

Cytomorphological Spectrum of Head and Neck Lesions: A Retrospective Study

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DOI: 10.21276/APALM.3302

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Submitted: 20-Feb-2024

Final Revision: 18-Mar-2024

Acceptance: 20-May-2024

Publication: 01-Jun -2024



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Abstract

Background

Fine needle aspiration cytology (FNAC) is globally employed as the primary diagnostic method for assessing swellings, particularly in the head and neck area. It offers numerous benefits such as cost-effectiveness, minimal invasiveness, suitability for all age groups, outpatient feasibility, and low complication rates. Most importantly, it helps distinguish between benign and malignant growths. Common pathologies encountered include lymphadenopathies, salivary gland and thyroid lesions, and skin appendage issues.

Material and Methods

A retrospective study was conducted on 305 patients with palpable swellings of the head and neck who presented to the Pathology department from July 2023 to December 2023. FNAC was performed using aspiration and non-aspiration techniques, after which cytomorphological diagnoses were given.

Results

Among the 305 cases analyzed, inflammatory lesions accounted for 65.57% (200 cases), benign lesions for 19.67% (60 cases), and malignant lesions for 14.75% (45 cases). Inflammatory lesions were the most prevalent, followed by benign and malignant lesions. Lymph nodes were the most frequently aspirated sites, followed by the thyroid, with salivary gland cases being the least common. Benign conditions were predominantly observed in the second to fifth decades, while malignant conditions were more prevalent from the fifth decade onwards.

Conclusion

FNAC serves as a rapid, cost-effective, and minimally invasive approach for evaluating head and neck swellings. Moreover, FNAC can offer both diagnostic and therapeutic benefits, particularly in cystic lesions. Consequently, it can be recommended as the primary diagnostic modality for head and neck swellings, aiding surgeons in formulating appropriate surgical strategies for affected patients.

Keywords:

Head and neck, FNAC, Lymph node, Thyroid gland, Salivary gland

Introduction

Fine needle aspiration cytology (FNAC) is practiced worldwide as the first-line diagnostic tool for the evaluation of palpable swellings. It is the investigation of choice for head and neck swellings. Palpable lesions do not include oropharyngeal, nasal, ocular mucosal lesions, and space-occupying intracranial lesions [1]. The advantages of FNAC are that it is cost-effective, can be done on all age groups, is minimally invasive, well tolerated by patients, can be done on an outpatient basis, repeatable, and has fewer complications. Till now, there is no evidence that the tumor spreads through the skin tract created by the fine hypodermic needle used in this technique [2]. Limitations in fine needle aspiration include the aspirator's skill, the cytopathologist's expertise, and the ability to distinguish between benign and malignant lesions to avoid unnecessary surgery.

Common pathologies encountered in the head and neck region are specific and nonspecific lymphadenopathies, salivary gland lesions, thyroid lesions, and lesions of skin appendages. FNAC is primarily used as a screening tool for more effective diagnosis. This procedure can be both diagnostic and therapeutic in cystic swellings [3]. Although it is not a replacement for histology, cytological diagnosis is thought to be a crucial part of the preoperative/pre-treatment examination of pathological diagnosis. FNAC does not give the same architectural detail as histology, but it can provide cells from the entire lesion as many passes through the lesion can be made while aspirating [4].

The gold standard is usually a biopsy and histological evaluation; nevertheless, these procedures are time-consuming, require asepsis, anesthesia, and frequently result in scarring. In contrast, FNAC is a simpler procedure, leaves no scars, and produces fast, accurate results. Additionally, other techniques can be done on FNAC samples like flow cytometry, cytogenetics, electron microscopy, cell block preparation, and immunocytochemistry, which act as additional tools for diagnosis [5].

Aim and Objectives: To study the cytomorphology of head and neck swellings. To classify head and neck swellings. To study the frequency of head and neck swellings according to the site of occurrence.

Materials and Methods

After taking patients' consent and detailed clinical history, significant findings were noted. Inclusion criteria include all age groups with head and neck swellings only and of indoor and outdoor patients. Unsatisfactory smears, hemorrhagic taps, and swelling other than head and neck lesions were excluded from the study. FNAC was done using a 10 cc disposable syringe and a 23 gauge needle with sufficient negative pressure to aspirate adequate material, and pressure was applied to the area of aspiration to avoid bleeding or hematoma formation. The negative pressure applied during aspiration leads to bloody smears, especially in highly vascular organs like the thyroid.

In 1981, fine needle sampling without aspiration, called fine needle non-aspiration cytology (FNNAC), was introduced. FNNAC, variously termed fine needle capillary sampling, cyto-puncture, non-aspiration fine-needle cytology, and fine needle sampling without aspiration, is a simple procedure [6]. So, for thyroid lesions, FNNAC was done. After the smears were air-dried and wet-fixed, they were stained with Papanicolaou, Giemsa stain, and Haematoxylin and Eosin. Ziehl-Neelsen staining for acid-fast bacilli was done in suspected tubercular cases. Special stains were carried out as and when required.

FNAC diagnosis was correlated with relevant clinical details and investigations to give a cytological diagnosis. In cases where excisional biopsy specimens were available, cyto-histopathological correlation was done. Data collected was entered in MS Excel and analyzed using the same software.

Results

This retrospective study included cases of head and neck swellings that underwent FNAC at Surat Municipal Institute of Medical Education and Research from July 2023 to December 2023, either as an outdoor procedure or as a pre-operative evaluation. A total of 305 patients were included in this study, all of whom underwent FNAC. The study included all patients who presented with swelling in the head and neck; any other mass was excluded. The age of the patients ranged from one year to eighty years, comprising 128 males (41%) and 177 females (58%). Of the 305 cases, 200 were inflammatory lesions (65.57%), 60 were benign lesions (19.67%), and 45 were malignant lesions (14.75%).

Out of the 305 aspirations, inflammatory lesions were the most common, followed by benign, and then malignant lesions. The majority of cases were of lymph node origin, followed by thyroid, with the least being salivary gland cases (Table 1). Overall, benign conditions were more common in the second to fifth decades, whereas malignant conditions were more common from the fifth decade onwards.

Table 1: Distribution of all the patients according to different pathologies

Pathology	No. of cases	Percentage (%)	Inflammatory	Benign	Malignant
Lymph node	210	68.85	178	0	32
Thyroid	53	17.37	4	41	8
Salivary Gland	17	5.57	3	10	4
Miscellaneous lesions	25	8.19	15	10	0
Total	305	100	200	61	44

In lymph node lesions, most cases were tubercular lymphadenitis, followed by reactive lymphadenitis, which were most commonly seen in females (64%). Of the malignant lesions, metastatic squamous cell carcinoma was the most common, showing a male to female ratio of 4:3. There was an almost equal number of cases of metastatic SCC among males and females, which was more commonly seen in the fourth to fifth decades (Table 2).

Table 2: Distribution of Lymph Node lesions

Cytological diagnosis-Lymph Node		No. of cases	Percentage (%)
Inflammatory	Tubercular Lymphadenitis	92	43.80
	Reactive Lymphadenitis	51	24.28
	Granulomatous Lymphadenitis	35	16.66
Malignant	Metastatic SCC	14	6.66
	Poorly differentiated Carcinoma	9	4.28
	Hodgkin's Lymphoma	4	1.90
	Non-Hodgkin's Lymphoma	3	1.42
	Metastatic Nasopharyngeal Carcinoma	2	0.95
Total		210	100

In thyroid swellings, the incidence in females (74%) was much higher than in males (26%). The most common benign lesion was a benign follicular nodule, followed by a colloid nodule, while for malignant lesions, papillary carcinoma was the most common. The incidence of papillary carcinoma varied from the second decade to the eighth decade. There was one case of medullary carcinoma reported in a male patient (Table 3).

In salivary gland cases, pleomorphic adenoma was the most common. All salivary lesions were more common in females (64%) compared to males (36%). Mucoepidermoid carcinoma was the most common malignancy (Table 4).

Among the miscellaneous lesions, epidermoid cyst was the most common. There was one case of scalp swelling diagnosed as a spindle cell tumor: ancient schwannoma (Table 5).

Table 3: Distribution of Thyroid lesions

Cytological diagnosis-Thyroid		No. of cases	Percentage (%)
Inflammatory	Thyroiditis	3	5.66
	Hashimoto Thyroiditis	1	1.88
Benign	Benign follicular Nodule	15	28.30
	Adenomatoid Nodule	3	5.66
	Colloid Nodule	14	26.41
	Graves' Disease	4	7.54
	Thyroglossal Cyst	4	7.54
AUS/FLUS	AUS/FLUS	1	1.88
Malignant	Papillary Carcinoma	5	9.43
	Medullary Carcinoma	1	1.88
	Follicular neoplasm (Hurthle cell)	1	1.88
	Lymphoma	1	1.88
Total		53	100

Table 4: Distribution of Salivary gland lesions

Cytological diagnosis-Salivary Gland		No. of cases	Percentage (%)
Inflammatory	Sialadenitis	2	11.76
	Sialadenosis	1	5.88
Benign	Pleomorphic adenoma	9	52.94
	Benign lymphoepithelial lesion	1	5.88
Malignant	Adenoid cystic carcinoma	1	5.88
	Mucoepidermoid carcinoma	2	11.76
	SCC	1	5.88
Total		17	100

Table 5: Distribution of Miscellaneous lesions

Cytological diagnosis- Miscellaneous lesions		No. of cases	Percentage (%)
Inflammatory	Parasitic cyst	1	4
	Epidermoid cyst	14	56
Benign	Benign cystic lesion	4	16
	Lipoma	1	4
	Spindle cell lipoma	1	4
	Paraganglioma	1	4
	Skin adnexal tumour	2	8
	Spindle cell tumor (Ancient Schwannoma)	1	4
Total		25	100

In 27 cases, cyto-histopathological correlation was possible. Two cases were false negatives as they were thyroid lesions where only cystic fluid was aspirated, and no follicular cells were seen. The cytological diagnosis was consistent with the histopathological diagnosis in twelve cases of inflammatory lesions, seven cases of benign lesions, and six cases of malignant lesions.

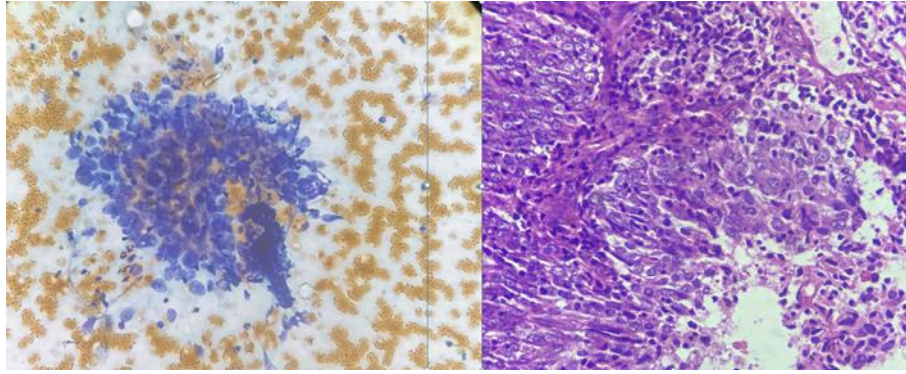


Figure 1: Nasopharyngeal Carcinoma with posterior triangle lymph node swelling; Left Cytology (Pap stain, 40x), Right Histopathology (H&E stain, 40x)

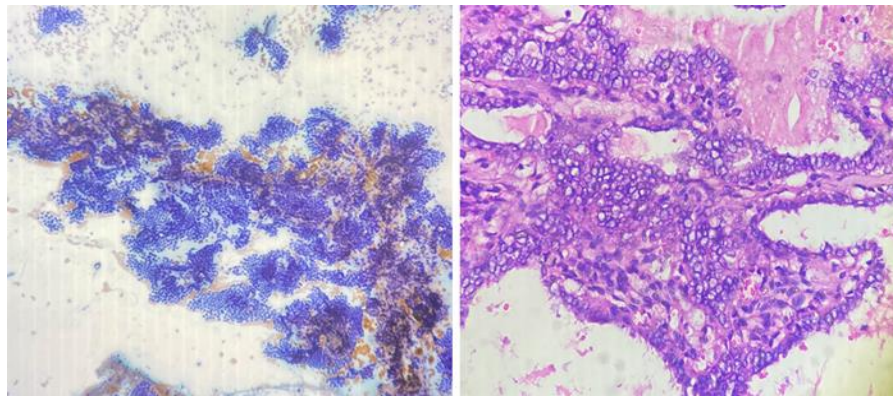


Figure 2: Papillary Carcinoma of Thyroid; Left Cytology (Pap stain, 4x), Right Histopathology (H&E stain, 10x)

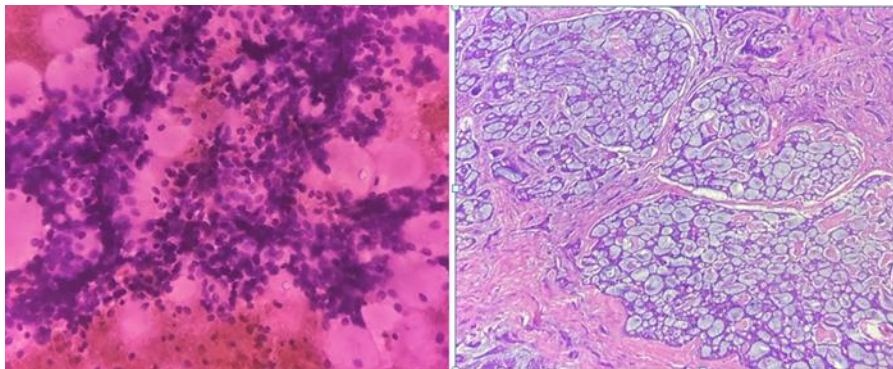


Figure 3: Adenoid Cystic Carcinoma of Salivary Gland; Left Cytology (H&E stain, 40x), Right Histopathology (H&E stain, 10x)

Discussion

Head and neck lesions are frequent entities found in clinical practice. The close proximity of various types of tissues at this site and a wide range of primary and metastatic neoplasms make it one of the most interesting and challenging in FNAC diagnosis [11].

Our results were concurrent with the results of other studies in which lymph node lesions were predominant, followed by thyroid gland lesions [2, 6, 7]. In our study, the most common lymph node lesion was tubercular lymphadenitis (43%), which is concurrent with Sangavi et al. [6], where 36% of cases were tubercular lymphadenitis. In contrast to other studies where reactive

lymphadenitis was more common compared to tubercular lymphadenitis, as seen with Shekhar et al. [2], Kaur et al. [7], and Agrawal et al. [8], where reactive lymphadenitis was 16%, 26%, and 28%, respectively, and tubercular lymphadenitis was 15%, 25%, and 25%, respectively. In our study, metastatic lymph nodes consisted mainly of squamous cell carcinoma (6%) with their primary malignancy being in the oral cavity, which is concurrent with findings of SCC being the most common: 8% for Shekhar et al. [2], 14% for Kaur et al. [7], and 21% for Agrawal et al. [8]. In other studies, there was male predominance for SCC, but in our study, the male-to-female ratio was 4:3 due to low socioeconomic status along with tobacco-chewing habits. Similarly, Neha et al. [10] found metastatic squamous cell carcinoma to be the commonest, which may be due to the higher prevalence of tobacco consumption in the study population.

Papillary carcinoma was the most frequent malignancy encountered in the thyroid. This is in accordance with studies by Neha et al. [9] and Hota et al. [10]. All the cases of papillary carcinoma of the thyroid were confirmed histologically. For most thyroid abnormalities, therefore, surgical intervention for diagnostic purposes could be avoided by FNAC. Among the salivary gland lesions, pleomorphic adenoma was the most common lesion (50%). Similar findings were reported by Kaur et al. [7] and Neha et al. [9]. One case of mucoepidermoid carcinoma was confirmed histologically.

In miscellaneous lesions, epidermoid cyst was the most common, similar to Hota et al. [10], whereas Neha et al. [9] found lipoma to be the most common lesion. These findings lead to the recommendation that FNAC be used as a primary line of investigation when diagnosing head and neck swellings.

Conclusion

Based on the above study, we conclude that FNAC is a quick, easy, affordable, and minimally invasive method for diagnosing various kinds of swellings in the head and neck region. It is a useful tool for making early diagnoses and for distinguishing between infectious, benign, and malignant lesions, which helps prevent needless surgeries. In the case of cystic lesions, it can be therapeutic in addition to being diagnostic. Therefore, FNAC can be suggested as an initial diagnostic method for head and neck swellings to help the surgeon choose, direct, and adjust surgical planning for patients who need surgery.

Funding: None

Competing Interests: There are no conflicts of interest in this study.

Acknowledgements: None

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