e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(10); 1274-1279

Original Research Article

Cytomorphological Evaluation of Palpable Head and Neck Lesions: A Comprehensive Analysis at a Tertiary Care Facility

Gautam R[1], Gupta V*[2], Chaudhary A[3], Devdhar S[4]

[1]Associate Professor, Department of Pathology, Noida International Institute of Medical Sciences, NIU, Greater Noida, Uttar Pradesh, India

*[2]Assistant Professor, Department of Pathology, Noida International Institute of Medical Sciences, NIU, Greater Noida, Uttar Pradesh, India

[3]Professor, Department of Pathology, Noida International Institute of Medical Sciences, NIU, Greater Noida, Uttar Pradesh, India

[4]Professor, Department of Pathology, Noida International Institute of Medical Sciences, NIU, Greater Noida, Uttar Pradesh, India

Received: 25-07-2023 / Revised: 28-08-2023 / Accepted: 30-09-2023

Corresponding author: Dr. Vertika Gupta

Conflict of interest: Nil

Abstract:

Introduction: Fine Needle Aspiration Cytology (FNAC) is a valuable diagnostic tool in the evaluation of palpable head and neck lesions which encompass a wide range of conditions, including benign and malignant tumors, cysts, inflammatory processes, and infections.

Objectives: In the present study, we aim to observe the cytomorphologic spectrum of lesions occurring in the head and neck region and explore the importance and applications of cytomorphological analysis in diagnosing head and neck lesions.

Materials and Methods: A total of 154 cases of all age groups were included in the study, spanning various anatomical locations within the head and neck region. Fine needle aspiration (FNA) was performed using 22-23 G needles. Smears were stained with Giemsa, Hematoxylin & Eosin, and Papanicolaou stains. Cytomorphological analysis was done and diagnosis given.

Results: Out of 154 FNA that were done; 56.5% were from lymph nodes followed by thyroid gland (18.2%), skin and soft tissue (17.5%), and salivary gland (7.8%). Reactive lymphadenitis was the most common lesion diagnosed. Slight female preponderance was observed in this study.

Conclusion: FNAC offers several advantages, including minimal invasiveness, rapid results, and the ability to guide clinical management decisions. When combined with clinical and radiological findings, cytomorphological analysis plays a crucial role in providing accurate and timely diagnoses, facilitating appropriate treatment planning, and ultimately improving patient outcomes in the challenging field of head and neck pathology.

Keywords: Fine Needle Aspiration Cytology (FNAC), Head and Neck, Lymph node, Thyroid, Skin and Soft tissue, Salivary gland.

Introduction

Head and neck lesions are frequently encountered by clinicians in all age groups [1]. Various types of tissues and a wide spectrum of benign, malignant, and metastatic neoplasms are seen at this site making it one of the most interesting and challenging in FNAC diagnosis. Common lesions seen in the head and neck region include reactive lymphadenitis, tuberculous lymphadenitis, chronic granulomatous lymphadenitis, lymphoproliferative lesions, colloid goitre, adenomatoid goitre, follicular neoplasms, sialadenitis, pleomorphic adenoma, lipoma, and keratinous cyst. Proper clinical examination, various imaging techniques, FNAC, and histopathology help a great deal in the proper evaluation of these lesions. The use of fine-needle aspiration cytology (FNAC) has revolutionized the field of head and neck pathology by providing a minimally invasive and highly informative means of obtaining diagnostic information. FNAC does not give the same architectural detail as histology but it is a safe, simple, inexpensive, and rapid method that can be performed in diagnosing a wide range of head and neck swellings as these are quite accessible to aspiration [2,3]. It causes minimal trauma to the patient and carries virtually no risk of complications. Other diagnostic tools like cytogenetics, flow cytometry, cell block

preparation, electron microscopy, and immunocytochemistry can be employed on the material obtained by FNA [4].

This study aims to observe the frequency and distribution of various lesions detected on FNAC in patients presenting with palpable head and neck swellings and to evaluate the role and applications of cytomorphological analysis in the diagnosis of head and neck lesions.

Materials and Methods

The present study is a retrospective study carried out in the Department of Pathology, NIIMS, Greater Noida for a period of 1 year from January 2022 to December 2022. A total of 154 outdoor and indoor patients who presented with palpable head and neck lesions and underwent FNAC were included in the study. Detailed medical histories of all the patients were taken with emphasis on past and family history of tuberculosis, syphilis, and AIDS.

Inclusion criteria

This study included all the patients who presented with palpable swelling in the head and neck region in IPD or OPD.

Exclusion criteria

All the cases of head and neck swellings with insufficient material in FNAC were excluded from the study.

Patients were explained about the procedure in detail and informed consent was taken in all the cases. The swelling was fixed with one hand and taking all aseptic precautions, FNAC was done using a 22- 23G needle with a 10ml syringe. The needle was inserted into the swelling and a negative pressure was applied. Multiple passes were given in all directions. The needle was removed after releasing the negative pressure. The aspirated material was smeared on the glass slides and stained with Giemsa, Hematoxylin & Eosin, and Papanicolaou stains for microscopic examination. ZN staining was done in aspirates from lymph node swellings, with clinical suspicion of tuberculosis or where purulent or cheesy material was obtained as aspirate. Analysis and reporting of cytological findings were done and cytomorphological diagnosis was given depending upon the pathology. FNAC diagnosis was correlated with clinical findings and other investigations done in these cases.

Statistical analysis was done by making tables for estimating the frequency distribution of various parameters and percentages were calculated.

Results

A total of 154 patients belonging to all age groups were included in the study, spanning various anatomical locations within the head and neck. The study included 84 females and 70 males, with M: F ratio of 1:1.2 (Table 1). Out of the total cases reported, most affected people were in the age group of 21-30 years (27.3%) (Table 2).

The lymph nodes were most frequently involved constituting 56.5% of the total cases (87 cases) followed by thyroid lesions (18.2% cases). Skin and soft tissue lesions (17.5%) were a close third and salivary gland lesions (7.8%) occurred with the least frequency (Table 1).

Table 1: Distribution of lesions according to site and gender

Tissue involved	Female	Male	Total	Percentage (%)
Lymph Node	39	48	87	56.5
Salivary gland	7	5	12	7.8
Skin and subcutaneous tissue	14	13	27	17.5
Thyroid	24	4	28	18.2
Total	84	70	154	100

Table 2: Age-wise distribution of various head and neck lesions

Age (years)	Number of cases	Percentage of cases (%)
0-10	16	10.4
11-20	29	18.8
21-30	42	27.3
31-40	20	13.0
41-50	21	13.6
51-60	11	7.2
>60	15	9.7
Total	154	100

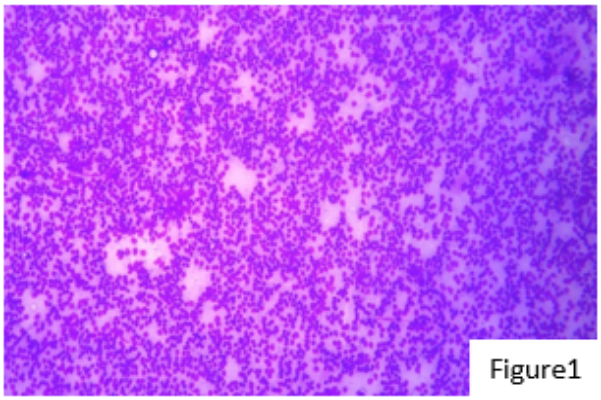
The most common lesion seen in lymph nodes was reactive lymphadenitis (Figure 1) comprising 43 cases (49.4%), followed by chronic granulomatous lymphadenitis (17.2% cases), tuberculous lymphadenitis (15.0 % cases) (Figure 2), acute suppurative lymphadenitis (8.0% cases), lymphoproliferative lesions (5.8% cases) and metastatic lesions (4.6% cases, Figure 3) (Table 3).

Lymphoproliferative lesions included 3 cases of Hodgkin lymphoma (Figure 4) and 2 cases of Non-Hodgkin lymphoma.

Lymph node lesions were more commonly seen in males (48 cases) as compared to females (39 cases).

Table 3: Distribution of Lymph Node lesions

Lesion	Female	Male	Total	Percentage (%)
Acute suppurative lymphadenitis	4	3	7	8.0
Chronic granulomatous lymphadenitis	9	6	15	17.2
Reactive lymphadenitis	13	30	43	49.4
Tuberculous lymphadenitis	10	3	13	15.0
Lymphoproliferative lesions	2	3	5	5.8
Metastatic lesions	1	3	4	4.6
Total	39	48	87	100



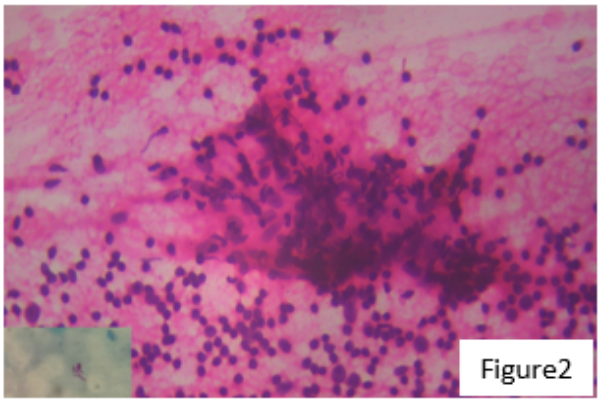
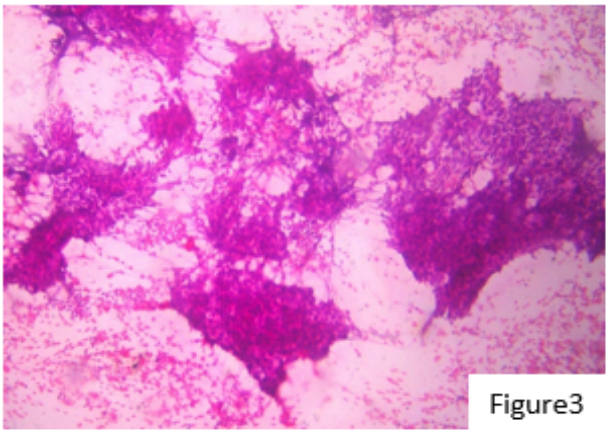


Figure 1: Reactive Lymphadenitis: Polymorphous population of lymphoid cells with a predominance of mature lymphocytes (Giemsa X100)

Figure 2: Tuberculous Lymphadenitis: Well- formed epithelioid cell granuloma with lymphoid cells in background (H&E X400), Ziehl Neelsen stain showing Acid fast bacilli (ZN x1000) (inset)



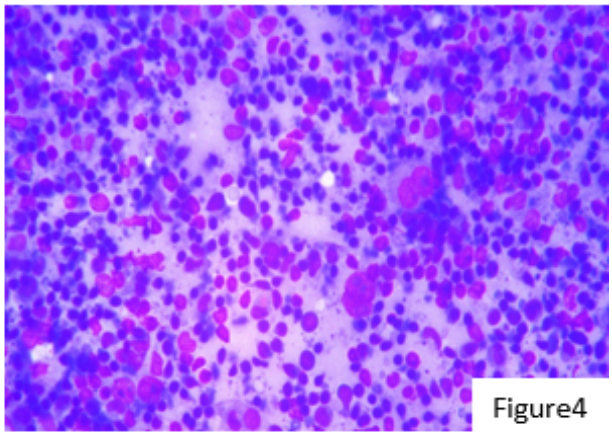


Figure 3: Metastatic Adenocarcinoma: Lymph node aspirate showing clusters of atypical cells (Giemsa x100).

Figure 4: Hodgkin's Lymphoma: Classic RS cell in a background of polymorphous lymphoid population (Giemsa x400).

Thyroid lesions were the second most commonly encountered lesions in head and neck region comprising 18.2% cases and were more frequently seen in females (24 cases) as compared to males (4 cases). Colloid goiter (60.7 % cases) was the most common lesion diagnosed, followed by follicular neoplasms (17.9 % cases) (Figure 5), adenomatoid goiter (10.7 % cases), malignant neoplasm (7.1% cases) and lymphocytic thyroiditis (3,6% cases) (Table 4). Both the malignant neoplasms were

cytomorphologically diagnosed as papillary carcinoma, thyroid (Figure 6)

Table 4: Distribution Thyroid lesions

Lesion	Female	Male	Total	Percentage (%)
Colloid Goitre	15	2	17	60.7
Adenomatoid goitre	3	0	3	10.7
Lymphocytic Thyroiditis	0	1	1	3.6
Follicular neoplasm	4	1	5	17.9
Malignant neoplasm	2	0	2	7.1
Total	24	4	28	100

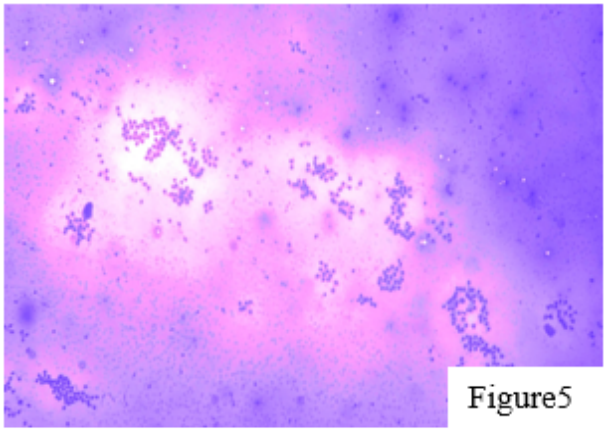


Figure5

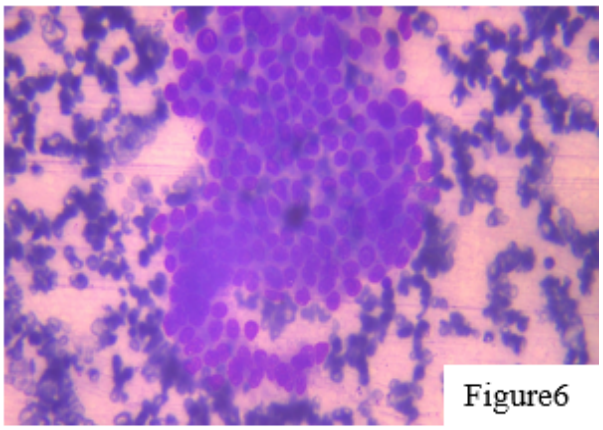


Figure6

Figure 5: Follicular neoplasm: Thyroid FNAC showing microfollicles in a repetitive manner (Giemsa x100)

Figure 6: Papillary Thyroid Carcinoma: Follicular cells showing intranuclear cytoplasmic inclusions (Giemsa x400)

Skin and soft tissue lesions were seen in 27 cases (17.5%). Keratinous cyst was the most common lesion (44.5% cases), followed by lipoma (25.9% cases). Other lesions included 2 cases each of benign adnexal tumor, branchial cyst and parasitic lesion and 1 case each of trichilemmal cyst and thyroglossal cyst (Table 5).

Table 5: Distribution of skin and soft tissue lesions

Lesion	Female	Male	Total	Percentage (%)
Lipoma	5	2	7	25.9
Keratinous cyst	5	7	12	44.5
Trichilemmal cyst	1	0	1	3.7
Benign adnexal tumor	0	2	2	7.4
Branchial cyst	2	0	2	7.4
Thyroglossal cyst	0	1	1	3.7
Parasitic lesion	1	1	2	7.4
Total	14	13	27	100

Among inflammatory salivary gland lesions, sialadenitis was seen in 41.8% cases and suppurative pathology in 8.3% cases. Benign neoplasm included 3 (25%) cases of pleomorphic adenoma and 1 case (8.3%) of epidermal cyst. Malignant neoplasm included 1 case each of acinic cell carcinoma and carcinoma ex pleomorphic adenoma (Table 6).

Table 6: Distribution of salivary gland lesions

Lesion	Female	Male	Total	Percentage (%)
Suppurative pathology	0	1	1	8.3
Sialadenitis	2	3	5	41.8
Epidermal cyst	0	1	1	8.3
Pleomorphic adenoma	3	0	3	25.0
Acinic cell carcinoma	1	0	1	8.3
Ca ex pleomorphic adenoma	1	0	1	8.3
Total	7	5	12	100

In 2 cases FNAC was inconclusive because of insufficient material aspirated and hence excluded from the study.

Discussion: Head and neck lesions include a variety of developmental, inflammatory and neoplastic lesions. FNAC has emerged as a highly reliable and minimally invasive technique for the evaluation of these lesions. The present study was carried out over a period of 1 year to find out the frequency of various pathological lesions in the head and neck region and to determine the role of FNAC as a rapid and sensitive diagnostic tool. This study included patients from all age groups with the maximum patients being between 21-30 years of age (27.3%) as was also observed by Pangotra et al (31.76%) and Modi et al (21.0 %) [5,6].

Female patients were more as compared to males with male to female ratio of 1:1.2. Similar results of female preponderance were also reported by Modi et al [6], Kishor et al [7], Muddegowda et al [8] and Sreedevi et al [9].The present study also compares its findings with various national and international studies published in the literature (Table-7).

Table 7: Comparison of distribution of head and neck lesions between our study and other national and international studies

	Lymph Node (%)	Thyroid gland (%)	Salivary gland (%)	Skin and soft tissue (%)
Our study	56.5	18.2	7.8	17.5
Pangotra et al [5]	48.2	20	7.05	24.7
Nadesan et al [10]	48.16	32.62	4.91	14.25
Modi et al [6]	66.55	21.9	5.9	5.6
Padia et al [11]	64.02	18.7	2.87	12.94
Sanghvi et al [1]	41	37	5	7
Gul et al [12]	64	-	10	14
Pathak et al [13]	61.2	19.2	6.7	12.9
Sreedevi et al [9]	50.32	44.07	3.28	2.3
Khetrapal et al [14]	64.1	16.9	4.1	13.8
Shekhar et al [15]	42	18	15.5	17.5

Most number of lesions were seen in lymph nodes (56.5%) followed by thyroid gland (18.2%) skin and soft tissue (17.5%), and salivary gland (7.8%) in decreasing order of frequency. Similar observation was made in various other studies [1,11,13,14,15].

In our study, lymph node lesions were seen in 56.5% of cases similar to observations made by Sreedevi et al [9] and Pathak et al [13]. Amongst lymph node lesions, reactive lymphadenitis (49.4%) was the most common as was also seen in studies by Nadesan et al [10], Sreedevi et al [9], Gul et al [12] and Pangotra et al [5]. Chronic granulomatous lymphadenitis was seen in 17.2% cases followed by tuberculous lymphadenitis (15.0% cases). This was against the observation made by Nadesan et al [10] and Sreedevi et al [9] where cases of tuberculous lymphadenitis outnumbered chronic granulomatous lymphadenitis. Thus, FNAC plays a vital role in the diagnosis of lymphadenopathy, facilitating the differentiation between reactive hyperplasia, metastatic malignancy, and other etiologies and guiding the selection of appropriate therapeutic strategies.

In the present study female preponderance was noted in thyroid lesions and colloid goitre (60.7%) was found to be the most common lesion as was also observed by Modi et al [6], Sreedevi et al [9], Muddegowda et al [8] and Padia et al [11]. Other lesions included follicular neoplasm (17.9% cases), adenomatoid goiter (10.7% cases), lymphocytic thyroiditis (3.6% cases), and 2 cases (7.1%) of malignant neoplasm (papillary carcinoma). FNAC thus helps to differentiate between benign and malignant lesions, thus guiding further management. The Bethesda System for Reporting Thyroid Cytopathology provides standardized reporting categories, enhancing communication between clinicians and pathologists.

Out of the 27 cases (17.5%) that were seen in skin and soft tissue; keratinous cyst was the most common lesion (44.5%) followed by lipoma (25.9%) as was also observed by Nadesan et al [10], Modi et al [6] and Pangotra et al [5]. Other lesions included 2 cases each of benign adnexal tumor, branchial cyst and parasitic lesion and 1 case each of trichilemmal cyst and thyroglossal cyst.

Among salivary gland lesions, sialadenitis (41.8%) was the most common diagnosis which was in concordance with the study done by Modi et al [6] while Nadesan et al [10] and Pangotra et al [5] observed pleomorphic adenoma to be the most common salivary gland lesion followed by sialadenitis. Other lesions included 3 cases of pleomorphic adenoma (25.0%) and 1 case each of suppurative lesion, epidermal cyst, acinic cell carcinoma and carcinoma ex pleomorphic adenoma.

While cytomorphological analysis is a valuable tool in the evaluation of head and neck lesions, it has some limitations. Unlike histopathology, FNAC provides only cellular information and lacks tissue architecture details.

False-negative results can occur due to inadequate sampling or challenges in distinguishing subtle cytological changes, especially in well-differentiated neoplasms. False-positive results can also arise, emphasizing the importance of clinical correlation and ancillary investigations.

Conclusion

In conclusion, cytopathology, particularly FNAC, is a cornerstone in the diagnosis and management of head and neck lesions. Its diagnostic utility, coupled with a nuanced understanding of its limitations, empowers clinicians to provide tailored and effective care, ultimately improving patient outcomes in this complex and anatomically intricate region.

As research continues to advance in the field of cytopathology, further refinements in diagnostic accuracy and prognostication can be expected, offering even greater benefits to patients with head and neck lesions.

References

1. Sangavi AKB, Itagi IR, Choudhari SY, Venkatesh U. Evaluation of FNAC of head and neck swellings: A retrospective study. Int j Otolaryngology and Head & Neck Surgery. 2018 Jan; 4(1):189-192.
2. Gamba PG, Messineo A, Antoniello LM, Boccato P, Blandamura S, Cecchetto G, Dall'Igna P, Guglielmi M. A simple exam to screen superficial masses: fine-needle aspiration cytology. Med Pediatr Oncol. 1995 Feb; 24(2):97-9.
3. Lee JC, Siow JK. Thyroid surgery-the Tan Tock Seng Hospital otolaryngology experience. Ann Acad Med Singapore. 2002 Mar; 31(2):158-64.
4. Klijanienko J. Head and neck and salivary gland.In: Layfield LJ, editor. Atlas of Fine Needle Aspiration Cytology, 1st edition. New Delhi: Jaypee Publishers; 2014.p.11.
5. Pangotra M, Aithmia R, Sharma N. (2022). Cytomorphological Patterns of Various Head and Neck Lesions-A Study in a Peripheral Hospital in North India. Saudi J Pathol Microbiol. 2022; 7(7): 272-275.
6. Modi MH, Kokani MJ. Diagnostic Role of FNAC in Evaluation of Head and Neck Lesions. Trop J Path Micro 2018; 4(8):572-577.
7. Suryawanshi Kishor H, Damle Rajshri P, Dravid Nandkumar V, Yogesh T. Spectrum of FNAC in palpable head and neck lesions in a tertiary care hospital in India- A 3 years study. Indian Journal of Pathology and Oncology, 2015; 2(1); 7- 13.
8. Muddegowda PH, Srinivasan S, Lingegowda JB, Ramkumar KR, Murthy KS. Spectrum of Cytology of Neck Lesions: Comparative Study from two centers. Journal of Clinical and Diagnostic Research 2014; 8(3): 44-45.
9. Sreedevi P, Kumar K, Parankusa NC. Diagnostic Role of FNAC in evaluation of Head and Neck lesions. Journal of Medical and Dental Sciences. 2016; 11-13.
10. Nadesan A, Kulkarni AM, Madane RB. Global Journal for Research Analysis. 2021; 10(2); 30-33.
11. Padia B., Dhokiya M. A study of FNAC of head and neck lesions at a tertiary care centre. Trop J Path Micro 2018; 4(8):592-596.
12. Gul A, Vani B.R., Srinivasa Murthy V. Fine Needle Aspiration Cytology Profile of Head and Neck Lesions in a Tertiary Care Hospital. Indian Journal of Pathology 2017; 6(2):372-377.
13. Pathak R, Prasad KBR, Rauniyar SK, Pudasaini S, Pande K, Koirala S, Kafle, Jha A, Chalise S, Basnyat AS. Fine needle aspiration cytology of head and neck lesions and its correlation with histopathology. Journal of Pathology of Nepal. 2016; 6(1):985 -989.
14. . Khetrapal S, Jetley S, Jairajpuri Z, Rana S, Kohli S. FNAC of Head & neck regions and its utility in clinical diagnosis: A study of 209 cases. Nat J. Med Res 2015; 5 (1):33-8.
15. Shekhar H, Kaur A, Agrawal P, Pancharia A, Jadeja P. Fine needle aspiration cytology in head and neck swellings: a diagnostic and therapeutic procedure. Int J Res Med Sci 2014; 2(4):1667-71.