

Spectrum of FNAC in Palpable Head and Neck Lesions in a Tertiary Care Hospital in Western India- A 2 Years Study

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Abstract

Background: Palpable head and neck swellings include various non-neoplastic and neoplastic lesions of lymph node, salivary gland, thyroid gland and soft tissue. Proximity of tissues of various types and wide range of primary and metastatic neoplasm are responsible for this site being the most common in FNAC diagnosis. Aim of the study was to assess the spectrum of various pathological conditions detected on FNAC in patients with palpable head and neck lesions.

Methods: A total of 1063 patients were studied over a period of two years from January 2014 to December 2015. Stained smears made from aspirated material were reported by pathologists according to standard criteria.

Results: Distribution of head and neck lesions shows lymph nodes lesion (56.54%) as the predominant site of FNAC followed by thyroid lesions (25.21%), soft tissue & miscellaneous (10.91%) and salivary glands (7.34%). Out of 1063 cases, 666 cases (62.65%) were inflammatory in nature while remaining 397 (37.35%) cases were of neoplastic in nature.

Conclusions: It was concluded that granulomatous lymphadenitis is the commonest problem followed by reactive lymphoid hyperplasia, benign nodular goiter and malignant neoplasm especially metastatic carcinoma in our study. Owing to its simplicity, rapidity, accuracy and cost effectiveness, we recommend FNAC as the first line investigation in diagnosing head and neck swellings.

Keywords: Fine Needle Aspiration Cytology (FNAC), Neck swelling, Granulomatous lymphadenitis, Thyroid.

I. Introduction

It has contributed a great deal to transform cytology from a primarily screening tool to powerful diagnostic Technique¹. Fine needle aspiration cytology does not give the same architectural detail as histology but it can provide cells from the entire lesion as many passes through the lesion can be made while aspirating². Fine Needle Aspiration Cytology is a procedure where by small amount of tissue or cells is aspirated from a pathological lesion with the help of fine 10ml disposable syringe of 21, 22 or 24 gauge needle. Virtually any superficial organ or tissue can be sampled through this procedure. Easily targeted organs include thyroid, breast, or lymph nodes. Whereas deep organs like lungs, liver, kidney, mediastinum, and retro peritoneum are aspirated under the guidance of ultrasound or computed tomography. FNAC is an inexpensive, safe and quick procedure, and when performed by experienced worker is quite accurate³.

Palpable head and neck swellings include various non-neoplastic and neoplastic lesions of lymph node, salivary gland, thyroid gland and soft tissue. Proximity of tissues of various types and wide range of primary and metastatic neoplasm are responsible for this site being the most common in FNAC diagnosis⁴. FNAC is a clinically appropriate procedure associated with minimal trauma and complications for patients for analysis of head and neck swellings because of factors such as easy approachability of the target site, increased compliance, and helping to avoid surgery in non-neoplastic lesions, inflammatory conditions and also some tumors⁵.

The common pathologies encountered in the neck presenting as a lump are lymphadenopathies (specific and non-specific, acute and chronic), metastatic carcinoma, lymphoma, thyroid swellings (goiter, nodules and cysts) and salivary gland swellings (sialadenitis, cysts, adenomas and carcinomas). The less common pathologies presenting as swelling in the neck are carotid body tumor, bronchial cyst, thyroglossal cyst, cystic hygroma, pharyngeal pouch and lumps of skin appendages⁶. Fine needle aspiration cytology is helpful for the diagnosis of salivary gland tumors where it can differentiate between a malignant and a benign tumor with over 90% accuracy⁷. FNAC is particularly helpful in the work-up of cervical masses and nodules because biopsy of cervical adenopathy should be avoided unless all other diagnostic modalities have failed to establish a diagnosis⁸. FNAC plays a major role as a diagnostic tool in metastatic disease as well as assisting in providing hints to the nature of the primary tumor⁵.

The primary objective of the study was to assess the spectrum of various pathological conditions detected on FNAC in patients presenting with palpable head and neck lesions and to evaluate the role of FNAC and its utility in their diagnosis.

II. Material and methods

A total of 1063 patients presenting with palpable head and neck lesions, which were referred to cytology section of pathology department from the OPD/IPD of Sir Takhtasinhji General Hospital and Government Medical College, Bhavnagar situated in western India, were studied over a period of two years from January 2014 to December 2015. After taking a brief history and evaluation of relevant investigations, a thorough clinical examination was performed. A signed informed consent was taken from the patient who was participating in the study. Under aseptic precautions, the aspiration was done using 22-24 G needle attached to 10 - 20 ml disposable syringe with plunger. Aspirated material was smeared onto clean glass slides. Slides were immediately fixed in Methanol and stained by Haematoxylin & Eosin and Papanicolaou method or air-dried and stained with May-Grunwald-Giemsa (MGG). Where ever fluid was aspirated, smears were prepared from the centrifuged sediment, and stained as described above. Whenever smears were acellular or hemorrhagic, the procedure was repeated. The stained cytological slides were studied by consultant pathologists and reported according to standard criteria defined by various authors⁴. Cases having inadequate patient's particulars or equivocal diagnosis were excluded from the study. All data were collected; tabulated and analyzed using simple statistical formulae.

III. Results

The study included 1063 patients with palpable head and neck swellings from various departments as an OPD as well as indoor patient. FNAC was performed in the age group of 2 month to 100 years. Out of total 2470 FNAC patients over a period of 2 years FNAC of palpable head and neck lesions constituted 1124(45.51%) of cases. In total 1124 cases, 61(5.43%) were excluded from the study as they were unsatisfactory or had equivocal diagnosis.

There were 548 (51.55%) male and 515 (48.45%) female patients with M: F ratio is 1.1:1. Incidence of thyroid lesions was significantly higher in females (87.31%) than in male (12.69%), while incidence of lymph node, salivary gland, soft tissue and miscellaneous lesions were slightly higher in male (**Table 1**). Maximum number of patients were in the age group of 21 to 30 years (19.2%) followed by 31 to 40 years (17.8%) and 11 to 20 years (16.6%). Least number of patients was seen in the age group above 70 years.

Table- 1: Sex wise distribution of lesions

Site	Male		Female		Total
	No. of cases	%	No. of cases	%	
Lymph node	386	64.23	215	35.77	601
Thyroid gland	34	12.69	234	87.31	268
Salivary gland	50	64.10	28	35.90	78
Soft tissue & miscellaneous	78	67.24	38	32.76	116
Total	548	51.55	515	48.45	1063

Distribution of head and neck FNAC (**Fig. 1**) shows lymph nodes lesion (56.54%) as the predominant site of FNAC followed by thyroid lesions (25.21%), soft tissue & miscellaneous (10.91%) and salivary glands (7.34%). Out of 1063 cases, 666 cases (62.65%) were inflammatory in nature while remaining 397 (37.35%) cases were of neoplastic nature (**Table 2**).

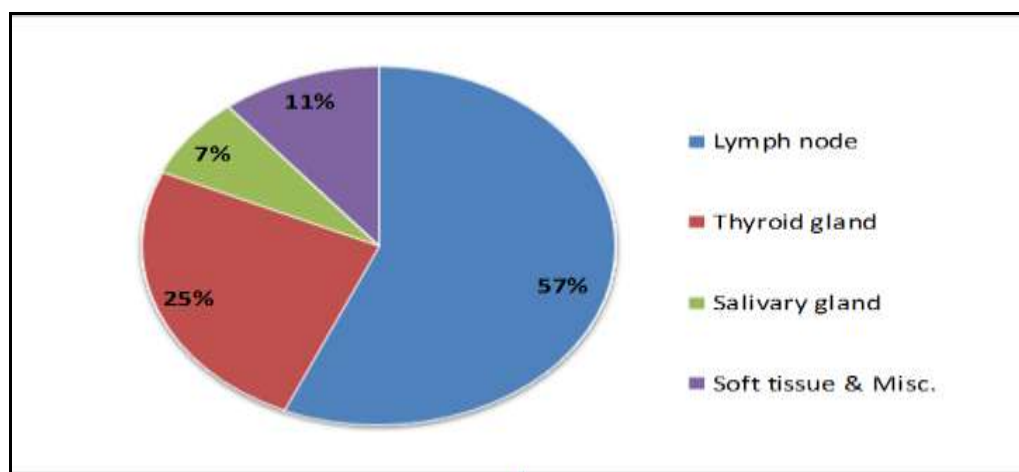


Fig. 1: Distribution of head and neck lesions (cases=1063)

Table- 2: Spectrum of inflammatory/reactive and neoplastic lesions

Site	Inflammatory / Reactive (%)	Neoplastic		
		Benign (%)	Primary/Metastatic Malignant (%)	Total Neoplastic (%)
Lymph node	469 (78.04)	-	132 (21.96)	132 (21.96)
Thyroid gland	68 (25.37)	184 (68.66)	16 (5.97)	200 (74.63)
Salivary gland	51 (65.38)	17 (21.79)	10 (12.82)	27 (34.62)
Soft tissue & miscellaneous	78 (67.24)	31 (26.72)	7 (6.03)	38 (32.76)
Total	666(62.65)	232(21.83)	165(15.52)	397(37.35)

Among 601 cases of lymph node lesions, granulomatous lymphadenitis (30.12%) was the predominant cause of lymphadenopathy followed by reactive lymphoid hyperplasia (28.79%), malignant (21.96%) and nonspecific/suppurative inflammatory lesions (19.13%). In malignant lesions, metastatic epithelial malignancy was the predominant finding (19.8%). 2.16% (13) cases of primary malignancy i.e. lymphoma were found (**Table 3**). Amongst 13 cases 11 were Non Hodgkin Lymphoma and 2 were Hodgkin's lymphoma. Histopathological examination was advised for final diagnosis in all cases of lymphoma.

Amongst 268 cases of thyroid lesions, benign nodular goiter constituted 62.69% of cases. Out of 19.03% cases of lymphocytic thyroiditis, Hashimoto's thyroiditis was 0.75% and Grave's disease was 12.31%. Out of 6.34% cases of cystic lesions, thyroglossal duct cyst was 3.36%. In malignant lesions 6 cases of papillary carcinoma and one case of anaplastic carcinoma were observed. In miscellaneous lesion 2 cases each of granulomatous and acute thyroiditis, one case each of dysmorphogenic goiter, amyloid goiter and chronic thyroiditis were observed (**Table-4**).

Table- 3: Spectrum of various lymph node lesions (N=601)

Lesions		No. of cases	%
Reactive lymphoid hyperplasia		173	28.79
Inflammatory	Non-specific /suppurative	115	19.13
	Granulomatous	181	30.12
Malignant	Lymphoma	13	2.16
	Metastasis	119	19.80
Total		601	100

Table- 4: Spectrum of various thyroid lesions (N=268)

Lesion	No. of cases	%
Benign nodular goiter	168	62.69
Lymphocytic thyroiditis (Including Hashimoto's & Grave's)	51	19.03
Follicular neoplasm	18	6.72
Cystic lesion	17	6.34
Malignant	7	2.61
Miscellaneous	7	2.61
Total	268	100

In salivary gland lesions, majority of cases (65.38%) were inflammatory (sialadenitis) /reactive (sialadenosis). Among benign neoplasm, pleomorphic adenoma was the commonest. Among malignant neoplasm, mucoepidermoid and acinic cell carcinoma were more common (**Table-5**).

Amongst 116 cases of soft tissue and miscellaneous lesions, epidermal cyst (36.21%) was the commonest in benign cystic lesions and lipoma (20.69%) was the commonest in benign soft tissue lesions. Out of 7 malignant lesions, 4 were of squamous cell carcinoma and one each of basal cell carcinoma, plasmacytoma and meibomian gland carcinoma (**Table-6**).

Table -5: Spectrum of various Salivary gland Lesions (N=78)

Lesion	No. of cases	%
Sialadenitis	28	35.90
Cystic lesions	10	12.82
Sialadenosis	15	19.23
Pleomorphic adenoma	7	8.97
Monomorphic adenoma	5	6.41
Warthin's tumor	3	3.85
Malignant	10	12.82
Total	78	100

Table- 6: Spectrum of various Soft tissue and Miscellaneous lesions (N=116)

Lesion	No. of cases	%
Benign cystic	59	50.86
Benign soft tissue	34	29.31
Inflammatory	10	8.62
Benign skin adnexal tumor	6	5.17
Malignant	7	6.04
Total	116	100

IV. Discussion

Martin and Ellis first introduced and described the technique of FNAC for diagnosis of organ lesion in 1930⁹. The two fundamental requirements on which success of FNA depends are representative sample and high quality of preparation. These two prerequisites will always remain a sine qua non, no matter how sophisticated supplementary techniques⁴. Without proper examination and assessment of the mysterious lesion, the correct medical management protocol cannot be followed if the differential diagnosis is not undertaken of the head and neck swellings¹⁰. It is important to assess the region and presenting condition thoroughly for the correct management as the differential diagnosis of head and neck swellings consists of a wide range of possible diseases¹⁰. FNAC should be regarded as the first diagnostic analysis choice as it is a fast, useful method in the exploration of head and neck lesions¹⁰. Head and neck neoplasm constitute a major form of cancer in India accounting for 23% of all cancer in males and 6% in females^{11, 12} and approximately 5% all childhood neoplasms¹³.

The present study included patients from all age groups. The majority of cases (90.97%) were observed below 60 years of age and least number of cases above 70 years of age which is similar to the study done by Chauhan S et al¹⁴ and Kishor H et al¹⁵.

In present study number of male (51.55%) were higher than female (48.45%) with M: F ratio 1.1:1, which is in concordance with Deval N Patel et al¹⁶ (52% male and 48% female) and Palak Modi et al¹⁷ (52% male and 48% female M: F= 1:1.06). But studies did by Vijay Tilak et al¹⁸ and Kishor H et al¹⁵ show female preponderance.

Predominant site of FNAC was lymph node lesions (56.54%) followed by thyroid gland (25.21). Similar result reported by Bhagat VM et al¹⁹ (53.50% were of lymph node origin), Deval N Patel et al¹⁶ (64% lymph node origin) and Savitri C et al²⁰ (67.8% were of lymph node origin), however studies done Rathod GB et al²¹ show thyroid preponderance (52% were thyroid lesion). Inflammatory / reactive lesions constituted 62.65% of total head and neck swelling in our study, thus FNAC can diagnose inflammatory /reactive cases and unnecessary surgery can be avoided.

In lymph node lesions, the reactive lymphoid hyperplasia in our study was 28.79% which is comparable to El-Hag et al²² (33%) and Kishor SH et al¹⁵ (35.08%), however studies did by Deval N Patel et al¹⁶ shows higher incidence (47%), while Rathod GB et al²¹ shows lower incidence (18%). Granulomatous lymphadenitis in our study was 30.12 %, which is comparable to Mohamed MH et al²³ (29.5%) and Deval N Patel et al¹⁶ (25%), however studies did by Rathod GB et al²¹ shows higher incidence (42.12%), while El Hag IA et al²² shows lower incidence (21%). Metastasis to lymph node is quite high in our study (19.8%), which is in concordance with Rathod GB et al²¹ (21.05%) and Deval N Patel et al¹⁶ (27%). While some other studies show low percentage of metastasis to lymph node (3.5% by Kishor SH et al¹⁵, 7% by Chauhan S et al¹⁴ and 8% by Bhagat VM et al¹⁹). Among metastasis to lymph node, metastatic squamous cell carcinoma was the commonest in our study reflecting high incidence of upper aero-digestive tract malignancy due to higher prevalence of tobacco consumption in our study population.

In our study the incidence of thyroid lesions were more common in female than male (34 cases of male and 234 cases were of female with M: F ratio 1:6.9) which is similar to Deval N Patel et al¹⁶ (1:10) and Rathod GB et al²¹ (1:4). Benign nodular goiter was the predominant thyroid lesion (62.69%) in our study. Similar findings were found in studies done by Rathod GB et al²¹ (55.77%), Kishor SH et al¹⁵ (47.77%), Palak Modi et al¹⁷ (83%) and Chauhan S et al¹⁴ (85%). Among malignant thyroid lesions, papillary carcinoma was the highest (6 cases out of total 7 malignant thyroid lesions) in our study which is comparable to Rathod GB et al²¹ and Kishor HS et al¹⁵. Thus, surgical intervention for a purely diagnostic purpose can be avoided in majority of thyroid lesions. Sometimes, evacuation of cystic thyroid lesions by FNAC procedure may result in involution of the lesion, thus FNAC itself serve as a therapeutic function.

In salivary gland lesions of present study, inflammatory and reactive together comprised 65.38% followed by benign neoplasm in 19.23% and 12.82% each of cystic lesions and malignant lesions. Kishor SH et al¹⁵ and Rathod GB²¹ et al found inflammatory lesions as the commonest findings followed by benign neoplasm while Bhagat VM et al¹⁹, Deval N Patel et al¹⁶ and Chauhan S et al¹⁴ found benign neoplasm as the predominant salivary gland lesion in their studies.

In our study benign cystic lesions was the most common lesion in soft tissues and miscellaneous group (50.86%) followed by lipoma (20.69%) which is similar to the findings of Deval N Patel et al¹⁶ where benign cystic lesions was 74% and lipoma was 22%. Epidermal cyst was the most common lesion in soft tissues and miscellaneous group (36.21%) of our study followed by lipoma (20.69%) which is similar to the findings of Kishor SH et al¹⁵ where epidermal cyst was 57.14% and lipoma was 23.8%.

In 5.43 % of cases of our study, cytological findings were unsatisfactory or had equivocal diagnosis. The causes of unsatisfactory or equivocal diagnosis were lack of cooperation by patient, smaller size of lesion, loss of aspirate during handling, inadequate (dry tap) or excessively hemorrhagic aspirate, improper fixation of mobile lesion, non-representative sampling and morphological diversity of lesion. Incidence of unsatisfactory cytology reports ranged from 0 to 10 % in various studies in the literature.

Inflammatory and non-neoplastic lesions was the predominant cause of head and neck masses in our study which is in concordance with most of the national studies, while various international studies show neoplastic lesion as the commonest finding.

V. Conclusions

It was concluded from the present study, that granulomatous lymphadenitis is the commonest problem in patients presenting with head and neck swellings in our set-up, followed by reactive lymphoid hyperplasia, benign nodular goiter and malignant neoplasm especially metastatic carcinoma. As benign lesions (895 cases) overrated the malignant one (165 cases) and FNAC could differentiate the inflammatory process from neoplastic one, it was also concluded from the present study that majority of head and neck lesions can be managed without undue surgical intervention in our set-up. Owing to its simplicity, rapidity, accuracy and cost effectiveness, we recommend FNAC as the first-line investigation in diagnosing head and neck swellings.

References

- [1]. Turbat-Herrera, EA. and Knowles, K. 1999. Cytology screening or diagnostic tool? *Hum Pathol.* 29:1356-1366.
- [2]. Kirk RM, Ribbans WJ. *Clinical Surgery in General.* 4th edition, Edinburgh: Elsevier; 2004.
- [3]. Frable, WJ. 1989. Needle aspiration biopsy. Past, present and future. *Hum Pathol.* 20:504-517.
- [4]. Orell SR. In: Orell SR, Sterrett GF, Walters MN, Whitakar D, editors. *Manual and atlas of fine needle aspiration cytology.* New Delhi: Churchill-Livingstone; 2005.
- [5]. Ishar T, Gupta RK, Khajuria A. Role of FNAC in diagnosis of non-thyroidal head and neck lesions. *JK Science.*2012; 14(1):9-13.
- [6]. Gamba PG, Messineo A, Antonello LM, Boccato P, Blandamura S, Cecchetto G, et al. A simple exam to screen superficial masses, FNAC. *Med Pediatr Oncol.*, 1995; 24: 97–9.
- [7]. Burnand KG, Young AE, Lucas J, Rrolands BJ, Scholefield J. *The new Aird's companion in surgical studies.* 3rd edition, China: Elsevier; 2005.
- [8]. Layfield LJ. Fine-needle aspiration of the head and neck. *Pathology (Phila),* 1996; 4: 409–38.
- [9]. Martin HE, Ellis EB. Biopsy of needle puncture and aspiration. *Ann Surg* 1930; 92:169-81.
- [10]. Rajbhandari M, Dhakal P, Shrestha S, Sharma S, Shrestha S, Pokharel M, Shrestha I, Shrestha B, Makaju R. The correlation between fine needle aspiration cytology and histopathology of head and neck lesions in Kathmandu University Hospital. *Kathmandu University Medical Journal.*2013; 44(4):296-9.
- [11]. Ahluwalia H, Gupta SC, Singh M, Gupta SC, Mishra V, Singh PA. Spectrum of head and neck cancers at Allahabad. *J Otolaryngol Head Neck Surg* 2001; 53:16-20.
- [12]. Mehrotra R, Singh M, Gupta RK, Singh M, Kapoor AK. Trends of prevalence and pathological spectrum of head and neck cancers in North India. *Indian J Cancer* 2005; 42:89-93.
- [13]. Ponder TB, Smith D, Ramzy I. Lymphadenopathy in children and adolescents: role of fine-needle aspiration in management. *Cancer Detect Prev.* 2000; 24:228–33.
- [14]. Chauhan S, Rathod D, Joshi DS. FNAC of swellings of head and neck region. *Indian Journal of applied basic medical sciences* 2011; 13:1-6.
- [15]. Kishor SH, Damle RP, Dravid NV, et al. Spectrum of FNAC in palpable head and neck lesions in a tertiary care hospital in India-a 3 years study. *Indian J of pathology and oncology* 2015; 2(1):7-13.
- [16]. Deval N Patel, Parth B Patel, Himani V Patel, et al. Fine needle aspiration cytology role in head and neck lesions. *IAIM* 2015; 2(8):99-104.

- [17]. Palak Modi, Haren Oza, Jignasa Bhalodia. Utility and adequacy of fine needle aspiration cytology in head and neck lesions: A hospital based study. *International journal of scientific study* 2014; 2(8):100-105.
- [18]. Vijay Tilak, Dhaded AV, Ragini Jain. Fine needle aspiration cytology of head and neck masses. *Indian journal of pathology, Microbiology* 2002; 45(1):23-30.
- [19]. Bhagat VM, Tailor HJ, Saini PK, et al. Fine needle aspiration cytology in nonthyroidal head and neck masses-a descriptive study in tertiary care hospital. *National Journal of Medical Research* 2013; 3(3):273-76.
- [20]. Savitri C, Dimple D, Dholakia A. Fine needle aspiration cytology of neck lesion- an experience at tertiary care hospital in central Gujarat. *National journal of medical research* 2012; 2(3):255-9.
- [21]. Rathod GB, Parmar P. Fine needle aspiration cytology of swellings of head and neck region. *Indian Journal of Medical Science* 2012; 66(3):49-54.
- [22]. El Hag IA, Chiedozi LC, al Reyees FA, et al. Fine needle aspiration cytology of head and neck masses. Seven years' experience in a secondary care hospital. *Acta Cytol* 2003; 47(3):387-92.
- [23]. Moamed MH, Hitam S, Brito-Mutunayagam S, et al. Role of FNAC in evaluation of neck masses. *J Curr Surg* 2013; 3(1):19-23.