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Original Research Article

Role of cytological examination in head neck masses

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ABSTRACT

Background: Fine needle cytology can differentiate inflammatory and the neoplastic lesions. Moreover, the neoplastic lesions of the head and neck have a propensity to seed the subcutaneous tissues if overlying planes are widely violated, thereby fine needle cytology over an excision's biopsy is the preferred choice.
Methods: 106 patients with head and neck swelling were selected from the head-neck tumor clinic of the Oto-rhino-laryngology services, Dayanand medical college and hospital, Ludhiana, India. An analysis of the efficacy of fine needle aspiration cytology (FNAC) in the diagnosis of head and neck swellings was carried out.
Results: Overall sensitivity of FNAC was 88.9% whereas overall specificity was 100%. Overall accuracy for salivary gland tumors was 100% for pleomorphic adenoma. FNAC from 50 subjects (56.2%) reported tubercular pathology. FNAC had to be repeated in 6.6% of the cases because of unsatisfactory smears. In 3 cases, false negative diagnosis was obtained and in 3 it was inconclusive.
Conclusion: Properly executed FNAC is of the greater value in surgical practice with 88.9% sensitivity and 100% specificity.

Keywords: FNAC, Neck masses, Benign, Malignant

INTRODUCTION

FNAC is the ideal procedure for assessment of individuals with a cervical mass. It differentiates the mass into inflammatory or a neoplastic and if the latter; suggests necessity of a subsequent meticulous search for a primary malignant condition in the upper part of the aerodigestive tract or elsewhere, prior to obtaining a tissue diagnosis from the cervical mass. Moreover, it suggests the most cost-effective plan to further evaluate and plan treatment of the patient.

Aim of the study was to assess the reliability of fine needle aspiration cytology in affording correct diagnosis in morbid head and neck masses and to work out the incidence of false negative, false positive and accuracy of fine needle aspiration was recorded.

METHODS

106 patients with head and neck masses, benign as well as malignant, were selected from the head neck tumor clinics of the Oto-rhino-laryngology and head neck services, Dayanand medical college and hospital, Ludhiana, India. The prospective study was undertaken in a period of one and a half years. (June 2009 to December 2010). All the patients were subjected to: detailed clinical history with special emphasis on: site, duration, mode of onset and progress of the mass, History of pain, its nature and relation to swelling, History of cough, fever, loss of appetite, hemoptysis and loss of weight, History of any complaints pertaining to ENT region hoarseness, dysphagia, epistaxis, deafness and facial pain, Past history of any swelling in the head and neck area, History of smoking and alcoholism and family history of any disease like tuberculosis, syphilis, diabetes etc.

A FNAC of the masses was carried out in all the patients and a cytological diagnosis was made. Out of the 106 aspiration biopsies, 89 aspirations were performed from lymph nodes, 7 from salivary glands, 7 were fine needle aspirates from masses, arising from oropharynx and oral cavity and one from ear canal. Out of 106 patients, excision biopsy following fine needle cytology was carried out in 38 patients.

Inclusion criteria included salivary gland swellings, cystic neck masses and intra oral tumors. Exclusion criteria excluded thyroid swellings and ulcerated masses.

All statistical calculations were done using the statistical package of social sciences (SPSS) 17 version statistical program for Microsoft windows (SPSS Inc. Released 2008. SPSS statistic for windows, version 17.0, Chicago). Ethical approval of the study was taken from the institutional ethics committee.

RESULTS

There were 61 males and 45 females. Youngest was a male child of one-year age and the oldest a 76-year-old male with a cervical metastatic lymph node. 57 (53.8%) patients belonged to the rural areas while 49 (46.8%) belonged to the urban areas.

Table 1: Site of aspiration cytology.

Site of aspiration	Patients	
	No.	Percentage (%)
Cervical lymph Nodes	89	84.0
Salivary glands	7	6.7
Oral cavity	3	2.8
Oro pharynx	4	3.8
Neck cysts	2	1.9
Ear canal	1	0.9

Table 2: Incidence of symptoms.

Symptoms	Patients	
	No.	Percentage (%)
Swelling	106	100.0
Fever	26	24.5
Pain	20	18.9
Dysphagia	7	6.6
Loss of weight	13	12.3
Hoarseness of voice	12	11.3
Epistaxis	1	0.9

The primary presenting symptom was swelling in the head and neck region. Though many patients presented with associated symptoms.

The duration of head and neck masses at the time of presentation in this series ranged from less than one month to more than one year. Maximum patients presented with duration of swelling ranging from one month to 6 months (65%) followed by duration of less than one month in 36 patients (15%).

In most of the cases, there was nothing significant in their past history. Two patients had received anti tubercular treatment in the past but reports were not available. Anemia in the form of pallor was present in 38 patients. Three patients had marked cachexia at the time of presentation. Axillary lymphadenopathy was noted in 6 patients while 2 patients had enlarged nodes in the inguinal region. Hepato-splenomegaly was noted in 5 patients.

Table 3: Location of lymphadenopathy.

Location	Patients	
	No.	Percentage (%)
Sub mental	1	1.1
Submandibular	15	16.9
Jugular chain	58	65.1
Supraclavicular	4	4.5
Multiple	11	12.4

The maximum (65.1%) cases of cervical lymphadenopathy had involvement of the jugular chain of lymph nodes. In all 11 (12.4%) cases, enlarged nodes were seen at more than one site submandibular nodes were involved in 15 (16.9%) patients and supraclavicular lymph nodes in 4 (4.5%) patients. In 1 (1.1%) patient, sub mental lymph node was involved.

Table 4: Location of salivary swellings (n=7).

Location	Patients	
	No.	Percentage (%)
Parotid	3	42.9
Submandibular	4	57.1

Table 5: Size of the head and neck masses.

Size (cm)	Patients	
	No.	Percentage (%)
<3	42	37.6
3-5	49	46.2
>5	15	14.2

47 out of 106 patients had hemoglobin below 10 gm/dl while 59 patients had hemoglobin concentration above 10 gm/dl total leucocyte count (TLC) was found to be in the normal range of 4000-11000 mm^3 in 94 cases. It was elevated above 11000 in 12 patients. Erythrocyte sedimentation rate (ESR) was elevated in 54 patients in which it ranged from 20 to 45 mm in the 1 hour. X-ray chest undertaken in all showed 4 patients with features of old healed tuberculosis and 2 with active lesion. In 9 the radiograph indicated chronic bronchitis.

Skiagram of regions other than the chest were done in selected cases wherever indicated. These revealed

increased soft tissue shadow of nasopharynx in two cases, increase in the soft tissue shadow of laryngopharynx in 4 cases and in one case barium swallow of esophagus showed irregularity and narrowing in the upper end of esophagus.

FNAC was done in all 106 cases. The results of aspiration biopsy are shown in the following tables:

Table 6: Cytological diagnosis in 89 cases of cervical lymphadenopathy.

Diagnosis	Patients	
	No.	Percentage (%)
Tubercular	50	56.2
Malignant metastatic	30	33.7
Lymphoma Non- Hodgkin	3	3.4
Reactive hyperplasia	3	3.4
Inconclusive	3	3.4

Cervical lymphadenopathy: Maximum patients (56.2%) were tuberculous lymphadenitis. In 30 (33.7%) cases, a diagnosis of metastatic carcinoma was made. Non-Hodgkin lymphoma was diagnosed in 3 (3.4%) patients on cytological examination. The cytological smears were reactive hyperplasia in 3 (3.37%) and unsatisfactory for examination in 3 (3.37%) cases. On taking biopsy from those cases, 2 came out to be tubercular and 3 malignant deposits. One case was lost in follow up.

Salivary Glands: In the 7 cases, 3 involved the parotid and 4 the submandibular gland. 4 (58.1%) were diagnosed as chronic sialadenitis and 3 (42.9%) as pleomorphic adenomas.

Table 7: Cytological diagnosis in salivary gland swelling.

Diagnosis	Patients	
	No.	Percentage (%)
Pleomorphic adenoma	3	42.9
Chronic sialadenitis	4	58.1

Pleomorphic adenoma of salivary gland was diagnosed on the cytological findings of epithelial cells of uniform shape and size, having oval or round nucleus and homogeneous cytoplasm arranged in acini or clumps with variable amounts of intercellular fibrillar mucus in the background. Some smears revealed collagen fibers and myoepithelial cells. In patients with chronic sialadenitis, the smears revealed numerous polymorphonuclear leukocytes and lymphocytes dispersed and in clumps with a few degenerated epithelial cells.

Cytological examination of 2 cystic swellings showed benign cystic lesion in one and dermoid cyst in the other.

Comparison between cytological and histopathological diagnosis: Out of 106 cases studied, 38 patients were operated either for surgical excision of the head and neck mass or for obtaining incisional biopsy for histopathological examination. These included 5 patients of lymphadenopathy, 7 patients with salivary gland swellings, 6 patients with oropharyngeal and oral cavity masses, one from ear canal, two cystic swellings and 17 cases from primary. In all these patients, the results of cytological diagnosis were compared with those of histopathology.

Table 8: Site of primary tumor in cervical metastatic lymphadenopathy.

Primary Site	Patients	
	No.	Percentage (%)
Larynx	11	36.6
Hypo pharynx	4	13.4
Oropharynx and oral cavity	11	36.6
Nasopharynx	3	10

Out of a total number of 30 cases of metastatic lymphadenopathy diagnosed on cytology, 11 (36.6%) cases had secondaries from larynx, 4 (13.4%) cases from hypo pharynx, 11 (36.6%) cases from oropharynx and oral cavity and three (10.0%) cases from nasopharynx. In one (3.4%) case, the primary could be detected.

Cytological correlation for salivary glands: Out of 7 cases studied, surgical excision and histological examination was done in 7 cases. The overall accuracy of cytological diagnosis in salivary gland lesions was 100%.

Out of 27 histopathologically proven cases of malignancy, 24 cases (88.9%) were correctly diagnosed on fine needle aspiration biopsy. Of the remaining 3 cases, the aspiration smears were unsatisfactory for examination in 1 case while 2 cases were diagnosed as reactive hyperplasia.

Table 9: Accuracy of cytological diagnosis in salivary gland lesion.

Diagnosis	Diagnosed by		Accuracy of cytodiagnosis (%)
	Histology	Cytology	
Pleomorphic adenoma	3	3	100
Chronic sialadenitis	4	4	100
Overall	7	6	100

Table 10: Accuracy of cytological diagnosis in malignant lesions.

Diagnosed on histopathology	Diagnosed by cytology	False negative	Inconclusive	Accuracy of cytodiagnosis
27	24	2	1	88.9%

DISCUSSION

In the present study of 106 subjects 89 had cervical lymphadenopathy, 7 were salivary glands, 2 cystic lesions, 3 masses in the oral cavity, 4 in the oropharynx and one in the ear canal. All the patients were subjected to fine needle aspiration biopsy of the mass at the time of initial evaluation.

Open surgical biopsy and histopathological examination was performed in 38 patients subsequently and the results of cytological and histological examination were compared in different groups to find the accuracy of fine needle aspiration biopsy in these cases. The purpose of this study was to evaluate 106 patients with head and neck masses by FNAC.

89 patients with cervical lymphadenopathy were studied involving sub mental lymph nodes in one case, submandibular lymph nodes in 15 cases, jugular chain in 58 cases, supraclavicular in 4 cases and multiple in 11 cases. 50 cases (56.2%) were reported as tubercular, 30 cases (33.7%) were reported as malignant and 3 cases (3.4%) were reported as non-Hodgkin lymphoma. Cytology was inconclusive in 6 cases (6.7%) out of which histopathology was done in 5 cases, 2 cases were reported as tubercular and 3 as malignant deposits. One case did not turn up for follow up.

Cases which were diagnosed as tubercular on cytology were not subjected to biopsy and histopathological examination. They were put on anti-tubercular-therapy and follow-up.

Out of the 27 proven cases of metastatic carcinoma, 24 (88.88%) cases were diagnosed correctly on cytological examination. This is in close conformity with the observations made by Bloch, Engzell et al, and Frable who have reported an accuracy of 87%, 90% and 92.2% respectively for the diagnosis of metastatic carcinoma on FNAC.[1-3]

Out of 7 cases with salivary gland masses, 3 were diagnosed as pleomorphic adenoma and 4 as sialadenitis. All the seven cases were subjected to histopathological examination and accuracy was found to be l00%. This is in accordance with the observations made by Mavec et al 92%, Thomsen et al 100%, and Frable et al 96%.[4-6]

There were two patients with cystic masses; one was reported as dermoid cyst and the other as benign cystic lesion (cysticercoids). Both were confirmed on histopathological examination and accuracy were 100%. Frable et al, Young et al and Gertner et al also reported 100% correct cytological diagnosis in various cystic neck masses.[6-8] It is evident from the present study and observations made by other workers that aspiration cytology is as accurate as histopathology in the diagnosis of a cyst, and can be made with certainty on aspiration biopsy, the patients can be saved from undergoing unnecessary diagnostic screening tests.

In 6 patients, intraoral aspiration was done: Tongue (3 cases) and tonsils (3 cases). All were reported for malignancy. On histopathological examination, the report was squamous cell carcinoma. From the above results it is quite evident that FNAC has got equal results (100%) even when aspirated from intraoral sites. Frable et al also reported similar results.[6]

False negative cases, sensitivity and specificity: Out of 38 cases where histopathological examination of the head and neck masses was done, 27 cases were diagnosed as malignant. Among three patients where the diagnosis of malignancy could not be made on aspiration biopsy, one smear was unsatisfactory for examination while two cases were diagnosed as reactive hyperplasia. Hence false negative results for malignancy were 7.4%.

The false negative results may be explained by the fact that the malignancy involved only a minor area of the lymph nodes at the time of aspiration biopsy and was missed by the needles. Engzell et al reported a false negative rate of 7% in the diagnosis of metastatic carcinoma in lymph nodes of the neck.[2] Sismanis et al compared the cytological findings in 90 FNAC from head and neck masses with histological findings obtained from open biopsy specimens.[9] They reported a false negative rate of 6.6% for diagnosing malignancy. Tilak et al reported overall accuracy in the 55 cases evaluated was 92.73% with sensitivity of 90.91% and specificity of 93.18%.[10]

Kapoor et al reported 90.47% sensitivity and 98.73% specificity. Yadwinder et al reported 83.33% sensitivity, 100% and a diagnostic accuracy of 98.57%. Jandu et al reported an accuracy of 100% in the hands of a consultant and 91% when performed by junior faculty. Experience of the operator to improve the accuracy rate.[11-13]

FNAC can be undertaken in the outpatient clinics with minimal trauma and has the advantage of early differentiation of benign from malignant pathology

thereby dictating the planned therapeutic modality. It can be both diagnostic and therapeutic in cystic swellings.

CONCLUSION

In the present study it was noted that interpretation of smears was erroneous in the presence of necrotic material and overlap of smear patterns thereby the need to repeat FNAC as in 6.6% subjects. 3 were false negatives and 3 were inconclusive. It is concluded that properly executed FNAC is of greater value in surgical practice.

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REFERENCES

1. Bloch MA. Comparative study of lymph node cytology by puncture and histology. Acta Cytolog. 1967;11:139-47.
2. Engzel U,Jacobsson PA, Sigurdson A, Zajicek J. Aspiration Biopsy of Metastatic carcinoma in lymph nodes of Neck. Acta Otolaryngol. 1971;72:138-47.
3. Frable WJ. Thin needle aspiration biopsy: A personal experience with 469 cases. Amer J Clin Pathol. 1976;65:168-82.
4. Mavec P, Eneroth C-M, Franzen S, Moberger G, Zajicek J. Aspiration biopsy of salivary gland tumors I: correlation of cytologic reports from 652 aspiration biopsies with clinical and histological findings. Acta Otolaryngol Stokh 1964;58:472-84.
5. Thomsen J, Andreassen JC, Bengsbo C. Fine needle aspiration biopsy of tumors of head and neck. J Laryngol Otol. 1974;87:1211-16.
6. Frable WJ, Frable MA. Thin needle aspiration biopsy. The diagnosis of head and neck tumors revisited. Cancer. 1979;43:1541-48.
7. Young JE, Archibald SD, Shier KJ. Needle aspiration cytologic biopsy in head and neck masses. Amer J Surg. 1981;142:484-89.
8. Gertner R, Podoshin L, Fradis M. Accuracy of fine needle aspiration biopsy in neck masses. Laryngoscope. 1984;94:1370-71.
9. Sismanis A, Merriam J, Yamaguchi KT, Shapshay SM, Strong MS. Diagnostic value of fine needle aspiration biopsy in neoplasms of head and neck. Otolaryngol Head Neck Surg.1981;89:62-6.
10. Tilak V, Dhaded AV, Jain R. Fine needle aspiration cytology of head and neck masses. Indian J Pathol and Microbiol. 2002;45(1):23-9.
11. Kapoor S, Bagga PK, Rupesh S, Singh A, Kumar A, Singh H. Diagnostic accuracy of fine needle aspiration cytology in palpable lesions of head and neck in comparison to histopathology. IJCMR. 2017;4:77-83.
12. Yadwinder KV, Ekta R, Sharma GL, Suri V, Goyal D, Jindal K. Diagnostic accuracy of fine needle aspiration cytology in neck swellings. 2019;6-5:98.46.
13. Jandu MP, Webster K. The role of operator experience in fine needle aspiration cytology of head and neck masses. Int J Oral Maxillofacial Surg. 1999;28(6):441-4.
14. William NS, Russel RCG, Bulstrode CJK. Bailey and Love's short practice of surgery, 24 ed. London Jaypee Brothers. 2004;1376.
15. Prasad P. Comparative study of FNAC and histopathology in diagnosis of thyroid swellings. Indian J Surg. 1992;54:287-91.
16. Gupta G, Joshi DS, Shah A, Gandhi M, Shah NR. FNAC of head and neck swellings. GCSMC J Med Sci. 2014;3(1):38-41.
17. El Hag IA, Chiedozi LC, Al Reyees FA, Kollur SM. Fine needle aspiration cytology of head and neck masses. Seven years' experience in a secondary care hospital. Acta Cytol. 2003;47(3):387-92.

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