

### **Diagnostic Role of Fine Needle Aspiration Cytology in Non-thyroidal Head and Neck lesions**

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#### **Abstract**

**Introduction:** The neck masses are relatively common problem. The differential diagnosis in a patient presenting with neck mass is often extensive and will vary with age. Fine Needle Aspiration Cytology (FNAC) is a simple, quick and inexpensive method that is used to sample superficial masses like those found in the neck and is usually performed in the Outpatient Department (OPD). It causes minimal trauma to the patient and carries virtually no risk of complications. Masses located within the region of the head and neck, excluding thyroid gland lesions can be readily diagnosed using this technique. It may be inflammatory, non-inflammatory, benign or malignant lesion. The objective was to assess the frequency and incidence of different sites, age, sex

and distribution of inflammatory, non-inflammatory, benign and malignant lesion.

**Aim and objective:** To assess the role of FNAC in diagnosing various Non thyroidal head and neck swellings.

**Methods:** A retrospective 2-year study was conducted at VBCH, Silvassa, Dadra and Nagar Haveli from January 2019 to December 2020. Patients between the ages of 1 to 90 years were enrolled into the study. A total of 718 patients with a head and neck swelling underwent FNAC. Aspirations were done by using 10 ml syringe and 22/23-gauge needles. Smears were stained with Hematoxylin and eosin, PAP stain and Giemsa stain. Fine needle aspiration diagnosis was correlated with detail of relevant clinical findings and investigations.

**Results:** Out of 718 fine needle aspiration procedures 83.14.56% (597 cases) were of lymph node, 4.46 % from salivary gland (32 cases), 12.40% (89 cases) from skin and subcutaneous swellings. Out of total 718 lesions, 684 (95.26%) were inflammatory, non-inflammatory and benign, 34 (4.74.%) were malignant and metastatic carcinoma.

**Conclusions:** Our study found that FNAC is simple, quick, inexpensive and minimally invasive technique to diagnose different types of head and neck swellings. It may also help the surgeon to select, guide, and modify surgical planning in patients requiring surgery. Thus, FNAC can be recommended as a first line of investigation in the diagnosis of head and neck swellings.

**Keywords:** Fine Needle Aspiration Cytology, Benign and Malignant

### **Introduction**

A lump is the most likely clinical problem to be encountered in the neck <sup>[1]</sup>. The evaluation of a neck mass is a common clinical dilemma and a condition to which clinicians routinely encounters <sup>[2]</sup>. The differential diagnosis in a patient presenting with neck mass is often extensive and will vary with age. These neck masses are evaluated by a detail history, clinical examination and investigation like FNAC, USG neck, CT Neck and excisional biopsy. The common pathologies encountered in the neck presenting as a lump are lymphadenopathies (specific and non-specific, acute and chronic and reactive), metastatic carcinoma, lymphoma, salivary gland swellings (sialadenitis, cysts, adenomas and carcinomas). The less common pathologies presenting as swelling in the neck are Lipoma, Keratinous cyst, brachial cyst, thyroglossal cyst, Lymphangioma and lumps of skin appendages <sup>[1]</sup>. Fine needle aspiration cytology is a simple, quick and inexpensive method that

is used to sample superficial masses like those found in the neck and is usually performed in the outpatient clinic. It causes minimal trauma to the patient and carries virtually no risk of complications. Masses located within the region of the head and neck, including Lymph nodes, salivary gland and adnexal tumors can be readily diagnosed using this technique <sup>[3,4]</sup>.

FNAC is both diagnostic and therapeutic in a cystic swelling <sup>[5]</sup>. Fine needle aspiration cytology is helpful for the diagnosis of salivary gland tumours where it can differentiate between a malignant and a benign tumor with over 90% accuracy <sup>[6]</sup>. FNAC is particularly helpful in the work-up of cervical masses and nodules because biopsy of cervical adenopathy should be avoided unless all other diagnostic modalities have failed to establish a diagnosis <sup>[7]</sup>. Fine needle aspiration cytology does not give the same architectural detail as histology but it can provide cells from the entire lesion as many passes through the lesion can be made while aspirating <sup>[8]</sup>. The purpose of this study was to see frequency of distribution of various pathological conditions detected on FNAC in patients presenting with head and neck swellings and to evaluate the role of FNAC in their diagnosis. It emerges from the analysis that Fine needle aspiration cytology is a safe, simple and rapid method that can be done in diagnosing wide range of neck swellings.

### **Material and methods**

In this study, FNAC was performed in 718 patients presented with lesions in the head and neck regions, in Department of Pathology, VBCH, Silvassa, Dadra and Nagar Haveli from January 2019 to December 2020. All patients were asked about history related to head and neck swelling and relevant questions to the etiological cause along with present, past and family history of tuberculosis and history of sexual exposure for syphilis

and AIDS. Patients were explained about the procedure and its advantages and their written consent was taken. Fine Needle Aspiration Diagnosis was correlated with detail of relevant clinical findings, radiological and other investigations. The technique was performed in the outpatient department with minimal trauma to the patient without any risk of complication. The FNAC was performed as an OPD procedure. The palpable swelling was fixed with one hand, the skin was cleaned and 22–23-gauge needle with 10ml syringe was inserted into the swelling and a full suction pressure was applied. The tip of the needle was moved around. The pressure was neutralized and the needle was withdrawn. The aspiration material was placed on the glass slides. Wet fixed smears in 95% alcohol were stained with Hematoxylin-Eosin stain and PAP stains while air dried smears were stained with Giemsa stain. Suspected tubercular lesion aspirates were stained by AFB stain. Statistical Analysis was done. Percentages were calculated for estimating frequency of various pathological conditions detected on FNAC in patients presenting with non-thyroidal head and neck swellings.

**Inclusion Criteria**

All the age group of patients (0-90 years).

**Exclusion Criteria**

Lesions of Thyroid and oral cavity.

**Statistical Analysis**

Percentages were calculated for estimating frequency of various pathological conditions detected on FNAC in patients presenting with non-thyroidal head and neck swellings.

**Results**

The study included 718 cases of the age ranged from 1 to 90 years out of which 372(51.81.%) were males and 346(48.19%) were females. Among the diagnostic

outcome, higher incidences of lesion are in the neck region than in the head region. Lymph node involvement 597(83.14%) was common than any other lesion. Among 597 cases of lymph node lesions, 332 cases (55.61%) were having tuberculous inflammation, 145(24.29%) were having reactive lymphadenitis, 39(6.53%) cases were acute suppurative inflammation and 55(9.21%) cases were having chronic nonspecific lymphadenitis ,19 (3.18 %) were having metastatic carcinoma (Metastatic Squamous cell carcinoma) and 07(1.17 %) cases were having Lymphoma. Out of the 32 salivary gland lesions, 02 cases (6.25%) were Salivary gland cyst, 20 cases (62.5%) were of Pleomorphic Adenoma, 01 case (3.13%) was Warthin's tumor, 3 cases (9.38%) were of chronic sialadenitis and 6 cases (18.75 %) were malignant lesions.

Out of 89 cases of skin and subcutaneous lesions 23 cases (25.84%) were Lipoma, 40 cases (44.94%) were Keratinous and sebaceous cysts, 16 cases (17.98 %) were Benign cystic lesions, 1 case (1.12%) was brachial cyst, 04 cases (4.49%) were Thyroglossal cyst, 03 cases (3.37%) were Benign adnexal tumor and 02 cases (2.24%) were malignant lesions.

Table 1: Distribution of various lesions Age wise.

Age (Years)	Male	Female	Total	(%)
00-10	67	46	113	15.74
11-20	60	88	148	20.61
21-30	106	111	217	30.22
31-40	67	59	126	17.55
41-50	28	20	48	6.69
51-60	27	12	39	5.43
61-70	15	10	25	3.48
71-80	02	00	02	0.28
81-90	00	00	00	00
Total	372	346	718	

Table 2: Distribution of lesions as per tissue involved and gender.

Tissue	Male	Female	Total
Salivary glands	19	13	32
Skin and subcutaneous tissue	48	41	89
Lymph node	305	292	597
Total	372	346	718

Table 3: Distribution of various Lymph node lesions

Lesions	Male	Female	Total
Tuberculosis	160	172	332
Reactive lymphadenitis	75	70	145
Acute suppurative Inflammation	18	21	39
Chronic non-specific inflammation	29	26	55
Lymphoma	07	00	07
Metastasis	16	03	19
Total	305	292	597

Table 4: Distribution of various Salivary lesions

Lesions	Male	Female	Total
Salivary gland cyst	01	01	02
Sialadenitis	01	02	03
Pleomorphic adenoma	11	09	20
Warthin's tumor	00	01	01
Adenoid Cystic Carcinoma	01	00	01
Mucoepidermoid Carcinoma	05	00	05
Total	19	13	32

Table 5: Distribution of various skin and subcutaneous lesions

Lesions	Male	Female	Total
Lipoma	18	05	23
Keratinous cyst	12	23	35

Sebaceous cyst	02	03	05
Benign Cystic lesion	09	07	16
Brachial Cyst	01	00	01
Thyroglossal Cyst	02	02	04
Benign Adnexal tumor	02	01	03
Malignant round cell tumor	01	00	01
SCC	01	00	01
Total	48	41	89

Fig. 1: Well-formed granuloma without necrosis H & E stain 40x.

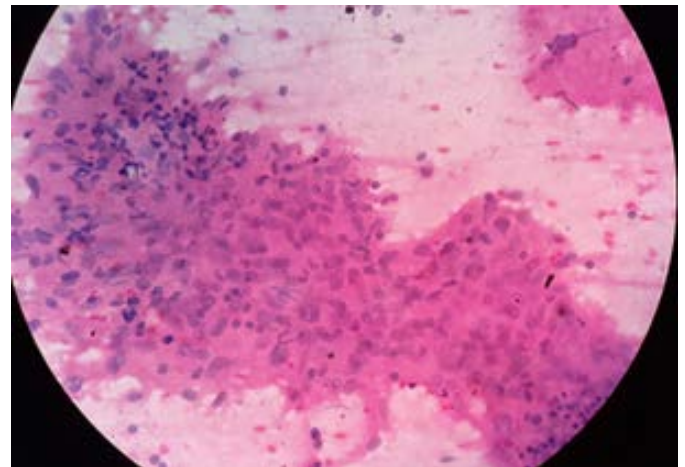


Fig. 2: Tingible body Macrophage in Reactive Lymphadenitis H & E stain 40x.

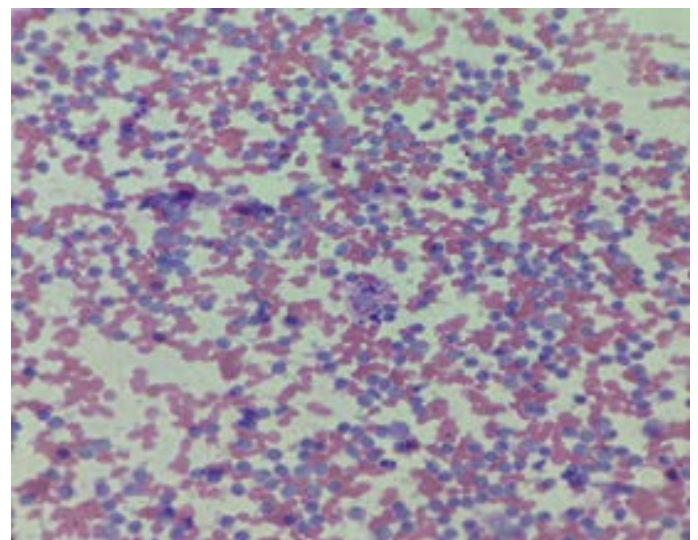


Fig. 3: Metastatic deposits of squamous cell carcinoma.

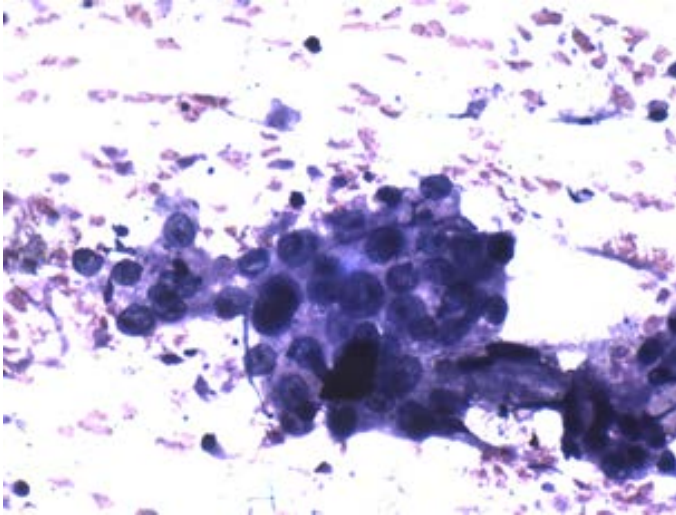
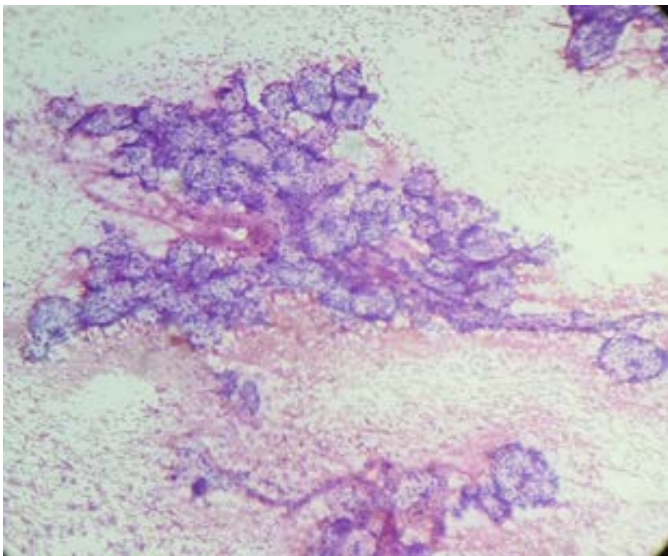


Fig. 4: Adenoid Cystic Carcinoma (Hyaline Globules)



### Discussion

Fine needle aspiration cytology is one of the most accessible techniques for head and neck lesions. The most common diagnosis obtained in our study was of tuberculosis lymphadenitis in 332 (46.24%) of all cases. (Fig. 1) It was seen in all the age groups. It was common in females compared to males. 2<sup>nd</sup> most common diagnosis obtained in over study was Reactive lymphadenitis in 145(20.19%) of all Cases. (Fig.2) Metastatic deposits in lymph node was diagnosed in 19(2.65 %) of all cases. It was common in males

compared to females. The most common malignancy encountered was that of squamous cell carcinoma deposits. (Fig.3) The smear from these cases were highly cellular and showed pleomorphic squamous epithelial cells arranged in loose cohesive clusters and singles. These cells were highly pleomorphic with very high N:C ratio and prominent nucleoli. Background showed keratinous material with necrosis. However, few of the malignant squamous cell carcinoma deposits showed cystic change where we aspirated a fluid material in FNAC. Few of the cases were adenocarcinoma where cells were arranged predominantly in glandular pattern with vacuolated cytoplasm.

32 (4.46 %) were salivary gland lesions in which 26 were Inflammatory, non-inflammatory and benign and 5 were low grade mucoepidermoid carcinoma and 01 was adenoid cystic carcinoma. Smears from the mucoepidermoid carcinoma cases showed mucus, intermediate and squamous cells. The nucleus were relatively bland with prominent nucleoli in few cells, Background showed debritic dirty material. Smears from Adenoid cystic Carcinoma showed uniform basaloid cells with scant cytoplasm, oval to angulated hyperchromatic nuclei and indistinct nucleoli and Characteristic extracellular hyaline globules. (Fig.4)

FNAC is a simple inexpensive method to diagnose the most significant lesions encountered in clinical practice. Though open biopsy is gold standard in lymph node lesions, FNAC is a simple out-patient procedure where diagnosis is obtained fast and reduces the cost of hospitalization to the patients. It is the technique which has high degree of accuracy. However doubtful lesions should always be correlated in biopsy specimen study. Further immunohistochemistry and other molecular diagnostic methods help in arriving the definite

diagnosis. There no complications of FNAC procedure in head and neck lesions. There are no reported cases of spread of tumor through sinus tract in cases of malignancy.

Study done by Rajyalakshmi et al in Kakinada found that out of 360 cases of head and neck tumors, 39% were from soft tissue, 38% were from lymph node and 19% were of salivary gland origin. 4% of adnexal lesions were also noticed.<sup>(10)</sup>

Study done by Sree devi et al<sup>(11)</sup> also coincided with our study where out of 304 cases studied. 50% of head neck lesions were from lymph node and in that common lesion seen was reactive lymphadenitis. The salivary gland lesions they encounterd was pleomorphic adenoma and one case of basal cell adenoma. They did not document any malignant salivary gland tumor. Where as in our study we got 05 cases of salivary gland malignancies. The soft tissue lesions they documented was of epidermal cysts and lipoma.

The number of cases studied coincided with our study of 50 cases in a study done by Yoshida et al<sup>(13)</sup> where they found that TB lymphadenitis was seen in 36%, reactive lymphadenitis in 18% of cases. Followed by malignant neoplasms and non-neoplastic lesions.

Anne R Wilkinson et al in the year 2012 did study on FNAC diagnosis of lymph node malignancies and concluded that diagnostic accuracy of metastatic lesions

Table 7: Comparison of results of various studies.

	Our study (2019-20)	Shree devi et al <sup>(11)</sup> (2016)	Patel DN et al <sup>(16)</sup> (2015)	Muddegowda et al <sup>(15)</sup> (2014)	Bhagat et al <sup>(17)</sup> (2013)	Modi M. et al <sup>(19)</sup> (2018)
Location	India	India	India	India	India	India
Duration	2 years	1 year	1 year	8 months	1 year	8 months
No. of patients	718	304	250			305
M:F ratio	1:0.93	1:2.1	---	0.53:1	--	0.48:1
Predominant sites	Lymph node	Lymph node	Lymph node	Thyroid	Lymph node	Lymph node

were 97%, for lymphomas it was 82% with a sensitivity of 97% and specificity of 100%.<sup>(14)</sup>

Rathore and team in Panacea conducted the study on head and neck masses on 756 cases. Lymph node swellings were more common followed by thyroid, skin and soft tissue lesions. Salivary gland lesions were least noticed in their study.<sup>(12)</sup>

Table 6: Showing comparison of distribution of head and neck lesions between our study and other national and international studies

	Lymph node %	Salivary gland %	Soft tissue %
Our study	83.15	4.47	12.40
Shobha <sup>(9)</sup>	86	12	02
Rajyalakshmi <sup>(10)</sup>	38	19	39
Sree devi <sup>(11)</sup>	50	10	10
Rathore <sup>(12)</sup>	75	15	10
Modi M. <sup>(19)</sup>	66.56	5.90	5.57

Table 06 explains the comparison of our study and other studies in distribution of lesions. It is observed that lymph nodes are the commonly encountered lesions. Followed by Salivary gland and then soft tissue lesions. However, in study done by Shobha<sup>09</sup> the Lymph node lesions are more compared to Lymph node lesions.

Table 8: Sex wise distribution of cases

Study	Number of cases	Male	Female
Present Study	718	372	346
Shekhar et al <sup>(18)</sup>	200	114	86
Modi M. et al <sup>(19)</sup>	305	147	158

**Conclusion**

It was concluded from the present study, that Tuberculosis lymphadenitis is the commonest problem in patients presenting with neck swellings in our set-up, followed by Reactive Lymphadenitis, chronic nonspecific and malignant neoplasm especially metastatic carcinoma. Our study found that FNAC is a reliable, cost effective, convenient, easily accessible, non-traumatic and highly accurate method as the best initial work up and management of swellings of head and neck region. It could differentiate the infective process from neoplastic one and avoids unnecessary surgeries. Thus, FNAC can be recommended as a first line of investigation in the diagnosis of head and neck swellings. It may also help the surgeon to select, guide, and modify surgical planning in patients requiring surgery. Though some limitations of this procedure are, there may be false negative or false positive diagnosis, which can be easily sort out by correlation with clinical, radiological, histopathological and hematological findings. False negative diagnoses can be due to faulty technique, Central cystic, hemorrhage or necrotic area devoid of diagnostic cells, small lesions and Uncooperative patients.

**Contribution from the Author**

- Dr. Mayur Kokani : Data collection, analysis and preparation of manuscript.
- Dr. Nilima M. Chaudhari : Analysis and preparation of manuscript & critical revision.

- Dr Sameep S. Garg : Analysis and preparation of manuscript & critical revision.
- Dr Mitsu Vaishnav: Analysis and preparation of manuscript & critical revision.
- Dr Jitendra Parmar: Analysis and preparation of manuscript & critical revision.

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