Analysis of FNAC in Palpable Head And Neck Lesions

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ABSTRACT

Introduction : FNAC is relatively painless, produces speedy results and cheap. FNAC differentiates non neoplastic lesions from neoplastic lesions thus eliminating need of surgical intervention in these lesions which can be treated conservatively

Methods : This Retrospective analytical study was conducted within ethical standards. Data of 300 samples in 4 years was collected from randomly selected Pathological / Cytological / Histopathological Units. The patient profile included all inpatient as well outpatient samples received of those patients Both Outdoor as well as indoor patients with palpable head and neck swellings who were referred to cytology department.

Result : Maximum no. of patients were in the age group of 21-30 years(32.63%) followed by 31-40 years(20.83%) and least no. of patients were seen in age group of above 70 years. Out of 300 patients 170 (56.66%) were females and 130(43.34%) were males. Site wise distribution of head and neck FNAC [Table- 1] shows lymph nodes lesion as the predominant site of FNAC (39.33%) followed by thyroid lesions (30.66%), salivary glands (18.66%) and soft tissue (7.66%). FNAC was inconclusive in 11 (3.66%) cases.

Conclusion : FNAC is a rapid, cheap diagnostic tool now-a-days with overall accuracy rate more than 90 % and diagnostic accuracy in differentiating non- neoplastic lesions from neoplastic lesions is well established.

Key Words : FNAC , Head Neck Lesions , Thyroid , Malignant , Cytology

INTRODUCTION

Palpable head and neck swellings include various non-neoplastic and neoplastic lesions of lymph node, salivary gland, thyroid gland and soft tissue. Proximity of tissues of various types and wide range of primary and metastatic neoplasms are responsible for this site being the most common in FNAC diagnosis.[1]

FNAC is relatively painless, produces speedy results and cheap. FNA is highly suitable for debilitated patients, is repeatable, useful for multiple lesions and has low risk of complications. FNAC is applicable to easily palpable lesions of thyroid, breast, salivary glands, superficial lymph nodes, superficial growth of skin & soft tissue. With the help of newer radiological techniques FNAC of deeper structures is easily possible. [1] Head and neck neoplasms is a major form of cancer in India accounting for 23 % of all cancer in males and 6 % in females.[2,3]FNAC of head and neck region is a generally well accepted technique with high specificity.[4] Psychological and economical advantage of an immediate diagnosis in outpatient clinic is obvious. Ancillary techniques done on cytology like flow cytometry, cytogenetic, electron microscopy, cell block preparation, immunocytochemistry have further added a tool in diagnosis.

FNAC is a prerequisite for various neck swellings as procedure is non- traumatic, easily accessible, inexpensive, excellent compliance, avoids anaesthetic complications and requirement of open surgical biopsy. FNAC differentiates non neoplastic lesions from neoplastic lesions thus eliminating need of surgical intervention in these lesions which can be treated conservatively.[5]

Aim of the study was :
1. To evaluate the role of FNAC and its utility in diagnosis of palpable head neck masses.
2. To study the spectrum of head neck lesions in rural population.
3. To study diagnostic accuracy of FNAC by histopathological correlation wherever possible.

METHEDOLOGY

This Retrospective analytical study was conducted within ethical standards. Randomization was done using computer tables in selecting data. This retrospective study was carried out in local randomly selected secondary & tertiary medical care hospitals including ours having full fledge Pathological / Cytological / Histopathological Units. Data of 4 years was collected from randomly selected Pathological / Cytological / Histopathological Units The patient profile included all inpatient as well outpatient samples received.

Outdoor as well as indoor patients with palpable head and neck swellings were referred to cytology department. Notes involved Detail clinical history and significant findings. After explanation of

procedure and taking informed consent of patient, FNAC was done using 10 cc disposable syringe and 22/23 gauge needle taking all aseptic precautions. Both aspiration and non- aspiration technique was used wherever required. Three or four smears were prepared by cytopathologist following standard guidelines. Wet fixed smears in 95% alcohol were stained with PAP and Haematoxylin-Eosin stain while air dried smears were stained with Leishman stain. Zeihl-Neelsen staining for acid fast bacilli was done in suspected tubercular lesions. Aspirations taken from various sites include lymph node, thyroid, salivary gland and soft tissue. Cytomorphological diagnosis was given depending upon the pathology. Excisional biopsy specimens were fixed in 10% neutral buffered formalin processed by paraffin embedding and stained with haematoxylin and eosin stain. Cyto-histopathological correlation was done.

Data was filled in Microsoft Excel & continuous data were expressed as mean ± standard deviation (SD) . The data were analyzed by IBM SPSS Statistics 23 . Overall, $p < 0.05$ was proposed to represent statistical significance after correction.

RESULTS

The present study included 300 randomly selected cases palpable head and neck lesions from various departments as an OPD as well as indoor patient. Age group of patients ranged from 1 year to 77 years. Maximum no. of patients were in the age group of 21-30 years(32.63%) followed by 31-40 years(20.83%) and least no. of patients were seen in age group of above 70 years. Out of 300 patients 170 (56.66%) were females and 130(43.34%) were males. Site wise distribution of head and neck FNAC [Table- 1] shows lymph nodes lesion as the predominant site of FNAC (39.33%) followed by thyroid lesions (30.66%), salivary glands (18.66%) and soft tissue (7.66%). FNAC was inconclusive in 11 (3.66%) cases. Out of 118 cases of lymph node lesions, tubercular lymphadenitis 56 (47.45%) was the predominant cause of lymphadenopathy followed by reactive lymphadenitis in 43(36.44%) cases. In malignant lesions, metastatic epithelial malignancy was the predominant finding (2.54%) and one case (0.84%) of lymphoma was found.[Table-2]

Amongst 92 (31.25%) cases of thyroid lesions, inflammatory lesions including Hashimoto's thyroiditis, chronic lymphocytic thyroiditis were found in 28.26% of cases. Benign neoplastic lesions constituted 69.54% of cases. In malignant lesions two cases of papillary carcinoma were observed.[Table-3] In salivary glands lesions, sialadenitis was observed in 68% of cases. Benign neoplasm included 13(23.21%) cases of pleomorphic adenoma and two cases (3.27%) of benign lymphoepithelial cyst.3 cases of malignant neoplasms were reported including one case of each of carcinoma ex pleomorphic adenoma, mucoepidermoid carcinoma and anaplastic carcinoma.[Table- 4] FNAC of soft tissue and miscellaneous constituted 23 cases (7.66%) with varied pathological lesions like 6 cases of lipoma ,Maximum 13 cases of epidermal cyst , benign adnexal tumor and malignant neoplasms including squamous cell carcinoma and metastatic epithelial neoplasm.[Table-5] Histo-cytopathological correlation was possible in 43 cases only which included 33 benign lesions and 10 malignant lesions. In 30 cases of benign lesions cytological diagnosis was consistent with histopathological diagnosis while three cases showed false negative result. In 9 cases of malignant lesions cytological diagnosis was consistent with histopathological examination and one case showed false positive result. Overall accuracy rate was 93.02% with sensitivity, specificity, positive predictive value and negative predictive value of 81.81%, 96.87%, 90.0 % and 93.93% respectively.

Table-1: Distribution of Head & Neck Lesions [Cases / n=300]

Site	No. of Cases	%
Lymph Node	118	39.33
Thyroid gland	92	30.66
Salivary gland	56	18.66
Soft tissue & miscellaneous	23	07.66
Inconclusive	11	03.66

Table-2: Distribution of Various Lymph Node Lesions [N=118]

Lesions		No. of cases	%
Reactive lymphadenitis		43	36.44
Inflammatory	Nonspecific	15	12.71
	Tuberculosis	56	47.45
Malignant	Lymphoma	01	0.84
	Metastasis	03	2.54
Total		118	100

Table-3: Distribution of various Thyroid lesions [n= 92]

Thyroid lesions	No. of cases	%
Inflammatory	26	28.26
Benign		
1.Colloid goitre	43	46.73
2.Hurthle cell neoplasm	8	8.69
3.Thyroglossal cyst	6	6.52
4.Follicular neoplasm	7	7.60
Malignant		
1.Papillary carcinoma	2	2.17
Total	92	100

Table-4: Distribution of various Salivary gland lesions [n= 56]

Salivary gland lesions	No. of cases	%
Inflammatory		
1.Acute sialadenitis	13	23.21
2. Chronic sialadenitis	25	44.64
Benign		
1.Pleomorphic adenoma	13	23.21
2.Benign lymphoepithelial lesion	2	3.57
Malignant		
1.Ca ex pleomorphic adenoma	1	1.78
2.Mucoepidermoid carcinoma	1	1.78
3.Anaplastic carcinoma	1	1.78
Total	56	100

Table-5: Distribution of soft tissue & miscellaneous [n=21]

	No. of cases	%
Benign		
1.Lipoma	6	23.80
2.Epidermal cyst	13	57.14
3.Benign adnexal tumor	1	4.67
Malignant		
1.Squamous cell carcinoma	2	9.52
2.Metastatic epithelial tumor	1	4.67
Total	23	100

DISCUSSION

In 1930, Martin and Ellis described and first introduced the technique of FNAC for diagnosis of organ lesion.[6] The two fundamental requirements on which success of FNA depends are representative sample and high quality of preparation. These two prerequisites will always remain a sine qua non, no matter how sophisticated supplementary techniques.[1] Head and neck neoplasm constitute a major form of cancer in India accounting for 23% of all cancer in males and 6% in females[2,3] and approximately 5% all childhood neoplasms.[7] Increased prevalence of malignancies may be due to use of various forms tobacco in our country. Palpable lesions of head and neck include variety of developmental, inflammatory and neoplastic lesions.

The present retrospective study was carried out over a period of 4 years to find out frequency of variety of pathologies and to find out accuracy of FNAC as a rapid diagnostic tool in outdoor patients. The present study also compares its findings with various national and international studies published in the literature.[Table-6] The study included patients from all age groups. Majority of patients were females , Similar results of female preponderance were also reported by Muddegowda et al [8], Sharma et al [11] and Ahmad T et al.[13] Predominant site of FNAC was lymph node lesions followed by thyroid gland. Similar result reported by various studies. In lymph node lesions tubercular lymphadenitis was the most common pathological findings followed by reactive lymphadenitis which is in concordance with Bhagat et al [9], Sharma et al [11], Ahmad T et al [13] and El Haq et al [4].In malignant neoplasms, epithelial metastasis was found in 3 cases and one case of lymphoma was found. All cases showed metastatic squamous cell carcinoma. This is due to consumption of tobacco in various forms in our area leading to high incidence of malignancy in aerodigestive tract. FNAC

of thyroid lesions was the next common site in our study. Colloid goiter was the predominant finding in benign lesion followed by inflammatory lesions consisting of Hashimoto's thyroiditis, chronic lymphocytic thyroiditis. Two cases of papillary carcinoma was detected which was confirmed on histopathology. Muddegowda et al [8] and Rathod et al [12] also found thyroid lesions as the predominant site of FNAC in their study with colloid goiter as the predominant finding. Female preponderance was observed in FNAC of thyroid lesion in our study with similar findings reported by Rathod et al [12] and Muddegowda et al. [8] In salivary gland lesions acute and chronic sialadenitis together comprised 68% followed by pleomorphic adenoma and benign lymphoepithelial cyst .Sharma et al [11] and Rathod et al [12] found inflammatory lesions as the commonest findings followed by benign neoplasms including pleomorphic adenoma while Bhagat et al [9] found benign pleomorphic adenoma as the predominant salivary gland lesion in his study. In soft tissue and miscellaneous lesions benign lesions were commonest finding including 13 cases of epidermal cyst, 6 cases of lipoma and one case of benign adnexal tumor. Three cases of malignant neoplasms comprising of 2 cases of squamous cell carcinoma and one case of metastatic epithelial tumor to scalp was reported. Bhagat et al [9] reported neoplastic lesions in 63% cases with lipoma as the predominant benign tumor and squamous cell carcinoma as the commonest malignant neoplasm. In some cases cytology was inconclusive. The causes of unsatisfactory aspirates were smaller lesions, poor handling of material, inadequate aspirate. Incidence of inadequate reports ranged from 0 to 10 % in varies studies in the literature. Cyto- histopathological correlation was possible in 43 cases . Out of benign lesions in 33 cases only cyto- histopathological correlation was

possible. Cytomorphological diagnosis was in concordance with histopathological diagnosis in 30 cases while 3 cases showed false negative results. Out of 10 malignant cases reported on cytology, in 9 cases cytological diagnosis was consistent histopathological diagnosis. One case reported as mucoepidermoid carcinoma on cytology turned out to be pleomorphic adenoma with squamous metaplasia on histopathological examination. In this study overall accuracy rate of FNAC was 93.02% with sensitivity of 81.81%, specificity of 96.87%, and positive predictive value of 90% and negative predictive value of 93.93%. Cyto- histopathological correlation was done by Sharma et al [11] in 71 cases out of 125 cases with sensitivity of 89.28%, specificity of 90.69%, positive predictive value of 85% and negative predictive value of 90.14%. Tilak et al [15] studied cyto-histopathological correlation in 55 out of cases 154 with overall diagnostic accuracy rate of 92.75%, sensitivity of 90.91% and specificity of 93.18%. In most of the national studies including our study inflammatory and non- neoplastic lesions were the predominant cause of head and neck masses while neoplastic lesion were the commonest finding in various international studies. To avoid or minimize false positive results various factors including regenerative changes, metaplasia and others should be taken into considerations while reporting. False negative results may be due to cystic change, necrotic and hemorrhagic areas revealing no diagnostic cellular yield. Repeat FNAC of solid areas or adjacent area may minimize false negative results in such cases. In this study we observed that FNAC is a rapid, cost effective, highly accurate and feasible first line diagnostic tool in management of palpable head and neck swellings. Though FNAC has certain limitations and pitfalls diagnostic accuracy rate in various studies including our study was over 90%.
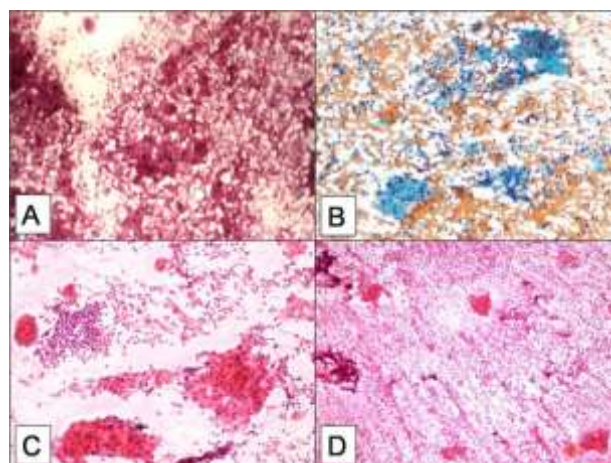

Figure 1 - A: Pattern 1 cytology characterized by a necrotic background with scattered polymorphs, lymphocytes, macrophages, and early ill defined granuloma with early epithelioid cell changes. The Z – N stain showed numerous AFB. (Hematoxylin and Eosin Stain ×250). B: Pattern 2 cytology characterized by few granulomata composed of well defined epithelioid cells with notable amount of necrosis. The Z – N stain showed many AFB. (Papanicolaou Stain ×250). C: Pattern 3 cytology is characterized by many granulomata formed by distinct large cohesive group of epithelioid cells with identifiable necrosis in the background and

occasional AFB. (Hematoxylin and Eosin Stain ×250). D: Pattern 4 cytology identified by numerous distinct granulomata with distinct epithelioid cells and no necrosis in the background. Z – N stain was negative for AFB.
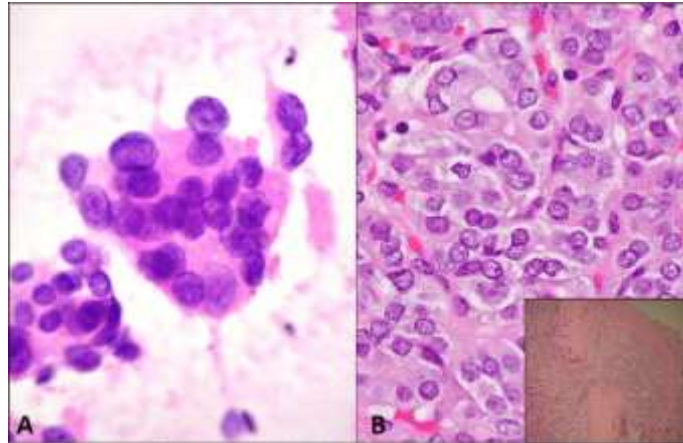

Figure 2 - A and B) Papillary thyroid carcinoma, follicular variant. (A) The FNA shows follicular cells arranged in microfollicles and exhibiting enlarged nuclei with occasional grooves (smear, Papanicolaou stain, 600X). (B) On histology, the neoplasm is composed of microfollicles lined by cells with clear nuclei; capsular invasion is present (inset) (Histology, Hematoxylin & Eosin, 400X). [Color figure can be viewed at wileyonlinelibrary.com]
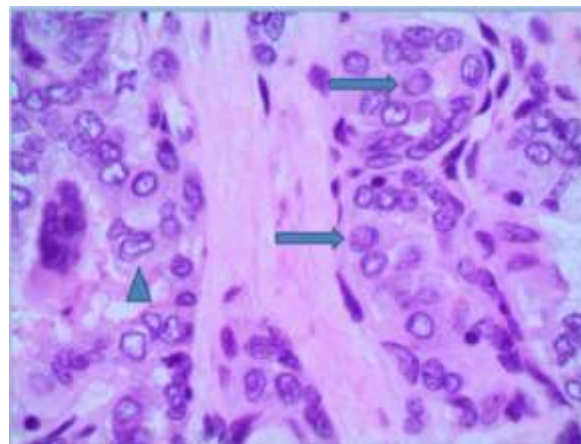

Figure 2 c - Typical nuclear features of papillary carcinoma, including nuclear inclusions (arrows) and groves (arrowhead).
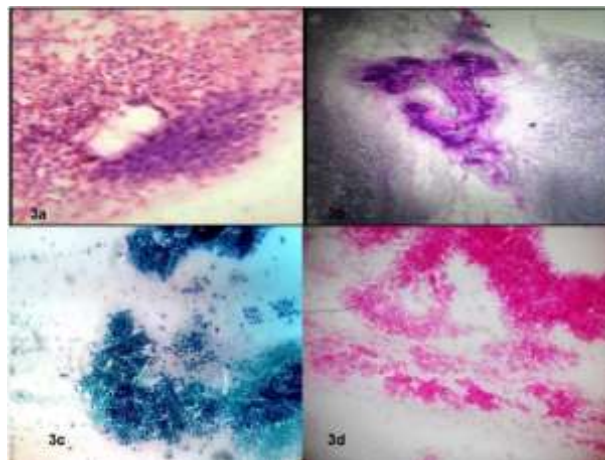

Figure 3 - FNAC of salivary gland showing acute sialadenitis [3a (Leishman Stain, x100)], benign pleomorphic adenoma [3b(Leishman Stain,x100)] and Carcinoma Ex Pleomorphic adenoma [3c(Pap stain, x100) and 3d (Haematoxylin and Eosin, x100)].

CONCLUSION

Though excisional biopsy is the gold standard for diagnosis of head and neck neoplastic lesion FNAC is a rapid, cheap diagnostic tool now-a-days with overall accuracy rate more than 90 % and diagnostic accuracy in differentiating non- neoplastic lesions from neoplastic lesions is well established.

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