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Original Research Paper

Pathology

UTILITY OF FNAC AS A DIAGNOSTIC TOOL IN HEAD AND NECK SWELLINGS

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ABSTRACT Head and neck lesions encompass a multitude of congenital, inflammatory or neoplastic lesions including several anatomic sites and originating in different tissues and organs. Fine needle aspiration cytology (FNAC) is a simple, quick, feasible, cost effective and repeatable outpatient procedure with minimal risk of complication. The study included 407 patients presented with palpable head and neck swelling in Department of Pathology RCSM GMC, Kolhapur from November 2016 to January 2018. Detailed clinical history of patient was noted. Aspirations were done by using 10 ml syringe and 22/23 gauge needles. Smears were stained with PAP, Haematoxylin and eosin and Leishman stain. Cyto-histopathological correlations were done wherever possible.

Results: Out of 407 patients of head and neck lesions studied, lymph node 48.16%, was the predominant site aspirated with reactive lymphadenitis being the commonest lesion. Thyroid lesions constituted 32.68%, followed by soft tissue and miscellaneous 14.25% and salivary gland 4.91%. In our study females predominated with male to female ratio 1:1.7 . Overall accuracy rate of FNAC was 96.33% with sensitivity 93.10%, specificity 97.5% and positive predictive value of 93.10%.

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 of more than 90%.

KEYWORDS : Head and neck, FNAC, rapid, diagnostic, accuracy

INTRODUCTION

Palpable swellings of head and neck are one of the commonest conditions routinely encountered by the practicing clinicians[1]. The common pathologies presenting as head and neck masses occur within lymph nodes, salivary glands and thyroid. These lesions can range from inflammatory to neoplastic[2].They are often not associated with any symptoms, other than a lump noted incidentally or by another individual. Evaluation of a patient with head and neck masses should always begin with through history followed by complete head and neck examination[1].

Fine Needle Aspiration Cytology is a procedure where by small amount of tissue or cells is aspirated from a pathological lesion with the help of fine 10ml disposable syringe of 21 or 22 gauge needle. Virtually any superficial organ or tissue can be sampled through this procedure. Easily targeted organs include thyroid, breast, or lymph nodes. Whereas deep organs like Lungs, liver, kidney, mediastinum, and retro-peritoneum are aspirated with the guidance of ultrasound or computed tomography. FNAC is an inexpensive, safe and quick procedure, and when performed by experienced worker is quite accurate[3].FNAC differentiates non neoplastic lesions from neoplastic lesions thus eliminating the need of surgical intervention. An Ancillary techniques done on cytology like flowcytometry, cytogenetic, electron microscopy, cellblock preparation IMMUNOCYTOCHEMISTRY has contributed a great deal to transform cytology from a primarily screening tool to powerful diagnostic technique[4].

METHODS

This is a prospective, cross sectional, observational study, conducted in department of pathology for a period of 15 months from November 2016 to January 2018 after ethical committee clearance. Both outdoor and indoor patients with head and neck swellings were included in this study. Detailed clinical history, physical examination including oral examination was done and significant history is noted.FNA was done after explanation of the procedure and informed consent from the patient, under strict aseptic precaution using 10cc syringe and 22/23g needles. Aspirates are procured by using both aspiration and non aspiration techniques wherever required. Both air dried and wet fixed smears are made on glass slides as per standard staining protocol. Wet smears were fixed using 95% ethanol and stained with PAP and Haematoxylin and eosin, air dried were stained with giemsa, special stains are done where ever required Histopathological examination was done wherever possible and cyto-histological correlation was studied. All the palpable head and neck swellings are included in the study, whenever required guided FNACS. Patients with lesions difficult to localize on physical examination as well as radiological examination and Patients who are not willing to give consent were excluded. All the data pertaining to the research were entered on the data collection forms.All the results were compiled and accessed using spss software. Conflicts of interest were none.

RESULTS

A total of 407 FNACs performed on neck masses / lesions during the period from November 2016 to January 2018 are included in this study. In 109(26.78 %) cases, FNA was followed by histopathological examination .The age of the patients ranged from 2 years to 85 years. However, the maximum numbers of patients were in the age group of 30–39 years. The mean age of the patients was 38.97 years. Sex wise distribution of patients shows female predominance and male to female ratio in the present series was 1: 1.7.

Lymph node was the most frequently aspirated organ in the present study accounting for 48.16% cases followed by thyroid (32.68%)(**TABLE No. 01**).

TABLE No. 1 : DISTRIBUTION OF CASES ACCORDING TO SITE

SITE OF FNA	No. OF CASES	PERCENTAGE
Lymph node	196	48.16 %
Thyroid	133	32.68 %
Salivary glands	20	04.91 %
Miscellaneous	58	14.25 %
Total	**407**	**100%**

Out of 196 aspirates of lymph nodes maximum number of cases belonged to non-neoplastic category accounting for (158) 80.61% of total lymph node aspirates followed by malignant in (33) 16.84% cases. Five cases of FNA, smears were inadequate for reporting due to very scant aspirates because only acellular necrotic material or blood was aspirated. Maximum numbers of patients were in the age group 20-29 yrs (21.93%) with male to female ratio 1:1.10.Reactive lymphadenitis was the most common non-neoplastic lesion encountered (35.20%) followed by Tuberculous lymphadenitis (26.02 %).The criteria followed for the diagnosis of tubercular lymphadenitis were acid fast bacilli positivity irrespective of cyto-morphology and / or presence of caseous necrosis with epithelioid cell granulomas. In malignant lesions, metastatic epithelial malignancy was the predominant finding (15.31 %) and 3 case of lymphoma was found (1.53%). **(TABLE No. 2).**

TABLE No.2 : DISTRIBUTION OF LYMPH NODE LESIONS

LESIONS	No. OF CASES	PERCENTAGE
NON-NEOPLASTIC	**158**	**80.61 %**
Reactive lymphadenitis	(69)	35.20 %
Tuberculous lymphadenitis	(51)	26.02 %
Suppurative lymphadenitis	(14)	7.14 %
Granulomatous lymphadenitis	(24)	12.24%
MALIGNANT	**33**	**16.83%**
METASTATIC CARCINOMA	30	15.31 %
Squamous cell carcinoma	(27)	13.78%
Adenocarcinoma	(02)	1.02 %
Anaplastic carcinoma thyroid	(01)	0.51%
LYMPHOMA	03	1.530%
NHL	(02)	1.02 %
Hodgkin's Disease	(01)	0.51%
INADEQUATE	**05**	**2.55 %**
TOTAL	**196**	**100%**

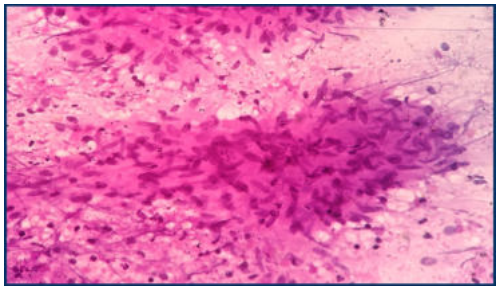

FIGURE 1: TUBERCULAR LYMPHADENITIS: Smears showing epithelioid cell granuloma (H&E400X)

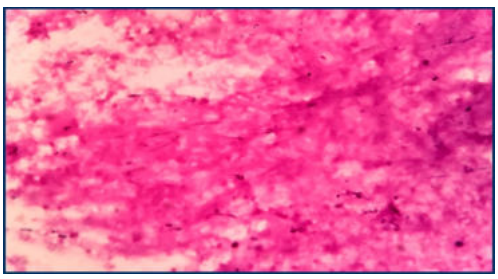

FIGURE 2: TUBERCULAR LYMPHADENITIS: Smears showing caseous necrosis. (H&E400X)

Amongst 133 (32.68 %) cases of thyroid lesion non-neoplastic comprising of 114 (85.71%) and neoplastic lesions constitute 06(4.51%).Overall, incidence of thyroid lesions were proportionately more in females with male to female ratio 1:7.8. and majority were at the age range between 30-39. **(TABLE No. 3).**

TABLE No. 3: DISTRIBUTION OF LESIONS ON THYROID FNA

LESION	No: OF CASES	PERCENTAGE AMONGST ALL THYROID ASPIRATES
NON NEOPLASTIC	**114**	**85.71%**
GOITRE	**100**	**75.19%**
Simple colloid goitre	(76)	(57.14%)
Colloid goitre with cystic change	(24)	(18.05%)
INFLAMMATORY LESIONS	**14**	**10.53%**
Lymphocytic thyroiditis	(08)	(6.02%)
Hashimoto thyroiditis	(06)	(4.51%)
THYROID NEOPLASMS	**06**	**(4.51%)**
Follicular neoplasms	(04)	(3.01%)
Papillary carcinoma	(01)	(0.75%)
Anaplastic Carcinoma	(01)	(0.75%)
ATYPIA OF UNDETERMINED SIGNIFICANCE	**02**	**(1.50%)**
INADEQUATE	**11**	**(8.27%)**
TOTAL	**133**	**100%**

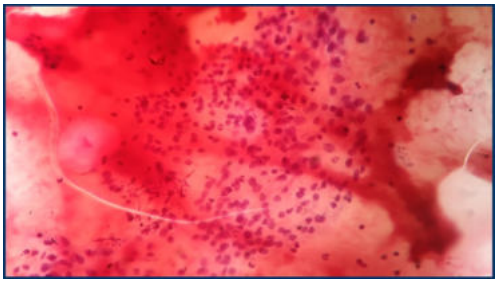

FIGURE 3: COLLOID GOITRE: Benign follicular cells in clusters and background show thick colloid. (H&E 400X)

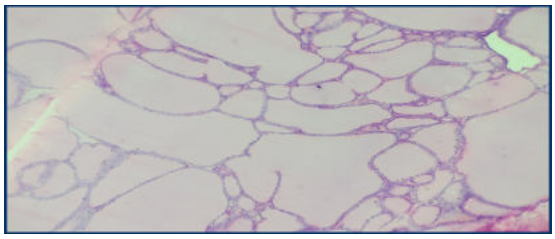

FIGURE 4: MULTINODULAR GOITRE: Sections showing thyroid with varying sized follicles filled with colloid (H&E 400X)

FNAC of soft tissue and miscellaneous lesion constitute 58 cases (14.25 %) majority of the lesion was non-neoplastic cyst of which epidermal cyst 24 (41.37%) was the predominant. Lipoma was the main benign neoplastic lesion encountered 13 (22.42%). In this study 2 cases of malignant soft tissue tumor were found and both being squamouas cell carcinoma. Majority of soft tissue lesions were seen in male 31(53.45%) **(TABLE No. 4).**

TABLE No. 4: DISTRIBUTION OF MISCELLANEOUS LESIONS OF FNA

LESIONS	No. OF CASES	PERCENTAGE
Epidermal cysts	26	44.84 %
lipoma	13	22.42%
Benign cystic lesion	10	17.24%
Thyroglossal cyst	01	1.72%

Branchial cyst	01	1.72%
Cystic Lymphangioma	01	1.72%
Hemangioma	01	1.72%
Benign spindle cell lesion	01	1.72%
Benign adnexal lesion	02	3.45%
Inadequate	02	3.45%
TOTAL	**58**	**100 %**

Salivary gland lesions were more common in fourth decade. Parotid gland was the most common site of salivary gland lesions comprising of 12 (60%) cases followed by submandibular 8 (40%).In this study both males and females were equally affected. In salivary gland lesion majority of the lesions were neoplastic of which pleomorphic adenoma was the most frequent benign neoplasm encountered. All these cases were occurred in parotid gland only. Mucoepidermoid tumor was the only malignant salivary gland lesion. **(TABLE No. 5).**

TABLE No. 5 : DISTRIBUTION OF LESIONS ON SALIVARY GLAND FNA

LESION	No. OF CASES	PERCENTAGE OF ALL SALIVARY GLAND ASPIRATES
NON NEOPLASTIC LESION	**8**	**40%**
Sialadenitis	05	25%
Cystic lesions	03	15%
NEOPLASTIC LESION	**11**	**55%**
Pleomorphic adenoma	08	40 %
Mucoepidermoid Tumor	03	15 %
INADEQUATE	**01**	**05 %**
TOTAL	**20**	**100%**

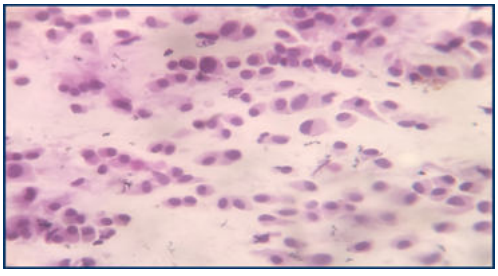

FIGURE 5(PLEOMORPHIC ADENOMA OF SALIVARY GLAND: Moderately cellular smear showing clusters and singly scattered oval and plasmacytoid cells having round to oval eccentric nuclei on chondromyxoid background. (H&E400X)

DISCUSSION

FNAC is the simple quick and cost effective method to sample superficial masses of head and neck. The successive FNAC depends on representativeness of the lesion, adequacy of the sample, proper smearing and processing and correct clinic radiological information[5].

The present cyto-histological study of Head and neck lesions is a prospective and cross sectional study that include swellings arising from cervical and supraclavicular lymph nodes, thyroid, parotid and submandibular salivary glands, developmental cysts and also miscellaneous lesions found in this area. The study was conducted over a period of 15 months in a tertiary care hospital to determine the frequency cytomorphology of various head and neck region and the accuracy of FNAC as a rapid diagnostic tool. The results achieved in the present study are compared with various national and international literatures. In the present study age group of patients ranged from 2 years old child to 85 years old man. The mean age of the patients in the present series was 38.97 years. Present study showed female preponderance with male to female ratio of 1: 1.7.Similler results were showed by Gupta et al [6], Gogoi G et al [2].

Our observation of lymph node as the most common neck swelling followed by thyroid subjected to FNA is consistent with most of the series like Gogoi G et al [2], Kishor H et al [7], Sreedevi P et al [8], and Valiya L.G et al [9]. We reported two cases as reactive lymphadenitis on cytology, histopathological examination revealed tuberculous lymphadenitis. This must be because of focal nature of the lesion which was not hit during FNA. Thus when clinical suspicion for such lesion was strong we repeated FNAs, used ZN staining for detection of acid fast bacilli and performed biopsy in selected cases. Amongst the non neoplastic group, reactive lymphadenitis was the most common pathological finding followed by tubercular lymphadenitis which is similar to Hag et al [10], Patel et al [11] and Sreedevi P et al[8].

Most common malignant lymph node lesion was metastatic carcinoma (15.31%), with metastatic squamouas cell carcinoma accounting for 27 out of 30 cases (13.78%) followed by adenocarcinoma(1.02%).Three cases were diagnosed as lymphoma. In the study by Gogoi G et al [2] and Hag et al [10] metastatic carcinoma is the predominant malignancy. This is very much similar to our study. Cytohistopathological correlation was possible only in 60 cases. Cytological diagnosis was similar to histological diagnosis in 56 cases, 4 cases were reported falsely positive. Two cases of reactive lymphadenitis and 2 cases of suppurative lymphadenitis turned out to be tubercular lymphadenitis on histological examination.

Thyroid was the next commonest lesion encountered in our study. Marked female preponderance in thyroid lesions was observed in the present study as well as Valiya L.G et al [9] and Gogoi G et al [2].Colloid goiter (75.19%) was the commonest lesion followed by inflammatory lesions consisting of lymphocytic thyroiditis and hashimoto thyroiditis which is concordance with Kulkarni C.V et al[12] and Gogoi G et al [2]. Out of the neoplastic lesion majority were follicular neoplasm. Two out of 4 cases diagnosed as follicular neoplasm on FNA, were confirmed on histopathological study to be follicular adenoma. Histological examination was done in 20 cases and one case of colloid goiter turned out to be follicular adenoma.

In salivary gland lesions neoplastic lesion (55%) was the predominant similar results are seen with Kumar A et al [13] (58.7%) and Gogoi G et al [2] (49.07%).Bulk of the neoplastic lesion observed were pleomorphic adenoma. Study done by Gogoi G et al[2] found pleomorphic adenoma as the commonest neoplastic lesion. Three cases of mucoepidermoid carcinoma were observed in our study. Study done by Valiya L.G et al [9] and Kishor H et al [7] found inflammatory lesions as the commonest followed by benign neoplasm pleomorphic adenoma. Cytological diagnosis correlated with histopathological diagnosis in 9 out of 10 cases. One case of pleomorphic adenoma was diagnosed as carcinoma ex-pleomorphic adenoma on histopathological examination.

Epidermal cyst (44.83%) formed the bulk of lesions amongst miscellaneous category, followed by lipoma (22.41%), which is similar to the findings of Kishor S H et al [7] in which epidermal cyst was (57.14%) and lipoma was(23.8%) followed by Valiya L.G et al[9] where epidermal cyst was (36.21%) and lipoma (20.69%). Squamous cell carcinoma was the commonest malignant neoplasm. Overall 19 (4.6%) cases were inconclusive in our study. The reason for unsatisfactory aspirates were high blood content , smaller size , necrosis, desmoplastic stroma, poor handling and preparation of smears etc.Various literatures in our study showed inconclusive report varies from 0 to 10%.

In this study overall accuracy rate of 96.33% with sensitivity 93.10% ,specificity 97.5% and positive predictive value of 93.10% and negative predictive value of 97.5%. On comparing

the results of the present study with Kishor H et al [7], it can be said that the results of this study are favorable with those published in the literature and are fairly accurate.

Based on this, we can say that FNAC is a safe, sensitive and specific technique in the initial evaluation of head and neck masses. A correct cytological diagnosis can be achieved in a majority of cases, thus obviating the need for second surgical intervention.

CONCLUSION

Although excisional biopsy is the gold standard for diagnosing head and neck pathologies FNAC is a safe, quick and minimally invasive technique which can be performed as an outpatient department procedure which is readily acceptable by the patient. FNAC could differentiate the inflammatory process from neoplastic one and could differentiate benign and malignant cases with overall accuracy of more than 90% is achieved in our study. It was also concluded from the present study that majority of head and neck lesions can be managed without undue surgical intervention even in most remote areas, where other sophisticated diagnostic tools are not available.

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