



CASE SERIES ON CORRELATION BETWEEN FNAC AND HISTOPATHOLOGY IN DIAGNOSING NECK MASSES

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ABSTRACT **Aim-** To evaluate the diagnostic accuracy of fine-needle aspiration cytology (FNAC) in comparison with biopsy and to assess its reliability in the diagnosis of neck masses. **Materials and Methodology-** This retrospective observational study was conducted in the Department of ENT, Outpatient Clinic, at Vydehi Institute of Medical Sciences and Research Centre. The study included 20 patients of both sexes who presented with neck masses to the ENT outpatient department. Each patient first underwent fine-needle aspiration cytology (FNAC) for preliminary evaluation of the mass. This was followed by surgical excision of the lesion, and the excised specimens were subjected to histopathological examination. The cytological findings from FNAC were then compared with the final histopathological diagnosis to assess diagnostic accuracy. **Results-** Most of the cases were benign (20%), malignant lesions were (15%). Rest of the lesions were inflammatory (30%) and congenital (35%). FNAC and Histopathology was correlating in about 65% of the cases of the neck swelling. 100% correlation was seen in submandibular swellings, 80% correlation seen in cervical lymphadenopathy. Zero % correlation was seen in cervical lymphoepithelial cyst and chondroid syringoma. **Conclusion-** FNAC is proved to be a safe and reliable technique in diagnosis of head and neck lesions. It is a quick, convenient, affordable, reliable diagnostic tool and should be the first line investigation while evaluating swelling of head and neck. But to come to a final diagnosis, histopathology is the gold standard.

KEYWORDS : FNAC – Fine Needle Aspiration Cytology, Histopathology, Benign, Malignant

INTRODUCTION

Neck masses, defined as abnormal growths arising anywhere from the skull base to the level of the clavicle, are commonly encountered in the ENT outpatient department. They are broadly classified into three categories: inflammatory, neoplastic, and congenital lesions [1]. The complex anatomy of the neck often makes establishing a differential diagnosis challenging. Several factors must be considered during evaluation, including the patient's age, sex, duration of clinical features, site of the mass, occupation, and place of residence [1]. Among these, age remains the most significant factor, as the risk of malignancy increases with advancing age.

The distribution of benign and malignant lesions also varies across age groups. Approximately 20% of paediatric neck masses are malignant and 80% are benign, whereas in adults, the reverse is observed, with 20% benign and 80% malignant. Fine-needle aspiration cytology (FNAC) has emerged as a valuable tool in the evaluation of head and neck masses, providing a rapid, simple, and cost-effective outpatient procedure for preoperative tissue diagnosis. FNAC not only helps to differentiate between congenital, inflammatory, infective, and neoplastic swellings, but also aids in distinguishing benign from malignant lesions. In cystic swellings, it may even have a therapeutic role. Previous studies have reported variable diagnostic accuracy for FNAC, with one series of 51 cases demonstrating an overall accuracy of 74% [2]. In general, cytopathological diagnostic accuracy has been reported at 87.5%, with false-positive and false-negative rates of 3.12% and 9.37%, respectively [3]. Despite its usefulness, the role of FNAC in head and neck pathology remains debated due to overlapping morphological features between benign and malignant conditions, which can make interpretation difficult.

Other diagnostic modalities include different types of biopsies. Core biopsy involves obtaining a cylindrical tissue sample for histopathological analysis, while incision biopsy entails the removal of a wedge of tissue. Excision biopsy, considered the gold standard, requires complete removal of the lesion for definitive histopathological examination [4].

The most common neck lesions encountered in clinical practice include lymph node enlargements, thyroid swellings, and salivary gland masses. Less commonly, patients may present with thyroglossal cysts, branchial cysts, epidermal cysts, or soft tissue tumors [5].

In this study, we evaluated 20 patients with neck masses presenting to the ENT outpatient department. All patients underwent FNAC

followed by surgical excision and histopathological examination. The cytopathological and histopathological diagnoses were compared to assess the diagnostic utility of FNAC. While cytopathological findings correlated with histopathological diagnoses in the majority of cases, discrepancies were noted in seven patients.

METHODS

Among the 20 patients selected in the study, 12 were male and 8 female. The patients were aged between 4 to 54 years.

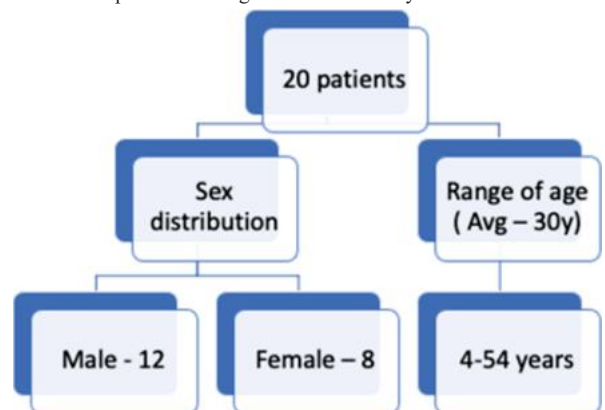


Figure 1 [Age and Sex Distribution of Subjects in the Study]
PRESENTATION OF NECK MASSES (IN THIS STUDY)

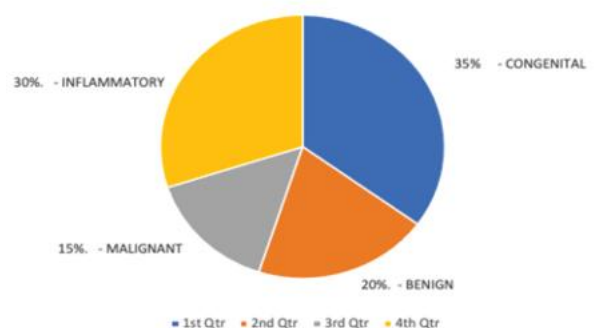


Figure 2 [Percentage of Different Diagnoses in this Study]

Among the 20 cases, 30% were inflammatory, 35% were congenital lesions, the rest were neoplastic lesions out of which 15% of the lesions were malignant and 20% were benign.

RESULTS

Among the 20 cases that were included in the study, 16 were inflammatory, congenital and benign lesions and 4 were malignant. Among the non malignant lesions, 5 cases of thyroglossal cyst were included, 1 case of reactive lymphadenitis and 2 of tubercular lymphadenitis, 1 each of epidermoid cyst, lymphoepithelial cyst and cavernous hemangioma. 1 each of salivary gland pathologies were included, ie, chronic sialadenitis, pleomorphic adenoma, fibroma. A rare benign tumour of the skin – chondroid syringoma was also included in the study. Among the 4 cases of malignancy were 3 cases of nasopharyngeal carcinoma and 1 case of verrucous carcinoma.

Table 1 [Details of Total Cases in the Study]

Investigation	Type of Lesion	Correlating With Final Diagnosis (no.)	Not Co-Relating With Final Diagnosis (no.)	Total
FNAC	• Congenital	5	2	7
	• Benign	2	2	4
	• Malignant	2	1	3
	• Inflammatory	4	2	6

Table 2 [Correlation of FNAC Report with Final Diagnosis]

Clinical Diagnosis	Cytological Diagnosis	Histopathological Diagnosis	No. of Cases
Thyroglossal Cyst	Inclusion Cyst	Epidermoid Cyst	1
Dermoid Cyst	Inconclusive	Reactive Lymphadenitis	1
Thyroglossal Cyst	Cystic Lesion	Thyroglossal Cyst	5
Soft Palate Cavernous Hemangioma	Inconclusive	Cavernous Hemangioma	1
Submandibular Sialadenitis	Chronic Sialadenitis	Chronic Sialadenitis	2
Granulomatous Pharyngitis	Granulomatous Inflammation	Tuberculosis Of Oropharynx	1
Malignancy Nasopharynx	Poorly Differentiated Carcinoma	Nasopharyngeal Carcinoma	3
Verrucous Lesion	Hyperplastic Squamous Epithelium	Verrucous Carcinoma	1
Cervical Lymph-adenopathy	Fibroadiopose Tissue	Lymphoepithelial Cyst	1
Submandibular Pleomorphic Adenoma	Pleomorphic Adenoma	Pleomorphic Adenoma	1
Cervical Lymph-adenopathy	Reactive Lymph-adenitis	Tubercular Lymphadenitis	2
Dermoid Cyst Neck	Chondroma	Chondroid Syringoma	1
Pleomorphic Adenoma Of Hard Palate	Inconclusive	Fibroma	1

Among the congenital lesions, 5 were correlating with the final diagnosis. 2 out of 4 benign lesions and 2 out of 3 malignant lesions correlated with the final diagnoses. Among the 6 inflammatory lesions, 4 were correlating with the final diagnosis.

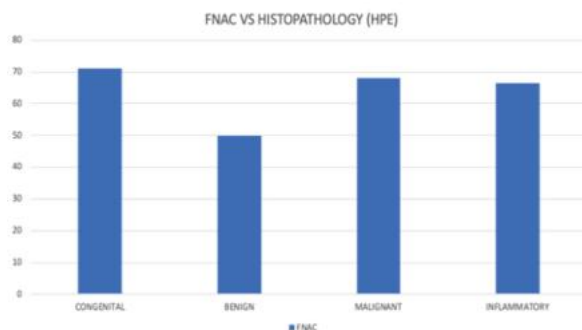


Figure 3 [Bar Graph Depicting Percentage Correlation with Final Diagnosis]

Table 3 [Statistics]

Fisher's exact test

FNAC * HPE Crosstabulation							
			HPE		Total	Test statistic value	P value
			1	2			
FNAC	1	Count	5	0	5		
		% of Total	25.0%	0.0%	25.0%		
	2	Count	3	5	8		
		% of Total	15.0%	25.0%	40.0%		
	3	Count	1	0	1	6.179	0.064
		% of Total	5.0%	0.0%	5.0%		
	4	Count	5	1	6		
		% of Total	25.0%	5.0%	30.0%		
Total	Count	14	6	20			
	% of Total	70.0%	30.0%	100.0%			

P value is 0.064

A p-value, or probability value, is a number describing the likelihood of obtaining the observed data under the null hypothesis of a statistical test.

The p-value serves as an alternative to rejection points to provide the smallest level of significance at which the null hypothesis would be rejected. A smaller p-value means stronger evidence in favor of the alternative hypothesis.

DISCUSSION

Head and neck masses are a common clinical challenge in otorhinolaryngology, and their accurate evaluation is essential for guiding appropriate management. Fine needle aspiration cytology (FNAC) has established itself as a widely used first-line diagnostic technique because it is simple, minimally invasive, cost-effective, and associated with minimal complications. In addition, FNAC can be therapeutic in cystic lesions by aspirating their contents. It plays an important role in differentiating inflammatory lesions, which often do not require surgical intervention, from cystic or neoplastic lesions with reasonable certainty.

However, the technique has inherent limitations. Its inability to provide sufficient tissue architecture makes it unreliable for establishing a complete histopathological diagnosis. In the present study, FNAC demonstrated an overall diagnostic accuracy of 65%. Other authors have reported higher sensitivity values, reaching 96.8%, although with considerably lower specificity of around 30.4% [2]. This variability underscores the need to interpret FNAC results cautiously, particularly in suspected malignant lesions, and highlights the importance of complementary diagnostic methods when cytology alone is inconclusive.

Alternative biopsy techniques, including core needle, incisional, and excisional biopsy, offer greater diagnostic potential. Among them, excisional biopsy remains the gold standard in the evaluation of head and neck masses, particularly when malignancy is suspected. Its superiority lies in providing adequate tissue for histopathological evaluation, including architectural detail, thereby ensuring the highest diagnostic yield and sensitivity [2]. Nevertheless, excisional biopsy is more invasive, frequently requires general anesthesia, and carries the risk of surgical complications [1].

According to a study conducted by Yaladahalli G. Lokesh, Dudda Ravi and Hodeyala J. Srikanth in September 2021, the diagnostic accuracy of FNAC was 86%. The sensitivity and specificity of FNAC for detecting malignancy was 84.2% and 98.5%. They concluded that FNAC is simple and safe first line of management for different neck masses, but histopathology remains gold standard, which is similar to our study.

A study conducted by Bassiouni M, Kang G, Olze H, Dommerich S and Arens P in June 2021 established the role of surgical excisional biopsy in the diagnosis of cervical lymphadenopathy suggesting that it serves as an indicator of many etiologies causing peripheral lymphadenopathy, including some rare pathologies.

Huq A, Aktaruzzaman M, Habib M, Islam M and Amin A conducted a study among cases of salivary gland neoplasms in August 2013 according to which the positive predictive value of FNAC was 92.3%

and negative predictive 93.6% .The diagnostic accuracy was 93.3% which was much higher than in our study. Yet they too concluded that histopathological examination is essential for diagnostic confirmation of major salivary gland neoplasm.

The study by Kapoor S, Bagga PK, Rupesh S, Singh A, Kumar A and Singh H in 2017 suggested that diagnostic accuracy of FNACs of head and neck masses was 93.5% for all sites, allowing a correct therapeutic management. However, this accuracy depended on the anatomic location of the mass. The salivary gland group had the highest rate of false negatives (2.8%). Among the most common locations, cytology of lymph nodes provided the best sensitivity (98.2%). Salivary glands as well as lymph nodes had the best specificity (100%). Our study did not show any variation in accuracy on the basis of site of lesion.

Taken together, these findings suggest that FNAC should be considered an excellent screening tool in the initial evaluation of head and neck masses, particularly when inflammatory or benign lesions are suspected. In contrast, excisional biopsy continues to play a decisive role in establishing a definitive diagnosis, especially for malignant processes. A combined and judicious use of both techniques—FNAC as a minimally invasive first step, followed by excisional biopsy when indicated—represents the most balanced and effective diagnostic approach.

CONCLUSION

- FNAC proves to be a reliable, minimally invasive, and cost-effective diagnostic tool with high sensitivity and specificity, though histopathological biopsy remains the gold standard for definitive diagnosis. When used complementarily, FNAC can significantly aid in early detection and management while reducing the need for unnecessary invasive procedures. Diagnostic accuracy of FNAC in the present study was 65% which suggested that FNAC may be used in the work-up and for screening but is not reliable for the final diagnosis

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