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Research Paper

FINE NEEDLE ASPIRATION CYTOLOGY: A DIAGNOSTIC TOOL IN LYMPHADENOPHTHY

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Background: Fine Needle Aspiration Cytology (FNAC) is a well accepted diagnostic procedure and considered to be a valuable test for initial assessment of lymph node swellings in all age groups (Agarwal *et al.*, 2010). The technique has gained popularity over the last decade, with varying degrees of acceptance rates, accuracy, and results among pathologists. **Objectives:** To evaluate the utility of aspiration cytology as a first-line diagnostic tool in palpable lymph node lesions, in comparison to result of histopathology. **Materials and methods:** The present study was conducted in 252 patients presenting with Lymphadenopathy over a period of 3 years. **Results:** In this series of FNAC, cervical lymph nodes were 168 (66.7%), and axillary lymph nodes were 27 (10.7%). Male to female ratio of the patients were 1.3: 1.0. FNAC diagnosis was found to be as follows: reactive hyperplasia 108 (42.80%), tubercular lymphadenitis 81 (32.14%), suppurative lymphadenitis 10 (3.96%). In the malignant category, metastatic deposits often involving the LN accounts to 39 (15.5%) and lymphomas 7 (2.71%) out of which 5 were Hodgkin's and 2 were found to be Non Hodgkin's lymphoma. 34 out of 36 cases diagnosed cytologically, had good histopathological correlation. **Conclusion:** FNAC is a reliable, safe, accurate, sensitive and minimally invasive first-line investigation in the diagnosis of lymph node lesions. It is highly accurate in isolating and determining potentially neoplastic lesions.

Keywords: Lymphadenopathy, FNAC, Fine Needle Aspiration Cytology, Lymph nodes

INTRODUCTION

Lymphadenopathy is one of the commonest clinical presentation with varied etiologies, ranging from inflammatory to malignant lesions and is one of the major causes of morbidity. FNAC has gained immense popularity among all the diagnostic modalities and has a well established

role as the first line investigation in the evaluation of lymph node enlargement. It is a rapid, simple, safe, reliable and cost effective method of establishing predictive pathological diagnosis of lesions in various sites with minimal complications. It also helps in obviating the need for surgical biopsy. The knowledge of pattern of

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lymphadenopathy in a given geographical region is essential for making a confident diagnosis or suspecting a disease. For example; tuberculosis is most common in developing countries like India and should be considered in every case of granulomatous lymphadenopathy unless proved otherwise.

Aspiration of lymph nodes for diagnostic purpose was reported as early as 1904 by Grieg and Gray who used this procedure in the diagnosis of Trypanosomiasis. In 1921, Guthrie attempted to correlate lymph node aspiration cytology with various disease processes. The present study was conducted to highlight the role of FNAC in diagnosis of lymphadenopathy of various etiologies in a resource challenged environment and to correlate with histopathology wherever necessary.

MATERIALS AND METHODS

The present study was carried out at Navodaya Medical College and Research Centre, Raichur, Karnataka for a period of two years. A total of 252 patients were included in our study, reported to various clinical departments with history of lymph node swelling. These patients were clinically evaluated and informed consent was obtained for the procedure. The limitations and complications of FNAC were explained to the patients. Lymph node to be aspirated was first examined thoroughly, to determine the site of aspiration. Under aseptic precautions, the node was held between the left index finger and the thumb, followed by insertion of a 22-23 gauge needle fitted to a 10 mL syringe for routine lymph node aspiration. The needle with syringe was introduced into the node; the plunger of the syringe was pulled to create a negative pressure. With the negative pressure intact, the needle was

moved to and fro within the node at least two to three times, to aspirate adequate material. The negative pressure was released and needle along with syringe was withdrawn from the node. The pressure was applied to the needle aspirated area with a cotton swab after which the needle was withdrawn. The needle was detached and, air was drawn into the syringe, needle was reattached and the material was dispensed on to glass slides. Four smears were made; two of them were fixed in a fixative containing ethyl alcohol, later to be stained with PAP and H&E, two smears were air dried followed by staining with MGG and in relevant cases, Zn stain.

RESULTS

In this study group, among the cases included aspiration was done in 252 cases, out of which, the aspirate was found to be inadequate in 8 cases for cytological examination and interpretation, possibly due to bloody aspirate and paucicellularity on the smears.

Age incidence of patients varied from 2 years to 76 years. Maximum incidence was seen in the 2nd decade and minimum in the 7th decade. Male to female incidence is 1.3:1.0 with male preponderance (Table 1). The commonest site of lymphadenopathy was in the neck with cervical lymph nodes constituting 168 cases. Among the remaining cases, 27 were axillary, 20 inguinal, 16 submandibular, 9 supraclavicular, 8 submantle and posterior auricular region accounting to 3 cases. Benign lymphadenopathies were diagnosed in 77.16 % of cases and malignant lymphadenopathies accounted to 18.24%. In the benign category, reactive lymphadenitis (42.8%) was commonly encountered. Other common lesions were tuberculous lymphadenitis (32.14 %) and acute Suppurative lymphadenitis (3.96 %).

Table 1: Age and Sexwise Distribution of Lymph Node Lesions

| S. No. | Age Group in Years | Number of Cases | Percentage | S. No. | Sex | No.of Cases | Percentage |
|--------|--------------------|-----------------|------------|--------|--------|-------------|------------|
| 1 | 0-10 | 37 | 14.6 | 1 | Male | 144 | 57.14 |
| 2 | 11-19 | 64 | 25.3 | 2 | Female | 108 | 42.85 |
| 3 | 20-29 | 54 | 21.4 | 3 | Total | 252 | 99.9% |
| 4 | 30-39 | 43 | 17.1 | | | | |
| 5 | 40-49 | 12 | 4.7 | | | | |
| 6 | 50-59 | 24 | 9.5 | | | | |
| 7 | 60-69 | 14 | 5.5 | | | | |
| 8 | 70-79 | 04 | 1.5 | | | | |
| 9 | 80-89 | NIL | - | | | | |
| 10 | 90-99 | NIL | - | | | | |

Out of 81 cases of tubercular lesions, the diagnosis in 36.4 % of cases was done on the basis of AFB positivity, on the smears subjected to ZN stain.

In the malignant category, metastatic deposits often involving the LN was squamous cell carcinoma accounting to 69.23 %. The other lesions were Adenocarcinoma. (15.38%), poorly differentiated carcinoma (7.69%), Ductal carcinoma (5.13%) and Mucoepidermoid carcinoma (2.56%). Seven cases were diagnosed as primary malignancies of the lymph node, where as 71.41% accounted to Hodgkin's lymphoma and 28.57% to Non-Hodgkin's lymphoma (Table 2). 34 out of 36 cases diagnosed cytologically, had good histopathological correlation.

Rare and interesting cases analyzed in this study affecting the lymph node at various sites were filarial infestation of inguinal node, metastatic squamous cell carcinoma associated with microfilaria of cervical node and metastatic squamous cell carcinoma with associated tuberculosis of cervical lymph node.

Table 2: Distribution of Cases by Etiology

| FNAC Diagnosis | No. of Cases | % |
|---------------------------|--------------|--------|
| Reactive Lymphadenitis | 108 | 42.8% |
| Tuberculous Lymphadenitis | 81 | 32.1% |
| Suppurative Lymphadenitis | 10 | 3.9% |
| Lymphomas | 07 | 2.7 % |
| Hodgkin's | 05 | 2.0% |
| Non Hodgkin's | 02 | 0.8% |
| Metastases | 39 | 15.5 % |
| Others* | 02 | 0.8 % |
| Inconclusive | 08 | 3.1 % |
| Total | 252 | 100 % |

*In the above Table, Other's included a case of metastatic squamous cell carcinoma associated with microfilaria of cervical node and metastatic squamous cell carcinoma with associated tuberculosis of cervical lymph node.

DISCUSSION

The fine needle aspiration cytology in the

evaluation of lymphadenopathy is well established, chosen modality and useful diagnostic tool for the assessment of lymph node enlargement. FNAC is completely safe, quick and inexpensive method for quick diagnosis of lymphadenopathy and it also reduces the need for surgical biopsy. We have presented our experience with 252 cases of lymphadenopathy over a period of three years. Out of all the cases, 8 cases were inadequate for interpretation (Refer Table 3) the probable reason may be smaller size of the node, very scant cellularity and obscuring of the cells by blood. The comparison of the same was done with other studies and presented in the table below.

The age incidence of patients varied from 2 to 76 years and maximum number of patients were seen in the 2nd decade. The male to female ratio was 1.3:1.0 showing slight female preponderance. The present study correlated with other studies conducted by Pandit *et al.* (1987) and Khajuria *et*

al. (2006). Most commonly, cervical group of lymph nodes were involved and least common were the nodes of posterior auricular region. Similar observations were made in other studied conducted by Tripathy *et al.* (1985) and Narang *et al.* (1990).

Out of total 252 cases, 197 cases (77.16%) accounted to benign category, where as 47 cases (18.24%) accounted to malignant category. Among the malignant category, 39 cases (15.47%) attributed to metastatic deposits and 7 cases (2.77%) to lymphomas. A correlation of these findings were done with the various other studies and depicted in Table 4.

Among the benign cases reactive lymphadenitis was the most commonest comprising of 108 cases. The second most common lesion was tuberculous lymphadenitis with 81 cases and 10 cases of Suppurative lymphadenitis. These results were correlating with studies conducted by other authors. Metastatic malignancy was diagnosed in 39 patients and the most common tumor in the order included squamous cell carcinoma, Adenocarcinoma, poorly differentiated carcinoma, ductal carcinoma and Mucoepidermoid carcinoma. The technique of FNAC has been used extensively for the diagnosis of lymphomas. Among total cases, 7 cases were diagnosed as lymphoma out of which, 5 were Hodgkin's and 2 cases were Non Hodgkin's lymphoma. The cases were showing

Table 3: Adequacy of Aspirates in Various Studies

| Studies | Total No. of Cases | Inadequate aspirate | % |
|--------------------------------------|--------------------|---------------------|-------|
| Frable WJ and Frable (1979) | 322 | 10 | 3.1% |
| Arun kumar <i>et al.</i> (1991) | 1161 | 163 | 14% |
| Barbara L Steel <i>et al.</i> (1994) | 1103 | 120 | 11% |
| Present study (2010) | 252 | 08 | 3.17% |

Table 4: Categorical Distribution of Lymphadenopathies in Various Studies

| Lesions | Patra <i>et al.</i> (1983) | Arun kumar <i>et al.</i> (1991) | Raghuvveer <i>et al.</i> (1996) | Khajuria <i>et al.</i> (2006) | Hirachand <i>et al.</i> (2009) | Present Study 2010 |
|------------------------|----------------------------|---------------------------------|---------------------------------|-------------------------------|--------------------------------|--------------------|
| Benign lymphadenopathy | 75% | 71.2% | 45% | 90.50% | 82% | 77.16 |
| Malignant deposit | 10% | 10% | 28% | 3.8% | 12% | 15.47 |
| Lymphomas | 7% | 1.8% | 6% | 2% | 6% | 2.77 |

Table 5: Comparison of the Diagnostic Indices of the Present Study with Those of Similar Studies

| Study | Sensitivity | Specificity | PPV | NPV | Accuracy | No. of cases |
|---------------------------|-------------|-------------|--------|--------|----------|--------------|
| Ahmad et al | 94.6 % | 98.5 % | N/A | N/A | 97.6 % | 115 |
| AlAlwan et al | 90.0 % | 98.8 % | N/A | N/A | 89.5 % | 158 |
| Mahammad et al | 75.5 % | 96.6 % | 94 % | 85.1 % | 88 % | 151 |
| Narang et al ⁷ | 95.6 % | 89.2 % | 88.4 % | 97.3 % | 85 % | 60 |
| Present study | 91.3 % | 86.6 % | 96.8% | 94.2% | 96.4 % | 252 |

typical bimodal age distribution. However, the number was too small to draw any comparison with other studies. Other category in our study comprises of two interesting cases. One was diagnosed a microfilarae associated squamous cell carcinoma and other was metastatic squamous cells carcinoma associated with tuberculosis.

For determination of diagnostic accuracy of the FNAC its usual practice to correlate cytodiagnosis with subsequent histological reports of excised biopsy specimens. In the present study our primary aim was to help the clinician in arriving at an early diagnosis in cases presenting with lymphadenopathy. In present study there was a good correlation between the FNAC and histopathology. All the malignant cases were confirmed good correlation with histopathology. The sensitivity and specificity of FNAC, considering histopathology as gold standard, were 91.3% and 86.6% respectively (Refer Table 5).

Our results clearly demonstrate the use of FNAC on palpable lymph node lesions and offers many advantages to clinician and pathologist, as it is an easy and reliable method and it not only offers tissue diagnosis but serves as a screening

procedure for a number of clinical considerations, e.g., Lymphoma, leukemia, metastases, tuberculosis and lymphadenopathy not otherwise specified. Three years study of our own and others' long term studies, demonstrate its safety.

CONCLUSION

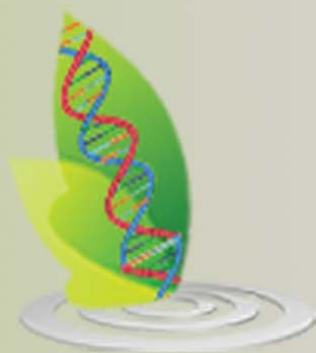
FNAC is a reliable, safe, accurate, sensitive and minimally invasive first-line investigation in the diagnosis of lymph node lesions. It is highly accurate in isolating and determining potentially neoplastic lesions, thus guiding the way for cases which truly require excision biopsy or other second-line investigations. It also plays vital role in the management of cervical lymphadenopathy as it could differentiate the infective process from neoplastic one and avoids unnecessary surgeries.

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