

# Assessment of the Utility of FNAC as an Initial Diagnostic Modality in Patients with Swellings in the Head, Neck and Face Region

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| Received: 05.03.2019 | Accepted: 10.03.2019 | Published: 31.03.2019

DOI: [10.21276/sjpm.2019.4.3.15](https://doi.org/10.21276/sjpm.2019.4.3.15)

## Abstract

**Background:** The presence of a mass in head, neck and face region often pose a challenging diagnostic problem to the clinician who is confronted with a maze of possibilities. The routine work up comprises of clinical history, clinical examination and other diagnostic aids like radiology which often fail to resolve the vexing problem regarding the nature of the mass. An early recognition and categorization of lesions is essential for treatment. **Aim of the Study:** To assess the utility of FNAC as an initial diagnostic modality in patients with swellings in the head, neck and face region. **Materials and Methods:** The study was conducted in the Department of General Pathology of D.Y. Patil Medical College. The ethical clearance for study protocol was obtained from ethical committee of the institution. The present study emphasizes on the diagnostic utility of the fine needle aspiration of head, neck and face swellings. This study is undertaken from February 2015- June 2016. All the patients referred to the department of pathology for FNAC of swellings in the region of head, neck and face, were analysed. A total number of 484 FNAC cases are analysed in this study. In the present study, the technique described by Franzen, Zajieck and their colleagues was employed. **Results:** Lymph node lesions are commonest (245 cases) followed by thyroid lesions (152 cases), other lesions (60 cases) & 27 salivary gland lesions. An asymptomatic swelling was the commonest presenting feature (30.9%), followed by cough (23.6%). 76 cases (50%) followed by haemorrhagic aspirates in 54 (35.5%) cases. Out of 104 colloid goiters 76 cases yielded only colloid. All the cases of thyroiditis (including lymphocytic, Hashimoto's & de Quervain's thyroiditis) & follicular neoplasm yielded haemorrhagic aspirates. Table 4 shows the cytomorphological diagnoses of salivary gland lesions (27 cases). **Conclusion:** Fine needle aspiration cytology is a useful technique for evaluation of patients with head, neck and face lesions because of its early presentation, less complication and excellent results. It is a rapid, safe, inexpensive and reliable diagnostic procedure which can be carried out on outpatient department basis and can be repeated if necessary. **Keywords:** clinical examination, FNAC, haemorrhagic aspirate, de Quervain's thyroiditis.

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## INTRODUCTION

The presence of a mass in head, neck and face region often pose a challenging diagnostic problem to the clinician who is confronted with a maze of possibilities. The routine work up comprises of clinical history, clinical examination and other diagnostic aids like radiology which often fail to resolve the vexing problem regarding the nature of the mass. An early recognition and categorization of lesions is essential for treatment [1]. FNAC of such masses is a rapid, safe, inexpensive and direct procedure for obtaining material for cytological analysis. Any swelling presenting in head, neck and face region is detected very early by the patient or clinician himself. The diagnostic possibilities in these regions range from infectious to developmental anomalies, to benign or malignant neoplastic processes [2]. Excisional biopsy is deleterious and often interferes with further treatment. FNAC provides alternatives to

the danger of open neck biopsy and inaccuracies of relying on clinical suspicious alone. FNAC is widely accepted as an effective and reliable diagnostic modality. A close cooperation between the clinician and cytopathologist is an essential pre-requisite for arriving at a reliable diagnosis [1-3]. The role of FNAC in diagnosis of masses in region of head, neck and face is well established and its accuracy is well documented. Koss who devoted his life to cytology rightly said, "Thin needle aspiration cytology is a procedure whose time has come" [4, 5]. Hence, the present study was planned to assess the utility of FNAC as an initial diagnostic modality in patients with swellings in the head, neck and face region.

## MATERIALS AND METHODS

The study was conducted in the Department of General Pathology of D.Y. Patil Medical College. The

ethical clearance for study protocol was obtained from ethical committee of the institution. The present study emphasizes on the diagnostic utility of the fine needle aspiration of head, neck and face swellings. This study is undertaken from February 2015- June 2016. All the patients referred to the department of pathology for FNAC of swellings in the region of head, neck and face, were analysed. A total number of 484 FNAC cases are analysed in this study. In the present study, the technique described by Franzen, Zajieck and their colleagues was employed. Before aspirating a swelling a thorough knowledge of the anatomy of the area is required. Procedure was described in detail to the patient for his cooperation during the actual procedure. Written consent of the patient was taken.

## PROCEDURE

An important step in FNAC is patient positioning. Depending on site of aspiration, a patient is positioned to allow the most optimal digital palpation of the mass. In cases of cervical lymphadenopathy patients were made to lie in supine position with the head turned away from the lesion so as to make the nodes prominent. In case of thyroid lesions, patients were made to lie in supine position. Placing a pillow under the neck which tends to expose the gland more, bringing it away anteriorly from sternocleidomastoids and surrounding soft tissues, this is particularly useful when a small, diffuse goiter is being aspirated. In cases of supraclavicular lymph node enlargement it was found that aspiration could be done easily with patient sitting on a stool while person aspirating stands by the side of the patient.

The plastic syringe with 22 gauge needle attached was fitted in aspiration gun. Patency of needle was tested by pushing air through it. All air from the syringe was removed. Five to six clean glass slides were kept ready on a table and a 50 ml wide mouth bottle filled % to its capacity with 95% ethyl alcohol as fixative was kept ready with lid opened up. Coplin's jar or any wide mouth bottle with tight fitting lid can be used as an alcohol container.

After giving convenient position to the patient the swelling was grasped with two fingers or the left hand or pushed into a position where it seems fixed and stable. With the right hand, area was cleaned with antiseptic solution. No anesthesia is required but in some uncooperative children sedation was needed. The syringe pistol with attached needle was laid against skin at the determined puncture site with the help of right hand. With a quick motion needle was inserted through skin into the mass. For deeper swellings needle was kept more or less vertical to the skin surface while for superficial swellings angle of needle was almost parallel to the skin. After puncturing the swelling negative pressure was created inside the syringe by pulling piston in a backward direction and at the same time needle was moved back and forth in the swelling

with short, quick strokes in different directions.

While aspirating, hub of the syringe was observed for any aspirate. This is critical step, as it is necessary to keep aspirate in the needle and not to aspirate excessive blood which dilutes the aspirate. Blood in the syringe usually means that the aspirate will be unsatisfactory. After this, with needle still inside the swelling, air pressure in the syringe was equalized by releasing the piston. In case of cystic lesions, entire cysts were decompressed and the aspirated fluid was collected in a clean bulb and centrifuged, the deposit being used for examination. The mass was palpated to feel any residual swelling; which if present was re-aspirated. Needle was withdrawn from the swelling and puncture site was pressed with sterile gauze.

After this needle was detached from the syringe, some air was pulled inside the syringe; needle was reconnected to the syringe. The material in the needle was expelled on to a glass slide, care being taken to deposit it as a single drop at one end of the slide. Care was taken while expressing this drop to place the bevel of needle lightly against the slide, so that there was no intervening air gap. This prevents the material from being scattered onto the slide or to cross any intervening air space. Cases in which only fluid was aspirated or aspiration was scant, it was repeated once again.

## PREPARATION OF SMEAR

The aspirate which has been deposited on the glass slide was first macroscopically inspected. Usually it consists of a droplet of a fluid with or without admixture of blood or semi-solid material. A thick cover-slip or another glass slide was kept over the material aspirated and quickly pulled the top and bottom glass plates apart. This spreads the material due to the weight of the top slide or cover glass. Excess of blood or fluid was first removed by tilting the slide. The remaining material was touched with another glass slide. This distributed the aspirate evenly along the edge of glass slide which was then used to spread the aspirate rapidly over the slide. Larger tissue fragment collect at the end of the smear. They were gently crushed by firm flat pressure with the glass slide. In this was six to seven smears were prepared. Whole of the procedure was carried out as early as possible to avoid drying artifacts. Slides were numbered with appropriate case numbers with diamond marking pencil.

## FIXATION

Prepared smears can be either wet fixed or air dried depending on the stain to be used subsequently. Wet fixation is achieved by putting smear immediately in a bottle containing 95% ethyl alcohol, while air drying by allowing it to dry in air for few minutes. In this study we have used both the methods.

## STAINING

Smears were stained with following stains:

- Haematoxylin and Eosin stain
- Papinoculaou stain
- Giemsa Stain.
- Ziehl – Neelsen stain (acid fast bacilli stain)

All the smears were examined systematically as follows:

- Cellularity: Scant / Adequate / Rich
- Cases with scant cellularity (inadequate to opine) are excluded
- Background of the smear e.g. Presence of inflammatory cells, blood, necrosis
- Pattern of cells arranged in.
- Detailed study of cytomorphology of cell population.

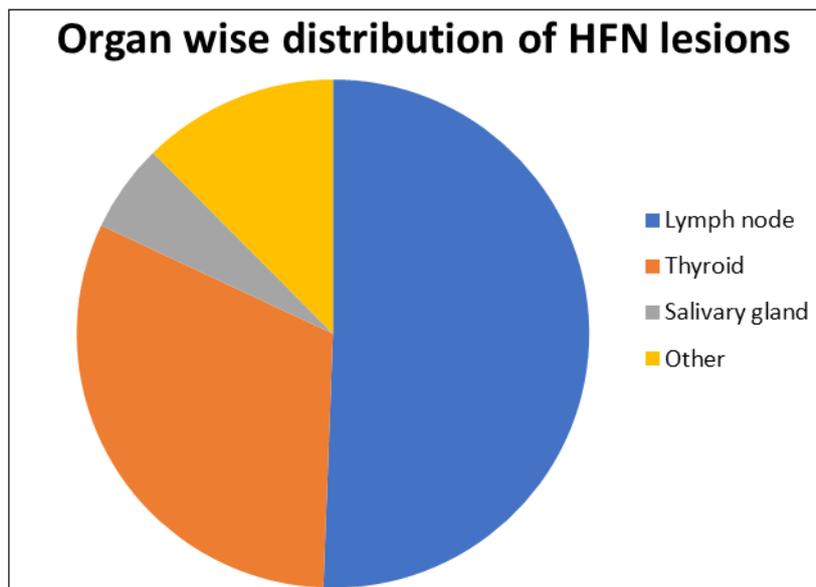
The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

Table-1 shows organ wise distribution of all the head, neck & face lesions (484 cases). Lymph node lesions are commonest (245 cases) followed by thyroid lesions (152 cases), other lesions (60 cases) & 27 salivary gland lesions. **Table-2 shows** the clinical features of granulomatous lymphadenitis (55 cases). An asymptomatic swelling was the commonest presenting feature (30.9%), followed by cough (23.6%). Table-3 shows the correlation of FNAC diagnoses of thyroid gland with nature of aspirates revealed colloid aspirates in majority i.e. 76 cases (50%) followed by haemorrhagic aspirates in 54 (35.5%) cases. Out of 104 colloid goiters 76 cases yielded only colloid. All the cases of thyroiditis (including lymphocytic, Hashimoto's & de Quervain's thyroiditis) & follicular neoplasm yielded haemorrhagic aspirates. Table 4 shows the cytomorphological diagnoses of salivary gland lesions (27 cases). Amongst non-neoplastic lesions (14 cases) there were 12 cases (85.8%) of sialadenitis, one case each of mucus retention cyst & benign salivary gland lesion (7.1% each). Out of 13 cases of neoplastic lesions, 9 cases (69.2%) were of pleomorphic adenoma, one case each (7.7%) of Warthin's tumor & benign salivary gland tumor. Malignant lesions were 2 (15.4%).

## RESULTS

**Table-1: Organ Wise Distribution of Lesions in Head, Neck & Face Region (484 Cases)**

Organ	No. Of cases	Percentage (%)
Lymph node	245	50.6
Thyroid	152	31.4
Salivary gland	27	5.6
Other	60	12.4
<b>TOTAL</b>	<b>484</b>	<b>100</b>



**Fig-1: Organ wise distribution of HFN lesions**

**Table-2: Clinical Features of Granulomatous Lymphadenitis (55 Cases)**

Clinical features	No. of cases	Percentage (%)
Asymptomatic – swelling	17	30.9
Cough	13	23.6
Fever	11	20
Evening rise of temperature	5	9.1
Past history of Tuberculosis	5	9.1
Koch's contact	5	9.1
Weight loss	4	7.3

**Table-3: Thyroid Gland Lesions (152 Cases) Correlation of FNAC Diagnoses With Nature of Aspirate**

FNAC Diagnoses	Aspirate				Total
	Haemorrhagic	Colloid	Colloid + Blood	Clear	
Colloid goiter	11	76	17	-	104
Benign thyroid lesion	1	-	-	-	1
Cystic lesion of thyroid	1	-	-	-	1
Thyroiditis	4	-	-	-	4
Hashimoto's thyroiditis	21	-	-	-	21
Lymphocytic thyroiditis	3	-	-	-	3
de Quervain's thyroiditis	1	-	-	-	1
Grave's disease	-	-	1	-	1
Thyroglossal cyst	-	-	-	1	1
Suspicious for follicular neoplasm	1	-	-	-	1
Follicular neoplasm	7	-	-	-	7
Hurthle cell neoplasm	2	-	-	-	2
Suspicious for papillary carcinoma	-	-	1	-	1
Papillary carcinoma	1	-	2	-	3
Medullary carcinoma	1	-	-	-	1
<b>Total</b>	<b>54</b>	<b>76</b>	<b>21</b>	<b>1</b>	<b>152</b>

**Table-4: Diagnoses of Salivary Gland Lesions (27 Cases)**

FNAC diagnoses	No. of cases	Percentage (%)
Benign cystic salivary gland lesion	1	3.7
Benign salivary gland tumor	1	3.7
Sialadenitis	12	44.5
Mucus retention cyst	1	3.7
Pleomorphic adenoma	9	33.3
Warthin's tumor	1	3.7
Mucoepidermoid carcinoma of parotid	1	3.7
Adenoid cystic carcinoma	1	3.7
<b>Total</b>	<b>27</b>	<b>100</b>

## DISCUSSION

This prospective study from the period of February 2015 to July 2016 of FNAC's of head, neck & face lesions comprised of total 484 cases. In the present study, among the total number of patients 185 were males & 299 were females, giving a male: female ratio of 1:1.62. El Hag *et al.*, [6] in his study had found male: female ratio of 1:1.02. In the present study, out of the total 484 adequate samples, 423 cases (87.4%) were non-neoplastic, while 61 cases (12.6%) were neoplastic. Koo V *et al.*, determined the final histological and clinical diagnosis of patients with granulomatous lymphadenitis on fine needle aspiration cytology (FNAC). A retrospective cohort study was carried out over a five year period in a tertiary referral hospital. FNAC of 22 patients with granulomatous lymphadenitis was reviewed and correlated with the final histological

diagnosis and clinical outcome. Fourteen cases (64%) underwent surgical biopsy for histological assessment. a definitive diagnosis on FNAC with ancillary investigations was achieved in 82% (18 out of 22) of the cases: four Hodgkin's lymphoma, two non-Hodgkin's lymphoma (NHL), five tuberculosis (TB), two toxoplasmosis, one sarcoidosis and four benign reactive changes. They concluded that a significant number of cases of FNAC diagnosed granulomatous lymphadenitis have an identifiable underlying cause. Patients with reactive cytological changes, who clinically appear benign, can avoid unnecessary surgery. Ahmad T conducted a study to see the frequency of various pathological conditions detected on FNAC in patients presenting with neck swellings coming to Surgical Outpatient Department of Postgraduate Medical Institute, Lady Reading Hospital Peshawar. This study included patients with neck

swellings presenting to the Surgical Outpatient Department of Postgraduate Medical Institute, Lady Reading Hospital Peshawar from January 2007 to December 2007. Patients below 18 years of age were excluded. Patients' data were recorded. Samples of FNAC were sent to the cytologist and results recorded. Frequency of various pathologies was determined. The study included 50 patients with neck swellings. There were 16 male and 34 female patients with an age range of 15-55 years. Tuberculous lymphadenitis was the commonest diagnosis (36%) followed by reactive/non-specific lymphadenitis (18%). Other pathologies were malignant neoplasms (14%), cysts (10%), benign neoplasms (8%) and sialadenitis (6%). FNAC was inconclusive in 8% of cases. Carcinomas metastatic to lymph nodes were the most common type of malignancy followed by lymphoma and thyroid gland carcinoma (Papillary Carcinoma). It is concluded that tuberculous lymphadenitis is still the commonest condition in patients presenting with neck swellings followed by non-specific lymphadenitis and malignant neoplasms especially metastatic carcinoma. FNAC is an easy and suitable tool for the assessment of patients with neck swellings in the outpatient clinics. Although its diagnostic accuracy is limited as compared to tissue biopsy but it is a good test for both screening and follow-up [7, 8]. The present study comprised of FNAC of 152 cases of thyroid gland lesions. The male to female ratio was 1:4.4 which showed female predominance. Others authors have reported a ratio ranging from 1:3.54 to 1: 6.1. (78,110,111,108) Maximum cases were seen in the 4th decade of life i.e. 30.9%. Youngest patient was 14 year old & eldest was 76 year old, both were females. In present study, all the patients presented with a midline neck swelling. The commonest presenting feature was asymptomatic swelling which was seen in 131 patients (86.1%) followed by hoarseness of voice in 8 patients (5.3%), weight gain in 4 patients (2.6%), weight loss & pain were seen in 3 patients each (2%) while cold intolerance was seen in 2 (1.3%) patients. A 36 year old male showed pressure symptoms like difficulty in breathing. We evaluated that colloid was aspirated in 50% (76) cases, all were colloid goiters. Haemorrhagic aspirate was seen in 54 cases (35.5%). Out of these, 21 were Hashimoto's thyroiditis (13.8%), 11 were goiters (7.2%), 7 were diagnosed as follicular neoplasms (4.6%), 4 were thyroiditis (2.6%), 2 were hurthle cell neoplasms & 2 were malignancies (1.3% each). One case of thyroglossal cyst yielded clear, mucinous aspirate. 21 aspirates showed hemorrhage mixed with colloid. 17 cases were goiters (81%), 2 were papillary carcinomas & one case each of Grave's disease & suspicious for papillary carcinoma. Our findings of aspirates and their relationship to diagnoses correlates well with study of Kung and Yuen [9]. In our study, majority of cases were reported as colloid goiters (69.1%) followed by Hashimoto's thyroiditis (13.8%), 7 cases of follicular neoplasm (4.6%). Thyroiditis was reported in 8 cases, of these 3 cases were lymphocytic

thyroiditis & 1 was de Quervain's thyroiditis. Silverman J. F *et al.*, reported that an incidence of follicular neoplasms ranges from 1-6% [10]. There was 1 case each of Grave's disease, thyroglossal cyst, cystic lesion of thyroid, benign thyroid lesion, suspicious for follicular neoplasm. 2 cases of Hurthle cell neoplasm were seen. The present study showed 3 cases of papillary carcinoma & 1 case of medullary carcinoma. We categorized all thyroid lesions according to BETHESDA category & found that maximum cases (90.1%) were seen in category II followed by category IV (6.7%), category VI (2.6%) & category V (0.7%).

## CONCLUSION

Fine needle aspiration cytology is a useful technique for evaluation of patients with head, neck and face lesions because of its early presentation, less complication and excellent results. It is a rapid, safe, inexpensive and reliable diagnostic procedure which can be carried out on outpatient department basis and can be repeated if necessary. It helps to differentiate inflammatory condition from neoplastic disease. It has not been able to substitute excision biopsy in subtyping of lymphomas.

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