

Cytomorphology of head and neck lesions: A study in tertiary care hospital

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Abstract:

Head and neck swellings are the most common and challenging lesions in the field of FNAC diagnosis. FNAC is simple, inexpensive and fairly accurate alternative to the time consuming, complicated and invasive excision biopsy. The study was carried out to assess the role of FNAC in diagnosing various head and neck lesions. This prospective study was undertaken on palpable head and neck lesions in all age groups for the duration of 9 months from September, 2013 to May, 2014 in Pathology Department of tertiary care hospital. Total 756 cases were evaluated in the cytopathology section and aspiration was done using 10 ml syringe and 22-26 gauge needles. The results of material positivity were compared with histopathology material obtained in follow-up. Out of the total 756 patients, 376 were males and 380 were females. Overall male to female ratio was 1:1. Head and neck swelling were present most frequently in the third decade. Lymph node swellings were the most common lesion (64.3%), followed by thyroid (17.5%), skin and soft tissue (13.5%) and salivary gland swellings were least common (4.8%). Non - neoplastic lesions were the commonest (67.3%) followed by malignant lesions (13.1%). Histopathological correlation was performed in 40 cases. We concluded that FNAC is a reliable, cost effective, convenient and easily accessible method as the best initial work up and management of head and neck lesions. In expert hands accompanied by good clinical information, proper history and relevant laboratory investigation the results are even better.

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Introduction

Lesions of head and neck are the most diversified and challenging amongst the swellings that are available for fine needle aspiration cytology. Most of these swellings, although superficially located, are related closely to the important anatomical structures of this region. Because of its minimally invasive nature, fine needle aspiration cytology has always been supported by clinicians as a replacement to the incisional biopsy. Although FNAC is fairly accurate, a relevant clinical history and a help from radiology regarding the nature and location of swelling can further improve the likelihood of correct diagnosis (1-3).

Fine needle aspiration biopsy is particularly useful in small settings where the facilities for histopathological diagnosis are lacking. Because of its hassle free nature, FNAC is particularly suitable for debilitated patients. Multiple lesions can be biopsied in single sitting and repeat biopsies are easy to get if the need arises (4-5).

The aim of this study was to evaluate the role of FNAC in the initial assessment, diagnosis and clinical management of patients with palpable masses in the head and neck region and to determine the sensitivity and specificity of fine needle aspiration in the diagnosis of palpable head and neck lesions by follow-up of histopathological correlation studies.

Material and Method

This prospective study includes 756 cases of palpable head and neck lesions over a period of 9 months from September, 2013 to May, 2014 in the Pathology department, J.L.N. Medical College and Associated Group of Hospitals, Ajmer, Rajasthan. Non randomized sampling technique was applied to collect the necessary data.

After explaining the procedure and taking written consent, brief clinical history and information of radiological and laboratory investigation were noted. Fine needle aspiration of the swelling was then performed using 22 – 26 gauge needle and 10 ml syringe. The material obtained was blown onto a glass micro-slide and spread using another spreader slide. These slides were then either wet-fixed in alcohol or dried and then fixed in methanol. Wet slides were then stained with hematoxylin and eosin stain and dry slides with MGG stain. These stained slides were scrutinized under the light microscope and reported. Out of 756 cases, 40 were available for histopathological correlation. All biopsies for histopathology study were stained with H and E staining and special stain as and when required.

Result

Out of the total 756 patients, 376 were males and 380 were females. Overall male to female ratio was 1:1. In thyroid swellings the male to female ratio was 1:6 in favour of females while in swellings of lymph nodes, salivary glands and other swellings it was around 1.4:1 in favor of males. Head and neck swellings were present most frequently in the third decade (23.2%) followed by the second (16.8%) and fifth (13.9%) decade respectively. When distribution of different lesions were considered age-wise, 75%(383) of all the non-neoplastic lesions were found to have occurred in patients under 40 years, with maximum 27.5% patients in the third decade followed by 22% in the second decade. Out of the 103 patients categorized as malignant and suspicious of malignancy, 86 cases (83.5%) were above the 40 years with maximum 32(31%) patients in the sixth decade of life followed by 22(21.36%) and 19(18.5%) patients in the seventh and fifth decade. 74% Benign lesions occurred in the third to sixth decade.

Lymph node swellings were the most common 485(64.3%) lesions followed by thyroid 132(17.5%), skin & soft tissue 102(13.5%) and salivary gland swellings were least common 37(4.8%). Non-neoplastic lesions were the commonest (67.3%) overall followed by malignant lesions (13.1%). Only 9.3% cases remained inconclusive (Table 1).

In lymph nodes, the highest number of cases was of non-neoplastic (70.3%) lesions. Malignant lesions were 18.1%, being higher than in the other categories. 3 smears were diagnosed as suspicious of malignancy. In salivary glands, benign tumors (47.66%) were highest in number while there was no malignant lesion. Inconclusive cases were 8.33%. 1 smear was suspicious of malignancy. Among skin and soft tissue lesions, 43.13% smears were non-neoplastic. Percentage of inconclusive smears (13.72%) was highest in the category of skin and soft tissue lesions. 6.9% lesions were malignant in this category. Highest percentage of non-neoplastic lesions (81.81%) was in the thyroid lesions. 4 cases were diagnosed as malignant.

We also considered the repeat FNAC in different categories. Overall repeat percentage is 9.5%, with maximum repeat seen in salivary gland swellings (16.7%) and minimum repeats seen in soft tissue swellings (5.9%). After the repetition, 1/3rd cases of soft tissue swellings remained undiagnosed while the undiagnosed cases in lymph nodes and salivary glands were 15.6% and 16.7% respectively. Out of the total 72 repeat cases only 10 remained undiagnosed after the repetition. Among the non-neoplastic lesions (341) of lymph nodes, tubercular lymphadenitis 122(35.8%) was the commonest cytological diagnosis followed by chronic non-specific lymphadenitis 108(31.7%). Out of the total 91 malignant/suspicious for malignant cases, metastatic deposits of squamous cell carcinoma accounted for maximum 75(82.4%) cases. 5 cases were

of non-Hodgkin lymphoma and 4 cases of metastatic adenocarcinoma (Fig. 1).

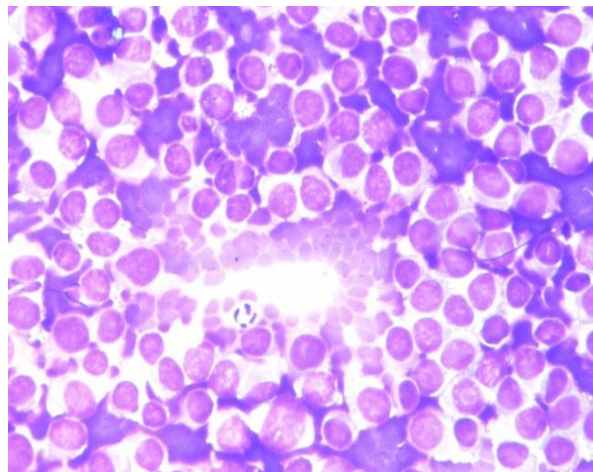


Fig. 1: Metastatic adenocarcinoma smear shows loose clusters and singly lying cells showing irregular nuclear contour and margination of chromatin (Giemsa, 200X)

2 cases were of small round cell tumor category, out of which one was found to be small cell anaplastic carcinoma and histological correlation of the exact diagnosis was not confirmed in the other.

Out of the 16 non-neoplastic lesions of salivary glands, 11 were cases of sialadenitis. There were 17 cases of neoplastic lesions, out of which 10 were pleomorphic adenoma (Fig. 2).

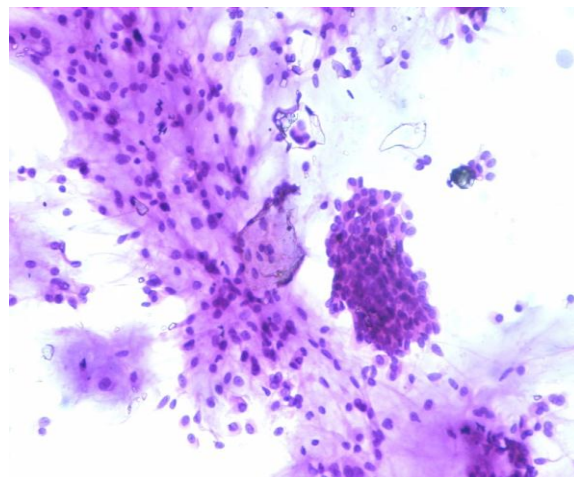


Fig. 2: Loosely formed cluster in a background of fibrillar fibromyxoid stroma. Cells are mostly plasmacytoid with well-defined abundant cytoplasm and eccentric round nuclei.(Giemsa,200X)

3 cases were uncategorized benign salivary gland lesions, 2 cases were of monomorphic adenoma and 1 case each of submandibular adenoma and warthin's tumor (Fig. 3).

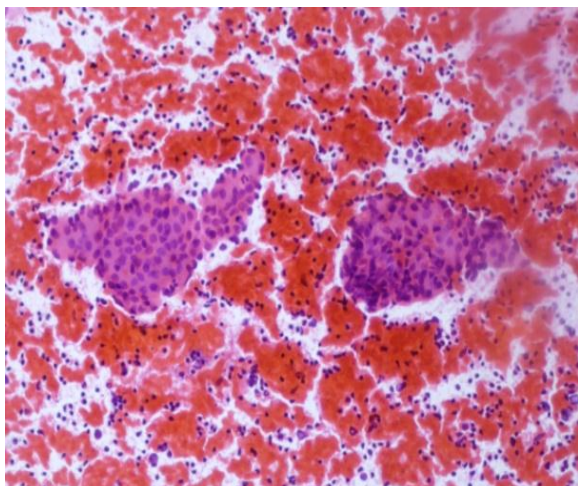


Fig. 3: Warthin's tumor- Cohesive monolayered clusters of oncocytic cells with lymphocytes in the background (H&E, 200X)

There was only one case that was suspicious of malignancy. Of the 44 non-neoplastic lesions of skin & soft tissue, epidermal cyst cases were maximum 33(75%). There were 37 cases of benign lesions, of which 20(54.1%) were lipomas. Among others were one case each of fibrolipoma, fibroma, giant cell reparative granuloma and paraganglioma. 11 cases were of uncategorized benign spindle cell mesenchymal lesions. There were only 7 malignant diagnoses which included 2 cases each of basal cell carcinoma and squamous cell carcinoma. Anaplastic giant cell

carcinoma, poorly differentiated carcinoma and metastatic squamous cell carcinoma each had one case. Among the 123 cases of non-neoplastic lesions, 67 cases were of colloid goiter, 22 cases of autoimmune thyroiditis and 10 cases of nodular goiter. There was 1 case each of granulomatous lesion and thyroglossal cyst. Of the 9 neoplastic thyroid lesions, there were 4 follicular neoplasms and 1 case of thyroid adenoma. 2 cases were of medullary carcinoma of thyroid and 1 case each of ductal carcinoma of breast and metastatic deposits of squamous cell carcinoma.

We also correlated provisional diagnosis given by clinicians with our cytological diagnoses. Out of the total 756 cases, provisional clinical diagnosis was given in 109 cases. In 647 cases no clinical diagnosis was given. Provisional clinical diagnosis in 82 (75.2%) cases was matching with cytological diagnosis and in 27 cases was different from the cytology diagnosis. Of the total 109 cases, 78 were benign clinical diagnosis and 31 were malignant diagnosis. Out of these, on 3 occasions in each category the diagnosis was reversed. Of the 25 cases of tuberculosis on clinical diagnosis, cytological diagnosis correlated only in 13 cases. In the remaining 12 cases, other non-neoplastic conditions were diagnosed on cytology.

Histopathological correlation was performed in 40 cases. Results are as per Table 2. We found that for malignant lesions of head and neck region, the Sensitivity, Specificity, Positive predictive value, Negative predictive value and Accuracy were 84.6%, 100%, 100%, 93.1%, and 95% respectively.

Table 1: Nature of the head and neck lesions determined by FNAC

Organ	Inconclusive		Non neoplastic		Neoplastic						Total cases
	No of cases	%	No of cases	%	Benign		Malignant		Suspicious of malignancy		
					No of cases	%	No of cases	%	No of cases	%	
Lymph node	53	10.9	341	70.3	0	0	88	18.1	3	0.6	485
Salivary gland	3	8.1	16	43.2	17	45.9	0	0	1	2.7	37
Skin & Soft tissue	14	13.7	44	43.1	37	36.3	7	6.9	0	0	102
Thyroid	0	0	108	81.8	20	15.2	4	3	0	0	132
Total	70	9.3	509	67.3	74	9.8	99	13.1	4	0.5	756

Table 2: Analysis of cytology-histopathology corroboration of head and neck masses (n=40)

Histology	Cytology diagnosis				
	Inconclusive	Non-neoplastic	Benign	Malignant	Total
Correlated	0	19	6	11	36
Not correlated	1 and that case turned out to be malignant.	2. One case turned out to be malignant and the other benign.	1 and that case turned out to be non-neoplastic.	0	4
Total cases	1	21	7	11	40

Discussion

The male to female ratio in our study among the thyroid swelling patients was 1:6 which was similar to the studies by Bagga PK et al and Bamanikar S et al (1-2). In the other head and neck swellings M/F ratio was 1:4 which was consistent with findings in studies by Manjunath BS et al and Rathod GB et al (3-4). The highest frequency of lesion was seen in second to sixth decade which was similar to studies by Manjunath BS et al, Solanki PK et al and Amatya BB et al (3, 5-6).

Organ wise distribution of cases in our study showed that maximum 485(64.3%) cases were from lymph node swellings as seen in studies by Amatya BB et al and Gupta BB et al (6-7). 70 (9.3%) cases were inconclusive mostly due to insufficient material and then unavailability of patients for repeat FNAC. Conclusive report was given in 90.7% cases out of which 509 lesions (67.3%) were non-neoplastic, 99 lesions (13.1%) malignant, 74 lesions (9.8%) benign and 4 cases of suspicious of malignancy in nature. It was further noticed that 88 malignant lesions (89%) of total 99 malignant lesions in head and neck were in the cervical lymph nodes, which provides a clue that higher incidence of metastatic lymph node malignancies surpasses the benign disorders as well as all other organ malignancies.

It was also seen that the benign and non-neoplastic lesions were prevalent in the age groups below 40 years and the malignant conditions were seen predominantly in the age groups above 40 years. This observation in the present study corroborate with the fact that with the advancement of age, genetic aberrations and prolonged exposure carcinogenic agents play their role in oncogenesis.

In the present study we performed a repeat FNAC in 72 cases (9.5%) out of which only 10 (13.89%) cases remained inconclusive after the repeat FNAC. In successful repeat cases we were able to differentiate benign lesions from malignant ones and in most of the cases, definite diagnoses were reported. Therefore the successful diagnostic rate of our repeat attempts was 86.1%. It is concluded that prior assessment of representative area in cytology increases the positive reporting in various lesions. Also acute suppuration in the first FNACs may mask out the actual pathological lesion which is being diagnosed in repeat FNAC smears after antibiotic treatment in those cases.

On comparison of provisional clinical diagnosis with cytology reports, 75% provisional diagnoses were found matching. The mismatch of diagnosis was mainly in lymph node swellings in which many clinically diagnosed cases of tuberculosis were found to be non-tubercular. Out of three clinically suspected malignancy cases, one suspected lymphoma case turned to be reactive lymphoditis on cytology, in one case of suspected salivary gland malignancy, normal salivary gland tissue was seen, one case of suspected metastasis was turned to lymphoepithelial cyst on cytology.

We aspirated 485 lymph node lesions, out of which 53(11%) smears were inconclusive. Of the remaining 432 cases, reactive lymphadenitis (41.9%) was the commonest finding followed by granulomatous lesions including tuberculosis (33.8%). The commonest lesion in other studies was not reactive but granulomatous lesions including tuberculosis. Tuberculosis individually was the commonest diagnosis in our study followed by chronic non-specific lymphadenitis. Metastatic squamous cell carcinoma was the commonest malignancy in our study and was comparable with studies by Rathod GB et al and Mohan A et al (4,8).

When compared with the studies across India and outside, it was seen that the number of non-neoplastic lesions in salivary glands in our study was slightly less (47%) as compared to 52%, 66.2% and 55.2% in the studies of Thailand, Gujarat region and Mysore region respectively (9-13). Benign neoplastic lesions were most common (50%) in our study as against the other studies in which non-neoplastic lesions were the commonest.

It was observed that epidermal cyst, was the most common lesion of skin and soft tissue in the studies by Tippu I et al and Bhagat VM et al followed by lipoma (11-12). We also reported a giant cell reparative granuloma and a case of paraganglioma for which histopathological correlation was not available.

Out of the total 132 thyroid lesions 123 were non-neoplastic comprising of 67 cases (54.1%) of colloid goiter, 22 cases of autoimmune thyroiditis were reported which included both lymphocytic thyroiditis and Hashimoto's thyroiditis. It denotes that goiter is predominant lesion in the Ajmer territory of Rajasthan. 4 cases were follicular neoplasms of thyroid along with 2 reported medullary carcinomas, 1 reported as metastatic deposit of ductal breast carcinoma and 1 case of metastatic deposit of squamous cell carcinoma. We did not receive any case of papillary carcinoma and no histopathology was available to confirm the malignancies reported in cytology.

In this study, histopathological correlation was available for 40 cases. Of these, 11 cases were reported malignant and remaining 29 cases were reported non-neoplastic and benign lesions. For malignant lesions the sensitivity, specificity and accuracy of cytological study was 84.6%, 100% and 95% respectively which were found to be comparable to the other studies available (1,6,9,13-16).

Conclusion

The accuracy of cytology diagnosis is very high if the requisition forms are accompanied with all relevant clinical information regarding palpable swellings, as well as all the possible relevant laboratory information along with proper clinical history. Even though with some pit falls, cytology in the expert hands accompanied with adequate clinical and laboratory

details has proven a versatile tool for early diagnosis and appropriate timely management of head and neck lesions.

References:

1. Bagga PK, Mahajan NC. Fine needle aspiration cytology of thyroid swellings: How useful and accurate is it? *Indian Journal of Cancer*. 2010 October–December;47(4):437-442.
2. Sunita Bamanikar, Pinky Soraisham, Sudhir Jadhav, Harsh Kumar, Pradeep Jadhav, Arvind Bamanikar. Cyto-histology and clinical correlation of thyroid gland lesions: A 3 year study in a tertiary hospital. *Clinical Cancer Investigation Journal*. 2014 May-June; 3(3); 208-212.
3. Manjunath BS. Fine needle aspiration cytological study of palpable head and neck (excluding thyroid) lesions. Rajeev Gandhi University of Health Sciences, Karnataka. 2006.
4. Gunvanti B Rathore, Pragnesh Parmar. Fine needle aspiration cytology of swellings of head and neck region. *Indian Journal of Medical Sciences*. 2012 March- April; 66(3); 49-54.
5. Solanki Piyush K, Patel Ankur P, Taviad Pankaj P, Chaudhari Vipul P, Patel Shirish M. Fine needle aspiration cytology as a diagnostic procedure in head and neck swellings. *National Journal of Community Medicine*. 2012 July – Sept; 3(3); 433-436.
6. Amatya BB, Joshi AR, Singh SK, Panth R, Basnet RB. A study of fine needle aspiration cytology of head and neck masses and their corroboration by histopathology. *Post Graduate Medical Journal of National Academy of Medical Sciences*. 2009; 6(2).
7. Garima Gupta, D.S. Joshi, Alpa Shah, Minesh Gandhi, N.R. Shah. FNAC of head and neck swellings. *GCSMC J Med Sci*. 2014 January-June; 3(1) 38-41.
8. Alok Mohan, Rajender Thakral, Swarn Kaur, Shruti Singh.. Fine needle aspiration cytology in metastatic lymphadenopathy-A five year experience in muzaffarnagar region. *Journal of Advance Researches in Biological Sciences*, 2013, 5 (2) 172-176.
9. Sudarat Nguansangiam, Somnuek Jesdapatarakul, Nisarut Dhanarak, Krittika Sosrisakorn. Accuracy of Fine Needle Aspiration Cytology of Salivary Gland Lesions: Routine Diagnostic Experience in Bangkok, Thailand. *Asian Pacific J Cancer Prev*, 13, 1583-1588.
10. Agravat AH, Dhruva GA, Pujara KM, Sanghvi HK. Role of Fine Needle Aspiration Cytology in Salivary Gland Pathology and its Histopathological Correlation: A Two Year Prospective Study in Western India. *Online Journal of Health Allied Sciences*. 2012;11(3):5.
11. Tippu I, Gupta RK, Khajuria A. Role of FNAC in Diagnosis of Non- Thyroidal Head and Neck Lesions. *JK Science Journal*, 2012 Jan- March;14 (1), Page 9- 13.
12. Bhagat VM, Hemali J Tailor, Peeyush K Saini, Reena B Dudhat, Gopal R Makawana, Ravi M Unjiya. Fine needle aspiration cytology in non-thyroidal head and neck masses: A descriptive study in tertiary care hospital. *National Journal of Medical Research*, 2013 July-Sept , 3(3); 273-276.
13. Sankalap Tandon, Riad Shahab, James I. Benton, Samit K. Ghosh, Jonathan Sheard, Terry M. Jones, Fine needle aspiration cytology in a regional head and neck cancer centre: comparison with a systematic review and meta-analysis. *Wiley Inter Science*, DOI: 10.1002/hed.20849.
14. Neveen Tahoun, Noha Ezzat. Diagnostic Accuracy and Pitfalls of Preoperative Fine Needle Aspiration Cytology in Salivary Gland Lesions. *Journal of the Egyptian Nat. Cancer Inst* 2008; 20(4); 358-68.
15. Deniz Nart, Yeşim Ertan, Asuman Argon, Murat Sezak, Ali Veral, Özer Makay, İrem Paker, Müge Tuncyurek. Role of Fine Needle Aspiration Cytology and Intraoperative Diagnosis in the Diagnosis of Thyroid Nodules. *Turkish Journal of Pathology* 2010; 26(1);48-54.
16. Palak Modi, Haren Oza, Jignasa Bhalodia. Utility and Adequacy of Fine Needle Aspiration Cytology in Head and Neck Lesions: A Hospital Based Study. *International Journal of Scientific Study* 2014; 2(8): 100-105.