



## Fnac on Palpable Neck Masses – A Hospital Based Study

### KEYWORDS

FNAC, lymphadenopathy, neck mass

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**ABSTRACT** FNAC of the neck region is a well accepted technique with high specificity. Palpable neck swellings include various non-neoplastic and neoplastic lesions of lymph node, salivary glands, thyroid and soft tissue. The aim of this study is to assess the role of FNAC in determining the cytomorphology of different palpable neck masses in respect to their sites of occurrence, age and sex distribution with histopathological correlation in surgically treated cases. The study included 786 patients presenting with palpable neck swelling in a tertiary care hospital from January 2013 to December 2015. The most frequent cause of neck swelling is lymphadenopathy 63.6%, followed by thyroid swelling 14.8%, soft tissue lesion 14.4% and salivary gland lesions 7.2%. The most common lesion in these patients was non-neoplastic followed by malignant neoplasm. FNAC on neck mass, though not always specific, helps in avoidance of unnecessary surgeries.

### Introduction

Fine needle aspiration cytology (FNAC) is a simple, quick and cost effective method to sample superficial masses found in the neck<sup>[1]</sup>. The evaluation of a neck mass is a common clinical dilemma and a condition which clinicians routinely encounter. Commonly presenting head and neck masses occur within lymph nodes, thyroid, parotid and other salivary glands. Less common pathologies presenting as neck swellings are from thyroglossal cysts, branchial cleft cysts, carotid body tumours, cystic hygromas, pharyngeal pouch abnormalities and lumps of skin appendages<sup>[2]</sup>. Masses in the neck are common occurrences and the lesions range from inflammation to neoplasia. The majority of cervical lymph nodes will disclose either reactive, granulomatous lymphadenopathy, metastatic carcinoma or lymphoma. Other neck lesions are salivary gland and thyroid lesions, carotid body tumors, soft tissue tumors etc<sup>[3]</sup>. In the head and neck region, FNAC is of great value because of the multiplicity of accessible organs and heterogeneous pathologies encountered. An early differentiation of benign from malignant pathology greatly influences the planned treatment<sup>[4]</sup>. FNAC can be both diagnostic and therapeutic in cystic swellings<sup>[5]</sup>.

Fine needle aspiration cytology is helpful for the diagnosis of salivary gland tumor where it can differentiate between a benign and malignant tumor with 90% accuracy<sup>[6]</sup>. FNAC is clearly no substitute for histology, especially in determination of nodal architecture in lymphoma, the malignant pattern of follicular thyroid tumor, intracapsular spread in squamous carcinoma or in the distinction of pleomorphic from monomorphic adenoma<sup>[4]</sup>.

This study was done to assess the role of FNAC in determining the cytomorphology of different palpable neck masses in respect to their sites of occurrence, age and sex distribution with histopathological correlation in surgically treated cases.

### Materials & Methods

The study was conducted in the department of Pathology, Jorhat Medical College and Hospital for a period of three years from January 2013 to December 2015. Cases of all age groups and both sexes with palpable neck masses

were included in the study. Detailed clinical history of the patients were noted. Aspirates were procured by using 21 or 23 gauge needle attached to a 10 ml syringe. The aspirated material was smeared into glass slides with preparation of both air dried smears for May-Grunwald Giemsa stain and 95% alcohol fixed smears for Papanicolaou stain. Ziehl-Neelsen stain was performed whenever required. Cytological evaluation was performed and diagnosis from each case was based on cytomorphology and clinical findings. Histopathological examination was done on all the excised or incised surgical specimens after routine processing and haematoxylin and eosin staining.

### Observations

The study included 786 patients with neck mass either single or multiple and unilateral, midline or bilateral. The ages of the patients ranged from 1 year 6 months to 80 years and in both sexes, the median age of occurrence being 41 years. Majority of the cases were in the age group 21-30 years with overall female preponderance (60.56%). Male cases (39.44%) showed a rising trend in the ages 50 and above.

**TABLE 1 shows age and sex distribution of the cases with neck masses**

Age group (years)	Male	Female	n (%)
0-10	34	60	94(11.95%)
11-20	76	88	164(20.86%)
21-30	52	120	172(21.88%)
31-40	52	107	159(20.22%)
41-50	37	62	99(12.59%)
51-60	24	21	45(5.72%)
61 and above	35	18	53(6.74%)
Total	310(39.44%)	476(60.56%)	n=786

The most common cause of neck mass in this study was lymphadenopathy (63.3 %) followed by thyroid lesions (14.8%), soft tissue lesions (14.4%) and salivary gland lesions(7.2%). Majority of the cases were from the non-neoplastic group comprising 76.84% of the cases. On the other hand malignant neoplasm (10.81%) were found to be more common than the benign neoplasm (5.98%) and 2.79% cases were inconclusive. Remaining 3.56 % cases constituted the miscellaneous lesions (others).

**TABLE 2 shows organwise distribution of cytomorphological diagnosis of cases**

Organ	Non-neoplastic (M/F)	Benign neoplasm (M/F)	Malignant neoplasm (M/F)	Others (M/F)	Inconclusive (M/F)	n (%) M/F
Lymph nodes	426(54.19%) (164/262)	Nil (0/0)	67(8.52%) (46/21)	03(0.38%) (01/02)	04(0.51%) (02/02)	500(63.3%) M=213(27.1%) F=287(36.5%)
Thyroid	91(11.58%) (11/80)	07(0.89%) (02/05)	04(0.51%) (01/03)	05(0.64%) (03/02)	09(1.15%) (00/09)	116(14.8%) M=17(2.2%) F=99(12.6%)
Soft tissue	62(7.89%) (23/39)	24(3.05%) (14/10)	02(0.25%) (02/00)	18(2.29%) (07/11)	07(0.89%) (04/03)	113(14.4%) M=50(6.4%) F=63(8.01%)
Salivary glands	25(3.18%) (16/09)	16(2.04%) (07/09)	12(1.53%) (08/04)	02(0.25%) (02/00)	02(0.25%) (01/01)	57 (7.2%) M=34(4.3%) F=23(2.9%)
Total no of cases	604(76.84%) (214/390)	47(5.98%) (23/24)	85(10.81%) (57/28)	28(3.56%) (13/15)	22(2.79%) (07/15)	786 M=314(39.9%) F=472(60.1%)

Lymphadenopathy was more common in females (57.4%) than males (42.6%). Reactive (54.6%) and granulomatous lesions (20.2%) constituted the majority of the cases (74.8%) and tuberculous lymphadenitis comprised 10.4% of the cases with female preponderance. Metastatic lymph nodes constituted 12 % of the cases with male preponderance. Primary lymphoid malignancies comprised only 1.4% of the cases (5 Non-Hodgkin's Lymphoma and 2 Hodgkin's Lymphoma cases) with male preponderance.

**TABLE 3 shows distribution of lymphoid lesions in both sexes**

Lesion/Diagnosis	Male	Female	Total(n=500)
Reactive	114 (22.8%)	159 (31.8%)	273 (54.6%)
Granulomatous	37 (7.4%)	64 (12.8%)	101 (20.2%)
Tubercular	13 (2.6%)	39 (7.8%)	52 (10.4%)
Primary Neoplasm	06 (1.2%)	01 (0.2%)	07 (1.4%)
Metastatic	40 (8%)	20 (4%)	60 (12%)
Others	03 (0.6%)	04 (0.8%)	07 (1.4%)
<b>Total</b>	<b>213 (42.6%)</b>	<b>287 (57.4%)</b>	<b>500</b>

Majority of the thyroid lesions were seen in the females (85.34%). Colloid goitre was found to be the commonest lesion (71.55%). Papillary carcinoma comprised of 3.45% of thyroid lesions whereas follicular neoplasm were 6.03%. Thyroiditis cases with female preponderance were found to be 6.89% which included one case of Hashimoto's thyroiditis, three cases of granulomatous thyroiditis and the remaining three cases of chronic lymphocytic type. One case of thyroglossal cyst was diagnosed in a female paediatric patient.

**TABLE 4 shows distribution of thyroid lesions in both sexes**

Lesion/Diagnosis	Male	Female	Total(n=116)
Colloid Goitre	09 (7.76%)	74 (63.79%)	83 (71.55%)
Thyroiditis	02 (1.72%)	06 (5.17%)	08 (6.89%)
Follicular Neoplasm	02 (1.72%)	05 (4.31%)	07 (6.03%)
Papillary Carcinoma	01 (0.86%)	03 (2.59%)	04 (3.45%)
Cystic lesion	03 (2.59%)	02 (1.72%)	05 (4.31%)
Inconclusive	00 (0%)	09 (7.76%)	09 (7.76%)
<b>Total</b>	<b>17 (14.66%)</b>	<b>99 (85.34%)</b>	<b>116</b>

Soft tissue lesions were found to be more common in females (55.75%), out of which majority of the lesions were either inflammatory (31.86%) or cystic (23.01%). Lipoma was the main benign neoplastic lesion encountered (21.24%). In this study, only two cases of malignant tumours were found, both being squamous cell carcinoma. Two cases of bronchial cyst were detected in the pediatric age group, both in female patients.

**TABLE 5 shows distribution of soft tissue lesions in both sexes**

Lesion/Diagnosis	Male	Female	Total(n=113)
Inflammatory	11 (9.73%)	25 (22.12%)	36 (31.86%)
Cystic	12 (10.62%)	14 (12.39%)	26 (23.01%)
Benign neoplasm	14 (12.39%)	10 (8.85%)	24 (21.24%)
Malignant neoplasm	02 (1.77%)	00 (0%)	02 (1.77%)
Others	07 (6.19%)	11 (9.73%)	18 (15.93%)
Inconclusive	04 (3.54%)	03 (2.65%)	07 ( 6.19%)
<b>Total</b>	<b>50 (44.25%)</b>	<b>63 (55.75%)</b>	<b>113</b>

Salivary gland lesions were found to be more common in males (59.65%) than females (40.35%). Majority of the cases were pleomorphic adenoma (28.07%) followed by cystic lesions (26.32%) and malignant lesion (21.05%). Two cases of mucoepidermoid carcinoma, two cases of basal cell carcinoma and one case of adenoid cystic carcinoma were also diagnosed on FNAC which were later on confirmed by histopathology. Ten cases of sialadenitis (17.54%) were encountered and four cases were inconclusive (7.02%).

**TABLE 6 shows distribution of salivary gland lesions in both sexes**

Lesion/Diagnosis	Male	Female	Total(n=57)
Sialadenitis	05 (8.77%)	05 (8.77%)	10 (17.54%)
Cystic lesion	11 (19.30%)	04 (7.02%)	15 (26.32%)
Pleomorphic adenoma	07 (12.28%)	09 (15.79%)	16 (28.07%)
Malignant lesion	08 (14.04%)	04 (7.02%)	12 (21.05%)
Inconclusive	03 (5.26%)	01 (1.75%)	04 (7.02%)
<b>Total</b>	<b>34 (59.65%)</b>	<b>23 (40.35%)</b>	<b>57</b>

**Discussion**

Diagnostic cytology when performed by well trained experienced individual offers high degree of accuracy, reliability

and feasibility. Therefore FNAC has gained universal acceptance as the most inexpensive, safe and quick diagnostic tool for neck masses.

This study was carried out to determine the cytomorphology and assess the role of FNAC in palpable neck masses. The results achieved in the present study were compared with different national and international studies.

In this study, non-neoplastic lesions comprised the majority of the cases accounting for 76.84% whereas malignant lesions comprised 10.81 % and benign neoplastic lesions 5.98% of the cases. In most of the national studies inflammatory and non-neoplastic lesions were the predominant cause of head and neck masses (Kishore et al)<sup>[7]</sup>.

In the study by Jasani et al, 54% were male and 46% were female<sup>[8]</sup>. Maximum incidences observed in the age group of 25 to 35 years. In contrast our study constituted 39.44% of male cases and 60.56% of female cases. Maximum incidence observed in our study was in the age group of 21 to 30 years. Our study is similar to the study by Rathod GB et al<sup>[9]</sup> which showed female preponderance and similar age group.

FNAC in neck lesions can be done even in children and its utility has been illustrated in numerous studies<sup>[10-13]</sup>. This study also included 94 cases of children (0 – 10 years) with neck lymphadenopathy and majority of them were diagnosed as reactive lymphadenitis (n=60) and remaining cases as tuberculosis (n=34).

Out of the lymphadenopathies, reactive hyperplasia constituted the majority of the cases (54.6%) with female preponderance and granulomatous lesions (20.2%) also with female preponderance. Results by Lawrence et al 2003 showed 59% of cases with reactive hyperplasia followed by granulomatous lesion (41%)<sup>[14]</sup>. Hag et al carried out a similar study in Saudi Arabia over a period of 5 years which included 225 patients which showed reactive/non-specific lymphadenitis to be the commonest cause of neck masses accounting for 33% of cases<sup>[15]</sup>. In our study, tuberculous lymphadenitis comprised 10.4% of the cases with female preponderance (75%) and similar to the study by Saira Fatima et al done in a tertiary hospital at Pakistan<sup>[16]</sup>. This may be because of poor nutrition and overall health of females in developing countries. Metastatic lymph nodes constituted 12 % of the cases with male preponderance and majority were diagnosed as squamous cell carcinoma. Metastatic adenocarcinoma was found in five cases. In the study by Jasani et al, metastatic lymph node comprised of 11.3% of cases<sup>[7]</sup>. This is very much similar to our study. Primary lymphoid malignancies comprised only 1.4% of the cases with male preponderance. Only in one case of Hodgkin's lymphoma in a male patient whereas five cases of Non-Hodgkin's lymphoma were diagnosed in four male and one female patient.

Out of the thyroid lesions, colloid goitre was the commonest comprising 71.55 % of cases and follicular neoplasm comprising 6.03% of cases. In the study by Jasani et al, he reported similar studies by Antonello et al 2005<sup>[17]</sup> and Klemi et al 1991<sup>[18]</sup> which showed 57% of multinodular goiter and 29% of follicular neoplasm. A study in Pakistan conducted by Tariq N et al 2007 which showed 56.9% of nodular goiter and 23.08% of follicular neoplasm<sup>[19]</sup>. In all these studies the most common thyroid lesion was colloid goitre as in our study, though the percentage in our study is significantly high. This may be due to the increased

number of female patients in our study. Out of the seven cases of follicular neoplasm, one case was later on diagnosed as follicular carcinoma on histopathological examination. On the other hand, histopathological findings of all the surgically treated cases of papillary carcinoma and colloid goiter were consistent with FNAC reports.

Out of the salivary gland lesions, pleomorphic adenoma was the commonest in our study comprising (28.07%) followed by cystic lesions (26.32%) and malignant lesions (21.05%). Ten cases of sialadenitis (17.54%) were encountered and four cases were inconclusive (7.02%). This is comparable to most of the other studies and pleomorphic adenoma constitutes the majority of salivary gland tumours<sup>[20]</sup>. Two cases of mucoepidermoid carcinoma, two cases of basal cell carcinoma and one case of adenoid cystic carcinoma were diagnosed on FNAC which were later on confirmed by histopathology.

Fine needle aspiration from lesions with high blood content, necrosis and desmoplastic stroma yields little material resulting in inconclusive opinion<sup>[9]</sup>. Overall there were 22 (2.79%) inconclusive cases in this study and the reason may be the same.

In our study, FNAC diagnoses were compared wherever necessary with histopathological diagnoses in the biopsied cases which showed satisfactory results with a high sensitivity index.

The triad of physical examination/ clinical history, appropriate cell preparation and subsequent interpretation is essential for a successful FNAC reporting. The success rate of FNAC diagnosis in material obtained by an experienced cytopathologist is far in excess of that where specimens are taken and sent to a laboratory<sup>[21]</sup>.

## CONCLUSION

FNAC is a simple, quick, inexpensive and minimally invasive technique to diagnose different types of neck swellings. Neck mass is the commonly encountered swelling in the OPD of which lymphadenopathy is commonest cause, followed by thyroid lesions, soft tissue swellings and salivary gland swellings. FNAC alone is helpful to avoid unnecessary surgeries and for planning of appropriate management. Thus, FNAC is recommended as a first line of investigation which can be performed as out-patient's procedure in the diagnosis of neck masses for both screening and follow-up. Ancillary techniques, namely immunocytochemistry, flowcytometry and sometimes molecular techniques can greatly broaden the diagnostic range and specificity of FNAC<sup>[22]</sup>.

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