



## FINE NEEDLE ASPIRATION CYTOLOGY OF HEAD AND NECK LESIONS AN EXPERIENCE AT A TERTIARY CARE HOSPITAL

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**ABSTRACT** **Background:** Fine needle aspiration cytology (FNAC) is a widely recognized and sensitive technique in which needle is introduced into the palpable swellings, cellular material is aspirated, and cytological examination is made. This procedure provides the initial, early diagnosis of the palpable head and neck swellings. It helps in the management of the patients. **Objectives:** To study the FNAC in the diagnosis of palpable head and neck swellings. **Methodology:** Patients presenting with palpable head and neck swellings who presented to the cytology department were included in the study. FNAC results were analyzed into four groups according to the tissue of origin into lymph nodes, salivary glands, thyroidal swelling, skin, and soft tissue swellings. TBSRTC classification system is used for thyroid FNAC lesion classification. **Results:** A total of 1110 patients had FNAC during the study period. Females 738(66.5%), preponderance more than Males 372(33.5%). Out of 1110 various Head and neck, FNAC's lymph node cases 481(43.3%) reactive lymphadenitis common lesion. Thyroid cases 430 (38.7%) colloid goiter common thyroid lesion, skin and soft tissue lesions 103(9.25%) Lipomatous lesions are common, Salivary gland cases 60 (5.4%) Pleomorphic adenoma common lesion, non-diagnostic lesion 36 (3.24%). **Conclusion:** FNAC of the head and neck swellings is a simple, cost-effective procedure for the initial diagnosis of head and neck swellings. It provides the management plan for the patients in which reactive and inflammatory lesions don't require the surgeries. It also diagnoses the malignant and benign neoplasms.

**KEYWORDS :** FNAC; Lymph node; Salivary gland; Thyroid gland, TBSRTC.

### INTRODUCTION

Clinicians commonly encounter head and neck lesions in all age groups with differential diagnoses ranges from reactive lymphadenitis to malignancies. Lesions occur within the lymph node, thyroid, salivary gland, soft tissues.

Martin introduced the FNAC procedure in 1930, since then it is widely accepted due to the easy accessibility of target sites and minimally invasive nature of method<sup>1</sup>. This technique of FNAC has various modifications over a while and recognized as a successful procedure with negligible complications<sup>2,3</sup>. This procedure is used as a primary first-line investigation in the diagnosis of head and neck region swellings. It is an inexpensive, safe, outpatient procedure with rapid results and requires minimal equipment<sup>4,5</sup> avoids surgery for benign conditions. It can be repeatable and provides the easy differentiation of benign from malignant<sup>6</sup>. This procedure doesn't require any general anaesthesia with gained so much acceptance. Cervical lymphadenopathy is one of the common forms of extrapulmonary tuberculosis. About 30-40% of cases of extrapulmonary TB presents with cervical lymphadenopathy as a sole manifestation of tuberculous infection without other constitutional symptoms. FNAC serves the purpose of rapid diagnosis and early treatment of the TB cases; this procedure causes the minimal distortion of lymph node architecture and interferes with subsequent histological examination<sup>7</sup>.

Salivary gland tumours are uncommon constitutes about 3%-10% of head and neck region<sup>8,9</sup>. Parotid glands involved commonly followed by submandibular, minor salivary glands, sublingual glands. FNAC preferred over Open biopsy of parotid gland neoplasms because open biopsy leads to increased risk of tumour implantation in the wound site and increased rate of local recurrence of the tumour<sup>10</sup>, open biopsy of a neck mass of unknown aetiology should not be undertaken until the possibility of carcinoma of salivary gland tumour has been excluded.

Over half of the asymmetrical masses in adults are reported to be malignant, either primary lymphoma, secondary carcinoma<sup>11</sup> a complete thorough examination of patients presenting with the neck masses. For cystic swellings, it can be both diagnostic and therapeutic. In the Thyroid reporting cytopathologists were facing problem to communicate thyroid FNAC interpretation to the physician because there are various reporting formats for thyroid reporting system, Addressing these issues National cancer institute NCI hosted a state conference at Bethesda, Maryland. There are six committees dealt with different areas regarding thyroid cytopathology. Diagnostic terminology and morphological criteria were dealt with in committee

IV 2(2).The Bethesda System for reporting thyroid cytopathology TBSRTC which includes definitions, diagnostic criteria/morphological criteria, explanatory notes and a brief management plan for each category.<sup>12</sup>

### Material and methods:

**Study design:** Descriptive, retrospective and prospective study  
**Study population:** Patients who referred to the department of cytology from the various departments of our college.  
**Locus of study:** Osmania Medical College, Hyderabad  
**Study duration:** 2 years  
**Ethical approval:** The study was approved by the institutional ethics committee, and written consent was taken from the patient.  
**Inclusion criteria:** Patients with palpable head and neck masses were included in the study.  
**Sampling method:** Consecutive sampling method  
**Sample size:** Over two years of the study period, a total of 1110 patients were included in the study

**Methodology:** Initially, an examination of the swelling was performed with palpation, and FNAC procedure explained to the patient clearly in their local language, Local anaesthesia is not given to the patient as this procedure was done using a small gauge needle, avoiding another needle prick to the patient. Swelling stabilized by digital palpation, and it was cleaned with an alcohol swab, and 25 gauge needle with attached 5ml syringe introduced into swelling subcutaneously with the through and fro movements needling was done with the suction applied to the syringe with in the mass and the needle is withdrawn from the patients after the suction being released. The material expelled on the slides and smears are made, smears are fixed with 90% alcohol solution and stained with hematoxylin and eosin stain, examined under the microscope by the cytopathologist. TBSRTC classification system is used for thyroid FNAC lesion classification.

**Statistical analysis:** The data were tabulated and expressed in the form of a percentage

### Results

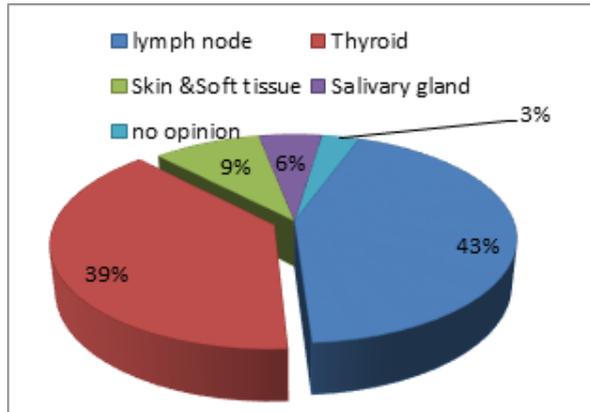
Over two years of the study period, a total of 1110 patients, who had palpable head and neck masses and underwent FNAC'S in Osmania Medical College, Hyderabad. These patients are divided into the paediatric age group and adult group. Children below 18 years are coming under the pediatric age group, and adult patients split 19-30,31-40,41-50,51-60,>61years was shown in Table 1. In this study, the age range was between the youngest patient's age was three

months, and older patients aged 80 years. The peak incidence of cases 29.2% was seen in the 19-30 years. Female patients are more compared to males. Female patients were about 738 (66.5%) and males 372 (33.5%).

**Table 1: The age-wise distribution of patients**

Age (Years)	Patients (%)
1-18	170 (15.3)
19-30	324 (29.2)
31-40	292 (26.3)
41-50	183 (16.4)
51-60	97 (8.73)
>61	44 (3.96)
Total	1110

Most of the cases include the lymph node, thyroid gland, salivary gland, soft tissue, vascular tumours, and no possible opinion cases shown in Figure 1.



**Fig1 FNAC distribution of cases**

**Table 2: Cytological distribution of various lymphnodopathies.**

Cytological diagnosis	Number(%)
Reactive lymphadenitis	192 (39.9)
Granulomatous lymph adenitis	165 (34.3)
Caseating tuberculous lymphadenitis	52 (10.8)
Metastatic deposits in lymph node	25 (5.19)
Necrotizing lymphadenitis	23 (4.78)
Suppurative lymphadenitis	17 (3.53)
Lymphoproliferative lesions	07 (1.45)

Among 1110 thyroid FNAC includes 430 (39%) cases according to TBSRTC classification category I include 14, category II 397, category III 01, category IV 8, category V 4, category VI 6 cases shown in table 3.

**Table 3 Cytological distribution of various thyroid lesions.**

Category	Cytological diagnosis	Number (%)
I	Un satisfactory	14 (3.2)
II	Benign	197 (45.8)
	Colloid goiter	150 (34.8)
	Hashimotos / lymphocytic thyroiditis	50(11.6)
	Adenomatous goiter	
III	Atypia of undetermined significance	01 (0.2)
IV	Follicular neoplasm/ suspicious of follicular neoplasm	08 (1.8)
V	Suspicious of malignancy	04 (0.9)
VI	Malignancy	06 (1.39)

**Table 4: Cytological distribution of skin and soft tissue lesions**

Cytology diagnosis	Number (%)
Lipoma	48 (46.6)
Epidermoid cyst	40 (38.8)
Epidermoid cyst with infection	04 (3.8)
Inflammatory lesions	04 (3.8)
Spindle cell lesion	04 (3.8)
Vascular lesion	01 (0.97)
Fibroma	01 (0.97)
Malignant melanoma	01 (0.97)

Among 1110 Skin and Soft tissue lesions include 103 cases (9.2%).

**Table 5: Cytological distribution of salivary gland lesions**

Cytology diagnosis	Number (%)
Pleomorphic adenoma	26 (43.3)
Chronic sialadenitis	15 (25)
Acute sialadenitis	05 (8.3)
Suppurative sialadenitis	04 (6.6)
Mucous retention cyst	05 (8.3)
Sialadenosis	01 (1.6)
Cystic lesion of the parotid	01 (1.6)
Adenoid cystic carcinoma	01 (1.6)
Warthin tumor	01 (1.6)
Mucoepidermoid carcinoma	01 (1.6)

Youngest age group 10-month female baby diagnosed with reactive lymphadenitis. Granulomatous lymphadenitis cytology shows the epithelioid clusters (fig 2a) and Langhans giant cells and necrosis in the background. Necrotizing lymphadenitis shows caseous necrosis predominantly (fig 2b). Metastatic deposits to the lymph node mostly unknown origin, followed by squamous cell carcinoma (fig 2c & 2d). Lymphoproliferative lesions presented with bilateral lymphadenopathy and smears show high cellularity with a polymorphous population consisting of large cells admixed with intermediate-sized and small cells. (fig 2e).

Female predominance seen in thyroid lesions than males. Most of the cases belong to the category II Colloid goiter consist of colloid in the background and benign thyroid follicular epithelial cells and cyst macrophages ( figure 3a), Hashimoto's thyroiditis shows hurtle cells, the polymorphous population of lymphocytes some are impinging on the thyroid follicular cells (figure 3b). Follicular neoplasms show the high cellularity with repetitive thyroid follicular cells (figure 3c). Malignancy includes 6 cases; all of them show papillary carcinoma thyroid with high cellularity, papillary fronds, and intranuclear inclusions. (figure 3d,3e).

Epidermoid cyst and epidermoid cyst with infection total 44 cases, which includes 12 in the scalp (27.2%), ten behind and front of the ear (22.7%), 8in (18.1%) cheek, 6(13.6%) lateral side of the neck. 6(13.6%) in the eyebrow, 2(4.54%) nape of neck and cytology shows the nucleated and anucleated squamous cells (Figure4a) with superadded neutrophilic infection (Figure 4b). Benign lipomatous lesions constitute about 48 /103 soft tissue lesions, also seen in the various regions on the head and neck region. Spindle cell lesion shows the sheets of spindle cells (Figure 4c). vascular lesion cytology shows the only haemorrhage. 50Years old patient presented with a swelling in forehead cytology reveals sheets of cells consisting of black coloured pigment and diagnosed as Malignant melanoma. (Figure 4d).

Among 1110 salivary FNAC includes 60 (5.4%), and cytological distribution cases are shown in Parotid gland involved in the majority of cases 88%, submandibular gland 3.3% submental gland 3.3%, minor salivary3.3% mucous retention cyst seen in intraorally. Pleomorphic adenoma was the most common benign tumour with benign ductal epithelial cells and chondromyxoid background (Figure5a), and inflammatory lesions include sialadenitis chronic, acute, suppurative sialadenitis. Cystic lesions include the mucus retention cyst arises in the floor of the mouth, cystic lesions of parotid contains the sheets of ductal epithelial cells with cyst-macrophages in the background. Malignant salivary gland tumour includes Adenoid cystic carcinoma, Mucoepidermoid carcinoma, warthin tumour.

**DISCUSSION**

A total of 1110 cases with head and neck masses analyzed according to age, gender, anatomic location, and cytological findings. The age ranged from 3 months to 80years and with female predominance with 2:1 female to male ratio.

Overall, lymph node enlargement (43.3%) being the commonest cause to undergo FNAC for swellings of head and neck region followed by the thyroid and soft tissues and salivary glands (38.7%, 9.20%, 5.40%, and no opinion possible in 3.20%). These results are in correlation with Shaan K et al.<sup>13</sup> Ajay et al.<sup>14</sup> Singhal P et al.<sup>15</sup> studies.

Lymph node Cytology reveals reactive/nonspecific lymphadenitis most common (39.9%), followed by granulomatous (34.3%),

caseating tuberculous lymphadenitis (10.8%) similar to Kusum et al<sup>16</sup>, Apoorva et al.<sup>17</sup>, Shaan K et al.<sup>13</sup> & Setal C et al.<sup>18</sup>. Most of the inflammatory lesions, benign lesions were seen in the young age group compared to malignant lesions adult age group.

Priyanka chand<sup>19</sup> in her cytopathological pattern of tubercular lymphadenopathy on FNAC divided the cytology smears into four categories only caseous necrosis 85% (15.4%), caseous necrosis with inflammatory cells 189 (39.9%), caseous necrosis with epithelioid granulomas and giant cells 120 (21.8%), epithelioid granulomas without necrosis 156 (28.4%). The sensitivity of this study increased with acid-fast staining complementing with cytomorphology and also mention the positivity of acid-fast bacilli increased by doing Ziel – Nielsen staining on another smear or if only necrosis is seen on the smear decolorizing the smear and doing Ziel –Nielsen staining on that smear or by repeat aspiration Nidhi et al. study<sup>20</sup>.

In the present study, thyroid swelling constituted 430 (39%) classified according to TBSRTC classification. There are six committees that dealt with different areas regarding thyroid cytopathology. Diagnostic terminology and morphological criteria were dealt with in committee iv 2 (2). The Bethesda system for reporting thyroid cytopathology TBSRTC, which includes definitions, diagnostic criteria/ morphological criteria, explanatory notes, and a brief management plan for each category. In this study, colloid goiter was the most frequent benign thyroid lesion 197 (45.8%), hurthle cell/ lymphocytic thyroiditis 150, adenomatoid goiter 50 cases follicular neoplasms/ suspicious for follicular neoplasms 8, suspicious malignancy four all are suspicious for papillary carcinoma thyroid, malignancy 6 cases. These findings are correlating with Gopal Krishna et al. study<sup>21</sup> Handa u et al.<sup>22</sup>

Among skin and soft tissues lesions epidermoid cyst with associated neutrophilic infection 47 cases followed by the benign lesions followed by malignant lesions compared to the Rahul et al. study<sup>23</sup>. In Rekhi b et al. study,<sup>24</sup> malignancies are most common in soft tissues.

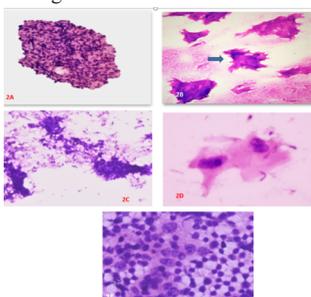
Among salivary gland lesions pleomorphic adenoma most common with 26 cases (43.3%) followed by chronic sialadenitis, Setal et al.<sup>18</sup> Fernandes et al<sup>1</sup> also found the pleomorphic adenoma was a most frequent benign lesion, mucoepidermoid carcinoma was the most prevalent malignant salivary gland tumour.

Malignant lesions include 54 (4.86%) cases out of which metastatic deposits in seen 25 cases (17 males, eight females) in the cervical lymph nodes patients age range from 42 years to 80 years. These metastatic deposits are of unknown primary origin (80%), followed by squamous cell carcinoma (20%). Lymphoproliferative disease seen in 7 cases. Follicular neoplasms / suspicious of follicular neoplasms in 8 cases, suspicious of papillary carcinoma thyroid in 4 cases, papillary carcinoma thyroid in 6cases. Salivary gland carcinoma in 3 cases correlating with Setal et al. study<sup>18</sup>, Shaan, et al. study<sup>13</sup>. An epidemiological study conducted by Ogbera et al.<sup>25</sup> also found the papillary carcinoma thyroid was the most frequent malignancy due to the vigorous iodization program.

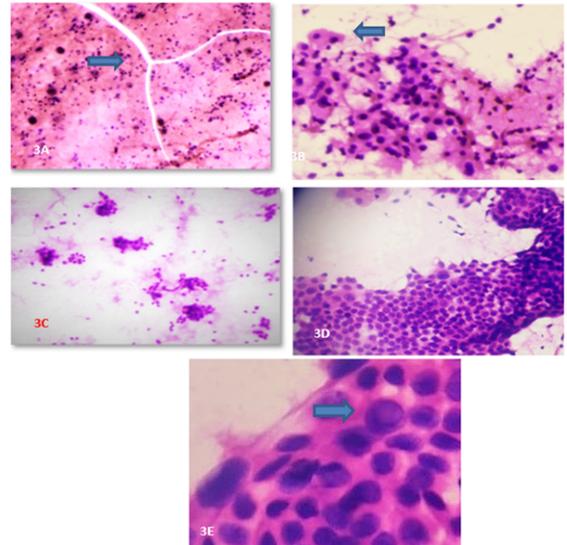
In our study, inflammatory lesions are common, followed by benign and malignant lesions.

**CONCLUSIONS**

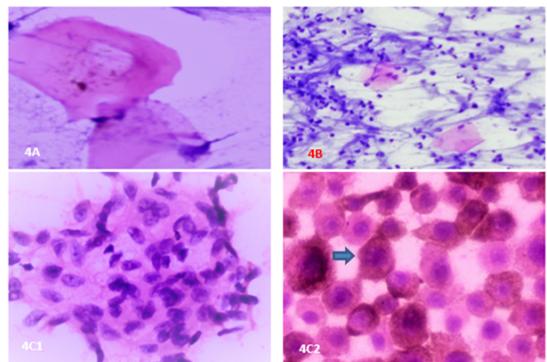
FNAC of the head and neck swellings is a simple, cost-effective procedure for the initial diagnosis of head and neck swellings. It provides the management plan for the patients in which reactive and inflammatory lesions doesn't require the surgeries. And it also diagnoses the malignant and benign neoplasms. Accurate sampling and careful examination of cytological smears can help to reduce the false positive, false-negative results in FNAC.



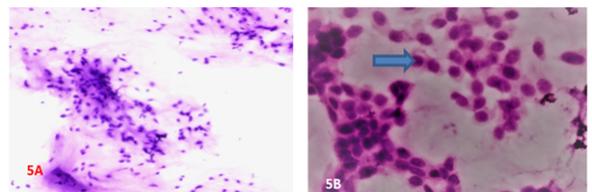
**Fig 2A:** Photomicrography shows cluster of epithelioid histiocytes (40X), 2B: Photomicrography shows caseous necrosis (40X), 2C: Photomicrography shows high cellularity with sheets of pleomorphic cells with hyperchromatic nuclei with abundant cytoplasm (10X), 2D: Photomicrography shows metastatic deposits of squamous cell carcinoma with abundant cytoplasm and pleomorphic nuclei (40X), 2E: Photomicrography shows polymorphous population of consisting of large cells, intermediate cells, small cells (10X) {H&Estain}.



**Fig 3A:** Photomicrography shows benign thyroid follicular cells admixed with haemosiderin laden macrophages in the thick colloid with cracks (10X), 3B: Photomicrography shows benign thyroid follicular cells, Hurthle cells impinged by lymphocytes (40X), 3C: Photomicrography showing high cellularity with a repetitive pattern of thyroid follicular cells in follicular neoplasm of the thyroid (10X), 3D: photomicrography shows high cellularity thyroid follicular cells arranged in a papillary pattern showing anatomical borders, overcrowding and overlapping of nuclei (40X), 3E: Photomicrography shows thyroid follicular cells with intranuclear inclusion (40X) {H&Estain}.



**Fig 4A:** Photomicrography shows anucleated and nucleated squamous epithelial cells in the epidermoid cyst (40X) H&E, FIG 4B: Photomicrography shows anucleated and nucleated squamous epithelial cells with neutrophils in the background .epidermoid cyst with infection. 10X H&E, 4C1: Photomicrography shows spindle cells (40X) H&E, 4C2: Photomicrography shows Pleomorphic cells with melanin pigment (40X) {H&Estain}.



**FIG 5A:** Photomicrography shows ductal epithelial cells in chondromyxoid background 10X, 5B: Photomicrography shows plasmacytoid cells in chondromyxoid background (40X) H&E.

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