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Fine Needle Aspiration Cytology of Lymph Node Lesions of Head & Neck Region among Bangladeshi Population

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Abstract

Background: Lymphadenopathy in the head and neck region is a common clinical issue with diverse causes, ranging from benign conditions to malignancies. Fine Needle Aspiration Cytology (FNAC) has become an essential diagnostic tool due to its minimally invasive nature, cost-effectiveness, and ability to provide rapid, accurate diagnoses. FNAC is particularly valuable for distinguishing between benign and malignant lymph node lesions and identifying specific infections like tuberculosis. **Objective:** This study focuses on analyzing the frequency and types of lymph node lesions in the head and neck region using FNAC. **Methodology:** This prospective study, conducted from January 2022 to January 2023 in the Department of Pathology at the Medical College for Women & Hospital, included a total of 53 patients. The study focused on patients presenting with head and neck swelling. **Results:** Chronic nonspecific lymphadenitis was the most frequently observed pathological condition of the lymph nodes, comprising 50.9% of cases. Granulomatous lymphadenitis, including both tuberculous and non-tuberculous forms, was identified in 33.9% of cases, with the tuberculous form being more common. Acute suppurative lymphadenitis accounted for 13.2% of cases, while metastatic lesions, squamous cell carcinoma was the least common, each representing 1.9% of the total cases. The most common age group affected was 11 to 20 years (32.0%), and females were more frequently affected (71.7%). **Conclusion:** This study reveals that chronic nonspecific lymphadenitis is the most frequently encountered lymph node condition, followed by granulomatous lymphadenitis, particularly of tuberculous origin, acute suppurative lymphadenitis, and metastatic involvement either squamous cell carcinoma or adenocarcinoma. Frequently female were frequently affected and most common age group in between 11-20 years. FNAC is recommended as a safe, reliable minimally invasive method for diagnosing head and neck lesions. It serves as a complementary diagnostic procedure to histopathological examination in the diagnosis and management of palpable head and neck lesions. *[Journal of National Institute of Neurosciences Bangladesh, January 2025;11(1):58-62]*

Keywords: Fine Needle Aspiration Cytology; Lymph Node Lesions; Head & Neck Region; Bangladeshi Population

Introduction

Lymph nodes play a crucial role in the human immune system. Lymphadenopathy arises when a lymph node becomes enlarged, increased in number, or exhibits atypical consistency[1,2]. The causes of lymphadenopathy vary from benign reactive lymphoid hyperplasia to malignant conditions. While several conditions can cause lymph node enlargement, the majority (90.0%) are due to benign causes, including reactive hyperplasia (60.0%) and infectious or inflammatory lymphadenitis (30.0%)[2-3]. Infectious or inflammatory lymphadenitis encompasses conditions such as Kikuchi-Fujimoto disease (KFD),

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tuberculosis, sarcoidosis, infectious mononucleosis, toxoplasmosis, HIV infection, cat-scratch disease, and drug reactions like phenytoin. Malignant lymphadenopathies make up only 10.0% of cases, with primary lymphomas accounting for 3.0% including diffuse large B-cell lymphoma, follicular lymphoma, mantle cell lymphoma, peripheral T-cell lymphoma, and Hodgkin's lymphoma and metastatic carcinomas constituting 7.0% including metastatic papillary thyroid carcinoma, adenocarcinomas from the lung or breast, and poorly differentiated squamous cell or small cell carcinomas[3].

Fine Needle Aspiration Cytology (FNAC) is widely used as a primary diagnostic method for evaluating enlarged lymph nodes and ruling out involvement of other organs, such as the salivary glands, head, neck, or other subcutaneous masses. This minimally invasive technique offers quick diagnosis and treatment with minimal complications, such as hemorrhage, nerve damage, and vasovagal reactions, particularly in head and neck procedures[4-6]. FNAC is especially beneficial in developing countries where surgical biopsy costs may be prohibitive. It aids surgeons in selecting, guiding, and adjusting surgical plans or clinical management, including antibiotic therapy or neoadjuvant chemotherapy. This study aims to assess the use of FNAC for lymph node lesions in the head and neck region.

Methodology

Study Design: This prospective cross-sectional study was conducted over a period of one year, from January 2022 to January 2023, in the Department of Pathology, Medical College for Women's Hospital, Dhaka, Bangladesh. The study aimed to evaluate the cytomorphological spectrum of head and neck swellings and to establish the diagnostic role of Fine Needle Aspiration Cytology (FNAC) in their assessment.

Study Population: A total of 53 patients presenting with palpable head and neck swellings were included in the study. The patients were referred to the Department of Pathology from the outpatient and inpatient departments for cytological evaluation.

Selection Criteria: All patients of any age and sex presenting with superficial swellings in the head and neck region, such as those involving lymph nodes, thyroid, salivary glands, and soft tissues, were included. Patients with masses located outside the head and neck region, or those with inadequate or hemorrhagic aspirates yielding non-diagnostic smears, were excluded from the study.

Sample Collection Procedure: Fine Needle Aspiration Cytology (FNAC) was performed on each patient under strict aseptic precautions. After obtaining informed consent, the overlying skin was cleaned with 70% isopropyl alcohol. The aspiration was carried out using a 10 mL disposable syringe fitted with a 23- or 24-gauge needle. Depending on the consistency and vascularity of the lesion, both aspiration and non-aspiration (capillary) techniques were employed to ensure adequate material collection. The aspirated material was carefully expressed onto clean glass slides. Multiple smears were prepared for each case to increase diagnostic yield. The air-dried smears were used for Giemsa staining (if performed), while alcohol-fixed smears were stained using the Papanicolaou (PAP) stain for detailed cytomorphological evaluation.

Staining Procedure: The Papanicolaou (PAP) staining method was utilized as the primary stain due to its superior nuclear and cytoplasmic detail. In selected cases, Giemsa stain was also employed to complement cytoplasmic evaluation and background material assessment. The stained smears were examined under a light microscope by experienced cytopathologists to evaluate the cellular morphology, background elements, and other cytological features essential for diagnosis.

Data Collection and Management: Relevant clinical information such as age, sex, site and duration of swelling, and provisional clinical diagnosis were recorded using a pre-designed data collection form. The cytological findings were documented systematically for each case. All data were coded and entered into a computer database. The information was cross-checked for accuracy and completeness prior to analysis.

Data Analysis: The collected data were analyzed using Statistical Package for the Social Sciences (SPSS) software, Windows version 25.0. Descriptive statistics such as frequency, percentage, mean, and standard deviation were calculated to summarize the demographic and clinical variables. Categorical data were analyzed using Chi-square (χ^2) test where applicable, and a p-value < 0.05 was considered statistically significant.

Ethical Considerations: Prior to the commencement of the study, ethical clearance was obtained from the Institutional Review Board (IRB) of the Medical College for Women's Hospital. All participants (or guardians, where applicable) were informed about the purpose, procedure, and possible outcomes of the study, and written informed consent was obtained from each patient before sample collection. Confidentiality of patient information was maintained throughout the

study.

Results

Chronic nonspecific lymphadenitis was the most common pathological condition of the lymph nodes, accounting for 50.9% of cases. Granulomatous lymphadenitis, including both tuberculous and non-tuberculous forms, was observed in 33.9% of cases, with the tuberculous form being more prevalent. Acute suppurative lymphadenitis was present in 13.2% of cases, while metastatic lesions, squamous cell carcinoma was the least common, each making up 1.9% of the total cases (Table 1).

Table 1: Frequencies of Various Pathological Conditions of Lymph Nodes (N=53)

Types of lesions	Frequency	Percent
Acute Suppurative Lymphadenitis	7	13.2
Chronic Nonspecific Lymphadenitis	27	50.9
Granulomatous Lymphadenitis	13	24.5
(tuberculous)	5	9.4
Granulomatous Lymphadenitis	1	1.9
Metastatic (Squamous cell carcinoma)	**53**	**100.0**
Total		

In Table 2 it is illustrated the analysis of 53 cases of lymph node lesions from the head and neck region indicates specific trends related to age and sex. The age group 11 to 20 years displays the highest frequency of lymphadenitis cases (32%), with chronic nonspecific lymphadenitis (13 cases) being the most common lesion in this category. Among patients aged 21–30 years, granulomatous lymphadenitis, including tuberculous types, is notably prevalent, comprising 28.3% of cases. Acute suppurative lymphadenitis is mainly seen in patients aged 21–30 years. Metastatic lymphadenopathy, particularly in patients aged 51 and above, is rare but present (1.9% of cases), indicating a greater risk of malignancy with advancing age. Out of 53 patients, 15 (28.3%) were males and 38(71.7%) were females. Chronic Nonspecific Lymphadenitis were highest frequency in female (28.3%) and male (22.6%)

Discussion

Head and neck lesions are frequently encountered in clinical practice. In this study, lymph nodes were the most common sites for head and neck masses, followed by the thyroid, other soft tissues, and salivary glands. These findings align with other studies, which also report lymph nodes as the primary site for FNAC in the head and neck region[7,8,9].

This study shows chronic nonspecific lymphadenitis emerges as the most prevalent condition, accounting for 50.9% of the cases, suggesting that it is the predominant cause of lymph node enlargement. Granulomatous lymphadenitis, particularly the tuberculous variant, is the second most common condition, comprising 24.5% of the cases. The presence of non-tuberculous granulomatous lymphadenitis, albeit less frequent at 9.4%, indicates the necessity to consider a broad differential diagnosis for granulomatous lymphadenitis, including sarcoidosis and fungal infections. Acute suppurative lymphadenitis, observed in 13.2% of the cases, reflects acute bacterial infections, which are a significant but less common cause of lymph node pathology compared to chronic conditions.

The low frequency of metastatic involvement (1.9%) highlights the importance of lymph node examination in the staging and diagnosis of malignancies. This study points towards a predominance of benign, inflammatory conditions, with a notable proportion of

Table 2: Frequencies of Various Pathological Conditions of Lymph Nodes in Relation to Age and Gender (N=53)

Age of Patient (Years)	Acute Suppurative Lymphadenitis	Chronic Nonspecific Lymphadenitis	Granulomatous Lymphadenitis (tuberculous)	Granulomatous Lymphadenitis	Metastatic (Squamous cell carcinoma)	Total	% 1
1 to 10	1	5	1	0	0	7	3.2
11 to 20	1	13	3	0	0	17	32.0
21 to 30	3	3	5	4	0	15	28.3
31 to 40	2	3	4	0	0	9	17.0
41 to 50	0	2	0	1	0	3	5.7
51 and above	0	1	0	0	1	2	3.8
Gender							
Male	0	12	2	0	1	15	28.3
Female	7	15	11	5	0	38	71.7

cases attributable to tuberculosis. The relatively low incidence of metastatic disease suggests that while malignancy is a critical consideration, it is less commonly encountered in this clinical context. These findings emphasize the need for a thorough and differential diagnostic approach in the evaluation of lymphadenopathy. These findings are consistent with other studies by Padia and Dhokiya[5].

In a similar study, Pathak et al[7] reported that among 128 cases of lymph node lesions, reactive lymphadenitis was the most frequent pathological finding, followed by metastatic carcinomas, granulomatous lymphadenitis, lymphomas, and abscesses. Other studies have also found reactive lymphadenitis to be the most common diagnosis for lymph node lesions, consistent with our findings[10-12].

In contrast, some studies have identified tuberculous lymphadenitis as the most common finding among lymph nodes[1,2,5,6]. Among 66 cases available for histopathological examination, non-Hodgkin lymphoma (27.3%) was the most frequent pathological finding, followed by granulomatous lymphadenitis (25.8%), metastatic carcinoma (19.7%), reactive lymphadenitis (10.6%), Hodgkin lymphoma (7.6%), Kikuchi-Fujimoto disease (4.5%), and abscesses (4.5%). Another study by Shekha et al[13] reported that reactive lymphadenitis was the most common pathology, accounting for 16.0% of cases, followed by granulomatous lesions (tuberculous) at 15%, and malignant lesions at 14.5%.

In a study by Sreedevi et al[14] in Andhra Pradesh, lymph nodes accounted for 50.0% of head and neck lesions out of 304 cases, with reactive lymphadenitis being the most common lesion. Thyroid lesions were the next most frequent, with colloid goiter being the predominant diagnosis. Kaur et al[15] reported that lymph node lesions comprised 52.9% of all head and neck lesions, with reactive lymphadenitis being the most common (33 cases, 25.78%), followed by tuberculous lymphadenitis (32 cases, 25.0%) and granulomatous lesions (24 cases, 18.75%). Other lesions included abscesses (10 cases, 7.81%) and benign cystic lesions (three cases, 2.34%). Among malignant lesions, metastases from squamous cell carcinoma were most prevalent (18 cases, 14.06%), followed by non-Hodgkin lymphoma (three cases, 2.34%) and one case of Hodgkin lymphoma (0.78%). Four cases (3.12%) were deemed inadequate due to hemorrhagic aspirate. In present metastatic squamous cell carcinoma was common than other malignant tumor (1.9%) which is similar with that study Goswami et al[16] found tuberculous lymphadenitis to be the most common lymph node lesion (42.12%), while it was the second most common in our study (27.4%) and in Patel et al[17] study (25%).

In the present study, lymphadenopathy was more common in females (71.7%), similar to findings by Kumar et al18 (64%). Mali et al[19] reported that the most common age group for lymphadenopathy was 11 to 20 years (28.8%), which aligns with our findings, where the same age group accounted for 32.0% cases.

Conclusion

This study indicates that the frequency distribution of various pathological conditions of lymph nodes shows chronic nonspecific lymphadenitis as the most common, followed by granulomatous lymphadenitis, particularly of tuberculous origin, granulomatous lymphadenitis, acute suppurative lymphadenitis, and metastatic involvement (squamous cell carcinoma). Frequently female were affected and most common age group in between 11-20 years. FNAC is recommended as a safe, reliable, quick, cost-effective, and minimally invasive technique for diagnosing head and neck lesions. It acts as a complementary diagnostic tool to histopathological examination in the diagnosis and management of palpable head and neck lesions.

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Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. As this was a prospective study the written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

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