

# DIAGNOSTIC VALUE OF FINE NEEDLE ASPIRATION CYTOLOGY (FNAC) IN CERVICAL LYMPHADENOPATHY

Muhammad Javaid, Niamatullah, Khurshid Anwar, Muhammad Said

Department of ENT,  
Postgraduate Medical Institute, Hayatabad Medical Complex, and  
Lady Reading Hospital, Peshawar

## ABSTRACT

**Objective:** The aim of this study was to evaluate the diagnostic value of fine needle aspiration cytology (FNAC) in head and neck lymph nodes and in differentiating malignant from benign diseases.

**Material and Methods:** This prospective study was conducted in the ENT Department of PGMI HMC and LRH Peshawar from 1st April 2003 to 30th March 2004. A total of 42 patients were studied. After thorough history and examination, FNA biopsy was obtained with the help of experienced cytopathologist using 21G needle and the results compared with final histopathological diagnosis.

**Results:** FNAC findings in this series were metastatic (42.85%), tuberculosis adenitis (26.19%), reactive hyperplasia (16.66%), lymphoproliferative disorder (9.52%) and lymphoma (4.76%). In terms of differentiating malignant from non-malignant lesions; diagnostic accuracy, sensitivity, specificity, positive predictive value and negative predictive value of FNAC were 95.23%, 95.83%, 94.44%, 95.85% and 94.44% respectively.

**Conclusion:** FNAC has been found to be a useful diagnostic tool in the evaluation of patients presenting with neck nodes and should be considered before performing open biopsy.

**Key Words:** Fine Needle Aspiration Cytology, Lymph Node, Histopathology.

## INTRODUCTION

Head and neck masses often pose a challenging diagnostic problem to the clinicians as diagnosis by purely clinical criteria is often unremarkable. Clinical examination and often diagnostic aids like radiology and blood tests fail to resolve the vexing problem regarding the nature of the mass. Malignancy remains an important differential diagnosis and neck nodes are a common site of metastasis for different cancers.<sup>1,2</sup> Moreover, cervical lymphadenopathy may be the first or only symptom of this disease. The final answer regarding the nature of the mass lies in its surgical exploration and reliance on frozen section precludes definitive pre operative planning of therapy and the opportunity for full discussion with the patient.<sup>3</sup>

Fine needle aspiration cytology (FNAC) is a quick, simple and safe technique which has been in practice since 1930.<sup>1</sup> It can be carried out at bed side or in the out patient clinic, requiring neither local nor general anaesthesia. It separates inflammatory and reactive processes that do not

require radical treatment from neoplastic lesions either benign or malignant and can help the clinician to differentiate carcinoma from lymphoma. FNA cytology, therefore has become an integral part of the initial diagnosis and management of patients with cervical lymphadenopathy.<sup>1,4</sup> The purpose of this study was to evaluate the accuracy of FNAC in the diagnosis of cervical lymphadenopathy especially differentiating neoplastic from non-neoplastic lesions.

## MATERIAL AND METHODS

This prospective study was conducted in the ENT Department of PGMI HMC and LRH Peshawar from 1<sup>st</sup> April 2003 to 30<sup>th</sup> March 2004. The inclusion criteria were:-

- Patients of all age group and both sexes presenting with palpable lymph node in the neck.
- All new and undiagnosed cases.

Those patients in whom FNAC were not

## FNAC RESULTS

No.	Disease	No of Cases (n = 42)	Percentage
6	Metastatic Nodes	18	42.85%
1	Tuberculous Lymphadenopathy	11	26.19%
2.	Reactive Hyperplasia	7	16.66%
3	Lymphoproliferative Disorder	4	9.52%
4	Hodgkin's Disease	1	2.38%
5	Non-Hodgkin's Disease	1	2.38%

Table 1

followed by biopsy of the node or of the primary in cases of metastasis, were excluded from this study. Patients who were lost to follow up were also excluded from this study.

A detailed history and clinical examination was performed before FNAC with special emphasis on the mucosal surfaces of upper aero- digestive tract as metastatic deposits to cervical lymph nodes are common from sites like nasopharynx, oropharynx, oral cavity, and hypopharynx. All FNACs were obtained in the presence of pathologist, experienced in the interpretation of smears using 21G needle. All patients were then operated for lymph node biopsy (or biopsy of the primary in case of metastatic nodes). In patients with malignant disease who underwent surgery for primary disease, neck dissection was carried out and lymph node sent for histological examination. The final histopathological results were compared with FNAC results.

## RESULTS

A total of 42 patients were included in the study during the time period. The results of FNAC are shown in Table 1. Most common findings were metastatic nodes in 18 (42.85%) cases, tuberculous lymphadenopathy in 11 (26.19%) cases and reactive hyperplasia in 7 (16.66%) cases.

In terms of differentiating malignant from non-malignant lesions; diagnostic accuracy, sensitivity, specificity, positive predictive

value and negative predictive value of FNAC were 95.23%, 95.83%, 94.44%, 95.85% and 94.44% respectively ( Table 2). The results were divided in to true positive i.e. positive for malignancy (23 cases), true negative for malignancy (17 cases), false negative (1 case) and false positive (1 patient). Correlation of FNAC results with histopathology are shown in Table 3. A case reported as reactive hyperplasia proved to be lymphoma on histopathological examination. The other case having suspicion of lymphoproliferative disorder reported on FNA cytology proved to be reactive hyperplasia on histopathological examination. In rest of the three cases of lymphoproliferative disorder, 2 cases were confirmed as Non-Hodgkin's lymphoma and 1 case as Hodgkin's disease with lymphocytic predominance. All the 18 cases of metastatic cervical lymph nodes were confirmed, the metastasis occurring from primary sites located in head and neck region. Tuberculous lymphadenitis comprised about 26.19% of the cases and was correctly diagnosed in this study. No serious complications were noted during the study.

## DISCUSSION

The history of FNAC dates back to late 19th century.<sup>1</sup> The FNA for cytological evaluation of neck masses was first reported by Kum in 1947.<sup>2</sup> However the first organized attempt at aspiration of head and neck masses were made by Marless and Elli's at the memorial Sloam-Keltering Hospital in 1930 using 18G needle. The use of large bore needle at that time led to frequent complications and occasional seeding of tumour along biopsy tract. This prevented widespread acceptance of this technique in other center of America.<sup>3</sup> True fine needle for aspiration (22 to 27 gauge versus 18 gauge) were first introduced by Zepoz Cardozo in the Netherlands and Sodestran in Sweden. However despite their success, it was not until 1980's that FNA became popular in US and UK.<sup>4</sup> Nowadays this technique is becoming increasingly popular all over the world in the diagnosis and management of masses of head and neck region as no sophisticated equipments is

## COMPARISON OF FNAC RESULTS WITH BIOPSY

		BIOPSY	
		Malignant	Non-malignant
FNAC	Malignant	23	1
	Non-malignant	1	17

Accuracy 95.23%, Table 2

Sensitivity 95.83%,

Specificity 94.44%,

Positive Predictive Value 95.85% and

Negative Predictive Value 94.44%

CORRELATION OF FNAC RESULTS WITH BIOPSY

No	Disease	TN	TP	FN	FP
1	Metastatic Nodes	0	18	0	0
2	Tuberculous Adenitis	11	0	0	0
3	Reactive Hyperplasia	6	0	1	0
4	Lymphoproliferative Disorder	0	3	0	1
5	Hodgkin's Disease	0	1	0	0
6	Non- Hodgkin's Disease	0	1	0	0
<b>TOTAL</b>		<b>17</b>	<b>23</b>	<b>1</b>	<b>1</b>

Table 3

TN = True negative, TP = True positive

FP = False positive, FN = False negative

required and is a less invasive procedure. Although it is a straight forward procedure but it does have certain limitations. Most expert agree that it is extremely difficult if not possible to differentiate between follicular adenoma and carcinoma of thyroid moreover it may all together fail to diagnose non-Hodgkin lymphoma. There is also difficulty in identifying the histological types of lymphoma. Another areas of difficulty is the distinction between lymphoid hyperplasia and low grade lymphoma.<sup>8,9</sup> Inadequate aspirate should not be a problem as the procedure can be safely repeated. The problem of interpretation is largely due to small amount of cellular material available for examination and the loss of normal tissue architecture as a result of aspiration. Therefore it calls for greater expertise on the part of the histopathologist as inadequate rates are lower when FNAC samples are taken by experienced cytopathologist.<sup>10</sup>

Our results indicate that malignant lymphadenopathy constitute a significant proportion of findings in aspirates of enlarged lymph node (57.15%). The benign lymphadenopathy only constitute 42.85% of which tuberculous lymphadenitis was the commonest finding (26.19%), followed by reactive hyperplasia (16.66%). This is in contrast to other studies from Pakistan where tuberculous lymphadenopathy is at the top of the list.<sup>11-13</sup> Reactive hyperplasia ranged second in the benign group. Both reactive hyperplasia and tuberculous lymphadenitis were correctly identified by FNA Cytology in our series except for one false negative that occurred in the reactive hyperplasia group. Lau SK and colleagues found specificity of FNAC at 93% and sensitivity at 77% in diagnosing tuberculosis related granulomatous lymphadenopathy. They concluded in their review that FNAC is an efficient way to detect the cause of cervical lymphadenopathy.<sup>14</sup> Umar Farooq Khan and colleagues studied the utility of FNAC in tuberculous cervical lymphadenitis. FNAC results compared favorably

with excision biopsy results having sensitivity of 95.8% specificity of 100%, positive predictive value of 100% and negative predictive value of 98% in these lesions.<sup>15</sup>

The largest entity in our study in this category was metastatic cervical lymphadenopathy which alone constituted 42.85% of the cases. Others include lymphoproliferative disorder (9.52%), Hodgkin's disease (2.38%), and non-Hodgkin's lymphoma (2.38%). Both the lymphomas were correctly identified by FNAC. A false positive case was reported as lymphoproliferative disorder on cytology. Subsequent histopathological examination revealed it to be reactive hyperplasia. It is very difficult to differentiate low-grade lymphoma from reactive hyperplasia on FNA cytology alone.<sup>16</sup> Recognition of the subtypes of lymphoma is also very difficult. Maximum numbers of correct diagnoses were obtained in metastatic carcinomas. There was not a single case over diagnosed or under diagnosed in this group. Thus the accuracy of FNAC in diagnosing metastatic lymphadenopathy were 100% as compared to 96% reported in literature.<sup>17</sup>

However not all studies demonstrate such impressive results. Guyot and colleagues<sup>18</sup> in 1990 reported 80% FNAC accuracy in head and neck masses. FNA finding were not diagnostic in 10% of aspirates and false negative rates exceeded 10%. The authors concluded that FNA is not a substitute for excisional biopsy but is instead an additional diagnostic tool.<sup>18</sup>

In present study, these figures were found to be: accuracy 95.23%, sensitivity 95.83%, specificity 94.44%, positive predictive value 95.85% and negative predictive value 94.44%. Most importantly, no radical treatment resulted from false positive diagnosis and no treatment delay occurred from false negative diagnosis.

CONCLUSION

The results in this study suggest that it

would be worth while to evaluate histologically all palpable cervical lymph nodes and the choice of first histological evaluation of the mass rest on fine needle aspiration cytology which is simple, accurate, fast, economical and indeed safe. It is free from any complications and is well tolerated by most of the patients. Open biopsy from cervical lymph node should be delayed until metastatic disease is ruled out by thorough examination and FNAC.

## REFERENCES

1. Amedee RG, Dhurandhar NR. Fine Needle aspiration cytology. *Laryngoscopy* 2001;111:1551-7.
2. Mendenhall WM, Mancuso AA, Amdur RJ, Stringer SP, Villaret DB, Cassisi NJ. Squamous cell carcinoma metastasis to head & neck from an unknown Primary site. *Am J Otolaryngol* 2001; 22:261-7.
3. Shykhov M, Mc Namara M, EL Assy A, Warfield AT. Role of repeat fine needle aspiration cytology in head & neck lesions, preliminary study. *J Laryngol Otol* 2004;118: 294-8.
4. Lioe TF, Elliott H, Allen DC, Spence RA. Fine needle aspiration cytology in the investigation of superficial Lymphadenopathy: Uses and limitation of the technique. *Cytopathol* 1999;10:291-7.
5. Shinohara S, Yamamoto E, Tanabe M, Maetani T, Kim T. Implantation metastasis of head & neck cancer after fine needle aspiration cytology. *Auris Nasus Larynx* 2001; 28:337-80.
6. Schwartz R, Chan NH, Macfarlane JK. Fine needle aspiration cytology in the evaluation of the Head and Neck masses. *Ann J Surg* 1990; 159: 482-5.
7. Murray A, Stewart CJ, McGarry GW, Mackenzie K. Patients with neck lumps, can they be managed in a "one stop" clinical settings? *Clin Otolaryngol* 2000; 25:471-5.
8. Orell SR. Pitfalls in fine needle aspiration cytology. *Cytopathol* 2003; 14:173-82.
9. Carter TR, Feldman PS, Innes DJ. The role of fine needle aspiration in the diagnosis of lymphoma. *Acta Cytol* 1988; 32: 848-53.
10. Singh N, Ryan D, Berney D, Calaminici M, Sheaff MT, Wells CA. Inadequate rates are lower when FNAC samples are taken by Cytopathologists. *Cytopathol* 2003; 4: 327-31.
11. Siddique FG, Ahmed Q. Cervical lymphadenopathy. *J Surg. Pakistan* 2002; 7: 23-5.
12. Hussain A, Sheikh AS, Bokhari MI, Naveed IA. The value of fine needle aspiration cytology in the diagnosis of lymphadenopathy. *Biomedica* 2002; 18:38-40.
13. Saeed MS, Khalid MC. Fine needle aspiration cytology in the diagnosis of tuberculous lymphadenitis in developing country. *Pak J Chest Med* 2002; 8: 15-8.
14. Lau SK, Wei WJ, Itsu C, Engzell VC. Efficacy of fine needle aspiration cytology in the diagnosis of Tuberculous cervical lymphadenopathy. *J Laryngol Otol* 1990;104: 247.
15. Khan UF, Khan AI, Ashraf J, Barki NV. Fine needle aspiration cytology vs accessional biopsy and tuberculous cervical adenitis. *J Rawal Med Coll* 2001;5:214.
16. Farrukh K, Shahida N, Nagi AH, Mansour AJ, Naveed IA. Fine needle aspiration cytology, an experience at King Edward Medical College Lahore. *Pakistan J Pathol* 1996; 7:33-6.
17. Ghazanfer A, Choudhry ZA, Nasir SM, Ahmad W. Correlation of the diagnostic accuracy of FNAC to the clinical and histological diagnosis, a prospective study of 100 cases. *Ann KE Med Coll* 2001;7:131-3.
18. Guyot JP, Obradoric D, Krayenbuhl M. Fine needle aspiration in the diagnosis of head and neck growths, is it necessary? *Otolaryngol Head Neck Surg* 1990;103: 697-701.

### Address for Correspondence:

Dr Muhammad Javaid  
Department of ENT,  
Postgraduate Medical Institute,  
Hayatabad Medical Complex, Peshawar.