Role of Fine Needle Aspiration Cytology in Assessment of Head and Neck Lesions - A Study at a Tertiary Care Centre

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ABSTRACT

BACKGROUND

Fine needle aspiration cytology (FNAC) is a rapid, economical and less invasive method used for diagnosis in case of head and neck lesions which are commonly seen in general practice. Aim was to assess advantage of using FNAC in case of diagnosis of palpable head and neck masses. We wanted to assess the prevalence and distribution of head and neck swellings diagnosed by FNAC, assess the frequency and distribution of various lesion as per the site, age, and gender as well as according to the lesion being benign or malignant.

METHODS

This was a retrospective study conducted among five hundred and forty-four patients who went through FNAC for different types of head and neck swellings evaluated for cytomorphology.

RESULTS

Majority of the patients belonged to the age group of 31 to 40 years. Out of 544 cases, maximum lesions were from lymph nodes 264, followed by thyroid gland 193, salivary gland 59, cheek lesions 18, post–auricular 8 and forehead / scalp lesions 2 cases respectively.

CONCLUSIONS

FNAC being extremely sensitive, specific and a reliable procedure for screening and primary diagnosis of palpable head and neck lesions, helps as an adjunct to histopathology. For surgical and radiological decisive purposes, to decide as to whether to resect a benign tumour or to plan extensive surgeries, FNAC helps in guiding the therapeutic management by avoiding unnecessary surgeries and expenses.

KEY WORDS

Head & Neck, Lymph Node, Goiter

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BACKGROUND

Needle aspiration had a fleeting course during 1930s, first reported by Hayes Martin for management of head & neck malignancies but it re-emerged as Fine Needle Aspiration Cytology in 1970s. With vital structures situated in head and neck region, complete excision biopsy would later lead to mortality and therapeutic biopsy of any malignant mass would later lead to its invasion into deeper tissue, hence these procedure were often fatal.[1,2] In case of Fine Needle Aspiration Cytology, skin track may be created by needle but there is no proof till now that it may lead to invasion.[3] With advent of Fine Needle Aspiration Cytology which reduced trauma and had other benefits due to its simple technique was often employed.

Fine Needle Aspiration Cytology is generally confused with Fine Needle Aspiration Biopsy (FNAB), because biopsy is in general regarded as a procedure of removing tissue fragment and processing it for histopathological assay. Fine Needle Aspiration Biopsy is done with large gauge 14 Silverman or Tru-Cut needle which yields us more amount of tissue, but procedure causes injury and local trauma. The process for cytological diagnosis is called as aspiration cytology. Aspiration cytology acts as a preliminary tool for wide options of diagnoses but it can be confirmed by biopsy of tissue or specimen. Nowadays Fine Needle Aspiration Cytology is routinely done as first line investigation procedure for rapid diagnosis. Aspiration cytology acts as a preliminary tool for wide range of diagnosis and can be confirmed by biopsy.[4]

So, in most of the cases we can avoid excisional biopsy and start therapy as soon as possible. For diagnosis and management of patients with head and neck lesion, Fine Needle Aspiration Cytology has become an integral part.[5] Sometime Fine Needle Aspiration Cytology may give false-negative and false-positive results so in every circumstance, we should interpret Fine Needle Aspiration Cytology report with the entire clinical circumstance.[6] Lymph node enlargement is the common presentation and secondary squamous carcinoma is the common cause of enlargement of lymph nodes in elderly population. Fine Needle Aspiration Cytology of head and neck lesions is also very useful in differentiating inflammatory lesions that does not require surgical excision from other neoplastic lesions that require surgical management.[7]

Out of all head and neck lesions, cancer still continues to be the major health problem in spite of availability of advanced diagnostic and treatment facilities. Cancers of head and neck region constitutes the main preventable causes of cancers. We can diagnose these lesions with good certainty by Fine Needle Aspiration Cytology.[7] Fine Needle Aspiration Cytology is considered as painless, fast and cheap procedure. Fine Needle Aspiration Cytology is also a procedure of choice for elderly patients and has relatively very few chances of complications.

For deep seated lesions and for small lesions radiologically guided Fine Needle Aspiration Cytology is also available e.g., ultrasonography guided, and computed tomography guided Fine Needle Aspiration Cytology. Fine Needle Aspiration Cytology of head and neck region is a generally well accepted technique with high specificity. Fine Needle Aspiration Cytology is a prerequisite for various neck swellings as the procedure is non-traumatic, easily accessible, inexpensive, excellent compliance, avoids anaesthetic complications and requirement of open surgical biopsy. Fine Needle Aspiration Cytology differentiates non-neoplastic lesions from neoplastic lesions thus eliminating the need of surgical intervention in these lesions which can be treated conservatively.

Recognizing the benefit of Fine Needle Aspiration Cytology in the management and planning of further therapy in patients of head and neck mass is the main aim of this paper.

METHODS

This is a retrospective study carried out in cytology section at a tertiary care institute from January 2017 to December 2018. FNAC was performed in 544 patients who presented with head and neck regions lesion, after detailed clinical history of all the patients were taken and relevant questions were asked to extract the aetiology and also about present, past and family history. The sample size was taken based on the convenience of the study. Whole procedure of FNAC was explained in detail with its advantages to patients and their written consent about the same was taken. FNAC was done with proper cleaning of the lesion with alcohol-based disinfectant and betadine, swelling was properly fixed, then proper gauze needle and appropriate angle FNAC was performed with a to and fro needle movement. The needle was removed after releasing the negative pressure and then pressure was applied to the FNAC site with dry cotton swab to avoid bleeding or haematoma formation. The material obtained was used for making smear and then stained with haematoxylin and eosin stain, or the stains required as per the tissue content.

All age groups of patients with swelling in head and neck area were included and patients with lesions in the oral cavities were excluded from the study.

Frequency distribution of various parameters were performed. Data were plotted in tables and pie charts.

RESULTS

In the present study a total of 544 cases was included. In our study, highest numbers of cases were seen in the age group of 31 to 40 years. (Table 1). Females (56.43 %) were affected more than the males (43.6 %). (Table 2).

Age Group (in Years)	Cases	Percentage (%)
0 to 10	19	4
11 to 20	57	11
21 to 30	109	20
31 to 40	122	22
41 to 50	108	19
51 to 60	69	13
> 60	60	11.0
Total	**544**	**100**

Table 1. Distribution of Patients According to Age

We found that lesions were more common in neck region than in the head region. Maximum number of lesions were found in lymph nodes (48.5 %) followed by thyroid (35.47 %), salivary glands (10.84 %) and cheek (3.3 %). (Table 3)

Total 264 (48.52 %) cases were present in lymph nodes. Out of which granulomatous lesions in 95 (35.98 %) cases was

the predominant cause of lymphadenopathy followed by metastatic lesions in 80 (30.30 %) cases. Other lesions identified in lymph nodes are reactive lymphadenitis 51 (19.31 %) cases, lymphoma 10 (3.8 %) cases, lipoma 9 (3.4 %) cases, abscess 7 (2.7 %) cases, tuberculosis and carcinoma 2 (0.75 %) cases, and others as shown in Figure 1.

Site	Male	Female	Total
Lymph Node	159	105	264 (48.52 %)
Thyroid	35	158	193 (35.47 %)
Salivary Gland	25	34	59 (10.84 %)
Cheek	10	08	18 (3.30 %)
Post auricular Swelling	6	02	8 (1.47 %)
Forehead / Scalp Swelling	2	00	2 (0.36 %)
Total	**237**	**307**	**544 (100 %)**

Table 2. Distribution of Lesions According to Tissue Involved and Gender

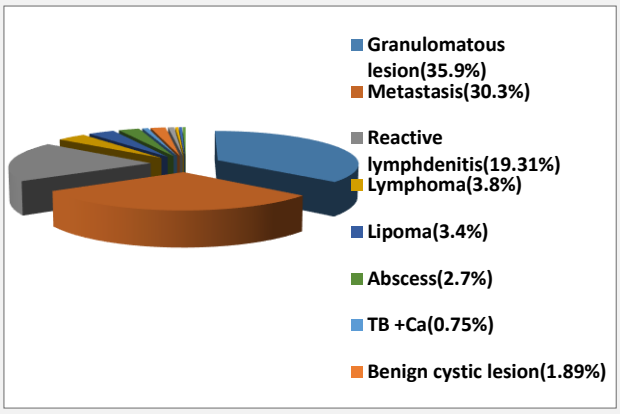

Figure 1. Distribution of Various Lymph Node Lesions

Total 193 (35.47 %) cases of thyroid gland lesion were observed in which 121 cases (62.7 %) were of nodular goiter, 38 cases (19.7 %) were of simple goiter, 11 cases (5.7 %) were of Hashimoto's thyroiditis and 7 cases (3.62 %) were of thyroglossal cyst. Follicular neoplasms constitute 09 cases (4.7 %) and 6 cases (3.10 %) were of papillary carcinoma (Figure 2).

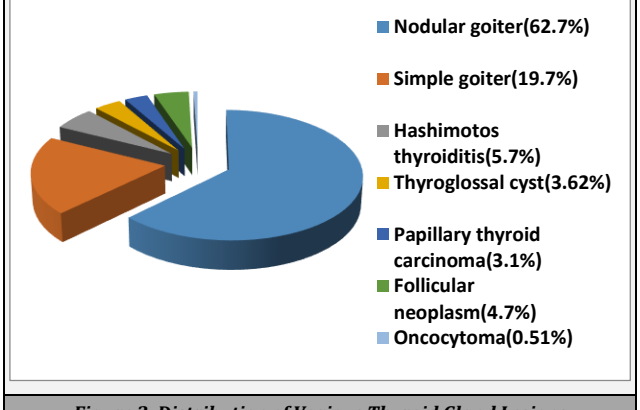

Figure 2. Distribution of Various Thyroid Gland Lesions

In case of 59 cases of salivary gland lesions, sialadenitis was detected in 18 (30.5 %) cases and sialadenosis was detected in 07 (11.9 %) cases. Benign neoplasms included pleomorphic adenoma 26 (44.1 %) cases, 02 cases (3.4 %) of Warthin's tumour and 01 case (1.7 %) of oncocytoma. 5 (8.5 %) cases were of malignant salivary gland lesions in our study (Figure 3).

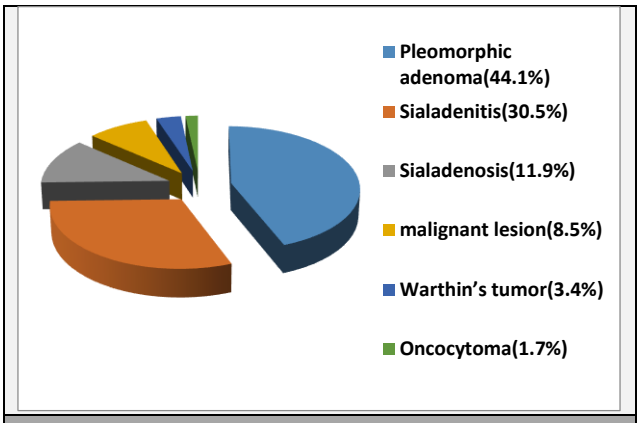

Figure 3. Distribution of Various Salivary Gland Lesions

DISCUSSION

Fine Needle Aspiration Cytology is a valuable diagnostic as well as useful therapeutic test. Sometimes Fine Needle Aspiration Cytology may give false-negative and false-positive results, so in every circumstance, we should interpret Fine Needle Aspiration Cytology report with the entire clinical scenario. Lymph node enlargement is the common presentation in head and neck lesions.[6] When patient present with mass in head and neck region Fine Needle Aspiration Cytology is useful as an initial assessment and also when a recurrence is suspected after previous treatment. Fine Needle Aspiration Cytology is one type of outpatient department procedure, so patient does not need to be admitted for procedure and no cost of hospitalization. No need for any type of anaesthesia for this procedure so almost no harm to the patients. By doing Fine Needle Aspiration Cytology we are not able to get full information of lesion every time, but it gives idea about benign or malignant nature so according to that treatment can be planned. Immunocytochemistry, molecular testing, immunohistochemistry and core biopsy can be done whenever needed.[7]

Fine Needle Aspiration Cytology is sometimes confused with Fine Needle Aspiration Biopsy, because biopsy is regarded as a procedure of removing the tissue fragment. Fine Needle Aspiration Biopsy yields more amount of tissue but causes more injury and local trauma.[4] Two basic things requiring for reporting cytology report perfectly: 1) high quality of preparation and 2) representative sample. If these two requirements are not going to be fulfilled no matter how carefully Fine Needle Aspiration Cytology is done remains unimportant.[8]

The adequacy depends not only upon the nature of the lesion but also upon the aspirator, constant practice is the only way of developing expertise. In India, head and neck cancers form a major chunk of all the cancers. In males it accounts to 23 %, in female about 6 % and forms 5 % of all childhood malignancies.[9-12]

	Our Study	Sreedevi P et al[12]	Shekhar H et al[13]	Sangavi A et al
Location	India	India	India	India
Study Duration	2 years	1 year	8 months	1 year
No. of Cases	544	304	200	100
M:F Ratio	0.8:1	0.5:1	1.3:1	0.6:1
Predominant Site	Lymph node	Lymph node	Lymph node	Lymph node

Table 3. Comparison of Various Studies

Like our study, other studies also reported lymph node as a predominant site of Fine Needle Aspiration Cytology followed by thyroid gland. (Table 3)

Also, lymph nodes are the commonest site for malignancy in head and neck region, which usually shows late presentation with lymph node enlargement but earliest diagnosis on Fine Needle Aspiration Cytology with usually metastatic squamous cell type. In case if Fine Needle Aspiration Cytology is positive for tumour, without doing excisional biopsy or frozen section we can proceed to the appropriate therapy. In case if Fine Needle Aspiration Cytology is negative but the swelling is suspicious clinically then we should repeat the Fine Needle Aspiration Cytology if possible and also do other helpful investigations like endoscopy and computed tomography scans. In case of lymphoma on cytology, an open biopsy can be performed for histopathological analysis and immunohistochemical studies. A false positive result is usually due to misinterpretation of histiocyte appearance or very actively dividing lymphocytes. A false negative result is directly related to the accessibility of the swelling and also to the experience of the aspirator, although it may also be due to aspiration of a benign area of lymph node, other parts of which may contain tumour cells. When a result is doubtful and there is no correlation with the clinical features, Fine Needle Aspiration Cytology should always be repeated. For the successful Fine Needle Aspiration Cytology, there must be close cooperation between the referring clinician, radiologist and the reporting cytopathologist.[10,11]

Role of Fine Needle Aspiration Cytology in the thyroid lesions is vital and has been used since the 1950s and is one of the cost-effective methods in the diagnosis. The thyroid lesions are more common in females. Thyroid lesions usually present in the form of a nodule which are mostly detected by sonography in about 19 to 67 % cases and rarely with the palpation about 5 % of cases.[14-16] Thyroid nodules may cause hormonal imbalance, cosmetic problems and also have the malignant potential so they should be treated as early as possible to reduce the complications.[16,17] Fine Needle Aspiration Cytology plays a key role by differentiating between benign and malignant nodule and by this decrease needless surgery and start early treatment in malignant lesion by proper triage.[13] Despite its recognized interest, it has various drawbacks, such as incomplete aspiration, false negative and false positive and inability to distinguish follicular adenoma from carcinoma.[18,19]

Pleomorphic adenoma (Fig 3) was the commonest form of salivary gland lesions, in which most of cases showing involvement of parotid gland. Diagnosis of pleomorphic adenoma on cytological smear is usually made obvious after the identification of 3 main components: extracellular matrix, myoepithelial and ductal cells which are present in various proportions, and stroma but there is proportions variation.[20,21] Stroma-deficient or cellular cases may be difficult to recognize as pleomorphic adenomas and they may be confused with other tumours of the salivary gland such as low-grade carcinomas, monomorphic adenomas and metastases, and the plasmacytoid appearance of the myoepithelial cells may be mistaken for malignant lymphomas or plasma cell proliferations.[21,22] There were 18 cases of sialadenitis along with 2 cases of Warthin tumour (WT). There were three main components for cytological diagnosis of Warthin tumour, oncocytes, lymphocytes, and the fluid background but not pathognomonic of Warthin tumour, as they are encountered in several other conditions also like lymphoepithelial cysts, metaplasia of pleomorphic adenomas, and metaplastic cells of squamous cell carcinomas.[20,21,23] Of 5 high grade epithelial carcinoma, mucoepidermoid malignancy was confirmed on excision biopsy.[24]

CONCLUSIONS

From the present study, we can say that metastatic carcinoma was the most frequently seen malignancy and colloid goitre the most common benign lesion. Our study found that fine needle aspiration cytology to be an easy, safe, quick, convenient, least invasive, accurate and relatively complication-free outpatient method for diagnosis of lesions of the head and neck. Nowadays people want quick diagnosis and fast treatment so as to decrease hospital stay and expense to the patients.

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