

COMPARATIVE STUDY BETWEEN FNAC AND CYTOPUNCTURE FINDINGS IN CERVICAL LYMPHADENOPATHY

Parvathy Premchandran¹, Rohan Abraham Rajan², Sudhakar Rao M. S³

¹Postgraduate Student, Department of Otorhinolaryngology- Head and Neck Surgery, Vijayanagar Institute of Medical Sciences, Ballari, Karnataka, India.

²Postgraduate Student, Department of Otorhinolaryngology- Head and Neck Surgery, Vijayanagar Institute of Medical Sciences, Ballari, Karnataka, India.

³Specialist, Department of Otorhinolaryngology- Head and Neck Surgery, Vijayanagar Institute of Medical Sciences, Ballari, Karnataka, India.

ABSTRACT

BACKGROUND

The aim of this study was to compare diagnostic accuracy of Cytopuncture with Fine Needle Aspiration Cytology (FNAC) in cervical lymphadenopathy.

MATERIALS AND METHODS

This is a prospective study conducted on 100 patients between January 2017 and December 2017 in a tertiary care center. Patients with cervical lymphadenopathy were subjected to both FNAC & Cytopuncture after clinical examination. The two techniques were compared for the five objective parameters, using Mair's point scoring system.

RESULTS

A total of 100 cases of various diagnostic findings were subjected to statistical analysis. Common clinical diagnosis observed in the study was chronic cervical lymphadenitis- 58%, acute cervical lymphadenitis- 24%, secondaries in neck- 12%, TB lymphadenitis- 6%. On comparing FNAC and cytopuncture, both the techniques yielded comparable results in granulomatous lymphadenitis, metastatic deposits, nonspecific lymphadenitis, and in malignancy, but cytopuncture was diagnostically inferior in acute inflammatory lesion and in reactive lymphadenitis.

CONCLUSION

FNAC and cytopuncture shows comparable results for granulomatous lymphadenitis, metastatic deposits, nonspecific lymphadenitis and in malignancy for all 5 parameters, but cytopuncture was diagnostically inferior in acute inflammatory lesion and in reactive lymphadenitis.

KEYWORDS

Cytopuncture, FNAC, lymphadenopathy.

HOW TO CITE THIS ARTICLE: Premchandran P, Rajan RA, Rao SMS. Comparative study between FNAC and cytopuncture findings in cervical lymphadenopathy. J. Evid. Based Med. Healthc. 2018; 5(13), 1206-1210. DOI: 10.18410/jebmh/2018/249

BACKGROUND

The base line investigation being used in the diagnosis of head and neck swelling is Fine-Needle Aspiration Cytology (FNAC).¹ But the negative pressure during aspiration causes bloody smears and it is detrimental to both cell concentration and cell morphology of the specimen, leading to an unsatisfactory specimen and improper cytological interpretation.²⁻⁴ Fine needle non aspiration cytology (FNNAC) also called cytopuncture or fine needle capillary sampling is an alternative to FNAC developed in the 1980s by Brifford *et al* in France.⁵

It has been reported that the problem of inadequate and bloody specimens in aspiration can be avoided by using a fine needle and capillary pressure to suck cells into the needle lumen. FNNAC avoids active aspiration and relies on capillary tension to suck the tissue sample into the needle bore; this reduces bleeding and minimizes trauma to thyroid tissue.

However, will the fine needle non aspiration technique yield adequate material for a cytologic diagnosis was the question in doubt. In addition majority of the referenced studies included only thyroid lesions. There are many conflicting studies regarding the superiority of FNNAC to FNAC. Some studies have reported that FNNAC reduced bleeding and obtained higher quality samples; other reports have indicated that the diagnostic adequacy of FNAC was higher than FNNAC or that both methods were equally efficient.⁶⁻¹⁴ Studies on the accuracy, sensitivity, specificity, negative predictive value (NPV), and positive predictive value (PPV) of both techniques based on histopathology have also been inconclusive. Hence this study was undertaken to compare the diagnostic accuracy and quality

Financial or Other, Competing Interest: None.
Submission 16-02-2018, Peer Review 21-02-2018,
Acceptance 28-02-2018, Published 24-03-2018.

Corresponding Author:

Dr. Rohan Abraham Rajan,

Postgraduate Student, Room No. 113,

Department of Otorhinolaryngology- Head & Neck Surgery,
Vijayanagar Institute of Medical Sciences, Ballari-583104.

E-mail: rohanabrahamrajan@gmail.com

DOI: 10.18410/jebmh/2018/249



of cytopuncture with that of FNAC in cervical lymph node lesions.

MATERIALS AND METHODS

The study population comprised of all patients who presented with cervical lymphadenopathy on outpatient basis at the Department of Otorhinolaryngology, Vijayanagar Institute of Medical Sciences, Ballari from January 2017 to December 2017. The study received the ethical clearance from the in-house hospital ethical committee.

After clinical examination, study subjects were subjected to both FNAC and Cytopuncture.

Inclusion Criteria

All patients with clinically significant cervical lymphadenopathy between 1 year and 70 years of age belonging to both sexes were included in this study.

Exclusion Criteria

Clinically insignificant cervical lymphadenopathy. The details of both techniques were explained to the patient and consent was obtained from each case before performing the procedure.

All the study subjects underwent both procedures. Both procedures were done using 23 gauge needle. Fine needle aspiration was performed using a 10 ml syringe, while the non-aspirate technique was done without syringe or holder.

The smears were analysed using a scoring system developed by Mair et al.⁶ Five parameters used for scoring were background blood or clot, amount of cellular material, degree of cellular degeneration, degree of cellular trauma and retention of appropriate architecture (Table 1).

Mean and SD value was calculated for continuous variables and proportions for categorical variables. Mean between two groups were analysed by using Student’s t test unpaired. Diagnostic accuracy was calculated. Association between groups was done with chi-square test. A P value of >0.05 was considered statistically significant.

All the results were tabulated and were statistically interpreted by IBM SPSS VERSION 20 for windows.

RESULTS

The total number of cases in which both the techniques were available for comparison was 100. All the 100 cases included in our study showed a wide variety of lesions. They were grouped depending upon the cytological diagnosis. Each of these groups were analysed and compared for the five objective parameters in the two techniques [Table 1].

Our study included patients in the age group of 1 year to 70 years (Figure 1). There were 61 males and 39 females, with a male to female ratio of 1.5:1. (Figure 2)

Common clinical diagnosis observed in the study was chronic cervical lymphadenitis-58%, acute cervical lymphadenitis-24%, secondaries in neck-12%, Tb lymphadenitis-6% (Figure 3).

Criterion	Quantitative description	Point score
Background blood or clot	Large amount; great compromise to diagnosis	0
	Moderate amount; diagnosis possible	1
	Minimal; diagnosis easy; specimen of "text book" quality	2
Amount of cellular material	Minimal to absent, diagnosis not possible	0
	Sufficient for cytodiagnosis	1
	Abundant; diagnosis simple	2
Degree of cellular degeneration	Marked; diagnosis impossible	0
	Moderate; diagnosis possible	1
	Minimal; good preservation, diagnosis easy	2
Degree of cellular trauma	Marked; diagnosis not possible	0
	Moderate; diagnosis possible	1
	Minimal; diagnosis obvious	2
Retention of appropriate architecture	Minimal to absent; non diagnostic	0
	Moderate; some preservation of e.g., follicles, papillae, acini, flat sheets, syncytia or single cell patterns	1
	Excellent architectural display closely reflecting histology diagnosis obvious	2

Table 1: Method of point allocation

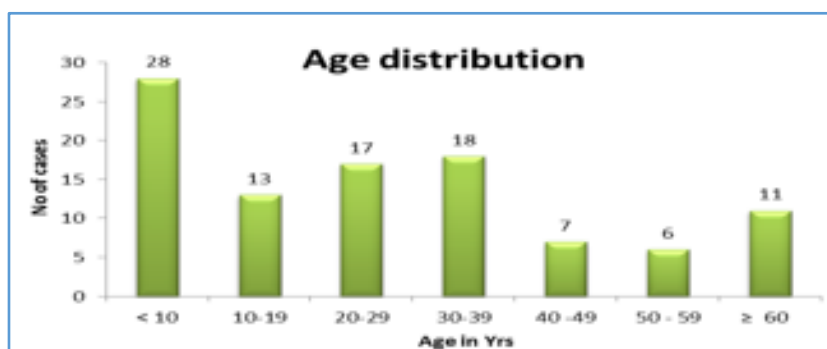


Figure 1

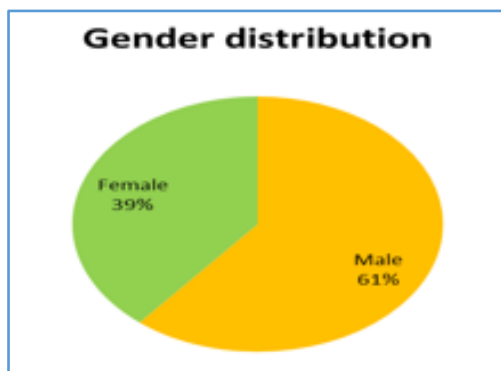


Figure 2

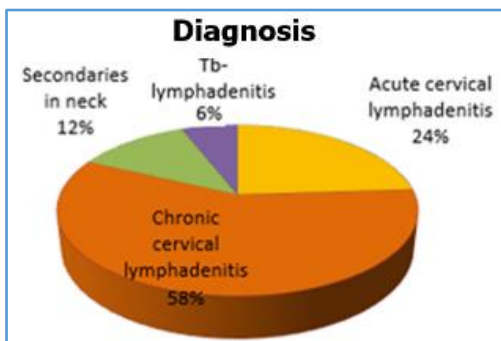


Figure 3

Study subjects were grouped into various cytological diagnosis (Table 2). It is observed that while FNAC gave a cytological diagnosis for all 100 cases, cytopuncture did not show any cellularity to make a diagnosis in 6 cases.

Based on Mair’s point scoring system, (Table 3) there was no statistically significant difference between FNAC and cytopuncture in the five objective parameters (Figure 4, 5, 6, 7, 8).

	FNAC	Cytopunc
Acute inflammatory lesion	24	23
Granulomatous lymphadenitis	10	8
Metastatic deposits	12	12
Non specific lymphadenitis	9	13
Reactive lymphadenitis	41	34
Malignancy	4	4
Nil cellularity	0	6

Table 2

Criterion	Quantitative description	Score	FNAC	Cytopuncture	Statistical analysis
Background blood or clot	Large amount	0	0	6	6.32, P<0.04
	Moderate amount	1	71	69	
	Minimal	2	29	25	
Amount of cellular material	Minimal to absent	0	0	6	6.22, P<0.04
	Sufficient	1	16	16	
	Abundant	2	84	78	
Degree of cellular degeneration	Marked	0	0	6	6.26, P<0.04
	Moderate	1	20	18	
	Minimum	2	80	76	
Degree of cellular trauma	Marked	0	1	6	6.21, P<0.04
	Moderate	1	19	19	
	Minimum	2	80	75	
Retention of appropriate architecture	Minimal to absent	0	0	6	6.15, P<0.04
	Moderate	1	37	33	
	Excellent	2	63	61	

Table 3

Comparison of the 5 objective parameter in each of the cytological diagnosis – acute inflammatory lesion, granulomatous lymphadenitis, metastatic deposits, non-specific lymphadenitis, reactive lymphadenitis, malignancy did not show any significant difference.

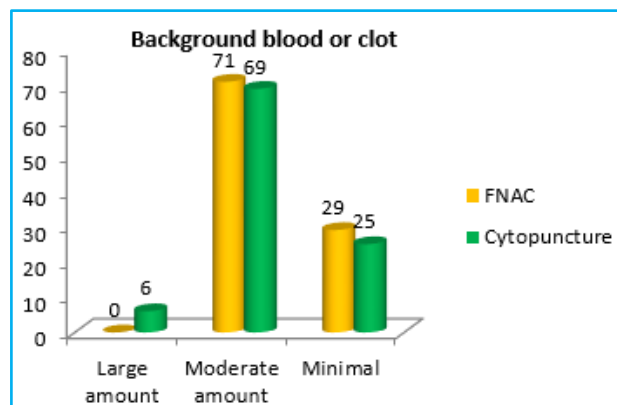


Figure 4

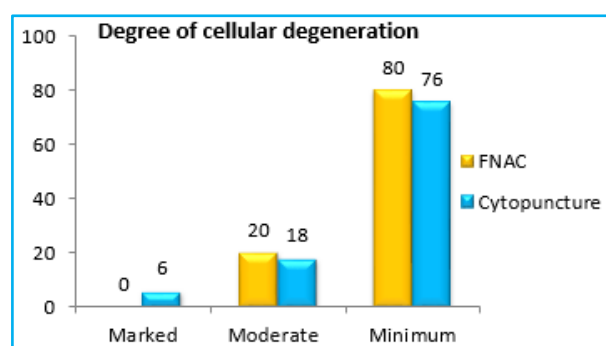


Figure 5

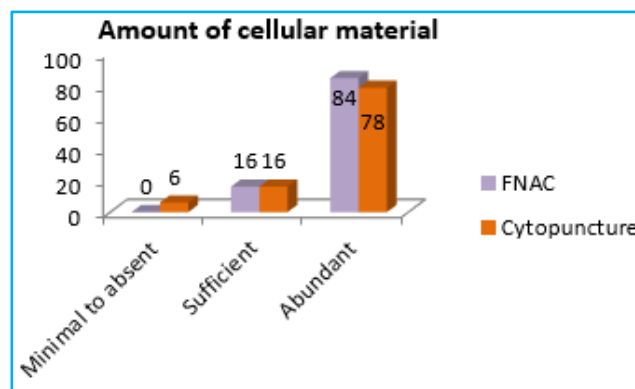


Figure 6

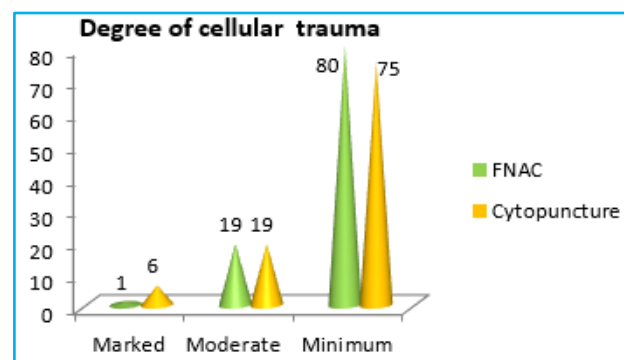


Figure 7

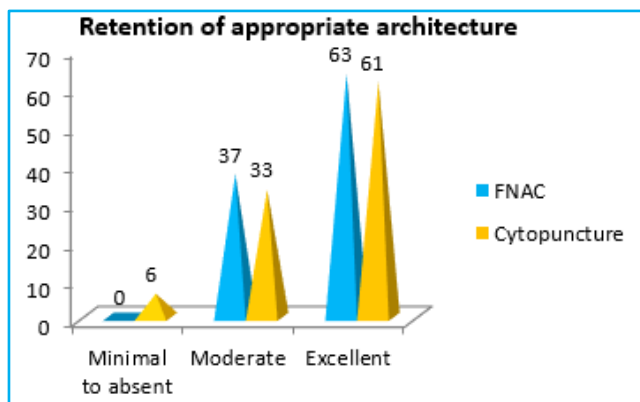


Figure 8

Diagnostic accuracy of cytopuncture in comparison to FNAC was 98% in granulomatous lymphadenitis, 100% in metastatic deposits, 87% in Nonspecific lymphadenitis, 100% in malignancy, but only 75% in acute inflammatory lesion, 59% in reactive lymphadenitis (Table 4).

Validity of Cytopuncture in comparison to FNAC					
	Sensitivity	Specificity	False positive	False negative	Accuracy
Acute inflammatory lesion	92%	98%	0.04%	0.08%	75%
Granulomatous lymphadenitis	80%	100%	0	0.20%	98%
Metastatic deposits	100%	100%	0	0	100%
Non specific lymphadenitis	100%	96%	0.30%	0	87
Reactive lymphadenitis	83%	100%	0	0.17%	59%
Malignancy	100%	100%	0	0	100%

Table 4

DISCUSSION

Enlarged lymph nodes are accessible for FNAC and are of importance specially to diagnose secondary or primary malignancies. It plays a significant role in developing countries like India, as it is a cheap procedure, simple to perform and has almost no complications.¹² The diagnosis given on the cytological material is often the only diagnosis accepted and sometimes there is no further correlation with histopathology, especially in cases of advanced malignancies. It also provides clues for occult primaries and sometimes also surprises the clinician who does not suspect a malignancy. Aspiration cytology was first performed by Martin and Ellis in 1930 for diagnosis of a tumour.⁶ This needle aspiration technique was improved later by Franzen et al. in 1955 by introduction of a special syringe holder (Kate et al. 1998).⁷ The cellular yield in cytopuncture depends on capillary action and not on negative suction and so it is likely to produce less haemorrhage (Dey and Ray 1993).⁸

Although many studies have compared the efficiency of FNAC and FNNAC techniques in evaluating thyroid nodules, there is hardly one study regarding in evaluation of cervical lymphadenopathy.

It is well known that the smear quality may affect the cytological diagnosis of cervical lymphadenopathy. For assessing the quality of smears two important criteria are "Background blood or clot" and "amount of cellular material".⁹ Cytopuncture may produce better cellular material and cause less haemorrhage than FNAC. The needle

can be moved freely in any desired direction in the non-aspiration technique and also causes less blood contamination and it is less painful.¹⁰ The FNNAC also allows a better perception of tumor consistency.¹¹

The present study was undertaken to assess the efficacy of FNAC in the diagnosis of cervical lymphadenopathy and to debate the need for both the techniques in every case.

In the present study of 100 aspirates from cervical lymphadenopathy, commonest clinical diagnosis observed in the study was chronic cervical lymphadenitis – 58%, (Fig 3).

On comparing FNAC and FNNAC, both the techniques yielded comparable results in granulomatous lymphadenitis, metastatic deposits, nonspecific lymphadenitis, and in malignancy, but cytopuncture was diagnostically inferior in acute inflammatory lesion and in reactive lymphadenitis (Table 5).

Finally, some studies reported that FNNAC combined with FNAC can obtain better quality cellular material,^{15,16} while other studies reported that a better diagnostic accuracy can be achieved by combining both techniques.^{17,18,19}

In a similar study conducted by Srikanth et al,¹ Lymphadenopathy with highly cellular lesions like reactive hyperplasia and metastatic malignancy, both the techniques yielded comparable cellular material. In non-specific lymphadenitis, the non-aspiration technique was significantly better than aspiration technique with regard to background blood, amount of cellular material and retention of appropriate architecture.

CONCLUSION

Although FNAC and cytopuncture shows comparatively similar results for granulomatous lymphadenitis, metastatic deposits, nonspecific lymphadenitis and in malignancy for all 5 parameters, cytopuncture was diagnostically inferior in accuracy among acute inflammatory lesions and in reactive lymphadenitis. It is felt that the choice of technique of fine needle sampling employed for cytodiagnosis is left to the preference of the surgeon.

REFERENCES

- [1] Srikanth S, Anandam G, Kashif MM. A comparative study of fine-needle aspiration and fine-needle non-aspiration techniques in head and neck swellings. Indian J Cancer 2014;51(2):98-99.
- [2] Davies L, Welch HG. Current thyroid cancer trends in the United States. JAMA Otolaryngology Head Neck Surg 2014;140(4):317-322.
- [3] Krishnappa P, Ramakrishnappa S. Cytological evaluation of thyroid lesions by fine needle aspiration versus non-aspiration cytology techniques-a comparative study. Int J Curr Res Rev 2014;6(9):115-117.
- [4] Romitelli F, Di Stasio E, Santoro C, et al. A comparative study of fine needle aspiration and fine needle non-aspiration biopsy on suspected thyroid nodules. Endocrine Pathology 2009;20(2)108-113.

- [5] Briffod M, Gentile A, Hebert H. Cytopuncture in the follow-up of breast carcinoma. *Acta Cytologica* 1982;26(2):195-200.
- [6] Kline TS. *Handbook of fine needle aspiration biopsy cytology*. St. Louis; Mosby 1981.
- [7] Kate MS, Kamal MM, Bobhate SK, et al. Evaluation of fine needle capillary sampling in superficial and deep-seated lesions. An analysis of 670 cases. *Acta Cytol* 1998;42(3):679-684.
- [8] Dey P, Ray R. Comparison of fine needle sampling by capillary action and fine needle aspiration. *Cytopathology* 1993;4(5):299-303.
- [9] Gharib H. Fine-needle aspiration biopsy of thyroid nodules: advantages, limitations, and effect. *Mayo Clin Proc* 1994;69(1):44-49.
- [10] Song H, Wei C, Li D, et al. Comparison of fine needle aspiration and fine needle non-aspiration cytology of thyroid nodules: a meta-analysis. *Bio Med Res Int* 2015;2015:1-13.
- [11] Papanicolaou GN, Traut HF. *Diagnosis of uterine cancer by the vagina smear*. New York: The Commonwealth Fund 1943.
- [12] Bagwan IN, Kane SV, Chinoy RF. Cytologic evaluation of the enlarged neck node: FNAC utility in metastatic neck disease. *Int J Pathol* 2007;6:2.
- [13] Alam K, Khan A, Siddiqui F, et al. Fine needle aspiration cytology (FNAC): a handy tool for metastatic lymphadenopathy. *Int J Pathol* 2010;10:2.
- [14] Khajuria R, Goswami KC, Singh K, et al. Pattern of lymphadenopathy on fine needle aspiration cytology in Jammu. *JK Science* 2006;8(3):157-159.
- [15] Mahajan P, Sharma PR. Fine-needle aspiration versus non aspiration technique of cytodagnosis in thyroid lesions. *JK Science* 2010;12(3):120-122.
- [16] Rizvi SA, Husain M, Khan S, et al. A comparative study of fine needle aspiration cytology versus non-aspiration technique in thyroid lesions. *Surgeon* 2005;3(4):273-276.
- [17] Pinki P, Alok D, Ranjan A, et al. Fine needle aspiration cytology versus fine needle capillary sampling in cytological diagnosis of thyroid lesions. *Iranian Journal of Pathology* 2015;10(1):47-53.
- [18] Ibrahim AMR, Moawad MM, Al-Hamead A, et al. Cytological evaluation of thyroid lesions. *Asian Academy of Management Journal* 2012;10(2):192-213.
- [19] Kaur S, Garg U, Kaur S, et al. Comparison of aspiration VS non-aspiration techniques in fine-needle cytology of thyroid lesions. *IOSR Journal of Dental and Medical Sciences* 2014;13(5):97-101.