



SPECTRUM OF GLANDULAR LESIONS IN THE HEAD AND NECK REGION: AN FNAC-BASED EVALUATION

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ABSTRACT

Glandular lesions of the head and neck, especially those involving the thyroid and salivary glands show a wide range of non-neoplastic and neoplastic conditions. Fine-needle aspiration cytology (FNAC) is a rapid, minimally invasive and cost-effective first-line diagnostic technique for their evaluation. **Methods:** This study included 84 patients with palpable head and neck glandular lesions were studied over 18 months. FNAC was performed using standard techniques. Smears were stained by Papanicolaou, Giemsa and Hematoxylin and Eosin (H&E) stains for cytomorphological assessment. **Results:** Among 63 cases, thyroid lesions predominated. Bethesda categorization demonstrated a high prevalence of benign lesions (80.9%), with smaller proportions of AUS (7.9%), follicular neoplasm (4.8%), suspicious for malignancy (3.2%), malignant (1.6%) and nondiagnostic cases (1.6%). Whereas salivary gland lesions showed male predominance (70%), mainly in older patients, classified using the Milan system, were predominantly non-neoplastic (61.9%), followed by benign neoplasms (19%) and malignant lesions (19%), with no cases in other categories. The majority of cases were in the 41–60 years age group (42%) with an overall female predominance (81%). **Conclusion:** FNAC serves as an essential adjunct to histopathology. It enhances patient triage, supports optimal surgical planning and improves clinical outcomes in both thyroid and salivary gland lesions.

KEYWORDS

Glandular, Salivary, Thyroid, Head And Neck, FNAC.

INTRODUCTION

Thyroid and salivary gland swellings are frequently encountered in clinical practice and constitute a significant proportion of endocrine and head-and-neck lesions requiring cytological evaluation.^{1,3} Thyroid nodules are common in the general population, with a prevalence of 4–7% on clinical examination and up to 40–50% detected by ultrasonography.^{1,2} Although most nodules are benign, less than 5% are malignant, making accurate preoperative assessment essential.^{1,2}

Salivary gland lesions comprise a heterogeneous group of non-neoplastic and neoplastic conditions and account for approximately 2–6% of head and neck tumors.^{3,6} These lesions often present as painless swellings with overlapping clinical and radiological features, limiting definitive diagnosis without cytological evaluation.^{3,5}

Fine-needle aspiration cytology (FNAC) is a simple, rapid, minimally invasive, and cost-effective diagnostic modality widely used in the evaluation of thyroid and salivary gland lesions.^{3,8} It plays a crucial role in distinguishing benign from malignant lesions, thereby reducing unnecessary surgical interventions.^{1,2,7,8} Despite its high diagnostic accuracy, FNAC has limitations in follicular-patterned and indeterminate lesions, where histopathological examination remains the gold standard.^{1,2} Use of ultrasound-guided FNAC and standardized reporting systems, such as the Bethesda for thyroid and Milan System for salivary gland cytology, has further improved diagnostic accuracy and clinician–pathologist communication.⁷ Accurate cytological interpretation within these standardized reporting frameworks remains essential for optimal patient management, appropriate surgical planning, and prognosis.^{8,9}

OBJECTIVES–

1. To determine the frequency of benign, atypical and malignant lesions in FNAC cases.
2. To classify thyroid lesions according to the Bethesda System for reporting thyroid cytopathology and salivary gland lesions according to the Milan System for reporting salivary gland cytopathology.
3. To study role of FNAC in the evaluating head and neck glandular masses.

MATERIALS AND METHODS

This was a hospital-based observational study conducted in the Department of Pathology of a tertiary care hospital over a period of march 2025 to February 2026. All patients presenting with thyroid and salivary gland swellings and referred for fine-needle aspiration cytology (FNAC) during the study period were included. A total of 84 cases were studied. FNAC was performed using a 22–25 gauge needle under aseptic precautions. Air-dried smears were stained with May-Grünwald-Giemsa (MGG), and alcohol-fixed smears were stained with Papanicolaou and Haematoxylin and Eosin stains. Smears were examined under light microscopy and lesions were categorized as non-neoplastic, benign, malignant or atypical, based on cytomorphological features. Patients of all age groups and both sexes with thyroid or salivary gland swellings were included and inadequate or poorly preserved smears excluded.

Statistical Analysis: A total of 83 FNAC cases were analysed, including 63 thyroid and 21 salivary gland lesions. Data were entered in Microsoft Excel and analysed using descriptive statistics. Results were expressed as frequencies, percentages and pie charts.

Ethical Consideration: The study was approved by the Institutional Ethics Committee, and informed consent was obtained from all patients.

RESULTS:

A total of 84 cases of head and neck glandular lesions were evaluated by fine-needle aspiration cytology during the study period.

TABLE – 1 Age-wise Distribution of Thyroid FNAC Cases (n = 40)

Age	No. of Cases	Percentage (%)
0–20	0	0.0%
21–40	17	27.5%
41–60	27	42.5%
>60	19	30.0%
Total	63	100%

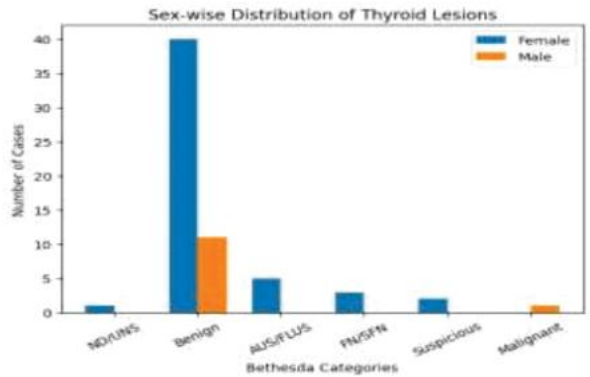
As shown in Table 1, the maximum number of cases was observed in the 41–60 years age group (27 cases, 42.5%), followed by patients aged above 60 years (12 cases, 30%). The 21–40 years age group comprised

17 cases (27.5%), while no cases were recorded below 20 years of age.

Table 2: Distribution of Thyroid FNAC Cases According to Bethesda System

Cytomorphological Pattern of Thyroid Lesions	Bethesda Category	Female	Male	Total
Non-diagnostic / Unsatisfactory	I (ND/UNS)	1	0	1
Benign Colloid Nodule / Goitre	II (Benign)	40	11	51
Atypia of Undetermined Significance (AUS)	III (AUS/FLUS)	5	0	5
Follicular Neoplasm / Suspicious	IV (FN/SFN)	3	0	3
Suspicious for Malignancy	V (Suspicious)	2	0	2
Papillary Carcinoma / Malignant	VI (Malignant)	0	1	1
Total	—	51 (81%)	12 (19%)	63

Fig: 1



According to Table 2, out of 63 cases studied, 51 patients (81%) were females and 11 patients (12%) were males, showing a female predominance.

Fig 2–Thyroid gland FNAC

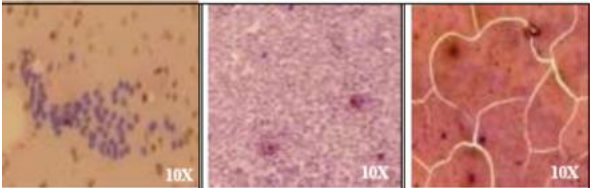


Fig-2A

Fig-2B

Fig-2C

Fig2A- FNAC of thyroid gland showing follicular cells with round regular nuclei in colloid mixed hemorrhagic background.

Fig2B- Colloidophages on hemorrhagic background.

Fig2C- Colloid crack (an artifact produced by drying of thick colloid).

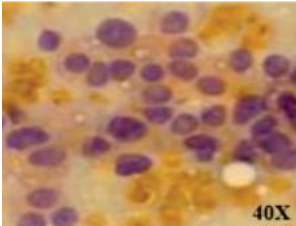


Fig-3

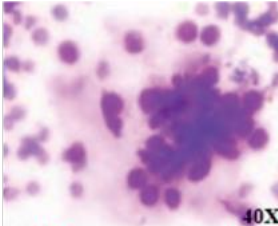


Fig4

Fig3 Cat III- AUS (Atypia of undetermined significance Bethesda)- Thyroid FNAC shows follicular cells with mild nuclear atypia.

Fig4 Cat V- Suspicious for Malignancy -Thyroid FNAC shows crowded cell clusters with nuclear overlapping, grooves, inclusion and fine chromatin, suspicious for malignancy.

TABLE 3: Distribution of Salivary Gland FNAC Cases According to Milan System

Milan Category	Diagnostic Category	No. of Cases	Percentage (%)
I	Nondiagnostic	0	0
II	Non-neoplastic	13	61.9
III	Atypia of undetermined significance	0	0
IVA	Benign neoplasm	4	19.0
IVB	Salivary gland neoplasm of uncertain malignant potential	0	0
V	Suspicious for malignancy	0	0
VI	Malignant	4	19.0
Total		21	100

Fig 5-Protid gland FNAC

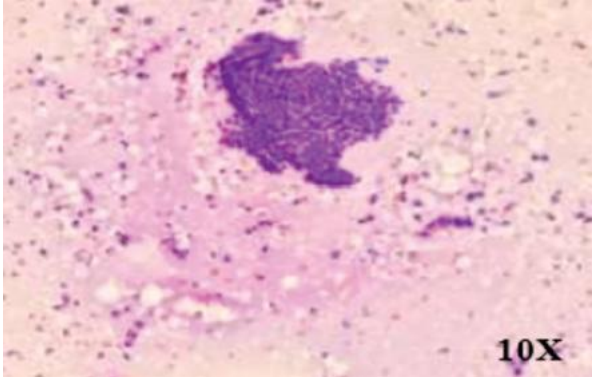


Fig-5A

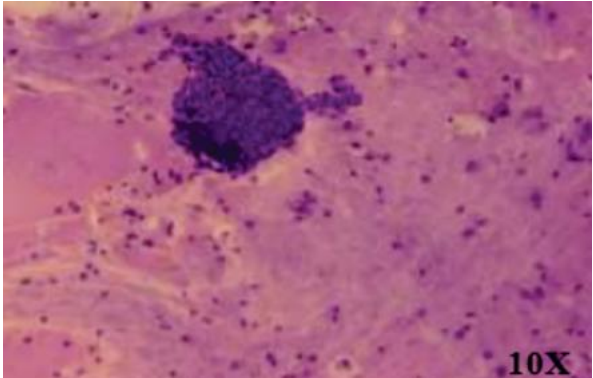


Fig-5B

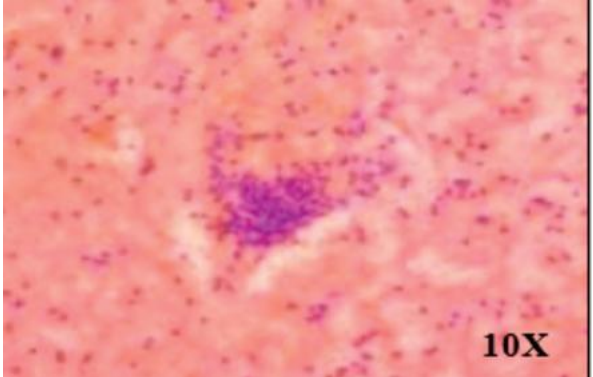


Fig-5C

Fig 5A - Parotid gland FNAC shows ductal epithelial clusters with inflammatory cells on necrotic background – features consistent with chronic sialadenitis.

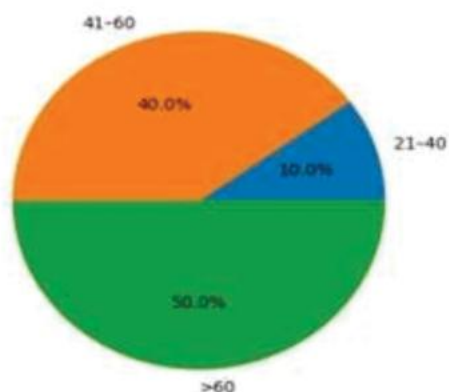
Fig 5B- Parotid gland FNAC shows cohesive clusters of epithelial and myoepithelial cells in chondromyxoid background- Pleomorphic adenoma Milan Cat IV.

Fig 5C -FNAC shows sheets of oncocytic epithelial cells on background of numerous mature lymphocytes. - Warthin Tumor Cat IV.

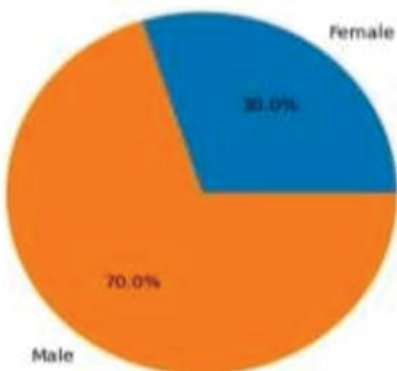
Age and sex-wise distribution of salivary gland FNAC cases showed that the majority of cases were observed in patients above 60 years of age (10 cases), followed by the 41–60 years age group (8 cases). Only two case was noted in the 21–40 years age group, and no cases were observed below 20 years of age. Males predominated in the present study, accounting for 15 cases (70%), while females constituted 6 cases (30%). All cases in the above 60 years age group were males, whereas equal distribution was observed among males and females in the 41–60 years age group. Overall, salivary gland lesions were more common in middle-aged and elderly male

Fig. 6: Age – sex wise Distribution of Salivary Gland FNAC Cases (n = 21)

Age-wise Distribution of Salivary Gland FNAC Cases (n



Sex-wise Distribution of Salivary Gland FNAC Cases (n=21)



DISCUSSION

Fine-needle aspiration cytology (FNAC) proved to be an effective first-line diagnostic tool for thyroid and salivary gland lesions due to its simplicity, rapidity, and cost-effectiveness. The lower frequency of Bethesda Category IV and V lesions supports the role of FNAC as a triaging modality for selecting patients for surgical management. Female predominance in thyroid lesions observed in this study aligns with established epidemiological patterns related to hormonal and autoimmune factors. In the present study, benign thyroid lesions constituted the largest proportion of cases, which is consistent with observations reported by Akshatha et al. and Singh et al.⁹, where benign lesions predominated in thyroid

FNAC samples. The smaller proportion of Bethesda Category IV and V lesions in the present study is similar to findings reported by Razzak et al.² and Xing and Tan².

Non-neoplastic lesions formed the majority of salivary gland FNAC

cases, reflecting the usefulness of FNAC in avoiding unnecessary surgical procedures. In the present study, non-neoplastic salivary gland lesions constituted the majority, which correlates with findings reported by Singh A et al.³ and Mangrulkar et al.⁶, where non-neoplastic lesions were the most frequent category. Pleomorphic adenoma was the most common benign neoplasm encountered, consistent with observations made by Mangrulkar et al.⁶ and Kasavala et al.⁵ Male predominance in salivary gland lesions suggests possible demographic and environmental influences.

The application of the Bethesda and Milan systems ensured uniform reporting. Limitations of FNAC include sampling errors and interpretational variability, particularly in cystic and low-cellularity lesions.

CONCLUSION

The present study concludes that fine-needle aspiration cytology is a simple, safe, minimally invasive, and cost-effective diagnostic modality for the evaluation of thyroid and salivary gland lesions. Benign lesions constitute the majority of thyroid and salivary gland FNAC diagnoses. The Bethesda and Milan systems provide standardized reporting and enhance clinician-pathologist communication.

FNAC plays a crucial role in triaging patients for surgery and reducing unnecessary surgical interventions. Histopathological examination remains the gold standard, particularly in indeterminate and follicular-patterned lesions. Overall, FNAC continues to be an indispensable first-line investigation in the diagnostic work-up of thyroid and salivary gland swellings.

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