



A DESCRIPTIVE STUDY ON FNAC AS DIAGNOSTIC PROCEDURE IN HEAD AND NECK IN A PERIPHERAL HOSPITAL

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ABSTRACT

Context: The Head and Neck pathologies present a diagnostic and management challenge, especially for a peripheral health care facility. FNAC is a safe and reliable diagnostic tool available, which can resolve many diagnostic and management related dilemmas in such conditions.

Aims: The aim of the present study was to determine incidence of various Head and Neck pathologies with FNAC and establish the role of FNAC in diagnosis of these pathologies in peripheral hospital.

Settings and Design: Descriptive study

Methods and Material: Four hundred and fifteen patients, who underwent FNAC for Head and Neck pathologies over a period of six years in a peripheral hospital. The distribution of various pathologies on basis of origin, age and sex was observed. All data was compiled and analysed in Microsoft Excel.

Results: Out of total 1409 FNACs done, 415 (29.45%) were conducted for head and neck pathologies on 238 male and 177 female patient with age ranging from 3 years to 76 years. The most common condition source of Head and neck lesion was lymph node, followed by thyroid. Reactive lymphadenitis and tubercular lymphadenitis were the most common lesions diagnosed in patient less than 20 years. In age group 20 -40 years, most common diagnosis were reactive lymphadenitis and colloid goiter, while in patients over 40 years of age, most common diagnosis were colloid goiter and nodal metastasis of squamous cell carcinoma.

Conclusions: The study describes the distribution of various Head and Neck pathologies encountered in a peripheral hospital. FNAC contribute considerably to diagnosis and management of these lesions and has a definitive role as a safe and reliable diagnostic tool.

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INTRODUCTION

The intricate and complex anatomy of Head & Neck region, along with variety of pathologies arising from these structures makes this region a 'Pandora's box'. A perplexing embryological development and presence of multiple important structures like lymph nodes, thyroid, salivary gland, major blood vessels and aero-digestive structures predispose the region for development of heterogenous pathologies. These lesions are encountered commonly and produce a clinical dilemma, especially in a peripheral hospital. Fine needle aspiration cytology (FNAC) has been established as a safe, fast and reliable technique for assessment and management of head and neck pathologies.^[1] The aim of the present study was to determine incidence of various Head and Neck pathologies

with FNAC and establish the role of FNAC in diagnosis of these pathologies in peripheral hospital.

MATERIALS AND METHODS

The study is an observational study done in a peripheral hospital of a town, situated at Sub- Himalayan region of North India. A total 415 patients reporting during a period of January 2011 to December 2017 were included in study. The inclusion criteria were all patients of Head and Neck Pathologies, detected clinically or as incidental findings of various investigations. All patients with a known pathology, like diagnosed Head and Neck Carcinoma or Tuberculosis, and all operated patients were excluded from the study. The approval from institutional ethical committee was obtained and written informed consent from all patients was obtained for FNAC procedure and inclusion in the study. The FNAC was

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performed with standard technique, either non-guided or Ultrasonography guided if required.^[2] The procedure was performed without local anaesthesia using the 10ml disposable syringe with an attached 22-23G needle. The air dried smears were stained with Leishman and Giemsa (LG) stain. The smears were fixed in methanol were stained with Papanicolaou (PAP) stain. The aspirate smears were also stained with Gram and Ziehl-Neelsen (ZN) stain whenever indicated, to find out infective pathologies. The Bethesda system for diagnosis of thyroid lesions was used and the “follicular neoplasms” and “Suspicious of follicular neoplasm” were placed in one category. An attempt was made to give definitive diagnosis of all non-neoplastic thyroid lesions.^[3] The diagnosis of Hashimotos thyroiditis was made when cytomorphology correlated with proper clinical context.^[3]

Statistical Analysis: All data was compiled and analysed in Microsoft Excel.

RESULTS

Out of 1409 FNACs, total of 415 (29.45%) cases were of head and neck region. with 238 males and 177 females.

The mean age of the patients was 31.51 years (SD=15.98) and range 3 years to 76 years. The 340 results were categorised under non-neoplastic category, 34 were categorised as neoplastic and 41 (9.9%) FNACs were inconclusive or could not be commented upon. The pathologies were grouped on the basis of origin (Table1-2). The most common cause of Head and Neck lesion was of lymph node origin. Reactive lymphadenitis comprised of 118 (28.43%) of the all cases followed by colloid goiter, which comprised of 79 (19.03%) cases. Suspicious of Follicular neoplasm of thyroid was placed in neoplastic category. Tubercular lymphadenitis was detected in 18 (4.33%) of the patients. Pleomorphic adenoma (9 cases, 2.17%) was the most common pathology encountered in salivary glands. Epidermal cyst (29 cases, 6.99%) was the commonest soft tissue lesion, categorised under miscellaneous category. Age group wise distribution for common pathologies was also done (Table 3). In the age group less than 20 years, reactive lymphadenitis was the most common pathology, followed by tubercular lymphadenitis (Figure 1). In age group 20 to 40 years, the most common pathology was reactive lymphadenitis (Figure 2), followed by colloid goiter.

Table 1 Distribution of pathologies in thyroid and salivary gland region

		Total Number n=415 (100%)	Male (%)	Female (%)
Thyroid and Parathyroid Origin	Non Neoplastic			
	Colloid goitre	79 (19.03)	23(29.1)	55(70.9%)
	Lymphocytic thyroiditis	12 (2.89)	7(58.3%)	5(41.7%)
	Hashimotos thyroiditis	11 (2.65)	2(18.2%)	9(81.8%)
	Normal Thyroid	3 (0.72)	1(33.3%)	2(66.7%)
	Autoimmune thyroididitis	2 (0.48)	1(50%)	1(50%)
	Neoplastic			
	Parathyroid adenoma	1 (0.24)	-	1(100%)
	Suspicious of Follicular neoplasm	7 (1.69)	1(14.3%)	6(85.7%)
	Papillary carcinoma	1 (0.24)	-	1(100%)
Salivary Glands Origin	Non Neoplastic			
	Sialadinitis	2 (0.48)	1(50%)	1(50%)
	Normal Parotid	2 (0.48)	1(50%)	1(50%)
	Neoplastic			
	Giant Cell Lesion Parotid	1 (0.24)	1(100%)	-
	Pleomorphic adenoma	9 (2.17)	2(22.2%)	7(77.8%)
Low grade muco-epidermoid carcinoma	1 (0.24)	1(100%)	-	

Table 2 Distribution of pathologies in lymph node and Miscellaneous category.

		Total Number n=415 (100%)	Male (%)	Female (%)
Lymph Node	Non Neoplastic			
	Reactive lymphadenitis	118 (28.43)	95(80.5%)	23(19.5%)
	Tubercular lymphadenitis	18 (4.33)	16(88.9%)	2(11.1%)
	Suppurative lymphadenitis	13 (3.13)	9(69.2%)	4(30.8%)
	Granulomatous lymphadenitis	12 (2.89)	2(16.7%)	10(83.3%)
	Necrotising lymphadenitis	1 (0.24)	1(100%)	-
	Normal lymph node	1 (0.24)	1(100%)	-
	Neoplastic			
	Squamous cell carcinoma metastasis	9 (2.16)	8(88.9%)	1(11.1%)
	Haematolymphoid malignancy	3 (0.72)	1(33.3%)	2(66.7%)
	Adenocarcinoma metastasis	2 (0.48)	1(50%)	1(50%)
	High grade carcinoma metastasis	1 (0.24)	1(100%)	-
	Large cell lymphoma	1 (0.24)	1(100%)	-
Miscellaneous	Benign			
	Epidermal cyst	29 (6.99)	19(65.5%)	10(34.5%)
	Benign cyst	11 (2.65)	7(63.6%)	4(36.4%)
	Lipoma	6 (1.45)	4(66.7%)	2(33.3%)
	Haematoma	5 (1.20)	3(60%)	2(40%)
	Spindle cell lesion	4 (0.96)	3(75%)	1(25%)
	Abscess	3 (0.72)	1(33.3%)	2(66.7%)
	Mucocele	2 (0.48)	1(50%)	1(50%)
	Cysticercosis	1 (0.24)	-	1(100%)
	Mesenchymal lesion	1 (0.24)	1(100%)	-
	Fat necrosis	1 (0.24)	-	1(100%)
	Malignant			
	Melanoma	1 (0.24)	-	1(100%)

However in age group greater than 40 years, the most common pathology encountered was colloid goiter, followed by nodal metastasis of squamous cell carcinoma (Figure 3).

Table 3 Age group wise distribution was for common pathologies

S No	Age group (years)	Total no of cases	Relatively common pathologies in age group	Percentage
1	10 yrs and less	28	Reactive Lymphadenitis	64.3%
			Suppurative Lymphadenitis	10.7%
			Tubercular Lymphadenitis	7.1%
2	11-20	71	Reactive Lymphadenitis	57.7%
			Tubercular Lymphadenitis	5.6%
			Granulomatous Lymphadenitis	5.6%
			Pleomorphic adenoma	2.8%
3	21-30	127	Reactive Lymphadenitis	28.6%
			Epidermal cyst	11.9%
			Colloid goiter	8.73%
			Tubercular Lymphadenitis	6.3%
			Colloid goiter	30.8%
4	31-40	91	Reactive Lymphadenitis	16.5%
			Epidermal cyst	9.9%
			Lymphocytic Thyroiditis	4.3%
			Granulomatous lymphadenitis, Hashimotos thyroiditis, Pleomorphic adenoma, Tubercular lymphadenitis	~3% each
			Suspicious of Follicular neoplasm	2%
			Colloid goiter	53.8%
			Cysts	10.2%
			Reactive Lymphadenitis	7.7%
5	41-50	39	Colloid goiter	33.3%
			Suspicious of Follicular neoplasm	10%
			Reactive lymphadenitis	10%
			Pleomorphic adenoma	6.6%
			Metastasis(Squamous cell carcinoma)	6.6%
			Metastasis(Adenocarcinoma)	3.3%
			Colloid goiter	36.4%
6	51-60	30	Metastasis(Squamous cell carcinoma)	27.3%
			Reactive lymphadenitis	9%
			Suspicious of Follicular neoplasm thyroid, Haematolymphoid malignancy, suppurative lymphadenitis	~4% each
			Metastasis Squamous cell carcinoma, Metastasis Adenocarcinoma, Suspicious of follicular neoplasm, Epidermal cyst, High grade carcinoma, Low grade mucoepidermoid carcinoma	~14% each
			Metastasis Squamous cell carcinoma, Metastasis Adenocarcinoma, Suspicious of follicular neoplasm, Epidermal cyst, High grade carcinoma, Low grade mucoepidermoid carcinoma	~14% each
			Metastasis Squamous cell carcinoma, Metastasis Adenocarcinoma, Suspicious of follicular neoplasm, Epidermal cyst, High grade carcinoma, Low grade mucoepidermoid carcinoma	~14% each
Total = 415				

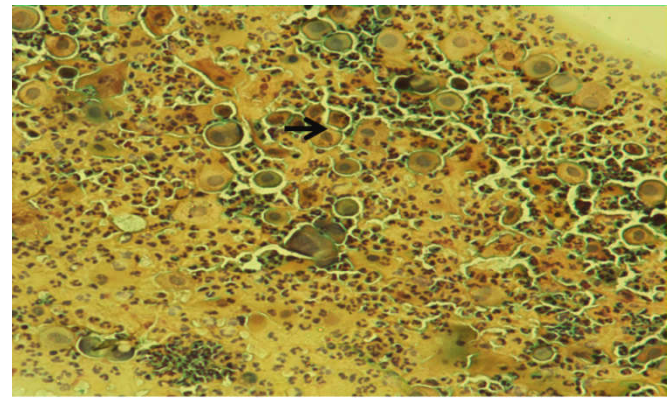


FIGURE 3. Lymph node metastasis of squamous cell carcinoma, PAP Stain (200 x)

DISCUSSION

The FNAC is a relatively simple, accurate, cost effective and useful diagnostic technique, which can influence management plan of a mass lesion. FNAC done in Head and Neck region forms a major portion of total FNACs being done in any institution. Almost all pathologies in head and neck region can be subjected to FNAC, with relatively few contraindications.^[2] FNAC has high sensitivity, specificity and accuracy as a diagnostic technique except for primary diagnosis of lymphoma.^[4] The rate of unsatisfactory or inconclusive reports in the this study is comparable to available literature.^[5] In the present study, 29.45% FNACs were performed from Head and Neck region, and this proportion is comparable to study done by Bhagat *et al.*^[6] Majority of the lesions were of lymph node origin (48%) followed by thyroid and parathyroid lesions (31 %). This finding is comparable to several other studies.^[7-9] However, according to study performed by Nalini N *et al*, lesions of thyroid origin are commoner than lymph node origin.^[10] Peak incidence of head and neck lesion was seen in age group 21-30 yrs followed up by 31-40 years. These findings correlate with the study done by Khetrapal *et al.*^[9]

The reactive lymphadenitis constituted 28.43% of all case, in which 80.5% were male. Tubercular lymphadenitis constituted 4.3% of the cases. It is in contrast to study conducted by Kate *et al* and Gupta *et al*, in which Tubercular lymphadenitis was found to be more prevalent.^[11,12] However finding of study by Pandey *et al* and Gogoi *et al* is similar to this study, in which reactive lymphadenitis is commonest pathology encountered in lymph nodes on FNAC.^[7,13] Reactive lymphadenitis, tubercular lymphadenitis, suppurative lymphadenitis showed a male preponderance, while granulomatous lymphadenitis showed a female preponderance. Metastasis from squamous cell carcinoma was the commonest (2.16%) neoplastic lesion detected in lymph nodes and it showed a male preponderance. Exact characterisation of haematolymphoid malignancy usually requires biopsy and it is one of the limitation of the FNAC as diagnostic test.^[6] However for diagnosis of lymph node malignancies, the FNAC has fairly good sensitivity and specificity.^[14]

FNAC has a high accuracy in diagnosing a thyroid swelling. In a study conducted by Shetty *et al*, the diagnostic accuracy of FNAC in follicular adenoma, nodular goiter, Hashimotos thyroiditis and malignancy was 75%, 78.57%, 80% and 80% respectively.^[15] The swelling of thyroid and parathyroid origin comprised of 31% of all H&N swellings which was comparable to study by Solanki *et al.* and Pandey *et al.*^[1,7] Colloid goiter was the commonest encountered pathology in thyroid. In neoplastic conditions of the thyroid, Suspicious of

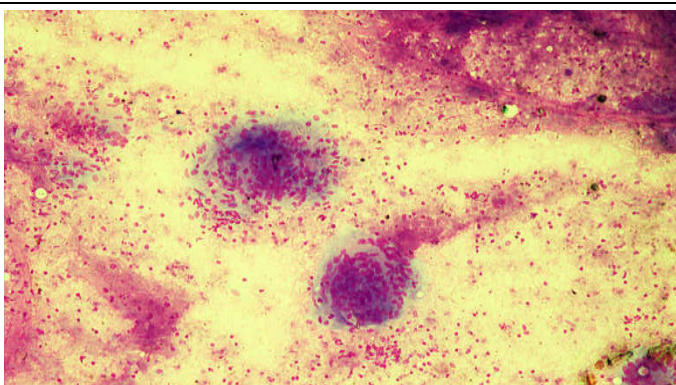


FIGURE 1. Tubercular lymphadenitis showing epithelioid cell granuloma in a necrotic background, LG stain (100x)

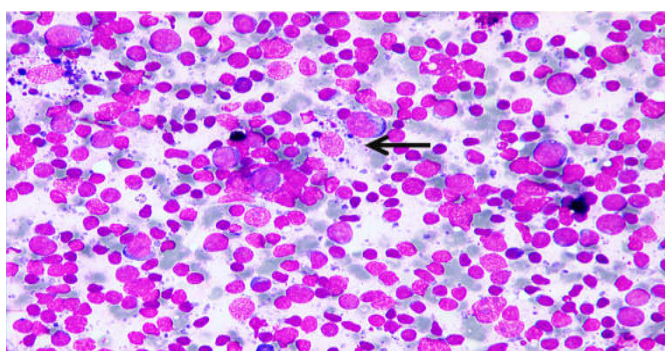


FIGURE 2. FNAC from Reactive lymph node showing polymorphous population of lymphocytes along with Tingible body macrophages (Black arrow), LG stain (400x)

follicular neoplasm was the commonest diagnosis on FNAC. All pathologies of thyroid showed a female preponderance, except lymphocytic thyroiditis, for which males constituted 58.3% of the cases. The study included population from Sub-Himalayan region of India and thus large number of goiter cases were predictable.^[7] In contrast to study by Shekhar *et al*, who mention papillary carcinoma to be commoner than follicular neoplasm, in the present study suspicious of follicular neoplasms was more common diagnosis than papillary carcinoma of thyroid.^[16] This was comparable to study by Solanki *et al* in which follicular neoplasm were more common than papillary carcinoma.^[1] In Salivary glands commonest pathology encountered was pleomorphic adenoma, which the commonest benign lesion of parotid.^[17] The pleomorphic adenoma showed a female preponderance (77.8%). FNAC has good diagnostic accuracy for salivary gland pathologies.^[4] Lipoma and Epidermal cysts were the most common soft tissue lesions encountered in miscellaneous category.

Age group less than 20 yrs included 99 patients and most common pathology encountered was Reactive lymphadenitis (59.6%). 75.8% cases having FNAC diagnosis related to primary lymph node pathologies. On FNAC, no malignant pathology was detected in this group. Excision biopsy was advised for 13 patients with the FNAC diagnosis of reactive lymphadenitis.

Reactive lymphadenitis (23.6%) was also the commonest pathology in 216 patients of age group between 20 to 40 years. However colloid goiter contributed to 18.05% cases in this group.

A total of 98 patients were in age group greater than 40 years. Colloid goiter (39.79%) was the commonest pathology in this age group, followed up by metastatic squamous cell carcinoma (9.18%) and Reactive lymphadenitis (8.16%). The study was conducted in a peripheral hospital and consequently, limitation of this study is lack of histopathological correlation of FNAC findings in most of the cases. However plethora of pathologies encountered and diagnosed on FNAC is suggestive of immense significance of the procedure as diagnostic tool available to clinician. It is further emphasised that diagnostic yield and accuracy can be enhanced if results of FNAC is correlated with clinical as well as imaging studies. This will definitely contribute to better patient management, even in peripheral centres where sophisticated diagnostic technologies are still not readily available.

CONCLUSION

The studies done previously in tertiary care setting reflect burden of disease in selected group of referred patients to these centres. This study was done to describe distribution of various Head and Neck pathologies reporting to a peripheral hospital and might reflect the actual burden of disease in a population. Peripheral medical centres are usually first medical contact point and concentration of patients following referrals is not there unlike tertiary health set-ups. This study establish role of FNAC as an excellent diagnostic tool for various Head and Neck lesions, even in peripheral health care set-up. It can contribute immensely toward management of various head and neck pathologies especially if considered in combination with methodical clinical and imaging assessment.

References

1. Solanki PK, Patel AP, Taviad PP, Chaudhari VP, Patel SM. Fine needle aspiration cytology as a diagnostic procedure in head and neck swellings. *Nat J Community Med.* 2012;3:433-6.
2. Dusenbery D. The technique of Fine needle aspiration of palpable mass lesion of the Head and Neck. *Oper Tech Otolaryngol Head Neck Surg.* 1997;8:61-7.
3. Ali SZ, Cibas ES, editors. The Bethesda System for Reporting Thyroid Cytopathology. New York: Springer; 2010
4. Khdhayer AA, Al-Azawi MJ, Yasseen HA. Fine Needle Aspiration Cytology In The Diagnosis Of Head And Neck Masses. *Eur Sci J.* 2016;6:361-70.
5. Majumdar A, Jana A, Biswas S, Bhattacharyya S, Jana A. Spectrum of Cytological Findings in Paediatric Non-Thyroidal Neck Swelling - Experience in a Tertiary Care Children Hospital. *Iran J Pathol.* 2014;9:193-8.
6. Bhagat VM, Tailor HJ, Saini PK, Dudhat RB, Makawana GR, Unjiya RM. Fine needle aspiration cytology in non-thyroidal head and neck masses-a descriptive study in tertiary care hospital. *Natl J Med Res.* 2013;3:273-6.
7. Pandey AK, Bhardwaj A, Maithani T, Kishore S, Singh VP. Distributive analysis of Head and neck Swellings with their cytopathological correlation. *Int J Otorhinolaryngol Clin.* 2016;8:89-96.
8. Nanik J, Rathore H, Pachori G, Bansod P, Ratnawat K. Cytomorphology of head and neck lesions: A study in tertiary care hospital. *PJMS.* 2015;5:145-9
9. Khetrapal S, Jetley S, Jairajpuri Z, Rana S, Kohli S. FNAC of head & neck lesions and its utility in clinical diagnosis: a study of 290 cases. *Natl J Med Res.* 2015;5:33-8.
10. Nallagutta N, Erugula SR, Gour S, Sameera A, Govada J, Kotikalapudi R. *Sch J App. Med Sci* 2016;4:3990-2.
11. Kate M, Sonawane Smita. Spectrum of lesions in head and neck region on fine needle aspiration cytology. *SEAJCRR* 2015;4:2092-101.
12. Gupta G, Joshi DS, Shah A, Gandhi M, Shah NR. FNAC of Head and Neck Swellings. *GCSMC J Med Sci.* 2014;3:38-41.
13. G Gogoi, Borgohain D. Fnac on Palpable Neck Masses -A Hospital Based Study. *Indian J Appl Res.* 2016;6:39-42.
14. Wilkinson AR, Mahore SD, Maimoon SA. FNAC in the diagnosis of lymph node malignancies: A simple and sensitive tool. *Indian J Med Paediatr Oncol.* 2012;33:21-4.
15. Shetty H, Sridhar S, Gangadhar KS. Accuracy of FNAC in diagnosing thyroid swelling: a retrospective study. *Int J Otorhinolaryngol Head Neck Surg.* 2017;3:280-4.
16. Shekhar H, Kaur A, Agrawal P, Pancharia A, Jadeja P. Fine needle aspiration cytology in head and neck swelling: a diagnostic and therapeutic procedure. *Int J Res Med Sci.* 2014;2:1667-71.
17. Basista H, Modwal A, Prasad B. Clinicopathological Evaluation of Neck Masses. *Sch J App Med Sci.* 2015;3:3235-41.
