



Original Article

Cytological Study of Patients Presented with Head and Neck Swellings: Experiences of 100 Cases in Bangladesh

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Abstract

Background: Head and neck swelling are common clinical issue with a broad spectrum of causes, ranging from benign conditions like infections and inflammation to malignant tumors. Fine Needle Aspiration Cytology (FNAC) is a key diagnostic tool used to assess head and neck masses due to its simplicity, cost-effectiveness, and minimally invasive nature. FNAC helps distinguish between benign and malignant lesions, aiding in timely diagnosis and appropriate management. **Objective:** To evaluate the cytological findings of head and neck swellings. **Methodology:** The prospective study was carried out from January 2022 to January 2024 in the pathology department of the Medical College for Women and Hospital. A total of 100 patients participated in this study. Patients presenting with head and neck swellings were included, while those with masses in other areas were excluded. Fine Needle Aspiration Cytology (FNAC) was conducted under strict aseptic conditions using a 10 ml syringe with a 23 or 24-gauge needle, utilizing both aspiration and non-aspiration techniques. The samples collected were placed on glass slides, prepared, and stained with Papanicolaou (PAP) stain. Data were recorded on a pre-designed collection form and analyzed using SPSS software, version 25 for Windows. **Results:** This study shows that the highest frequency of cases occurred in the 21 to 30-year age group, accounting for 26.0%. The FNAC results of 100 patients with head and neck swellings reveal that cervical lymph node lesions are the most common, accounting for 55.0% of cases. Thyroid gland lesions are the second most frequent at 29.0%. Salivary gland lesions represent 10.0% of cases, and soft tissue lesions are less common, each comprising 6.0%. Overall, cervical lymph node and thyroid gland lesions are the predominant causes of head and neck swellings in this group. Swelling in the head and neck region are more common in female than male, 74.0% cases and 26.0% cases respectively. **Conclusion:** This study shows that cervical lymph node lesions are the most prevalent cause of neck swellings, emphasizing their importance in the differential diagnosis. Thyroid gland lesions are the second most common, highlighting the significant role of thyroid disorders in head and neck masses. Less frequently, swellings involve the salivary glands, as well as soft tissues. [Journal of Current and Advance Medical Research, January 2025;12(1):10-15]

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Introduction

Head and neck swellings are frequently seen in routine clinical practices by physicians¹. The differential diagnosis in these cases is often extensive and varies with age, sex, and site²⁻⁴. The swellings around the neck range from enlarged lymph nodes to salivary gland diseases, cysts, lipomas, and thyroid lesions. Neck masses can be evaluated by detailed clinical history and examination, along with investigations like fine needle aspiration cytology, radiological tests like sonography and CT scan. In case of any suspected malignancy, the confirmation is done by a histopathological examination⁴.

Fine Needle Aspiration Cytology is generally confused with Fine Needle Aspiration Biopsy (FNAB), because biopsy is in general regarded as a procedure of removing a tissue fragment and processing it for histopathological assay. Fine Needle Aspiration Biopsy is done with a large gauge 14 Silverman or Tru-Cut needle, which yields us larger amount of tissue, but the procedure causes injury and local trauma. The process for cytological diagnosis is called aspiration cytology. Aspiration cytology acts as a preliminary tool for a wide range of diagnoses and can be confirmed by biopsy^{5,6}. Nowadays, Fine Needle Aspiration Cytology is routinely done as a first-line investigation procedure for rapid diagnosis.

The most common pathological lesions encountered in the head and neck region are enlarged lymph nodes, due to reactive or infective lymphadenitis, metastatic carcinoma, and lymphoproliferative lesions. Other common causes of swellings in the head and neck region are thyroid swellings like goitre, nodules and cysts and carcinoma, salivary gland swellings like sialadenitis, adenomas, and carcinomas, and the skin and soft tissue lesions like lipoma, epidermal (keratinous, dermoid) cysts, benign adnexal tumours, and so on⁵.

In the last two decades, fine needle aspiration cytology (FNAC) has been considered as the first-line investigation of choice for evaluating head and neck swellings, as it is a quick, safe, simple, cost-effective, and rapid diagnostic procedure¹. FNAC is very helpful in differentiating inflammatory lesions from neoplastic lesions by causing minimal trauma to the patient.^{1,7} The purpose of the present study was to study the cytological findings of head and neck swellings and to classify the nature of the swellings in a tertiary care center.

Methodology

Study Settings and Population: This prospective study was conducted over a two-year period, from January 2022 to January 2024, in the Department of Pathology, Medical College for Women and Hospital (MCWH), in collaboration with the Imperial Hospital, Dhaka, Bangladesh. Both institutions are well-equipped tertiary care centers that receive a wide range of outpatient and inpatient cases, including patients presenting with head and neck swellings from various clinical departments such as Surgery, ENT, and Oncology.

A total of 100 patients were enrolled in the study after fulfilling the inclusion and exclusion criteria. The study population comprised individuals of varying age groups and both genders who presented with palpable or clinically detectable swellings in the head and neck region. Patients with lesions or masses located outside the head and neck region were excluded from the study. Informed written consent was obtained from each participant prior to sample collection, and ethical clearance for the study was obtained from the Institutional Review Board (IRB) of the Medical College for Women and Hospital.

Detailed clinical information, including the patient's age, sex, duration of swelling, clinical diagnosis, and relevant medical history, was recorded in a pre-designed data collection form. Radiological and laboratory findings, where available, were also noted to aid in cytological interpretation.

Sample Collection Procedure: Fine Needle Aspiration Cytology (FNAC) was performed on all patients presenting with head and neck swellings, following strict aseptic precautions to minimize contamination and infection risk. Each procedure was carried out in the Cytopathology Unit of the Department of Pathology, under the supervision of qualified cytopathologists.

After the area of swelling was identified and cleansed with 70% isopropyl alcohol, the lesion was immobilized, and aspiration was performed using a 10 mL disposable plastic syringe fitted with a 23 or 24-gauge needle. Depending on the consistency and nature of the swelling, both aspiration and non-aspiration (capillary action) techniques were employed like Aspiration Technique Used for firm or cystic lesions, where negative pressure was applied to draw material into the syringe and Non-Aspiration Technique Utilized for highly vascular

or small lesions, relying on capillary action to obtain cellular material without applying suction.

In cases where multiple passes were required, separate needles were used for each attempt to prevent sample contamination. The aspirated material was expelled onto clean glass slides, and thin smears were prepared using another slide held at a 45° angle to spread the specimen evenly.

The prepared smears were immediately fixed in 95% ethanol for wet fixation and subsequently stained using the Papanicolaou (PAP) stain following standard cytological staining protocols. Air-dried smears were occasionally prepared and stained with May–Grünwald–Giemsa (MGG) stain when necessary to enhance cytoplasmic detail or to identify background material.

Each slide was carefully examined under a light microscope by experienced cytopathologists. Cytological findings were correlated with clinical data, radiological findings, and, when available, histopathological diagnoses to ensure diagnostic accuracy.

All data obtained during the procedure, including patient demographics, site of lesion, cytological diagnosis, and any complications, were systematically recorded in a structured data collection form. Each case was assigned a unique identification number to maintain confidentiality and facilitate data analysis.

Quality Control and Safety Measures: To ensure accuracy and reproducibility, all FNAC procedures were performed using sterile, disposable equipment, and strict adherence to infection control protocols was maintained. Slides were properly labeled immediately after preparation to avoid misidentification. Microscopic evaluation and diagnosis were conducted independently by at least two cytopathologists, and any discordant cases were reviewed jointly to reach a consensus diagnosis.

Biosafety protocols were followed at all stages of sample handling and staining to protect both patients and laboratory personnel. Used syringes and needles were disposed of safely in puncture-proof sharps containers according to institutional biomedical waste management guidelines.

Statistical Analysis: Statistical analyses were performed with SPSS software, version 22.0 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Continuous data that

were normally distributed were summarized in terms of the mean, standard deviation, median, minimum, maximum, and number of observations. Categorical or discrete data were summarized in terms of frequency counts and percentages. When values are missing, the denominator is stated. Chi-square test was used for comparison of categorical variables. Every effort was made to obtain missing data. A two-sided P value of less than 0.05 was considered to indicate statistical significance.

Ethical Clearance: All procedures of the present study were carried out in accordance with the principles for human investigations (i.e., Helsinki Declaration) and also with the ethical guidelines of the Institutional Research Ethics. Formal ethics approval was granted. Participants in the study were informed about the procedure and purpose of the study and the confidentiality of information provided. All participants consented willingly to be a part of the study during the data collection periods. All data were collected anonymously and analyzed using the coding system.

Results

The FNAC results from 100 patients with head and neck swellings reveal that cervical lymph node lesions are the most frequent, accounting for 55.0% of cases. Thyroid gland lesions follow as the second most common at 29.0%. Salivary gland lesions are present in 10.0%, and soft tissue lesions are rare, each comprising 6.0% (Table 1).

Table 1: Results of FNAC of Head and Neck Swellings, Showing the Relative Frequencies of Various Pathological Conditions (N=100)

Types of lesions	Frequency	Percent
Cervical Lymph node	55	55.0
Thyroid gland	29	29.0
Salivary gland	10	10.0
Soft Tissue	6	6.0
Total	100	100.0

Regarding age distribution, head and neck swellings are most commonly observed in the 21 to 30-year age group, representing 26.0% of cases, followed by the 31 to 40-year age group at 21.0%. Only 6.0% and 6.0% in the 51 to 60-year and 61 to 70-year age groups, respectively (Table 2).

Swelling in the head and neck region is more common in females than males, 74.0% cases and 26.0% cases, respectively (Table 3).

Table 2: Frequencies of Various Pathological Conditions of Head and Neck swelling in Relation to Age (N=100)

Age of the Patient	Cervical Lymph Node	Thyroid Gland	Salivary Gland	Soft Tissue	Total
Less than 12 Months	1	0	0	0	1
1 to 10 Years	8	2	1	1	12
11 to 20 Years	17	3	1	0	21
21 to 30 Years	15	7	1	3	26
31 to 40 Years	9	7	2	0	18
41 to 50 Years	3	4	0	1	8
51 to 60 Years	0	4	1	1	6
61 to 70 Years	2	1	3	0	6
71 Years to above	0	1	1	0	2
Total	55	29	10	6	100

Table 3: Frequencies of Various Pathological Conditions of Head and Neck swelling in Relation to Gender (N=100)

Gender	Cervical Lymph Node	Thyroid Gland	Salivary Gland	Soft Tissue	Total
Male	16(29.1%)	4 (13.8%)	4 (40.0%)	2 (33.3%)	26
Female	39(70.9%)	25 (86.2%)	6 (60.0%)	4 (66.7%)	74
Total	55(100%)	29 (100%)	10 (100%)	6 (100%)	100

Discussion

Fine Needle Aspiration Cytology (FNAC) is both a valuable diagnostic and therapeutic tool. However, it may occasionally yield false-negative or false-positive results, so its interpretation should always be considered in the context of the overall clinical situation. Lymph node enlargement is a frequent manifestation of neck lesions. FNAC is particularly useful for initial assessment of head and neck masses and for evaluating suspected recurrences following previous treatment^{1,3,5}.

Fine Needle Aspiration Cytology (FNAC) is often mistaken for Fine Needle Aspiration Biopsy, as the term "biopsy" implies the removal of tissue fragments. While FNAB provides a larger tissue sample, it also carries a higher risk of injury and local trauma. For accurate cytology reporting, two key factors are essential: high-quality sample preparation and a representative sample. Without meeting these requirements, the precision of FNAC results can be compromised, regardless of how meticulously the procedure is performed⁵.

This study included a total of 100 cases, with the highest number occurring in the 21 to 30-year age group. This finding aligns with other research, which also identified the 21 to 30-year age group as

the most affected. Similar observations were reported by Ali et al⁸ and Banstola et al².

This study shows the most common type of lesion observed was related to the cervical lymph node, which accounted for 55.0% of the cases, which shows correlation with other studies⁹⁻¹¹. This finding is consistent with the fact that lymphadenopathy, particularly of the cervical lymph nodes, is a frequent cause of neck swellings and can be associated with a wide range of underlying conditions, including infections, inflammatory processes, and malignancies. This high frequency underscores the clinical importance of lymph node assessment in the evaluation of neck swellings.

Lesions of the thyroid gland were the second most common, comprising 29.0% of the cases. These findings consistent with other studies^{5-6,9-11}. Thyroid nodules are commonly encountered in clinical practice, and FNAC is a valuable tool in distinguishing between benign and malignant thyroid conditions. The relatively high frequency of thyroid-related lesions in this study aligns with the growing prevalence of thyroid nodules in the general population, often detected incidentally during imaging studies.

Lesions involving the salivary gland were observed in 10% of the cases, while those involving the soft tissue represented 6.0%. These findings are well agreement with other studies^{2,4,7,9-10,12-13}. Although less common, these lesions are important to recognize, as salivary gland swellings can result from a variety of causes, including infections, sialolithiasis, and neoplastic processes. The lower frequency of soft tissue lesions indicates that while soft tissue masses can present as neck swellings, they are relatively uncommon compared to lymph node and thyroid-related conditions. This study highlights the predominance of cervical lymph node and thyroid gland lesions in neck swellings, emphasizing the need for careful evaluation of these structures in clinical practice. FNAC remains a key diagnostic tool for these lesions, providing valuable cytological information that aids in guiding further management.

A similar study by Patel et al⁵ reported that lesions were more prevalent in the neck region compared to the head region. The majority of lesions were located in lymph nodes (48.5%), followed by the thyroid gland (35.47%), salivary glands (10.84%), and the cheek (3.3%). Shahid et al⁹ also reported that lesions of the head and neck were most commonly found in lymph nodes (50.49%), followed by the thyroid gland (31.30%), soft tissue (11.90%), and salivary glands (5.71%).

Kaur et al¹ reported that the salivary gland was the third most common site affected by head and neck lesions. Among inflammatory conditions, chronic sialadenitis was the most prevalent, accounting for 26.1% cases, followed by acute sialadenitis at 8.7% cases. Banstola et al² included 456 patients with head and neck swellings who underwent FNAC, finding that lymph node swellings were the most common, representing 55.04% of cases.

In a study by Khetrapal et al¹⁴ lymph nodes were also the most frequently aspirated, comprising 185(64.1%) of 290 patients, followed by thyroid lesions at 49(16.9%) cases. Skin and soft tissue masses accounted for 40(13.8%) cases, while salivary gland lesions were present in 12(4.1%) cases. Among the 290 patients, 268(92.1%) cases had non-neoplastic conditions, 21(7.2%) cases had malignant cases, and one case was deemed inadequate for a definitive diagnosis¹⁴.

In the present study, head and neck swellings were more common in females (74.0%), similar to findings by Arvind Kumar et al¹⁶ (64%), Shahid et al⁹ (67.1%) and Nallaguta et al¹⁵ (84.2%).

Conclusion

In this study head and neck swellings reveal that cervical lymph node lesions are the most commonly encountered pathology, making them a key consideration in the differential diagnosis of head and neck swellings. Thyroid gland lesions follow as the second most frequent type of lesion, underscoring the significant role of thyroid pathology in head and neck swellings. Lesions involving the salivary gland, and soft tissue are less frequently observed. These findings highlight the utility of FNAC as an effective diagnostic tool in evaluating a range of pathological conditions associated with neck swellings.

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None

Conflict of Interest

The authors have no conflicts of interest to disclose

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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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