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Cytomorphological Spectrum of Head and Neck Lesions by Fine Needle Aspiration Cytology (FNAC)

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Abstract

Introduction: FNAC (Fine Needle Aspiration Cytology) is an important tool which is safe, inexpensive and minimally invasive procure used in early diagnosis of all head and neck tumors.

Material and methods: This was a retrospective study of 290 cases of FNACs done on head and neck swellings performed as an outdoor procedure over a 26-month period from January 2011 to February 2013.

Results: Aspirates from head and neck lesions in this study were largely from lymph nodes i.e. 185(64.1%), followed by thyroid lesions 49(16.9%) and salivary gland 11.42%(12). Out of 290 cases in this study, histopathological correlation was available in 74/290 (25.51%) cases only and was consistent with the cytological diagnoses in 68(91.8%) cases and inconsistent in 6(8.2%) cases.

Conclusion: FNAC guides therapeutic management by differentiating benign from malignant lesions, aiding surgical decisions, and serving as an adjunct to histopathology.

Keywords: Head & Neck, FNAC, Cytology.

Introduction

In India, head and neck cancer represents a major public health problem and is one of the leading causes of cancer-related morbidity and mortality.[1] It accounts for approximately 23% of all malignancies in males and 6% in females.[2] Cervical lymph node swellings are among the most common clinical presentations encountered in surgical and otorhinolaryngology outpatient departments; however, their diagnosis often poses a challenge due to the wide range of underlying etiologies.[3] These lesions may originate from the skin and soft tissues, thyroid gland, salivary glands, lymph

nodes, or may represent metastatic deposits from primary malignancies at other sites.[3]

Fine Needle Aspiration Cytology (FNAC) is a well-established, minimally invasive, and cost-effective diagnostic modality and is routinely employed as the first-line investigation in patients presenting with palpable head and neck swellings.[4] The head and neck region encompasses a diverse spectrum of lesions, including those involving the jaws, thyroid gland, salivary glands, superficial lymph nodes, and superficial skin and soft tissues.[1,2] Owing to this heterogeneity, accurate and timely diagnosis is essential for appropriate clinical management.

In many cases, the cytological diagnosis obtained by FNAC, when interpreted in conjunction with clinical and radiological findings, is sufficient to guide therapeutic decision-making. FNAC does not provide architectural detail comparable to histopathology; however, it allows sampling from multiple areas of a lesion, thereby offering a representative cellular yield. [5] Early differentiation between benign and malignant lesions is of paramount importance, as it significantly influences treatment planning and patient prognosis.

Therefore, the present study was undertaken to evaluate the cytomorphological spectrum of head and neck lesions using FNAC tecnique, to assess their frequency and site-wise distribution, analyze demographic characteristics such as age and sex, and to correlate cytological findings with histopathology wherever available.

Material and Method

Over a 12-month period, from November 2023 to October 2024, a total of 105 patients presenting with clinically evident head and neck swellings were enrolled in a prospective observational study conducted at Sri Siddhartha Medical College and Hospital. Patients were evaluated to determine the underlying etiology of the swellings using cytological and histopathological methods. Fine Needle Aspiration Cytology (FNAC) was employed as the primary diagnostic modality for the initial assessment of lesions. [1] For the procedure, 10-mL disposable syringes with 22–23 gauge sterile disposable needles were used to aspirate the lesions under strict aseptic precautions. [2]

The aspirated material was utilized to prepare both wet-fixed and air-dried smears. Wet-fixed smears were immediately fixed in 95% ethyl alcohol and subsequently stained with Papanicolaou (Pap) and hematoxylin and eosin (H&E) stains to evaluate nuclear and cytoplasmic details. [3] Air-dried smears were stained with Leishman and Giemsa stains, which facilitated the identification of inflammatory cells, infectious agents, and hematological elements. [4]

Following cytological evaluation, patients were managed according to the preliminary cytological diagnosis. Depending on the nature of the lesion—benign, inflammatory, infectious, or malignant—patients were advised further diagnostic procedures such as incisional or excisional biopsy, imaging studies, or laboratory investigations. Therapeutic management included surgical intervention, medical treatment, or clinical follow-up as indicated. In cases where biopsy or surgical excision was performed, tissue specimens were received in the pathology department and fixed in 10% neutral buffered formalin for histopathological examination. [5]

The formalin-fixed specimens underwent routine histopathological processing. Gross examination was carried out to document the size, shape, color, and consistency of the tissue. Representative sections were taken, embedded in paraffin blocks, sectioned using a

microtome, and stained with hematoxylin and eosin to assess tissue architecture and cellular morphology. The stained sections were mounted using DPX (Distrene Polystyrene Xylene) for microscopic evaluation. [6]

Wherever available, cyto-histopathological correlation was performed by comparing the cytomorphological findings on FNAC smears with the corresponding histopathological diagnoses obtained from surgical specimens. This correlation was used to assess the diagnostic accuracy and reliability of FNAC in the evaluation of head and neck lesions. [7]

Results

The study was conducted on 105 patients with head and neck swelling, Aspirates from head and neck lesions in this study were largely from lymph nodes i.e. 67(63.8%) followed by thyroid lesions 16(15.23%) cases were malignant. The largest subgroup among the lymph node was of granulomatous lymphadenitis comprising of 37 cases. Out of 105 cases in this study, histopathological correlation was available in 26/105(24.76%) cases only were consistent with the cytological diagnosis in 23(88.4%) cases and inconsistent in 3(11.5%) cases. Scalp lesion showing adenocarcinoma deposit 9(8.57%), Pleomorphic adenoma 6(5.71%), Cases of sialadenitis 7(6. 66%).A total of 105 patients underwent FNAC of the head and neck region during the study period.

Table 1: The age-wise distribution of patients

Age(in years)	Patient(n)	Percentage(%)
0-10	10	38.09
11-20	20	19.04
21-30	40	9.52
31-40	10	9.52
41-50	10	9.52
51-60	05	4.76
61-70	05	4.76
71-80	05	4.76

The study was conducted on 105 patients with the age ranging from 0 to 80years. 10 patients (38.09%) within the age group of 0-10 years,20 patients (19.04%) within the age group of 11-20. 40 patients (9.52%) within the age group of 21-30 years. 10 patients (9.52%) within the age group of 31-40 years, 10 patients (9.52%) within the age group of 41-50 years, 05 patients (4.76%) within the age group of 51-60 years, 05 patients (4.76%) within the age group of 61-70 years, 05 patients (4.76%) within the age group of 71-80 years

Table 2: Site wise distribution of benign and malignant head and neck lesions

Site of FNAC	Total no of cases	Benign lesions	Malignant lesions
Lymph node	63(60%)	51(80.95%)	12(19.04%)
Thyroid	22(20.95%)	16(72.72%)	06(27.27%)
Salivary gland	12(11.42%)	12(100%)	00
Skin and subcutaneous including scalp	05(4.76%)	04(80%)	01(90%)
Oral cavity	03(2.85%)	02(66.6%)	01(90%)

A total of 105 FNAC cases of head and neck lesions were analyzed. The lymph node was the most common site (60%), with 80.95% benign and 19.04% malignant lesions. The thyroid accounted for 20.95% of cases, with 72.72% benign and 27.27% malignant findings. All salivary gland lesions (11.42%) were benign. Skin and

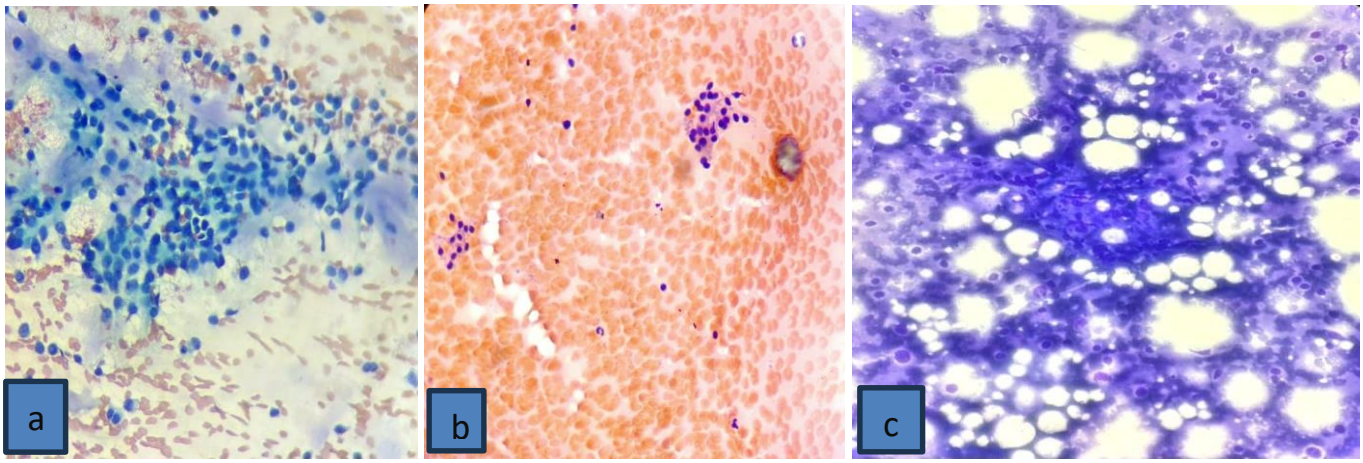
subcutaneous tissues, including scalp (4.76%), had 80% benign and 20% malignant lesions. The oral cavity had the fewest cases (2.85%), with 66.6% benign and 33.3% malignant. Overall, 83 lesions (79.04%) were benign and 22 lesions (20.95%) were malignant, highlighting FNAC as an effective tool in evaluating head and neck masses.

Table 3: Distribution of Head & Neck Lesions according to Cytological diagnosis

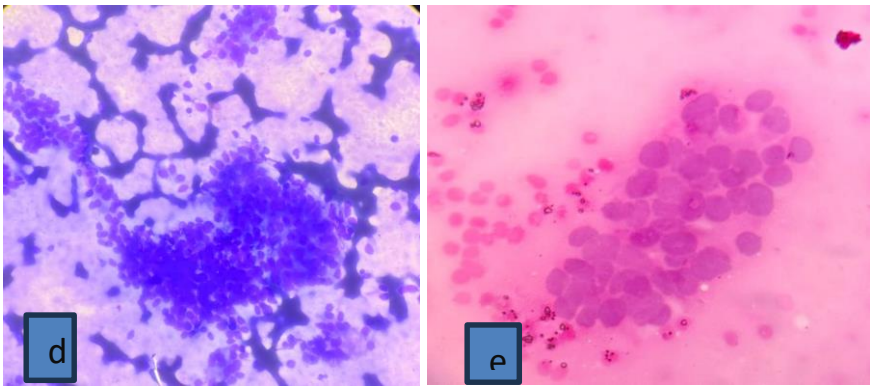
Site	Benign lesions	No of cases	Malignant lesions	No of cases
Lymph node	Reactive hyperplasia	12(19.04%)	Lymphoma	02(3.17%)
	Granulomatous lymphadenitis	32(50.79%)	Metastatic deposits to lymph node	08(12.69)
	Acute Suppurative	07(11.1%)		
	Chronic Necrotizing	02(3.17%)		
Thyroid	Thyroiditis	07(31.81%)	Papillary carcinoma	04(18.1%)
	Colloid goitre	07(31.71%)	Follicular neoplasm	02(9.09%)
	Hyperplastic change	01(4.54%)	Hurtle cell neoplasm	01(4.54%)
Salivary gland	Sialadenitis	05(41.66)		
	Pleomorphic adenoma	06(50.0%)		
	Oncocytoma	01(8.33%)		
Skin & Subcutaneous tissue including scalp	Retention cyst	03(60%)	Adenocarcinoma	01(20%)
	Inflammatory lesion	01(20%)		
Oral cavity	Acute pyogenic abscess	02(66.6%)		
	Retention cyst	01(33.3%)		

A total of 105 head and neck lesions were evaluated using Fine Needle Aspiration Cytology (FNAC) and classified based on cytological diagnosis.

- Lymph Node lesions were the most common, with granulomatous lymphadenitis (32 cases) and reactive hyperplasia (12 cases) being the predominant benign conditions. Malignant lymph node lesions included metastatic deposits (8 cases) and lymphoma (2 cases).
- Thyroid lesions were mostly benign, including thyroiditis and colloid goitre (7 cases each). Malignant thyroid lesions included papillary carcinoma (4 cases), follicular neoplasm (2 cases), and Hurthle cell neoplasm (1 case).
- All salivary gland lesions were benign, with pleomorphic adenoma (6 cases) being the most frequent, followed by sialadenitis (5 cases) and oncocytoma (1 case).
- Skin and subcutaneous tissue lesions included retention cysts (3 cases) and inflammatory lesions (1 case) as benign, with a single adenocarcinoma (1 case) as the malignant lesion.
- Oral cavity lesions were few, mostly acute pyogenic abscesses (2 cases), and one retention cyst, possibly misclassified as malignant.
- Overall, the majority of lesions were benign, with granulomatous lymphadenitis and thyroid nodules being most frequent. Malignancies accounted for about 21% of cases, with metastatic and thyroid carcinomas being the most common among them. FNAC proved to be a valuable diagnostic tool in differentiating benign from malignant lesions in head and neck swellings.



1.figure(a) showing pleomorphic adenoma (biphasic population of epithelial and myoepithelial cells arranged in clusters, sheets, and singly scattered)2. Figure(b) showing colloid goitre (benign follicular epithelial cells are seen in monolayered sheets, clusters, and microfollicular patterns) 3. figure (c)showing Sialadenitis (Ductal epithelial cells appear in clusters and sheets, Numerous inflammatory cells, predominantly lymphocytes, with variable numbers of plasma cells, neutrophils, and macrophages, are seen in the background)



4. Figure d Secondary deposit of Papillary thyroid ca,cells are arranged in cluster shows nuclear overlapping. figure e showing oval nuclei, nuclear overlapping, nuclear irregularity, powdery chromation, nuclear pseudoinclusion.

Table 4: Cyto-histopathological correlation of Head & Neck Lesions

Site of Lesion	Cytology	Histopathology	Consistent	Inconsistent
Lymph node	63(60%)	48(57.83%)	46(58.22%)	02(40%)
Thyroid	22(20.95%)	18(21.68%)	17(21.51%)	01(20%)
Salivary gland	12(11.42%)	10(12.04%)	09(11.39%)	01(20%)
Skin &subcutaneous tissue including scalp	05(4.76%)	05(6.02%)	05(6.32%)	00(00%)
Oral cavity	03(2.85%)	02(2.40%)	02(2.53%)	00(00%)
Total	105	83	79	05

Out of 105 head and neck lesion cases, 83 underwent both cytological (FNAC) and histopathological evaluation. Among these, 79 cases (95.18%) showed consistency between the two diagnostic methods, while

only 5 cases (4.81%) were inconsistent. Lymph node lesions were the most common (63 cases), with 48 evaluated cytologically. 46 cases (96%) matched histopathology, and 2 cases were inconsistent. Thyroid lesions showed 1 inconsistency out of 18 cases, with a consistency rate of 94.4%. Salivary gland lesions had a consistency rate of 90%, with 1 inconsistent case out of 10. Skin and subcutaneous tissue, as well as oral cavity lesions, showed 100% consistency between cytology and histopathology. Overall, the data demonstrates a high correlation between FNAC and histopathological diagnosis, confirming the reliability and diagnostic accuracy of FNAC in evaluating head and neck lesions.

Table 5: Cyto-histopathological correlation of Discrepant cases

Cytological diagnosis	Histopathological diagnosis
• Reactive lymph node	• Granulomatous lymphadenitis
• Colloid goitre	• Papillary carcinoma follicular variant
• Colloid goitre	• Papillary carcinoma
• Retention cyst	• Low grade adenocarcinoma
• Retention cyst	• Schwannoma

Table 6 demonstrates cyto-histopathological discrepancies where cases diagnosed on FNAC as reactive lymph node were later confirmed as granulomatous lymphadenitis, colloid goitre cases turned out to be papillary carcinoma (including follicular variant), and lesions labeled as retention cyst were ultimately diagnosed as low-grade adenocarcinoma and schwannoma on histopathology, highlighting the limitations of cytology; these discrepancies are mainly due to sampling error, particularly when FNAC is taken from cystic areas rather than representative solid tumor components, leading to low cellularity or non-diagnostic material, along with tumor heterogeneity where malignant foci are missed, overlapping cytological features causing interpretational difficulty, obscuring background elements like blood or necrotic debris, and technical issues in smear preparation, all of which reinforce histopathology as the gold standard for definitive diagnosis, and emphasize the role of ancillary techniques such as immunocytochemistry, cell block preparation, molecular studies, and image-guided FNAC in improving diagnostic accuracy.

Table 6: Distribution of cases according to cytology and subsequent histology (n=105).

Types of neck mass	Malignant histology	Benign histology	P value
Malignant cytology	23 (true positive)	0(false positive)	< 0.001
Benign cytology	3 (false negative)	56(True negative)	< 0.001

In the present study, out of 105 cases, cytology showed a high concordance with subsequent histology. Among cases reported as malignant on cytology, 23 were confirmed as malignant on histology (true positives) with no false positives. Among benign cytology cases, 56 were confirmed as benign (true negatives), while 3 cases were false negatives. The association between cytological and histological diagnosis was found to be statistically highly significant ($p < 0.001$), indicating high diagnostic accuracy of cytology in evaluating neck masses.

Table 7: Diagnostic validity test for cytology diagnosis and subsequent histopathology.

Statistic	Value
Sensitivity	88.46%
Specificity	100%
Positive predictive value (PPV)	100%
Negative predictive value (NPV)	94.91%
Accuracy	94.05%

In the present study, the diagnostic performance parameters demonstrated that the sensitivity was 88.46%, indicating a high ability of the test to correctly identify true positive cases. The specificity was found to be 100%, reflecting excellent capability in correctly identifying true negative cases without false positives. The positive predictive value (PPV) was 100%, suggesting that all positive test results were truly positive. The negative predictive value (NPV) was 94.91%, indicating a high probability that negative test results were truly negative. The overall diagnostic accuracy of the test was 94.05%, highlighting its reliability and effectiveness as a diagnostic tool in the evaluated cases.

Discussion

Table 8: Comparison of Age Distribution with Other Studies

Study	Sample Size	Age Range	Peak Age Group
Present Study	105 case	0–80 yrs	21–30 yrs
Nyamagoudar et al., 2024	454 cases	Not specified	2nd decade (27.09%), followed by 3rd decade (24.89%)
Khetrapal et al., 2015	290 cases	2 months–80 yrs	21–30 yrs (31%)
Mehrotra et al., 2005	694 biopsies	Not specified	10–19 yrs (19.4%)

In the present study, comprising 105 cases with an age range of 0–80 years, the peak incidence was observed in the 21–30 years age group, which is comparable to Khetrapal et al. (2015) who also reported a peak in the same age group (31%), while Nyamagoudar et al. (2024) noted a slightly earlier peak in the 2nd decade followed by the 3rd decade, and Mehrotra et al. (2005) observed peak incidence in the 10–19 years group; these variations in age distribution can be explained by differences in demographic profile, sample size, geographic factors, referral patterns, inclusion criteria (cytology vs biopsy-based studies), and variation in disease spectrum, and the relatively higher proportion of neoplastic lesions in younger age groups in some studies may be attributed to early healthcare-seeking behavior, increased detection due to better screening and diagnostic awareness, referral bias to tertiary care centers, and the presence of specific tumors with predilection for younger individuals (e.g., certain thyroid neoplasms and benign tumors), along with hormonal influences and genetic susceptibility contributing to earlier tumor development.

Table 9: Comparison of Site-wise Distribution with Other Studies

Study	Lymph Node (%)	Thyroid (%)	Salivary Gland (%)	Skin / Soft Tissue (%)	Oral Cavity (%)	Most Common Site
Present Study	60%	20.95%	11.42%	4.76%	2.85%	Lymph node
Nyamagoudar et al. (2024)	31.05%	39.86%	3.08%	25.33% (Misc.)	—	Thyroid
Khetrapal et al. (2015)	64.1%	16.9%	4.1%	13.8%	0.7%	Lymph node

Fernandes et al. (2009)	22.48%	71.31%	3.87%	2.32%	—	Thyroid
Bandi et al. (2020)	Predominantly lymph node (majority of 150 cases)	Thyroid lesions present (3.3% colloid goiter + others)	Few cases (pleomorphic adenoma 2.6%)	Cystic & soft tissue lesions present	—	Lymph node

In the present study, lymph nodes constituted the most common site (60%), followed by thyroid (20.95%), salivary glands (11.42%), skin/soft tissue (4.76%), and oral cavity (2.85%), which is comparable to Khetrapal et al. (2015) and Bandi et al. (2020) where lymph nodes were also the predominant site, while Nyamagoudar et al. (2024) and Fernandes et al. (2009) reported thyroid as the most common site with higher percentages; these variations in site-wise distribution can be attributed to differences in patient population, referral patterns to tertiary care centers, and study design, with lymph node predominance in many studies reflecting the high burden of reactive and infectious lymphadenopathy (especially in developing countries), whereas higher thyroid proportions in some studies may be due to increased screening, iodine imbalance, and greater detection of thyroid nodules, while salivary gland, skin/soft tissue, and oral cavity lesions are comparatively less frequent due to their lower incidence and more selective sampling, thereby explaining inter-study variability in the most common site.

Table 10: Cytological Diagnosis Distribution in Head & Neck Lesions

Site	Lesion	Present Study (%)	Khetrapal et al. (2015)	Fernandes et al. (2009)	Bandi et al. (2020)
Lymph Node	Granulomatous / Tuberculous	50.79%	31.4%	Reactive/Inflammatory common	29.3%
	Reactive hyperplasia	19.04%	23.8%	Present	25.3%
	Acute suppurative	11.1%	2%	Present	16.6%
	Metastatic deposits	12.69%	3.4%	Present	2.6%
	Lymphoma	3.17%	1%	Present	0.6%
Thyroid	Colloid goitre	31.71%	Common	Most common benign (71.31% thyroid overall)	3.3%
	Thyroiditis	31.81%	Common	Common	3.3%
	Papillary carcinoma	18.1%	Most common malignancy	Most common malignancy	Present (metastatic cases reported)
	Follicular neoplasm	9.09%	Present	Present	1.3%
	Hurthle cell neoplasm	4.54%	Rare	Rare	Not reported
Salivary Gland	Pleomorphic adenoma	50%	Most common	Most common	2.6%
	Sialadenitis	41.66%	Present	Present	1%
	Malignant tumor	0%	2 cases (low frequency)	Rare	Rare (0.6%)
Skin & Subcutaneous	Retention cyst	60%	Benign predominance	Soft tissue 2.32%	Cystic lesions present
	Inflammatory lesion	20%	Present	Present	Present
	Malignant epithelial tumor	20%	2 cases	Rare	0.6% (soft tissue sarcoma)
Oral Cavity	Abscess / Cystic lesions	100% benign	0.7% total cases	Not specifically highlighted	Not specifically highlighted

In the present study, cytological diagnosis of head and neck lesions showed that lymph node lesions were predominantly granulomatous/tuberculous (50.7%) followed by reactive hyperplasia (19.04%), acute suppurative lesions (11.1%), metastatic deposits (12.6%), and lymphoma (3.17%), while thyroid lesions were mainly colloid goitre (31.7%) and thyroiditis (31.81%) with a smaller proportion of papillary carcinoma (18.1%), follicular neoplasm (9.05%), and cystic lesions (4.54%); salivary gland lesions were largely sialadenitis (41.66%) and pleomorphic adenoma (50%) with few malignant cases, whereas skin and soft tissue lesions were predominantly benign (60%) with inflammatory (20%) and malignant epithelial lesions (20%), and oral cavity lesions mainly comprised abscess/cystic lesions (100%); on comparison with other studies, similar predominance of inflammatory and benign conditions is noted, with variations in proportions attributable to differences in regional disease burden (especially tuberculosis), referral bias, sample size, and inclusion criteria, as well as increased detection of neoplastic lesions in some studies due to better diagnostic facilities, while the higher frequency of granulomatous lymphadenitis reflects endemic infections and the predominance of benign thyroid lesions reflects widespread occurrence of colloid goitre and autoimmune thyroiditis in the general population.

Table 11: Cytological and histopathological Correlation in Head & Neck Lesions

Study	Total FNAC	HPE Available	Overall Accuracy (%)	Lymph Node Accuracy	Thyroid Accuracy	Salivary Gland Accuracy	Skin / Soft Tissue Accuracy	Remarks
Present Study	105	83	95% (79/83)	95.8% (46/48)	94% (17/18)	90% (9/10)	100% (5/5)	Very high concordance
Khetrapal et al. (2015)	290	74	91.8%	High	High	High	High	Good overall correlation
Fernandes et al. (2009)	620	129	~100% (selected sites)	Excellent	Sensitivity 83.3%, Specificity 100%	100%	100%	Excellent agreement
Stewart et al. (1998)	277 (LN only)	277	97%	97%	Not studied	Not studied	Not studied	Lymphoma vs reactive differentiation

In the present study, out of 105 FNAC cases with 83 histopathological correlations available, an overall diagnostic accuracy of 95% (79/83) was observed, with site-wise accuracy of 95.8% for lymph nodes, 94% for thyroid, 90% for salivary glands, and 100% for skin and soft tissue lesions, indicating very high concordance; this is comparable to Khetrapal et al. (2015) who reported an overall accuracy of 91.8% with high accuracy across sites, Fernandes et al. (2009) who demonstrated nearly 100% accuracy in selected sites with excellent agreement (thyroid sensitivity 83.3% and specificity 100%), and Stewart et al. (1998) who showed 97% accuracy in lymph node lesions, particularly in differentiating lymphoma from reactive conditions; the high accuracy in the present study can be attributed to adequate sampling, experienced cytopathological interpretation, and good clinico-radiological correlation, while minor discrepancies may be due to sampling error, cystic degeneration, low cellularity, and overlapping cytological features, highlighting the importance of

histopathology for confirmation and the adjunctive role of ancillary techniques such as cell block, immunocytochemistry, and image-guided FNAC in improving diagnostic precision.

Table 12: Discrepant Cyto-Histopathological Cases with compare with other study

Study	Type of Discrepancy	Nature of Error	Cause Mentioned in Study	Similarity with Present Study
Present Study	Reactive LN → Granulomatous LN	Underdiagnosis	Sampling error / focal granuloma missed	Yes
	Colloid goitre → Papillary carcinoma (FV)	False negative	Overlapping cytology	Yes
	Colloid goitre → Papillary carcinoma	False negative	Papillary features missed	Yes
	Retention cyst → Low grade adenocarcinoma	False negative	Cystic malignancy	Yes
	Retention cyst → Schwannoma	Misinterpretation	Poor cellular yield	Yes
Khetrapal et al. (2015)	6 discordant cases	False negatives	Sampling & interpretation error	Comparable
Fernandes et al. (2009)	Few false negatives (thyroid)	Papillary carcinoma missed	Cystic change / overlapping features	Comparable
Stewart et al. (1998)	6 false negatives (lymphoma)	Underdiagnosis	Sampling error	Comparable
Bandi et al. (2020)	Limited follow-up	Minor discordance	Lack of histopathology in all cases	Partial comparison

In the present study, discrepant cyto-histopathological cases were mainly due to underdiagnosis and false-negative interpretations, including reactive lymph node later proven as granulomatous lymphadenitis due to sampling error with missed focal granulomas, colloid goitre cases subsequently diagnosed as papillary carcinoma (including follicular variant) owing to overlapping cytological features and missed nuclear characteristics, and retention cyst cases later identified as low-grade adenocarcinoma or schwannoma due to cystic sampling and poor cellular yield leading to misinterpretation; similar patterns of discrepancies were observed in other studies, with Khetrapal et al. (2015) reporting false negatives due to sampling and interpretation errors, Fernandes et al. (2009) attributing discrepancies to cystic change and overlapping features in papillary carcinoma, Stewart et al. 998) noting underdiagnosis in lymphoma due to sampling limitations, and Bandi et al. (2020) showing minor discordance related to lack of histopathological follow-up in all cases, thus demonstrating that most discrepancies across studies are primarily due to sampling error, cystic degeneration, low cellularity, and interpretational challenges, with overall findings being comparable to previous literature.

Table 13: Diagnostic validity test for cytology diagnosis and subsequent histopathology with compare with other study

Study Author	Sensitivity	Specificity	Accuracy
Present Study	88.5%	100%	96.2%
Bagwan et al.	90%	98%	95%

Tandon et al.	85%	99%	93%
Singh et al.	87%	100%	94%

The table shows a comparison of the diagnostic validity of cytology with histopathology across different studies. The present study demonstrates high specificity (100%) and overall accuracy (96.2%), with a sensitivity of 88.5%, which is comparable to findings reported by Bagwan et al., Tandon et al., and Singh et al. Overall, cytology consistently exhibits high specificity and good diagnostic accuracy, confirming its reliability as an effective initial diagnostic tool.

Conclusion

FNAC is a simple, quick, inexpensive, and minimally invasive technique to diagnose different types of head and neck swellings. It serves a complimentary diagnosis procedure to histopathological examination. It also helps us to guide to the therapeutic management in planning radical surgery or other alternative treatment modality in case of malignancy. We conclude that FNAC is an excellent preliminary test and useful adjunct to histopathology.

Reference

1. Mehrotra R, Singh M, Gupta RK, Singh M, Kapoor AK. Trends of prevalence and pathological spectrum of head and neck cancers in North India. Indian J Cancer. 2005; 42:89-93.
2. Fernandes H, D'Souza C R S, Thejaswini B N. Role of Fine Needle Aspiration Cytology in Palpable Head and Neck Masses. JCDR 2009; 3:1717-25.
3. Setal Chauhan, Dharmendra Rathod, D. S. Joshi. FNAC of swellings of head and neck region. Indian Journal of Applied and Basic Medical Sciences 2011; 13:1-6.
4. Khetrapal S, Jetley S, Jairajpuri Z, Rana S, Kohli S. FNAC of head & neck lesions and its utility in clinical diagnosis: a study of 290 cases. National Journal of Medical Research. 2015 Mar 31;5(01):33-8.e views: Journal of Medical and Health Sciences 2013;2:54 9.
5. Orell SR, Sterrett GF. Fine Needle Aspiration Cytology. 5th ed. Churchill Livingstone; 2012.
6. Mittra P, Bharti R, Pandey MK. Role of fine needle aspiration cytology in head and neck lesions of paediatric age group. Journal of Clinical and Diagnostic Research: JCDR. 2013 May 15;7(6):1055.
7. Bagwan IN, Kane SV, Chinoy RF. Cytologic evaluation of the enlarged neck node: FNAC utility in metastatic neck disease. Int J Pathol. 2007;6(2):1-7.
8. Saxena S, Kumar V, Bhambani S, Puri K, Tandon A. Role of fine needle aspiration cytology in diagnosis of head and neck lesions. J Cytol. 2009;26(3):91-94.
9. Goyal R, Singh S, Kumar S, Garg M. Diagnostic utility of fine needle aspiration cytology in head and neck lesions. Int J Res Med Sci. 2015;3(7):1711-1715.
10. Siraj F, Kaur M, Dalal V, et al. Cytomorphological spectrum of head and neck lesions and their histopathological correlation. J Clin Diagn Res. 2017;11(6):EC01-EC04.
11. Hameed A, Akhtar N, Naqvi SQH, et al. Diagnostic accuracy of FNAC in head and neck masses: A cytohistopathological study. J Ayub Med Coll Abbottabad. 2016;28(2):272-275.
12. Abdelnaby M, Al-Ghazali M, et al. Cytological evaluation of head and neck lesions with histopathological correlation. Ann Afr Med. 2018;17(3):123-128.

13. Orell SR, Sterrett GF, Whitaker D. Fine Needle Aspiration Cytology. 5th ed. Philadelphia: Churchill Livingstone Elsevier; 2012.
14. Kocjan G. Diagnostic Cytopathology. 3rd ed. Philadelphia: Elsevier; 2010.
15. Cibas ES, Ali SZ. The Bethesda System for Reporting Thyroid Cytopathology. Thyroid. 2009;19(11):1159-1165.
16. Kini SR. Thyroid Cytopathology: An Atlas and Text. Philadelphia: Lippincott Williams & Wilkins; 2008.
17. Stewart CJR, Duncan JA, Farquharson M, Richmond J. Fine needle aspiration cytology diagnosis of lymphoma and reactive lymphadenitis. J Clin Pathol. 1998;51(3):197-203.
18. Pathak R, Prasad KB, Rauniyar SK, Pudasaini S, Pande K, Koirala S, Kafle S, 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 Sep 24;6(12):985-9.
19. Tandon S, Shahab R, Benton JI, Ghosh SK, Sheard J, Jones TM. Diagnostic accuracy of fine needle aspiration cytology in head and neck lesions. J Cytol. 2008;25(3):86–89.
20. Kocjan G, Nayagam M, Harris M. Role of fine needle aspiration cytology in the diagnosis of head and neck lesions. Cytopathology. 2008;19(5):271–276.
21. Orell SR, Sterrett GF. Fine Needle Aspiration Cytology. 5th ed. Churchill Livingstone; Year not specified.
22. Layfield LJ, Glasgow BJ. Fine needle aspiration in the diagnosis of head and neck lesions. Arch Pathol Lab Med. 1987;111:346–350.
23. Singh N, et al. FNAC accuracy in head and neck masses: correlation with histopathology. Indian J Pathol Microbiol. 2010;53(3):482–485.