



CYTOMORPHOLOGICAL SPECTRUM OF HEAD AND NECK LESIONS IN A TERTIARY CARE HOSPITAL

Pathology

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ABSTRACT

Background: - Head and neck lesions represent one of the most common clinical presentations encountered in medical practice, with a diverse array of pathologies ranging from benign inflammatory conditions to malignant neoplasms. These swellings may originate from various anatomical structures including lymph nodes, salivary glands, thyroid gland, skin and soft tissues. **Aim:** The aim of the study was the evaluation and documentation of role of FNAC in the initial assessment and diagnosis of patients with palpable lesions in the head and neck region and to test the utility of FNAC in diagnosis of non-neoplastic and neoplastic lesions of head and neck. **Material and Methods:** - A prospective study was conducted from January 2023 to December 2023. Total 604 patients with head and neck lesions were included. **Results:-** The present study analysed 604 cases of head and neck swellings to assess the cytomorphological patterns, diagnostic accuracy. The majority of cases were lymph node lesions (48%), followed by thyroid lesions (36%), salivary gland lesions (7%), and miscellaneous soft tissue lesions (9%). Among lymph node lesions, Granulomatous lymphadenitis was the most frequent diagnosis (indicative of tuberculosis). Thyroid lesions predominantly showed Colloid goitre, followed by various Thyroiditis and Follicular neoplasms while Papillary carcinoma was the most frequent malignant thyroid neoplasm. Pleomorphic adenoma was the most common benign salivary gland lesion, while Mucoepidermoid carcinoma was the malignant salivary neoplasms. Soft tissue and miscellaneous lesions included Epidermal cysts, lipomas, and cystic lesions, with FNAC providing effective classification. **Conclusion:-** This study reinforces the role of FNAC as an indispensable diagnostic modality for head and neck lesions. It provides high diagnostic accuracy with minimal invasiveness, rapid turnaround, and excellent patient compliance. FNAC remains a cornerstone in the early diagnosis, triage, and management of a wide spectrum of head and neck pathologies.

KEYWORDS

Fine Needle Aspiration Cytology (FNAC), Lymph Node, Thyroid Gland, Salivary Gland, Soft Tissue.

INTRODUCTION

Head and neck lesions represent one of the most common clinical presentations encountered in medical practice, with a diverse array of pathologies ranging from benign inflammatory conditions to malignant neoplasms¹. These lesions are readily noticeable due to their superficial location, often discovered incidentally as an asymptomatic "new lump" during routine grooming or pointed out by another individual². The anatomical complexity of the head and neck region, with its intricate arrangement of vital structures within a relatively confined space, makes accurate diagnosis essential for appropriate management³. These swellings may originate from various anatomical structures including lymph nodes, salivary glands, thyroid gland, skin and soft tissues⁴. Lymphadenopathy represents one of the most common palpable head and neck swellings encountered in clinical practice⁵. Cervical lymph nodes are strategically positioned to drain lymphatics from the upper aerodigestive tract, oral cavity, scalp, and facial structures, making them susceptible to involvement in local and systemic pathologies⁶. Thyroid swellings exhibit remarkable variation across age groups and geographical regions⁷. Multi nodular goitres predominantly affect middle-aged females, presenting as asymmetric, nodular enlargements with long-standing progression and occasional retrosternal extension causing compressive symptoms⁸. Solitary thyroid nodules require careful evaluation due to their malignant potential, particularly in individuals at extremes of age⁹. Salivary gland pathologies demonstrate characteristic age and site predilections¹⁰. Parotid gland lesions constitute the majority, with pleomorphic adenoma representing the most common benign neoplasm¹¹. In soft tissue lesions FNAC effectively differentiates lipomas, fibromas, and vascular lesions from their malignant counterparts through assessment of cytological atypia, mitotic activity, and necrosis¹². FNAC is the first-line, highly accurate diagnostic tool for epidermal keratinous cyst and other miscellaneous lesions. It helps confirm diagnosis, rule out mimics and guide management, making surgical excision or histopathology unnecessary in straightforward cases¹³. The aim of the study was the evaluation and documentation of role of FNAC in the initial assessment and diagnosis of patients with palpable lesions in the head and neck region and to test the utility of FNAC in diagnosis of non-neoplastic and neoplastic lesions of head and neck.

MATERIAL AND METHODS

This prospective study was conducted at Department of Pathology, Jawahar Lal Nehru Medical College and Associated group of

Hospitals, Ajmer (Rajasthan) from January 2023 to December 2023. Ethical approval was obtained from Institutional Ethical Committee and informed written consent was taken from all the participants prior to enrolment. Total 604 cases were taken.

Inclusion Criteria

All the cases of head and neck swellings sent for FNAC from all the departments of the hospital were included.

Exclusion Criteria

- The cases of head and neck swellings which were inaccessible.
- Swellings from bone region.
- Insufficient cellularity.

Detailed clinical history of all the patients was taken related to head and neck swellings and relevant questions like exact site, size, chief complaints with duration and also asked about present, past, family history to extract the etiology.

Method For Fine Needle Aspiration Cytology: Prior to the FNAC, the nature of the tumor and its location in relation to other structures determined. The skin over the tumor decontaminated by application of tincture iodine and subsequent repeated washing with rectified spirit. After immobilizing the lump with one hand, fine needle of 20-24 gauge introduced into the lump till the tip of the needle reached up to the center of the nodule. The plunger of the disposable syringe then withdrawn slowly thus, creating a negative pressure in the syringe and the needle move back and forth as well as in different directions within the mass so as to collect sample from different areas around. Throughout the procedure negative pressure maintained in the syringe by keeping the plunger retracted. when the aspiration felt to be complete, the plunger should be released to equalize the pressure in the syringe before withdrawing the needle, thereby preventing the loss of cells from the lumen of the needle to syringe. The syringe then detached from the needle and the latter then withdrawn. Pressure with sterile gauze piece should be applied at the site of aspiration for some time, to stop any leakage of blood.

Preparation of Smear:

- 2ml of air was taken in the syringe and reattached to the needle.
- Keeping the tip of the needle on the surface of a clean, grease free glass slide, the plunger of the syringe advanced so as to force the aspirated material in the needle on to the slide.

- Smear was made by gently pressing a clean glass slide over the lower one to spread the material.
- Constituents of fixative: The smears were fixed with 95% alcohol.
- Staining procedure: prepared slides stained with Harris Hematoxylin and Eosin stain and Giemsa stain.

Statistical Analysis

Statistical analysis was done using SPSS version 26. The qualitative data expressed in proportions and percentages and the quantitative data expressed as mean and standard deviations. The appropriate test applied. 5% probability considered as statistically significant i.e. $p < 0.05$.

RESULTS

This prospective observational study was conducted in the Department of Pathology, J.L.N. Medical College, Ajmer, over a period of one year from January 2023 to December 2023. It aimed to assess the diagnostic utility of Fine Needle Aspiration Cytology (FNAC) in evaluating head and neck swellings and to delineate the cytomorphological patterns of various neoplastic and non-neoplastic lesions encountered in this anatomically diverse region. A total of 604 patients presenting with palpable lesions in the head and neck area were included. The most commonly aspirated site was the lymph node (48%), followed by the thyroid gland (36%), salivary glands (7%), and soft tissues or miscellaneous regions (9%).

Table 1. Distribution of Cases According to Site of Lesion

Site	Cases	Percentage
Lymph node	287	47.5
Thyroid	215	35.6
Salivary gland	47	7.8
Soft tissue & miscellaneous	55	9.1
Total	604	100

The most frequently involved anatomical region was the lymph node (47.5%), followed by the thyroid gland (35.6%), soft tissues (9.1%), and salivary glands (7.8%).

Table 2. Distribution of Various Lymph Node Lesions

Diagnosis	No. of cases	Percentage
Inflammatory		
Acute inflammatory	24	8.35
Chronic reactive lymphadenitis	50	17.42
Reactive lymphoid hyperplasia	22	7.66
Granulomatous lymphadenitis	17	5.92
Tubercular Lymphadenitis	114	39.72
Malignant		
Metastatic deposits	55	19.16
Hodgkins Lymphoma	2	0.69
Non-Hodgkins Lymphoma	3	1.04
Total	287	100

Among lymph node lesions, Granulomatous Lymphadenitis was the most frequent diagnosis (indicative of tuberculosis), followed by Reactive Lymphadenitis and Metastatic Deposits were the most frequent malignant neoplasm.

Table 3. Distribution of Various Thyroid Gland Lesions

Diagnosis	Bethesda Category	No. of cases	Percentage
Inflammatory			
Hashimoto Thyroiditis	II	28	13
Chronic Lymphocytic Thyroiditis	II	12	5.5
Granulomatous Thyroiditis	II	3	1.39
Acute Thyroiditis	II	2	0.93
Benign			
Colloid Goitre	II	98	45.58
Adenomatous Goitre	II	8	3.7
Grave's disease	II	1	0.46
Hurthle cell adenoma	II	1	0.46
Nodular goiter	II	10	4.65
Thyroglossal cyst	II	2	0.93
Atypia of undetermined significance	III	1	0.46
Follicular Neoplasm	IV	27	12.55
Malignant			
Suspicious for papillary carcinoma	V	6	2.8

Papillary carcinoma of Thyroid	VI	12	5.6
Medullary Carcinoma	VI	2	0.93
Anaplastic carcinoma	VI	2	0.93
Total		215	100

Thyroid lesions predominantly showed colloid goitre, followed by various thyroiditis and follicular neoplasms while Papillary carcinoma was the most frequent malignant thyroid neoplasm.

Table 4. Distribution of Various Salivary Gland Lesions

Diagnosis	No. of cases	Percentage
Inflammatory		
Acute inflammatory pathology	9	19.1
Acute on chronic non-specific sialadenitis	1	2.12
Chronic sialadenitis	11	23.4
Reactive sialadenitis	2	4.25
Benign		
Pleomorphic salivary Adenoma	15	32
Sialadenosis	4	8.5
Oncocytoma	2	4.25
Warthin's tumor	1	2.12
Malignant		
Mucoepidermoid carcinoma	2	4.25
Total	47	100

Pleomorphic Adenoma was the most common benign salivary gland lesion, while Mucoepidermoid Carcinoma was the only malignant salivary neoplasms.

Table 5. Distribution of Various Soft Tissue and Other Miscellaneous Lesions

Diagnosis	No. of cases	Percentage
Inflammatory		
Inflammatory pathology	3	5.45
Infected epidermal keratinous cyst	15	27.27
Benign		
Epidermal keratinous cyst	13	23.63
Lipoma	11	20
Branchial cyst	2	3.67
Benign spindle cell lesions	5	9.1
Benign fibrous Lesion	2	3.67
Paraganglioma	2	3.67
Pilomatricoma	1	1.82
Calcinosis cutis	1	1.82
Total	55	100

Soft tissue and miscellaneous lesions included epidermal cysts, lipomas, and other cystic and fibrous lesions, with FNAC providing effective classification.

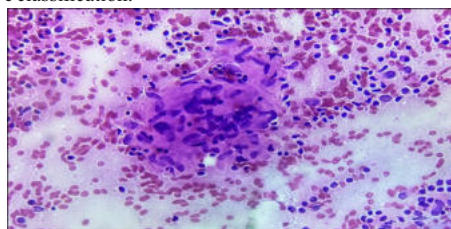


Image 1 :- Tubercular granuloma—An epithelioid cell granuloma with elongated and curved nuclei with abundant cytoplasm along with lymphocytes in the background of blood and necrotic debris (H&E: 40X)

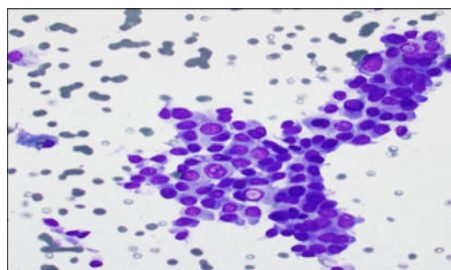


Image 2: Cytosmear of Papillary thyroid carcinoma shows Intranuclear inclusions (H&E: 40X)

DISCUSSION

Our study on FNAC of head and neck lesions and its comparison with other studies reveal a high diagnostic accuracy. While our findings are consistent with many previous studies, this comparison emphasizes the usefulness of FNAC as a first line diagnostic tool in head and neck swellings.

The predominance of lymph node lesions in our study is in line with numerous Indian studies. Khetrapal et al. (2015)¹⁵ reported that lymph node lesions constituted 64.1% of their FNAC sample. Yenpure et al. (2023)²² noted that 56.9% of FNACs were performed on lymph nodes, primarily for diagnosing tuberculosis or metastatic disease. Sheikh N. et al. (2020)¹⁹ found that among 116 head and neck FNACs, inflammatory lesions dominated the findings, especially in lymph nodes and thyroid glands. Their study emphasized FNAC's effectiveness in distinguishing inflammatory from neoplastic swellings, allowing early medical treatment in the former and reducing unnecessary excisions. In Lymph node lesions our observation aligns with studies by Maniyar et al. (2013)¹⁴ also found that lymph node lesions formed the majority of head and neck FNAC cases, with many being tubercular or reactive in nature. Kapoor et al. (2017)²³, who also found metastatic carcinoma to be the most frequently encountered malignancy in lymph node aspirates. In thyroid lesions, our observation that benign neoplasms outnumbered inflammatory and malignant lesions aligns with studies by Patel Jigna et al. (2021)²⁰ and Sheikh N. et al. (2020)¹⁹, both of which reported colloid goitre and follicular adenomas as the most common cytological diagnoses. Kaushal S. et al. (2022)²¹ also reported papillary carcinoma as the most frequently diagnosed malignant thyroid lesion in their FNAC study. In Salivary gland lesions, our pattern closely aligns with the study by Suryawanshi et al. (2015)¹⁶, where inflammatory salivary gland lesions, particularly chronic non-specific sialadenitis, formed a significant part of the aspirated samples. Our findings are consistent with those of Kapoor et al. (2017)²³, who reported pleomorphic adenoma as the most frequent benign salivary gland tumor and Mucoepidermoid carcinoma was the malignant tumour. In Soft tissue and miscellaneous lesions, our findings are consistent with those of Khetrapal et al. (2015)¹⁵ who documented a subset of soft tissue swellings that turned out to be infected epidermoid cysts on FNAC. Gul et al. (2017)¹⁷ and Sangavi et al. (2018)¹⁸ similarly reported a high frequency of lipomas and spindle cell lesions in soft tissues, where FNAC prevented unnecessary wide excision and provided a preliminary tissue diagnosis.

SUMMARY AND CONCLUSION

This prospective study analysed 604 cases of head and neck swellings to assess the cytomorphological patterns. Among lymph node lesions, Granulomatous lymphadenitis emerged as the most frequently diagnosed condition, underscoring the high burden of tuberculosis in the Indian population. Reactive lymphadenitis and metastatic deposits were also commonly observed. In the thyroid gland, colloid goitre was the predominant benign lesion, while follicular neoplasm and papillary carcinomas were the most frequent neoplastic entities. Salivary gland aspirations revealed pleomorphic adenoma as the most common benign neoplasm, with mucoepidermoid carcinoma featuring among the malignant counterparts. Soft tissue and skin lesions included benign entities such as lipomas, epidermal cysts and spindle cell neoplasms also encountered. The overall proportion of malignant lesions was approximately 15–17%, with metastatic deposits in cervical lymph nodes being the most frequently diagnosed malignant condition. Limitations of the study included diagnostic overlap in certain thyroid lesions—particularly follicular neoplasms—and challenges in subtyping lymphomas based solely on cytology. In such scenarios, the need for ancillary investigations such as immunocytochemistry and molecular testing was acknowledged. The integration of these tools could further refine the diagnostic precision of FNAC, especially in distinguishing low-grade malignancies and complex neoplasms.

In conclusion, this study reinforces the role of FNAC as an indispensable diagnostic modality for head and neck lesions. It provides high diagnostic accuracy with minimal invasiveness, rapid turnaround, and excellent patient compliance. The consistency of findings with existing literature validates its continued utility, particularly in tertiary care and resource-limited settings. With proper technique, cytological expertise, and appropriate ancillary support, FNAC remains a cornerstone in the early diagnosis, triage, and management of a wide spectrum of head and neck pathologies.

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