomatous lymphadenitis

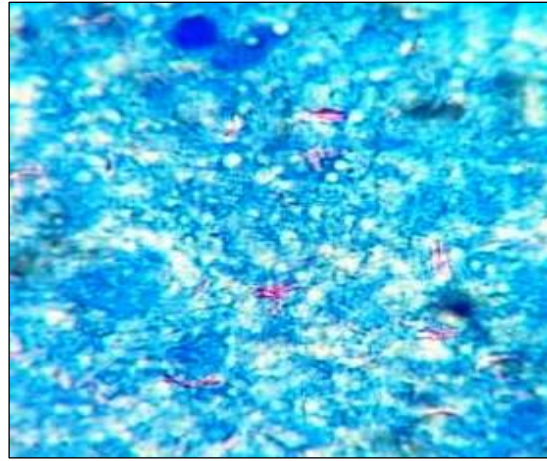


Fig 2: Acid fast positive bacilli on ZN staining

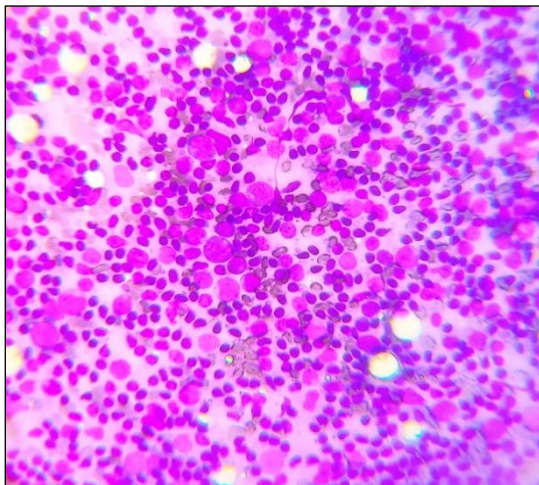


Fig 3: Photomicrograph showing Reactive lymphoid hyperplasia

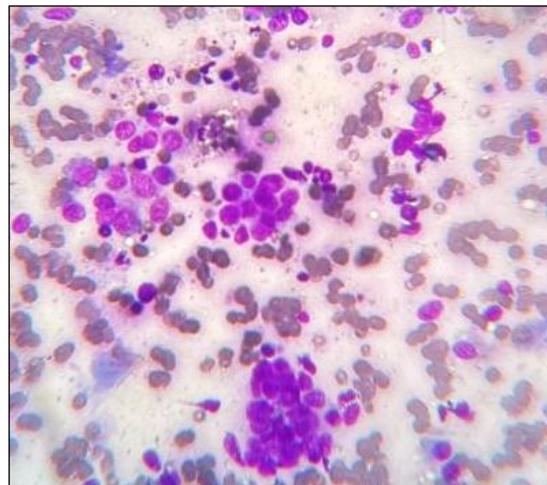


Fig 4: Adenocarcinoma metastasis in lymph node

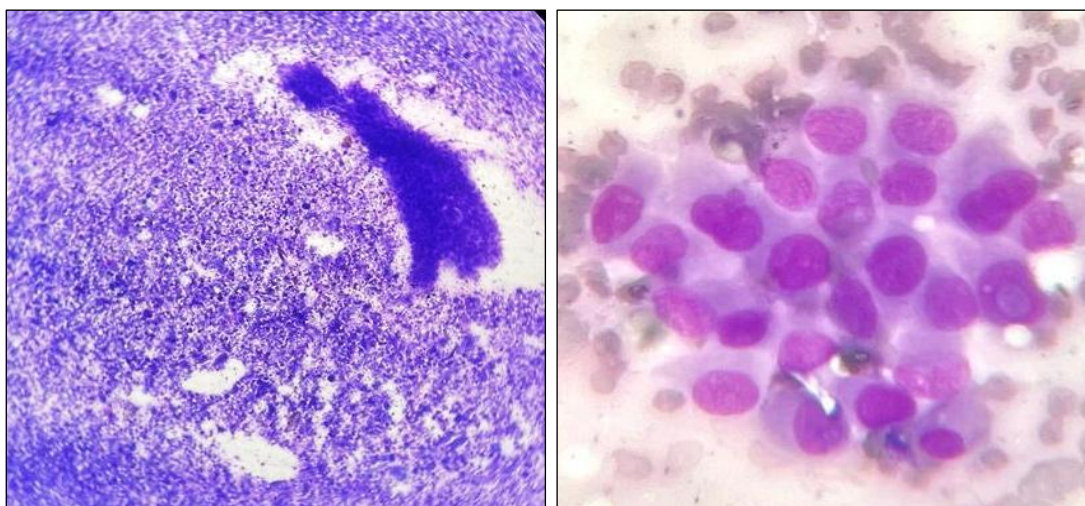


Fig 5: Metastatic Squamous cell carcinoma in Lymph node

Fig 6: Metastatic deposits of papillary thyroid carcinoma

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