# EVALUATION OF FINE NEEDLE ASPIRATION CYTOLOGY (FNAC) IN HEAD AND NECK SWELLINGS, PRESENTED IN AKHTAR SAEED MEDICAL AND DENTAL COLLEGE, LAHORE

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## ABSTRACT

***Objective:*** *To determine the frequency of various Head and Neck swellings at various sites reported at Pathology department Akhter Saeed Medical and Dental College, Lahore.*

***Materials and Methods:*** *The present study evaluates data of all the patients that underwent FNAC for various head and neck swellings from the period of 2012 to 2019 in Akhtar Saeed Medical College, Lahore. A total of 177 patients with swellings in the head and neck regions, on which FNAC was performed are included in this study. After cleaning the area properly, a 23 gauge needle with syringe and needle tip was inserted at convenient angles to the lesions and with the help of multiple hits, an adequate amount of material was aspirated. The needle was then removed with sufficient negative pressure. In order to avoid bleeding or hematoma formation, a cotton gauze was kept pressed over the aspirated area for a few minutes.*

***Results:*** *Out of 177 fine needle aspiration procedures, the maximum number of aspirates were procured from thyroid (35%), 22% from cervical lymph nodes, 16% from salivary glands, 24% from miscellaneous swellings in head and neck region. The highest number of cases were diagnosed as reactive/non-specific inflammatory lesions (19%) followed by benign lesions with hyperplastic colloid nodule (14%).*

***Conclusion:*** *The study mainly confirmed the results of various studies previously carried out in different countries. FNA of head and neck lumps proves to be an efficient and useful diagnostic method in segregating inflammatory and neoplastic lesions, thus avoiding unnecessary invasive procedures. The diagnostic accuracy of FNAC makes it a reliable first-line tool in predicting the nature of various head and neck swellings.*

***Keywords:*** *Fine needle aspiration cytology; Head and Neck Swellings*

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## INTRODUCTION

Head and neck lumps are common findings in clinical settings. These lumps can be developmental, reactive, inflammatory or neoplastic in nature.[1] Globally, head and neck cancerous lesions are frequently encountered. They can pose a major threat to an

individual's health and lead to significant morbidity and mortality.[2,3]

In 1847, Kun for the very first time performed FNAC for evaluation of head and neck swellings. Since then it has emerged as a well-acknowledged diagnostic tool for assessment of these lesions. One of the main advantages of FNAC is the early and expeditious detection of these lesions.[4] Early detection of cancerous lesions can guide clinicians in deciding effective treatment modalities for the management of these lumps. FNAC of the head and neck region is advocated to procure aspirates from lymph nodes, salivary glands, soft tissue, skin, and thyroid.[5] For triage of neoplastic and non-neoplastic lesions to avoid unnecessary surgeries, FNAC is recommended. Eliminating redundant surgeries of non-neoplastic lesions results in quicker management of malignant lesions1. Earlier management of lesions lowers the morbidity and mortality rates.

FNAC is accepted by a majority of the patients, as it yields accurate results with short turnaround time, is less invasive and is economical. Multiple samples from multiple sites of the same lesion can be taken, using this technique. This results in the avoidance of invasive incisional biopsy, whenever possible. Thus the associated risks and complications are almost negligible. Ideally, fine-needle aspiration should be performed preoperatively in all doubtful cases of lateral neck swelling. Other investigations can then be carried out, based on the interpretation of cytological mears.[6]

The first and foremost important step of fine-needle aspiration (FNA) cytology is sufficient procurement of representative aspirates from the swellings to ensure accurate results. The biological material has to be appropriately and timely transferred to the pathology laboratory for interpretation by skilled pathologists.[7]

The study was conducted to determine the value of FNAC in palpable head and neck masses reported at the Pathology department of Akhtar Saeed Medical College from 2012 to 2019.

## MATERIAL AND METHODS

This study included evaluation of data of all the patients that underwent FNAC for various head and neck swellings in Akhtar Saeed Medical & Dental College, Lahore. A total of 177 patients aged between 03 and 95 years with swellings in the head and neck regions had FNAC performed on them.

The steps of the FNAC procedure performed are as follows:

a. Detailed histories of all the patients were recorded, before FNAC procedures were performed.

b. The area to be aspirated was thoroughly cleaned using a spirit swab.

c. A syringe of 23 gauge needle was used to aspirate the contents of swellings. The needle tip was inserted in the swelling at convenient angles and multiple hits were made while sustaining the negative pressure.

d. The needle was then removed and the pressure was applied to the area of aspiration to avoid bleeding or hematoma formation.

e. Aspirated material was then smeared onto multiple glass slides followed by air drying.

f. All the smears were stained with Hematoxylin & Eosin stain in the pathology laboratory.

g. After staining, three histopathologists examined the slides under the under light microscope.

h. The results were then compiled and analyzed.

**Statistical Analysis:** The frequency of various lesions was calculated using %ages and compared with each other.

## RESULTS

The present study comprised of 177 FNAC cases of head and neck swellings from Akhter Saeed Medical and Dental College, Lahore over a 7 (seven) year period.

The age range for patients was found to be a minimum of 3 to a maximum of 95 years.

The majority of the patients presented for FNAC were female 117 (65%), significantly outnumbering the male patients 60 (34%). Thus the ratio for the male to female is 1: 2 approximately.

The current study found that thyroid swellings are the most commonly encountered pathologies among various head and neck swellings. Out of the total 177 cases, 35% or 63 cases were of "Thyroid Swellings". "Cervical Lymph Node" swellings were the second most common, numbering 39 cases or

22% of the total cases. Other pathologies found in the present study were 20 (11%) cases from "Parotid"; 10 (5%) from "Submandibular"; and only one case from the "Submental" region. The remaining 44 cases (24%) were from "Miscellaneous Head and Neck Sites".

The most frequent microscopic finding was "Benign Lesion with Hyperplastic Colloid Nodule" (26 cases), among all reported head and neck enlargements. This was followed by "Benign Neoplasms" (20 cases), the nature of which could not be confirmed based on cytology. The next category was "Non-specific Inflammatory" lesions which comprised 35 cases (19%). "Granulomatous Inflammation" with atypical cells was found in 17 cases (9%). "Pleomorphic Adenoma" was reported in 08 cases. There were 14 cases (8%) of "Colloid Goiter"; and 13 cases (7%) of "Abscess". "Lipoma" was detected in 3 (1%); whereas "Malignant" cells were seen in 8 cases (4%). Among all neck swellings, "Epidermal Inclusion Cyst" was seen in three cases (1%).

The most common site of swelling in females was thyroid 45.3%. This was followed by swellings from various areas of head and neck (22.2%) and cervical lymph nodes 18.8%.

However, in males, findings were in contrast to those observed in females. After miscellaneous head and neck swellings (30%), cervical lymph nodes (28%) were the next common swellings. Only 16% of swellings were observed in thyroid region.

In females, highest number of cases were reported as benign lesion of thyroid with hyperplastic colloid nodule. Benign neoplasms in 14% and reactive & non-specific inflammation in 11% female cases.

Among male FNAC cases, suspected malignant smears make up most of the cytological findings. The number of confirmed malignant smears were higher as compared to those in females.

## DISCUSSION

The overall research interest behind this paper is to identify the main vectors behind Head & Neck lesions in Lahore. The vectors identified will be co-related with the environmental and other conditions to determine possible risk factors, and recommend policy changes. This paper is the first step in that process. The specific objective of the paper is to provide an overall view of lesions reported by

**Table 1: Age distribution of various head and neck swellings**

| S / No | Age Range | Frequency | Percentage |
|---|---|---|---|
| 1 | 0 - 10 | 9 | 5.4% |
| 2 | 11 - 20 | 25 | 14.9% |
| 3 | 21 - 30 | 32 | 19.0% |
| 4 | 31 - 40 | 36 | 21.4% |
| 5 | 41 - 50 | 30 | 17.9% |
| 6 | 51 - 60 | 17 | 10.1% |
| 7 | 61 - 70 | 10 | 6.0% |
| 8 | 71 - 80 | 7 | 4.2% |
| 9 | 81 - 90 | 1 | 0.6% |
| 10 | 90 - 100 | 1 | 0.6% |

**Table 2: Distribution of Cases as Per Gender**

| S / No | Gender | Frequency | Percentage |
|---|---|---|---|
| 1 | Male | 60 | 33.9% |
| 2 | Female | 117 | 66.1% |

**Table 3: Distribution of Cases as Per Site Involved**

| S / No | Lesion Site | Frequency | Percentage |
|---|---|---|---|
| 1 | Cervical Lymph Node | 39 | 22.03% |
| 2 | Misc. Neck Swelling | 44 | 24.8% |
| 3 | Parotid | 20 | 11.2% |
| 4 | Submandibular | 10 | 5.6% |
| 5 | Submental | 1 | 0.56% |
| 6 | Thyroid | 63 | 35.5% |

**Table 4: Distribution of Cases as per Types of Lesions**

| S / No | Diagnosis | Frequency | Percentage |
|---|---|---|---|
| 1 | Suspicious for malignant cells | 17 | 9.6% |
| 2 | Benign neoplasm | 20 | 11.2% |
| 3 | Benign lesion with hyperplastic colloid nodule | 26 | 14.6% |
| 4 | Colloid Goitre | 14 | 7.9% |
| 5 | Epidermal inclusion cyst | 3 | 1.6% |
| 6 | Granulomatous Inflammation | 17 | 9.6% |
| 7 | Inadequate smears | 12 | 6.7% |
| 8 | Lipoma | 5 | 2.8% |
| 9 | Malignant | 7 | 3.9% |
| 10 | Pleomorphic adenoma | 8 | 4.5% |
| 11 | Abscess | 13 | 7.3% |
| 12 | Reactive & Non-specific Inflammation | 35 | 19.7% |

**Table 5: Distribution of Cases as per Lesion & Gender (Female)**

| S / No | Lesions | Frequency | Percentage |
|---|---|---|---|
| 1 | Cervical Lymph Node | 22 | 18.8% |
| 2 | Misc. Neck Swelling | 26 | 22.2% |
| 3 | Parotid | 10 | 8.5% |
| 4 | Submandibular | 5 | 4.3% |
| 5 | Submental | 1 | 0.9% |
| 6 | Thyroid | 53 | 45.3% |

**Table 6: Distribution of Cases as per Lesion & Gender (Male)**

| S / No | Lesions | Frequency | Percentage |
|---|---|---|---|
| 1 | Cervical Lymph Node | 17 | 28.3% |
| 2 | Misc. Neck Swelling | 18 | 30.0% |
| 3 | Parotid | 10 | 16.7% |
| 4 | Submandibular | 5 | 8.3% |
| 5 | Submental | 0 | 0.0% |
| 6 | Thyroid | 10 | 16.7% |

**Table 7: Distribution of Cases as per Diagnosis & Gender (Female)**

| S / No | Diagnosis | Frequency | Percentage |
|---|---|---|---|
| 1 | Suspicious for malignant cells | 7 | 6.0% |
| 2 | Benign | 17 | 14.5% |
| 3 | Benign lesion with hyperplastic colloid nodule | 21 | 17.9% |
| 4 | Colloid Goitre | 12 | 10.3% |
| 5 | Epidermal Inclusion Cyst | 0 | 0.0% |
| 6 | Granulomatous Inflammation | 12 | 10.3% |
| 7 | Inadequate | 8 | 6.8% |
| 8 | Reactive & Non-specific Inflammation | 21 | 11.1% |
| 9 | Lipoma | 2 | 1.7% |
| 10 | Malignant | 4 | 3.4% |
| 11 | Pleomorphic Adenoma | 5 | 4.3% |
| 12 | Abscess | 8 | 6.8% |

patients in ASMDC's catchment area and identify specific sub-sets, which are more common. The paper provides a macro view of the problem, and acts at the base upon which further research will be undertaken. The specific objective of this paper is to determine the frequency of various Head and Neck swellings

**Table 8: Distribution of Cases as per Diagnosis & Gender (Male)**

| S / No | Diagnosis | Frequency | Percentage |
|---|---|---|---|
| 1 | Suspicious for malignant cells | 10 | 16.7% |
| 2 | Benign | 3 | 5.0% |
| 3 | Benign lesion with hyperplastic colloid nodule | 5 | 8.3% |
| 4 | Colloid Goitre | 2 | 3.3% |
| 5 | Epidermal inclusion cyst | 3 | 5.0% |
| 6 | Granulomatous Inflammation | 5 | 8.3% |
| 7 | Inadequate | 4 | 6.7% |
| 8 | Reactive & Non-specific Inflammation | 14 | 8.3% |
| 9 | Lipoma | 3 | 5.0% |
| 10 | Malignant | 3 | 5.0% |
| 11 | Pleomorphic adenoma | 3 | 5.0% |
| 12 | Abscess | 5 | 8.3% |

at various sites reported at Pathology department Akhter Saeed Medical and Dental College, Lahore.

The current study comprised of 177 patients, who reported to the hospital complaining of head and neck swellings. FNAC was performed to evaluate the nature of aspirated material from these swellings; relative frequencies were calculated for these head and neck enlargements.

In this study majority of the patients presented with HN lumps were females (65%) outnumbering male patients (34%). This finding is well coordinated with a study by Sangavi. The study reported 64 females presented with Head and neck pathology as compared to only 36 males.[8]

"Thyroid" was the site in the head and neck region with the highest frequency of swellings (35%). The next most frequent site was "Cervical Lymph nodes", accounting for nearly 22% for all HN swellings. This finding is in good accordance with the study conducted by Nalini et al. The study stated that the majority of the neck lumps observed were thyroid lesions. That study included a total of 40 patients, out of which 19 cases were of the thyroid, whereas only seven patients presented with lymph node pathology.[9] A study by Patel et al found the frequency of thyroid lesions to be highest among head

and neck lumps. In that study, among 250 cases of head and neck swellings, 57 patients were reported to have benign thyroid swellings.[10]

In contrast to this, a study by Khetrapal et al showed the incidence of "Lymph Node" swellings was highest among other Head and neck swellings performing FNAC on 290 patients. In that study, "Lymph Nodes" swellings accounted for 64.1 % cases; whereas "Thyroid" swellings were reported in 16.9% cases11. Another recent study by Bantola showed that majority of Head and Neck lesions comprised of "lymph nodes" (55.04%) followed by "Thyroid" swellings 21.49%[12]

In the present study, almost 8% of total cases were "Colloid Goiter". A Nepalese study of 333 patients on whom FNAC of cystic lesions of the head and neck region was carried out; reported 15.6% cases of "Colloid Goiter".[13] Another study reported 12% of colloid goiter in their findings.[14]

In the current study, 11% swellings were of the parotid region while 5 and 1% from the submandibular and submental region respectively. These findings were supported by a study that reported the incidence of swellings was highest in the parotid region when compared with other salivary gland sites.[12] Another study by Kapoor et al. showed that 15 out of 100 patients presented with salivary gland lesions.[14]

In this study, 8 cases of Pleomorphic adenoma were reported and most common site was parotid gland. This finding is in well concordance with other studies. Banstola showed that incidence of pleomorphic adenoma in parotid gland was most common among other salivary gland swellings.[12] Similar findings were quoted by Kapoor et al. 15% of their study population presented with salivary gland lesions. They identified pleomorphic adenoma (60%) as a common presenting lesion when compared with other tumors of salivary gland origin. However, malignant tumors were seen in only 6.66% of patients.[14]

According to the present study, almost 4% of aspirates from Head and neck swellings are malignant. This finding is supported by Khertrapal and his colleagues who enrolled a total of 290 patients for evaluation of head and neck lumps. 91.1% cases belonged to a category of benign lesions and 7.2% to malignant lesions. However, there was only one case for which definitive diagnosis could not be given.[11]

Our study shows 17 cases (10%) of the study population have granulomatous inflammation. Singh et al. reported 8.3% of granulomatous inflammatory lesions in their study population.[15] 13.5% of granulomatous aspirates were reported in a study conducted by Pandey et al.[16] These findings are well coordinated with this study.

Reactive and non-specific inflammatory aspirates were calculated to be 35 (19.77%) out of total 177 cases. These are in accordance with a study performed by Poorey and Tyagi, who reported overall reactive cases in their study of 18.08 %.[17]

Muhammad Javaid et al found that, 16.66% reactive and inflammatory lesions were presented among miscellaneous head and neck masses.[18] Our study has shown abscess in 13 cases (7.3%), epidermal inclusion cyst 3 cases (1.6%) and lipoma in 5 cases (2.8%). Banstola and his friends performed FNAC for 456 patients who presented with swellings of Head and neck region. They confirmed abscess in 22 cases (4.8%), epidermal inclusion cyst in 29 (6.3%) and lipoma in just two (0.4%) cases.[12]

In our study, 17 cases (9.6%) of head and neck aspirates are considered positive for suspected malignancy. This corresponds to cytological findings by Altınboğa and Yüce. They studied a total of 171 cases of lymph node FNAC. 5.8% of patient's smears were categorized as suspicious for malignant cells.[19] Alshaikh et al, conducted a study on 681 thyroid FNACs. They suspected malignancy in 2.6% while atypia of undetermined significance in 12.4% cases of their study population.[20]

## CONCLUSION

Thyroid swellings were the commonest finding (35%) among palpable masses of the head and neck region. The second most commonly encountered lesion in this study was lymph node pathology (22%). Comparing and contrasting results with other studies have shown that, the findings of this study are in line with previous findings.

FNAC can reliably predict the nature of various swellings from the head and neck region. Thus the need for unnecessary invasive biopsies can be avoided. Therefore, FNAC could be of great value in deciding and planning surgical procedures for various head and neck lumps.

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