



## A Cross-Sectional Study of Non-Thyroid Cystic Lesions of Head and Neck Fine Needle Aspiration Cytology

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### Abstract:

Cystic swelling of the head and neck region include a wide range of lesions of salivary glands and lymph nodes with a variety of differential diagnosis ranging from inflammatory to neoplastic. FNAC is a simple and cost effective method to plan surgery, rule out malignancy in benign cases, and offers typing of malignant ones.

Aims: To assess the utility and to establish diagnostic accuracy of FNAC in diagnosing non-thyroidal cystic lesions of head and neck region.

Methods and Material: Retrospective cross sectional study was conducted from Jan -2013 to 2015.Total 177 cases presenting as purely cystic and solid cystic with head and neck lesions except thyroid were included in the present study. The cystic lesions which yielded only blood on FNAC and purely solid lesions were excluded from the study. The lesions were aspirated using a 22 or 23 gauze needle. The aspiration material was smeared on glass slides and smears made were stained using Giemsa and Papanicolaou.

Statistical analysis used: The sensitivity, specificity and diagnostic accuracy of FNAC were calculated, considering histo-pathological examination as gold standard.

Results: The diagnostic accuracy of FNAC for salivary gland lesions was 90.82%, while for metastatic and miscellaneous lesions, the diagnostic accuracy was 100%.

Conclusions: FNAC is a sensitive, specific and accurate initial diagnostic test for evaluation of patients with head and neck swellings, and a useful adjunct to histopathology.

Key-words: Cystic Lesions, Fine needle aspiration cytology, Salivary gland lesions.

### Introduction:

Lesions of the head and neck region are routinely encountered in patients across all age groups. Cystic swelling of the head and neck region include a wide range of lesions of salivary glands and lymph nodes with a variety of differential diagnosis ranging from inflammatory to neoplastic.<sup>[1]</sup> Head and neck cancers account for approximately 30–40% of all cancer sites in India.<sup>[2]</sup>

The approach to diagnosis relies on a thorough history and an appropriate examination including internal ENT examination to exclude an occult

primary malignancy. Radiology does not always help and may not be cost effective. Although biopsy gives reliable tissue diagnosis, it carries the complications of surgical intervention, may require hospitalization and it leaves behind unsightly scars. Fine needle aspiration cytology (FNAC) is an excellent alternative method of obtaining tissue diagnosis with rapidly gained acceptance due to easy accessibility of target sites, minimally invasive nature to decide an accurate and effective line of management. It is a simple, safe, outdoor procedure, with rapid reporting, requires minimal equipment, quick and cost effective method. It can be diagnostic as well as therapeutic in

cystic swellings. This tool can easily differentiate between benign and malignant swellings and help to avoid unnecessary investigations which the patient has to undergo for final diagnosis on which management depends.

The present study was undertaken to assess the utility and to establish the diagnostic accuracy of FNAC in diagnosing non-thyroidal cystic lesions of head and neck region.

### Material and Methods:

This was a retrospective cross sectional analytical study conducted over duration of three years i.e. from January 2013 to December 2015.

All the cases presenting as purely cystic and solid cystic head and neck lesions except thyroid, were included in the study. The cystic lesions which yielded only blood on FNAC and purely solid lesions were excluded from the study. Ethical clearance was obtained from the institutional ethical committee. The selection of subjects was done by convenience sampling. Clinical data of the cases and FNAC specimen were retrieved from the Department of Pathology.

FNAC was done as an out-patient department (OPD) procedure by standard technique. The lesions were aspirated directly through percutaneous with 22 or 23 gauge needle and with ultrasound guidance wherever needed. Both air dried and wet fixed smears were prepared and stained with Giemsa stain and Papanicolaou stain respectively. The histological and radiological follow-up, wherever available were compared.

The sensitivity, specificity and diagnostic accuracy of FNAC were calculated, considering histopathological examination as gold standard.

Diagnosis on cytology was divided into three categories, represented in Table 1.

### Results:

A total 7838 FNA were done during this period from head and neck. Amongst them 500 were purely or partially cystic. 323 cases of thyroid FNA were excluded from study. Total 177 cases were included in present study. Table 2 represents the type of FNAC done in cystic lesions.

According to level of lymph nodes on clinical palpation and previous USG report of local site suggestive of lymph node origin, the diagnosis of all metastasis of malignancies to lymph nodes was given on cytology.

The age range of patients in this study was between 10 years to 70 years. Among patients with salivary gland lesions, majority 9 (27.3%) patients belonged to the age group 61 to 70 years. In patients with metastatic lesions, peak incidence was noted in 41 to 50 years age group (15, 32.6%). Among patients with miscellaneous lesions, majority belonged to the age group 11 to 20 years (22, 22.44) (refer Table 3).

In all, there were 52 (29.37 %) females and 125 (70.63 %) were males (Male to Female ratio of 2.4: 1) with male preponderance in all salivary, miscellaneous & metastatic lesions (Figure 1).

Among 33 patients with Salivary gland lesions, 12 (36.3%) patients had benign tumours followed by lympho-epithelial cysts in 10 (30.3%) patients. In metastatic tumours, 41 (89.13%) of patients had squamous cell carcinoma while keratinous cyst dominated in miscellaneous lesions where it was found in 83 (84.6%) patients (refer Table 4).

Among 33 Salivary gland lesions, 9 cases had histo-pathological follow-up, where 8 cases were concordant and 1 was discordant with cytological diagnosis. Among 98 Metastatic lesions, 15 cases had histo-pathological follow-up, where all cases were concordant with cytological diagnosis. . Among 46 Miscellaneous lesions, 2 cases had histo-pathological follow-up, where both cases were concordant with cytological diagnosis (refer Table 5 to 8).

The diagnostic accuracy of FNAC for salivary gland lesions was 89%, while for Metastatic and Miscellaneous lesions both, the diagnostic accuracy was 100% (refer Table 9).

### Discussion:

FNAC is a valuable diagnostic procedure in the initial assessment of the patients presenting with a non-thyroidal cystic lesions in the head and neck region. We evaluated various parameters like age distribution, sex predilection, site-wise distribution, nature of the lesion and histo-pathological correlation wherever possible and the findings were compared with other studies.

## Salivary Gland:

In present study, benign cystic lesions were common in 61 to 70 year age group while malignant cystic lesions were common in 41 to 50 years age group. In studies conducted by Layfield et al<sup>[3]</sup> and Firat et al,<sup>[4]</sup> age wise distribution of cystic lesions of salivary gland was not considered.

In present study, male : female ratio was 2.4:1. For females, benign to malignant lesion ratio was 1.75:1, for males it was 4.5:1. Thus, benign cystic lesions of salivary gland were more common in males. Layfield et al<sup>[3]</sup> and Firat et al<sup>[4]</sup> have not studied gender wise distribution of cystic lesions of salivary gland.

In present study, lympho-epithelial cyst was the most common cystic lesion (10, 30.3%), while according to Layfield et al<sup>[3]</sup> and Firat et al,<sup>[4]</sup> Warthin tumour was the most common cystic lesion of salivary gland. Out of 33 cases of Salivary gland lesions, nine were followed up histopathologically. Amongst them, eight cases were concordant and one case was discordant. Out of two malignant cases, one was discordant.

70 years old female presented with right cheek cystic swelling since six months, measuring 3x3 cm, and soft, non-tender. USG suggestive of mural nodule of 1.5x1 cm with base at cheek wall. USG guided FNAC was performed which yielded blood mixed aspirate. FNAC showed moderately cellular smear, cluster of malignant squamous cells with hyperchromatic and mildly enlarged nuclei. In this case, the aspirate showed epithelial cells resembling squamous and mucous cells hence differential diagnosis of acinic cell carcinoma and mucoepidermoid carcinoma was given because of clinical location of the swelling. On histopathology the diagnosis was ameloblastoma. On review of cytology slides, we did see clusters showing squamous cells and mucous cells which could be squamous and granular cell change in stellate cells of ameloblastoma. The slides also showed stellate reticulum and ameloblastic epithelium which was missed on initial viewing.

For benign not otherwise specified category of salivary gland, all cases (1=warthin tumour, 2=low grade mucoepidermoid carcinoma, 1=pleomorphic adenoma) were low grade, and concordant with

histopathology findings, and not a single case was high grade (Figure 2, 3)

In the present study, the diagnostic accuracy of FNAC for salivary gland lesions was 89% (refer Table 9) which was higher than study by Layfield et al<sup>[3]</sup> (84%). In contrast, Kapoor et al<sup>[5]</sup> found the diagnostic accuracy to be 100%. Our study was in accordance with the study by Akerman et al<sup>[6]</sup> who got a diagnostic accuracy of 94.2% for the diagnoses of miscellaneous lesions using fine needle aspiration FNAC.

## Metastatic malignancies to lymph node:

In the present study, both radiological and clinical correlation was done to diagnose all the metastatic malignancies to lymph node on cytology.

Maximum number of metastatic cases were seen in age group of 41 to 50 years , while in study conducted by Ustun et al<sup>[7]</sup> mean age group was 59.2 years.

Male preponderance was seen in our study (82.6%) because of betel nut and tobacco chewing in India while in a study conducted by Ustun et al<sup>[7]</sup> females(58.82%) were common than males(41.17%).

In our study among the metastatic lesions to cervical lymph node, squamous cell carcinoma metastasis was the most common lesion for which advice to look for the primary lesion in upper aero-digestive tract was given (Figure 4). Other cases of metastasis included three cases of papillary carcinoma of thyroid (Figure 5, 6), 1 case of round cell tumour (CT suggestive of primary sacral region malignancy) and 1 case of papillary adenocarcinoma for which advice to look for primary site in GIT was given. This finding was similar to the study by Ustun et al.<sup>[7]</sup>

For Metastatic lesions the diagnostic accuracy was 100% (refer Table 9), which was similar to study by Utsun et al.<sup>[7]</sup>

## Miscellaneous Lesions:

Majority patients of this group belonged to the 2<sup>nd</sup> decade of life.

In our study, among the 98 miscellaneous cystic lesions, keratinous cyst was most common 70 (71.42%), while 2 odontogenic origin tumours (one case of ameloblastoma and one with differential diagnosis of sarcomatoid carcinoma or sarcoma )

and 4 cases of infective etiology were found ( 2 *Cysticercus cellulosae* (Figure 7), 1 abscess and 1 chronic inflammatory condition). This was in concordance with studies conducted by Hingway et al.<sup>[9]</sup> A study conducted by Goyal et al.<sup>[10]</sup> included only neck cystic lesions and they found thyroglossal cyst to be the most common lesion.

For Miscellaneous lesions the diagnostic accuracy was 100% (refer Table 9), which was similar to study by Akerman M et al.<sup>[6]</sup> and Kapoor et al.<sup>[5]</sup>

#### Limitation:

Major limitation is the small number of cases which were surgically followed-up. Further studies involving a large number of cases with surgical follow-up are needed.

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Salivary Gland Lesions	Metastatic malignancies to cervical lymph node	Miscellaneous Lesions
Lymphoepithelial cyst	Squamous cell carcinoma	Branchial Cyst
Warthin tumour	Papillary carcinoma of thyroid	Keratinous cyst
Mucoepidermoid carcinoma	Round cell tumour	Pilar cyst
Benign not otherwise specified	Papillary adenocarcinoma	Odontogenic cyst
Inflammatory lesion		Infective etiology
		Dermoid cyst

**Table 1: Distribution of Cytology diagnosis**

Site of lesion	Non guided FNAC	Guided FNAC	Total
Salivary gland	28	5	33
Metastatic malignancy to lymph node	46	0	46
Miscellaneous lesions	91	7	98

**Table 2: Type of FNAC in cystic lesions**

Site of the lesion	Salivary Gland		Metastatic malignancy to lymph node		Miscellaneous	
	No.	%	No.	%	No.	%
< 10 yrs	0	0	0	0	8	8.16%
11 to 20 yrs	1	3.0%	2	4.3%	22	22.44%
21 to 30 yrs	4	12.1%	3	6.5%	20	20.40%
31 to 40 yrs	7	21.2%	4	8.7%	12	12.24%
41 to 50 yrs	5	15.2%	15	32.6%	12	12.24%
51 to 60 yrs	6	18.2%	11	23.9%	16	16.32%
61 to 70 yrs	9	27.3%	5	10.9%	7	7.14%
> 70 yrs	1	3.0%	6	13.0%	1	1.02%
Total	33	100.0%	46	100.0%	98	100.0%

**Table 3: Age wise distribution of cases**

Salivary Gland	No.	%	Metastasis of malignancies to lymph node	No.	%	Miscellaneous	No.	%
Lymphoepithelial cyst	10	30.30%	Squamous cell carcinoma	41	89.13%	Branchial Cyst	3	3.06%
Warthin tumour	5	15.15%	Papillary carcinoma of thyroid	3	6.52%	Keratinous cyst	83	84.6%
Mucoepidermoid carcinoma	5	15.15%	Round cell tumour	1	2.2%	Pilar cyst	6	6.12%
Benign not otherwise specified	12	36.36%	Papillary adenocarcinoma	1	2.2%	Odontogenic cyst	2	2.04%
Inflammatory lesion	1	3.03%				Infective etiology	4	4.08%
Total	33	100.00%	Total	46	100.00%	Total	98	100.00%

**Table 4: Distribution of cases according to cytology diagnosis**

Salivary gland	Total (33)	Histopathology follow up (9)	Concordant	Discordant
Benign	28	7	7	0
Malignant	5	2	1	1

**Table 5: Cyto-histopathological correlation of salivary gland lesions**

Lymph node lesions	Total (47)	Histopathology follow up (3)	Concordant	Discordant
Benign	1	1	1	0
Metastatic	46	2	2	0

**Table 6: Cyto-histopathological correlation of lymph node cystic lesions**

Miscellaneous lesions	Total (98)	Histopathology follow up (15)	Concordant	Discordant
Benign	96	15	15	0
Malignant	2	0	0	0

**Table 7: Cyto-histopathological correlation of miscellaneous lesions**

Site of Lesion	Cytology	Histo-pathological follow-up	Concordant	Discordant
Salivary Gland	33	9	8	1
Metastatic malignancies to lymph node	98	15	15	0
Miscellaneous	46	02	02	0
TOTAL	177	26	25	1



**Table 8: Cyto-histopathological correlation of Head and neck lesions**

Site of Lesion	Sensitivity	Specificity	Diagnostic accuracy
Salivary gland	50%	100%	89%
Metastatic malignancies to lymph nodes	100%	100%	100%
Miscellaneous	-*	100%	100%

\* Could not calculated since histology follow-up was not available.

**Table 9: Diagnostic Accuracy of FNAC according to site of lesion**

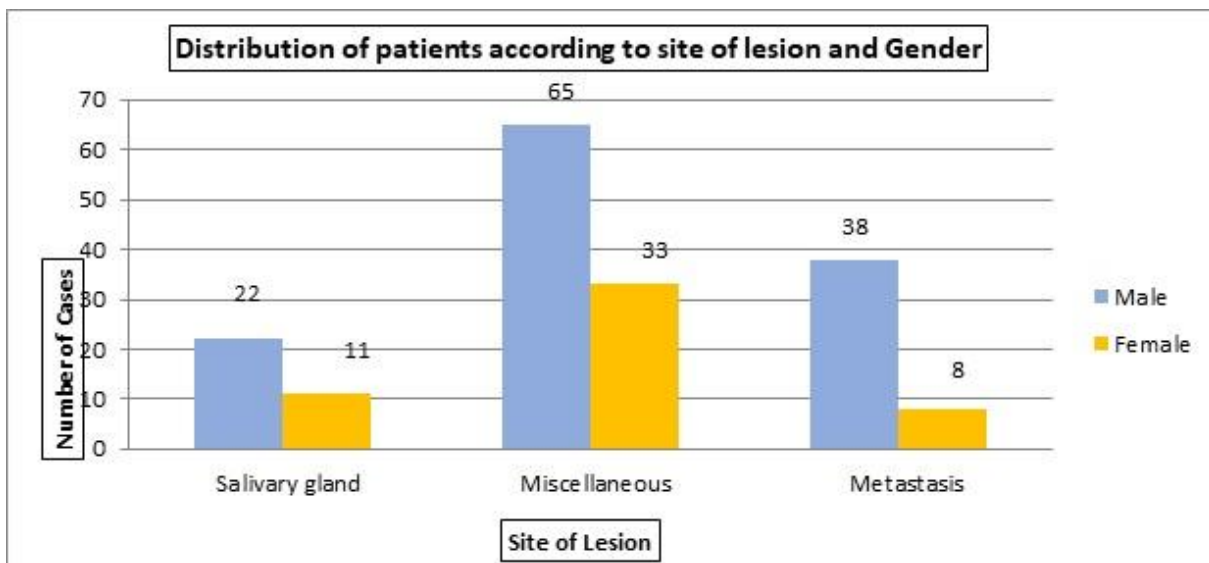


Figure 1: Gender wise distribution of cases

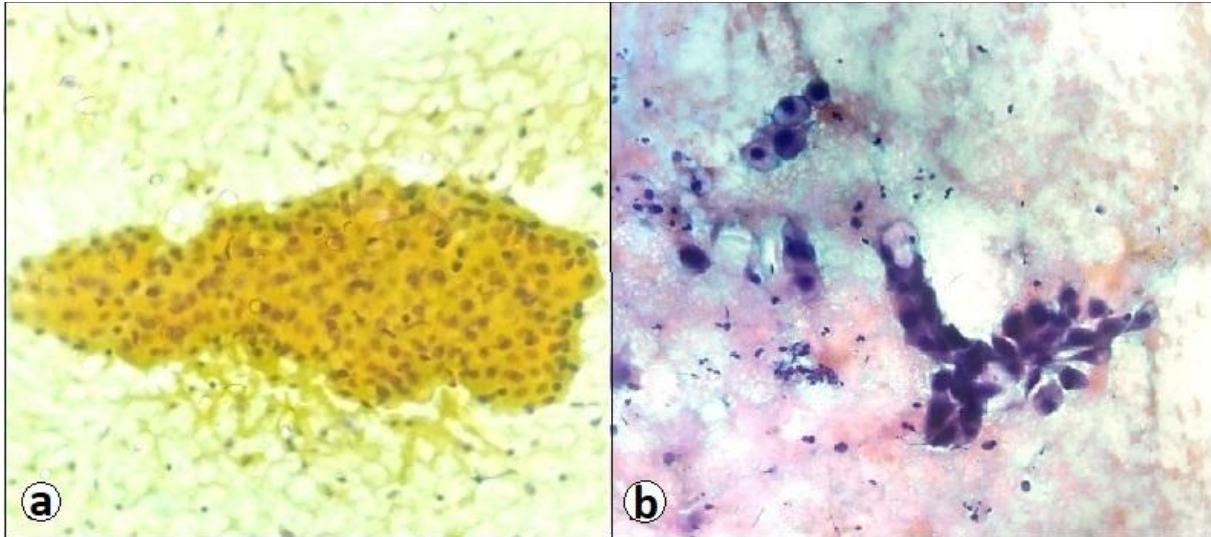


Figure 2 a : Aspiration cytology smear showing cluster of oncocytic cells with background lymphocytes, Pap, 40x

Figure 2 b: Aspiration cytology smear showing mucin containing cells and intermediate cells suggestive of low grade mucoepidermoid carcinoma, Pap, 40x

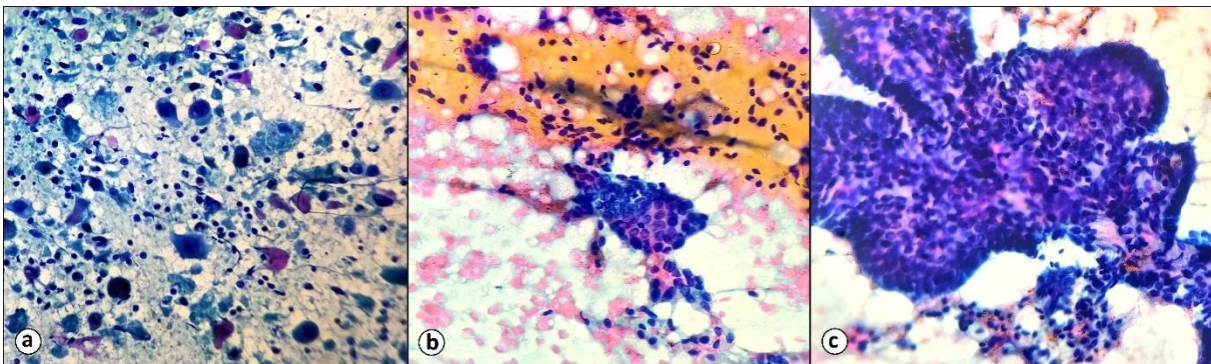
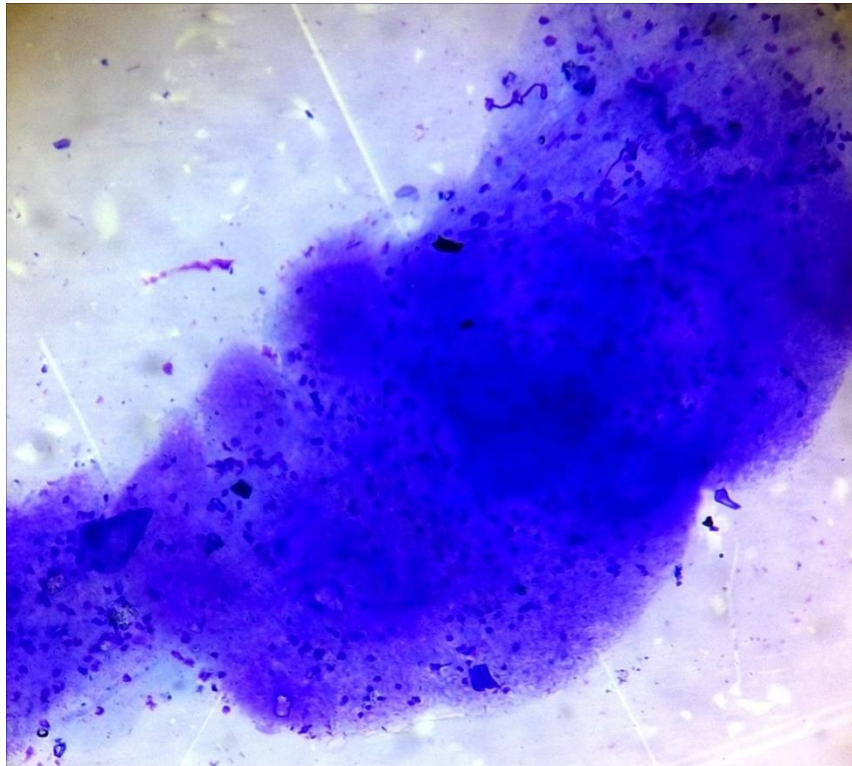


Figure 4 a: Aspiration cytology smears showing dispersed malignant squamous cells in metastatic keratinizing squamous carcinoma in a lymph node. Pap, 40x

Figure 4 b: Aspiration cytology smear showing papillary fragments with nuclear grooves and clearing along with lymphoid cells in background in metastatic papillary thyroid carcinoma, Pap, 40x

Figure 4 c: Aspiration cytology smear showing papillary fragments with true fibrovascular core in metastatic papillary thyroid carcinoma, Pap, 40x



**Figure 7: Aspiration cytology smear showing bluish bladder fragment of cysticercus cellulosae. Giemsa, 40x**