

## Research Article

# Fine needle aspiration cytology in head and neck swellings: a diagnostic and therapeutic procedure

Himanshu Shekhar<sup>1,\*</sup>, Ashmeet Kaur<sup>1</sup>, Pallav Agrawal<sup>2</sup>, Aruna Pancharia<sup>1</sup>, Poojaba Jadeja<sup>1</sup>

<sup>1</sup>Department of Pathology, Geetanjali Medical, College & Hospital, Udaipur, Rajasthan, India

<sup>2</sup>Department of Neurosurgery, IPGMER, Kolkata, West Bengal, India

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### \*Correspondence:

Dr. Himanshu Shekhar,

E-mail: drhimanshu91@gmail.com

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### ABSTRACT

**Background:** Fine Needle Aspiration Cytology (FNAC) is a very simple, quick, inexpensive and minimally invasive technique used to diagnose different types of swellings like lymph node, thyroid, soft tissue and salivary glands in head and neck region. These swellings frequently encountered in general practice. It may be inflammatory, reactive, benign or malignant lesion. The objective was to assess the frequency and incidence of different sites, age, sex and distribution of reactive, benign and malignant lesion.

**Methods:** A prospective study was conducted at Geetanjali Medical College & Hospital, from January 2014 to August 2014. Fine needle aspiration diagnosis was correlated with details of relevant clinical findings and investigations. Patients aged between 1 and 75 years were included in the study. A total of 200 patients were enrolled in the study with their name, age, sex, profession, address and contact.

**Results:** Out of 200 fine needle aspiration procedures 42% were of lymph node, 18.5% were of thyroid, 15.5% from salivary gland, 8% from soft tissue, scalp and forehead swellings and 5.5% from lips and oral cavity lesion. Lymphnodes were the commonest organ involved in which reactive were 16% and 15% granulomatous lesion. There were 2.5% cases of non specific inflammatory lesion from lymph nodes.

**Conclusions:** Our study found that FNAC is simple, quick, inexpensive and minimally invasive technique to diagnose different types of head and neck swellings. It could differentiate the infective and benign process from neoplastic one and avoids unnecessary surgeries and expenses.

**Keywords:** Fine Needle Aspiration Cytology (FNAC), Head and neck swellings, Lymph node, Prospective study

### INTRODUCTION

The art and science of cytology and cytopathology has been implemented and recognized as early as the 18th and 19th.<sup>1-5</sup> The first American Board of Examination in cytopathology was undertaken in 1989. Europeans, especially north Scandinavian countries, were able to utilize this technique even before the World War II.<sup>1,4</sup> The science of cytopathology is currently well standardized with two major branches, exfoliative and aspiration biopsy.

In 1930 (New York hospital), Martin and Colley, and a technical assistant, Ellis, conducted aspirations from several organs and carried out cytological studies on them.<sup>6-9</sup> Fine needle aspiration cytology (FNAC) is a very simple, quick, and cost-effective method of sampling of superficial masses found in the head and neck.<sup>10</sup> FNAC is widely used in the head and neck swellings frequently encountered in general practice, such as in the lymph nodes, thyroid, major salivary glands, and other neoplastic lesions.<sup>11-13</sup> In the head and neck regions, FNAC is of great value because of the multiplicity of

accessible organs and heterogeneous pathologies encountered. This technique is an outpatient department (OPD) procedure and causes minimal trauma to the patient and carries virtually no risk of complication. Fine needle aspiration cytology can be performed under local anaesthesia and is particularly useful if a neck lump is thought to be malignant. Till now, there is no evidence that the tumour spreads through the skin track created by the fine hypodermic needle used in this technique.<sup>14</sup> This procedure (FNAC) can be both diagnostic and therapeutic in cystic swellings.<sup>15</sup>

FNAC is very helpful in the diagnosis of salivary gland tumours, where it can differentiate between a malignant and a benign tumour with over 90% accuracy. The prime objective of study was to assess the diagnostic accuracy of FNAC in the Head and Neck lesions or tumours, to assist the surgeon in selection of the patient for surgery and palliative therapy and to help them in detecting the metastasis and staging management of the certain tumours.

## METHODS

This prospective study included 200 cases of Head and Neck swellings, performed predominantly either as outdoor procedure or as pre-operative assessment in our institute during "January 14 to August 14". Fine Needle Aspiration Diagnosis was correlated with detail of relevant clinical findings and investigation. Patients were explained about the procedure and its indication. Maximum efforts were been made to re-assure the patient as to the safety, simplicity of the procedure and minimal discomfort. The area to be aspirated was cleaned with spirit and a 22 or 23 gauge needle with 10ml syringe and trocar was inserted at convenient angles to the lesions and multiple hits were made within the lesion, with sufficient negative pressure, the needle was removed and the pressure was applied to the area of aspiration to avoid bleeding or hematoma formation.

The aspirated material was smeared on minimum two clean glass slides and later, they were either wet-dried or air-dried as per the staining procedure adopted. Smears were stained by Giemsa and Pap stain and special stains were carried out as and when required. The details regarding history of the patient, personal details of the patient, local examination findings, laboratory and other investigations, clinical diagnosis and microscopic findings were recorded on predesigned questionnaire.

## RESULTS

In this study total of 200 cases were included, age ranged from 1 to 75 years (Table 1) in which 57% were male and 43% were female (Table 2). Maximum incidence observed in the age group of 31 to 40 years and out of 200 cases 66% were below 45 years of age. Among the diagnostic outcome, higher incidences of lesion is in the neck region (138 cases) than in the head region (Table 3) in which 42% were associated with lymph node lesion (Table 4).

**Table 1: Age wise Distribution of cases.**

| Age (Years) | No. of cases | Percentage |
|-------------|--------------|------------|
| 1-15        | 27           | 13.5%      |
| 16-30       | 43           | 21.5%      |
| 31-45       | 62           | 31%        |
| 46-60       | 47           | 23.5%      |
| 61-75       | 21           | 10.5%      |
| Total       | 200          | 100%       |

**Table 2: Sex wise distribution of cases.**

| Study                                 | Number of cases | Male | Female |
|---------------------------------------|-----------------|------|--------|
| Present study                         | 200             | 114  | 86     |
| William study <sup>16</sup> 1973-1977 | 284             | 135  | 149    |

**Table 3: Distribution of cases according to region of head & neck.**

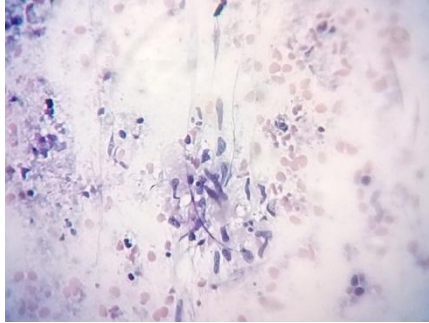
| Region of swelling                          | Number (%) |
|---|------------|
| Scalp and forehead                          | 17(8.5%)   |
| Salivary glands                             | 31(15.5%)  |
| Cervical lymph node                         | 73(36.5%)  |
| Thyroid                                     | 36(18%)    |
| Lips and oral cavity and upper airway       | 14(7%)     |
| Nape of the neck and supraclavicular region | 29(14.5%)  |

**Table 4: Distribution of cases according to the inflammatory and neoplastic lesion.**

| Organ                                 | Inflammatory (Reactive) | Benign   | Malignant |
|---------------------------------------|-------------------------|----------|-----------|
| Lymph node                            | 56(28%)                 | 11(5.5%) | 17(8.5%)  |
| Thyroid                               | 21(10.5%)               | 11(5.5%) | 04(2%)    |
| Salivary gland                        | 06(3%)                  | 22(11%)  | 03(1.5%)  |
| Soft tissue                           | 06(3%)                  | 12(6%)   | 01(0.5%)  |
| Scalp and forehead                    | 03(1.5%)                | 14(7%)   | Nil       |
| Lips and oral cavity and upper airway | 03(1.5%)                | 07(3.5%) | 04(2%)    |

According to the distribution of cases on the basis of organ and lesion the lymph node were most effected organ, in which reactive nodes (16%) were more common with granulomatous lesion (15%) [Figure 1] on the second position (Table 5). In thyroid and salivary gland lesions simple colloid goitre (5.5%) was most common in thyroid and papillary carcinoma was most common malignant lesion [Figure 2] while pleomorphic adenomas (4.5%) [Figure 3] were more common lesions in salivary glands.

In soft tissues round cell tumour [Figure 4] was the only malignant lesion we found. The lesions from soft tissue scalp and forehead, lipoma (8.5%) was the commonest while from lips and oral cavity cystic lesion, ulcer and leukoplakia (4%) were common.

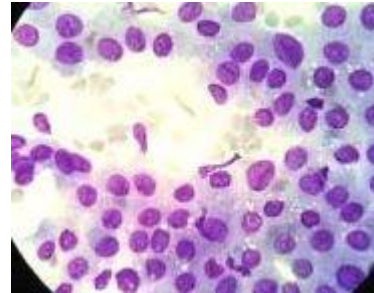


**Figure 1: Show epithelioid cell granuloma (Low magnification 10X).**

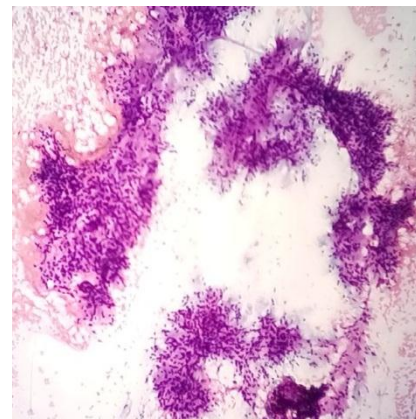
**Table 5: Distribution of cases on the basis of organ and lesions.**

| Organ and lesion                  | No. of cases (%) |
|-----------------------------------|------------------|
| Lymph node                        | 84 (42%)         |
| Reactive node                     | 32 (16%)         |
| Non-specific Inflammatory         | 05 (2.5%)        |
| Granulomatous lesion(Tuberculous) | 30 (15%)         |
| Metastatic                        | 11 (5.5%)        |
| Lymphoma                          | 06 (3%)          |
| Thyroid                           | 36 (18%)         |
| Simple Colloid goitre             | 11 (5.5%)        |
| Nodular Colloid goitre            | 05 (2.5%)        |
| Thyroglossal cyst                 | 05 (2.5%)        |
| Branchial cyst                    | 02 (1%)          |
| Grave's disease                   | 04 (2%)          |
| Hashimoto Thyroiditis             | 05 (2.5%)        |
| Papillary carcinoma               | 03 (1.5%)        |
| Follicular neoplasm               | 01 (0.5%)        |
| Salivary gland                    | 31 (15.5%)       |
| Sialadenitis                      | 07 (3.5%)        |
| Cyst                              | 07 (3.5%)        |
| Pleomorphic adenoma               | 09 (4.5%)        |
| WarthinTumor                      | 06 (3%)          |
| Mucoepidermoid Carcinoma          | 01 (0.5%)        |
| Adenoid Cystic Carcinoma          | 01 (0.5%)        |
| Soft tissue, Scalp & Forehead     | 35 (17.5%)       |
| Lipoma                            | 17 (8.5%)        |
| Neurofibroma                      | 03 (1.5%)        |

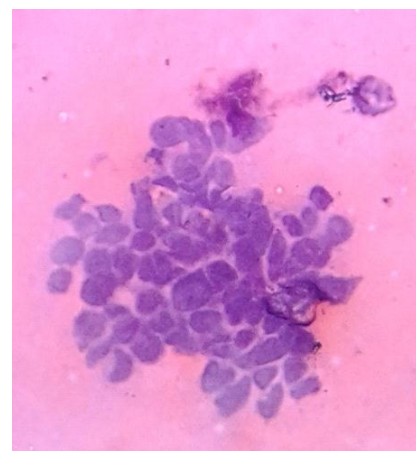
|  |           |
|--|-----------|
| Benign cystic lesion (Epidermoid cyst) | 07 (3.5%) |
| Sebaceous cyst                         | 07 (3.5%) |
| Small round cell tumor                 | 01 (0.5%) |
| Lips and oral cavity and uppr airways  | 14 (7%)   |
| Cystic lesions, Ulcer and Leukoplakia  | 10 (5%)   |
| Squamous cell carcinoma                | 04 (2%)   |



**Figure 2: Show clusters of follicular cells showing prominent nuclear groove i.e. Papillary carcinoma (High magnification 40 X).**



**Figure 3: Show sheets of acinar cells on a fibromyxoid stroma i.e. Pleomorphic adenoma (Low magnification 10X).**



**Figure 4: Show clusters of round cells showing nuclear moulding (small round cell tumor) (High magnification 40 X).**

## DISCUSSION

While performing FNAC the basic things to be needed are the experience of pathologist or clinician and familiarity of pathologist with details of the clinical history, physical examination and the results of laboratory investigations.

In the present study of 200 cases of various head and neck swellings, different data were obtained like age incidence, sex incidence etc. The results achieved in the present study were compared with other studies. Reactive lymphadenitis was found to be the most common pathology in our study accounting for 16% of cases followed by Granulomatous lesion (Tuberculous) found in 15% and 14.5% of cases were malignant lesion. El-Hag *et al*<sup>17</sup> carried out a similar study in Saudi Arabia over a period of five years which included 225 patients. This study was published in 2003 and it showed reactive lymphadenitis to be the commonest cause of neck masses accounting for 33% of cases. Tuberculous lymphadenitis was found to be the next most common pathology constituting 21% of cases followed by malignant swellings found in 8.5% of cases.

In the head and neck region, lesions are commonest in age group 16-45 years with male preponderance due to their living style with habits of tobacco chewing, cigarette smoking and alcoholism.

Out of 200 fine needle aspiration procedures, 42% were of lymph node tissue in present study. Also commonest site of malignancy in head and neck region are lymph nodes (8.5%). Squamous cell carcinoma is one of the commonest tumours in the head and neck region. It usually presents late and with nodal metastasis. Metastatic squamous cell carcinoma is the earliest diagnosis on FNAC. The primary sites are lip, tongue, oral cavity, tonsil, larynx etc.

Among other lesions thyroid and soft tissue, scalp and forehead lesions were 36% and 35% each while lesions from salivary glands and from lips and oral cavity were 31% and 14% respectively. Among all the lesions lipoma was the easiest to diagnose.

## CONCLUSION

From above study we came to conclude that FNAC is a simple, quick, inexpensive, and minimally invasive technique to diagnose different types of head and neck swellings. It could differentiate the infective process from neoplastic one and avoids unnecessary surgeries. Its not only diagnostic but can also be therapeutic especially in cystic lesions. Thus, FNAC can be recommended as a first line of investigation in the diagnosis of head and neck swellings. 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, histopathological, biochemical, and haematological findings.

## Limitations

False positive diagnoses can be caused by regenerative epithelial hyperplasia and squamous metaplasia in sialadenitis or Warthin's tumor. While epithelial atypia and high cellularity can occasionally be worrying in pleomorphic adenoma.

False negative diagnoses can be due to faulty technique, Central cystic, hemorrhage or necrotic area devoid of diagnostic cells, Small lesions and Uncooperative patients.

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*Ethical Approval: Not Required*

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