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Original Research Article

A clinical study of reliability of fine needle aspiration cytology as a diagnostic tool in cervical lymphadenopathy

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ABSTRACT

Background: Cervical lymphadenopathy is one of the commonest presentations in inflammatory and neoplastic disorders. Fine needle aspiration cytology (FNAC) is a well-established diagnostic method used to sample swellings at various sites in the body. It is a simple, quick, inexpensive and minimally invasive OPD technique used for establishing the etiology of cervical lymphadenopathy. Aim of this study was to evaluate the diagnostic accuracy of Fine needle aspiration cytology (FNAC) in cervical lymphadenopathy.
Methods: This study included 50 patients presenting to the surgery outpatient department with cervical lymphadenopathy. Detailed history and physical examination was done followed by FNAC in all the patients. The diagnosis was then compared with the gold standard excisional biopsy and histopathological examination by standard statistical methods.
Results: Among the 50 patients studied 31 were male and 19 were female. According to histopathologic diagnoses in 50 cases, the patients were diagnosed to have benign lesion in 28 cases (56%), and malignant lesion in 22 cases (44%). Among the benign etiologies, tuberculosis was the most frequent (40%) followed by reactive nonspecific inflammation (16%). Among the malignant etiologies, metastatic deposits constituted 30 % followed by lymphoma constituting 14%. FNAC results supported a benign lesion in 27 cases and were compatible with a malignant lesion in 19 cases. Comparing FNAC results with histopathological diagnoses revealed that, in 46 cases the FNAC results were compatible with histopathology, a total accuracy of 92%. In one case, benign lesion was over diagnosed as malignant and in 3 cases malignant lesions were underdiagnosed as benign lesions. It was found that, in diagnosing benign and malignant lesions, FNAC had a sensitivity of 96.42% and a specificity of 86.36%. Positive predictive value was 90% and negative predictive value was 95%. Out of the 50 patients studied, 20 patients (40%) were confirmed to have tuberculous lymphadenitis by histopathological examination. FNAC supported a tuberculous etiology in 14 cases and 6 cases were underdiagnosed by FNAC. The sensitivity of FNAC in diagnosing tuberculous etiology was found to be 70%, specificity was 100%, positive predictive value was 100%, negative predictive value was 85.71%. Overall the sensitivity of FNAC in diagnosing a pathological cervical lymph node was found to be 92.85%, specificity was 87.5%, positive predictive value was 97.5%, negative predictive value of 70%.
Conclusions: The utility of fine needle aspiration cytology in the evaluation of cervical lymphadenopathy has been well established by this study. It is a reliable and convenient method with minimal complications in the management of patients presenting with cervical lymphadenopathy. The various causes of cervical lymphadenopathy were found to be tuberculosis, secondary metastasis, primary malignancy of the lymph nodes and nonspecific reactive lymphadenitis. This study also supports the fact that tuberculosis is still a common cause of cervical lymphadenopathy in India.

Keywords: Cervical lymphadenopathy, FNAC

INTRODUCTION

Aspiration of lymph nodes for diagnostic purposes was first done in patients with sleeping sickness during the start of the twentieth century.[1] The experiment of fine needle aspiration (FNA) developed gradually, until 1921, when Guthrie tried to correlate FNA results with various disease processes.[2] Fine needle aspiration cytology has become an integral part of diagnostic work in a number of disease processes. It has an important place in the field of oncology where early diagnosis remains the cornerstone for a successful outcome. It is a reliable, cheap, inexpensive method with minimal complications. It can be done as an outpatient procedure without the need for hospital admission. It does not require the need for anaesthesia. It involves the use of simple equipment which is readily available. The main benefit of FNAC is to avoid the need for surgical biopsy, which requires local or general anesthesia, increased hospital stay and costs.[3]

Cervical lymphadenopathy is a common clinical finding. It might be a sign of various disease processes such as infection, inflammation, metastasis or primary malignancy. It is a common symptom which brings the patient to the physician. It might be an incidental finding in the process of evaluation of other symptoms. It requires thorough clinical examination to rule out a pathology. Clinical findings may be specific for a disease process such as a hard, round lymph node in metastatic malignancy, a tender swollen lymph node in an infective etiology, multiple matted lymph nodes in a tuberculous etiology or a rubbery consistency in a lymphoma. Often the above specific findings are not noted in all situations. It requires a definitive histological evaluation for proper management. The role of fine needle aspiration cytology in such situations is indispensable.

In our country where the prevalence of tuberculosis is high, cervical lymphadenopathy as a result of tuberculous infection is a common presentation. It is seen commonly in children and young adults. Associated constitutional symptoms such as evening rise of temperature and weight loss is seen. Fine needle aspiration cytology diagnoses tuberculosis with reasonable accuracy. Atypical presentation of tuberculosis poses a diagnostic challenge, because of the fact that acid fast bacilli are seen mostly in purulent aspirate smears which do not show granulomas, necrosis or epitheloid cells and which in absence of Ziehl-Neelsen staining can be missed as acute suppurative lymphadenitis. For a definitive diagnosis in such situations an excisional biopsy of the node with histopathological examination is warranted.

Primary malignancy of lymph nodes such as Hodgkins and non-Hodgkins lymphoma requires thorough evaluation before initiation of treatment. Immunohistochemistry analysis is required for initiation of treatment which is obtained with an excisional biopsy.

Metastatic deposits in cervical lymph nodes is a common cause of cervical lymphadenopathy especially in old age. This may be the first sign of a malignant lesion in the body which brings the patient for a consultation. Primary malignancy in the lips, oral cavity, nasopharynx, oropharynx, larynx, oesophagus may present with a cervical node secondary deposit. Fine needle aspiration cytology in such cases is indispensable. It avoids the need for an excisional biopsy which is not indicated because of the risk of tumour spread. Because of early availability of results, simplicity, minimal trauma and complications fine needle aspiration cytology is now considered as a valuable diagnostic aid and it provides ease in following patients with known malignancy and ready identification of metastasis or recurrence.

This study aims to show the accuracy of fine needle aspiration and the diagnostic utility of this method in cases of cervical lymphadenopathy.

METHODS

Fifty patients presenting to the Surgery outpatient department with cervical lymphadenopathy were selected and included in this study from the period between August 2015 to August 2016.

Inclusion criteria

- Patients with cervical lymphadenopathy presenting to surgery outpatient department
- Patients >12 years of age, both male and female patients.

Exclusion criteria

- Patients with bleeding diatheses
- Patients already on treatment for cervical lymphadenopathy
- Patients unfit for excisional biopsy under anaesthesia
- Patients unwilling for the interventions.

Patients included in the study were asked about history related to the neck swelling and relevant questions to the etiological cause. Present, past and family history of tuberculosis, history of sexual exposure for syphilis and AIDS and other relevant histories were asked. Detailed general physical examination and cervical nodal areas examination was done. The enlarged nodes were aspirated at the pathology department using a 23-25 G needle and syringe. The palpable cervical node was fixed with one hand and the skin was cleansed and 23-25-gauge 1.5 cm long needle with 10 ml syringe was inserted into the lymph node and a full suction pressure was applied. The tip of the needle was moved around. The pressure was neutralized and the needle was withdrawn. The aspirated material was placed on glass slides.

In all the cases, alcohol fixed smears were made and stained with H and E stains.

Patients having a proven site of primary malignancy presenting with a cervical node secondary were confirmed by FNAC and were not subjected to further excision biopsy, because of the known risk of tumour spread, but were included in the study with a presumption of positive histopathological diagnosis without an excision biopsy. Rest of the patients were assessed for anaesthetic fitness and posted for excisional biopsy of the enlarged lymph node under local/general anaesthesia and the specimens were sent in formalin medium to the pathology department for histopathological examination.

The results of fine needle aspiration cytology were compared with histopathological results of excision biopsy.

RESULTS

A total number of 50 patients were studied. 31 cases were male (62%) and 19 cases were female (38%) (Table 1), (Figure 1).

Table 1: Sex wise distribution of etiologies of cervical lymphadenopathy.

Etiology	Male	Female	Total
Tuberculous lymphadenitis	13	7	20
Reactive lymphadenitis	4	2	8
Lymphoma	5	4	7
Metastasis	9	6	15
	31	19	50

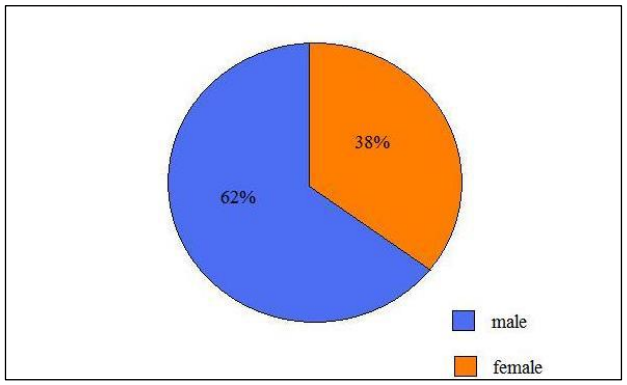

Figure 1: Sex wise incidence of cervical lymphadenopathy.

The mean age of patients was 36 years (ranging between 12 to 75 years) Figure 2. The mean age of patients with benign lesion was 24 years and those of malignant lesion was 51 years. Patients diagnosed with known primary and confirmed with metastatic deposits in the cervical node studied by FNAC were included in the study with a presumption of positive histopathological diagnosis without an excision biopsy. The histopathologic results were divided into four categories of lymph node disorders, namely tuberculous lymphadenitis, reactive lymphadenitis, lymphomas, metastatic deposits.

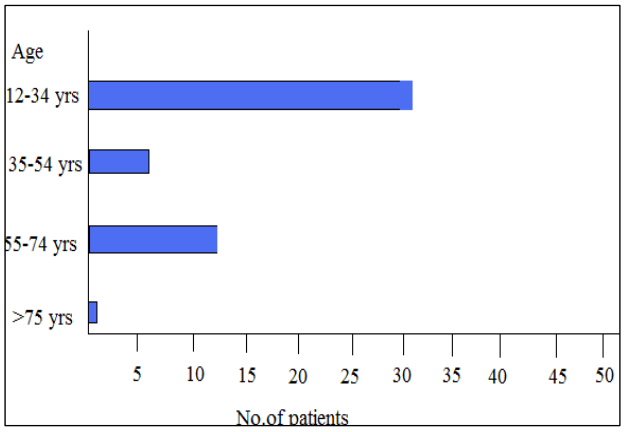

Figure 2: Age wise incidence of cervical lymphadenopathy.

According to histopathologic diagnoses in 50 cases, the patients were diagnosed to have benign lesion in 28 cases (56%), and malignant lesion in 22 cases (44%). The histopathology of malignant cases included metastatic deposits in 15 cases (30%) and lymphoma in 7 cases (14%).

FNAC results supported a benign lesion in 27 cases and were compatible with a malignant lesion in 19 cases. Comparing FNAC results with histopathological diagnoses revealed that in 46 cases, the FNAC results were compatible with histopathology, a total accuracy of 92%. In one case, benign lesion was over diagnosed as malignant and in 3 cases malignant lesions were underdiagnosed as benign lesions.

It was found that, in diagnosing benign and malignant lesions causing cervical lymphadenopathy, FNAC had a sensitivity of 96.42% and a specificity of 86.36%. Positive predictive value was 90% and negative predictive value was 95%. Out of the 50 patients studied, 20 patients (40%) were confirmed to have tuberculous lymphadenitis by histopathological examination. FNAC supported a tuberculous etiology in 14 cases and 6 cases were underdiagnosed by FNAC. The sensitivity of FNAC in diagnosing tuberculous etiology was found to be 70%, specificity was 100%, positive predictive value was 100%, negative predictive value was 85.71%. Overall the sensitivity of FNAC in diagnosing a pathological cervical lymph node was found to be 92.85%, specificity was 87.5%, positive predictive value was 97.5%, negative predictive value of 70%.

DISCUSSION

In the present study, out of the total 50 patients studied 28 cases had benign etiology (56%), and 22 cases had malignant etiology (44%). Among the benign etiologies,

tuberculosis was the most frequent (40%) followed by reactive nonspecific inflammation (16%). Among the malignant etiologies, metastatic deposits constituted 30% followed by lymphoma constituting 14%. There are various studies which analyses the etiological factors of cervical lymphadenopathy. The results of this study correlate well with those previous studies. Egea et al reported 55.1% cases of reactive or non-specific lesions.[4] Reactive glands were mostly small and less than 1 cm in size in 80% cases whereas tubercular and malignant glands were larger and over 1 cm in size in 84.8% and 83.1% cases, respectively. In another study by Javed M et al.[5] 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 the study by Kumar S et al.[4] 35 patients were enrolled in study, 20 cases showed benign disease and 15 were malignant.

Sensitivity of FNAC in diagnosing tuberculous etiology is lower due to false negative results. But considering the high specificity (100%) and positive predictive value (100%), it can be concluded that the positive results have a high validity. In the study performed by Bhattacharya et al, for FNAC for diagnosis of tuberculosis the authors concluded that FNAC is very useful adjunct in the diagnosis of tuberculosis which can be made by the demonstration of epitheloid granuloma with or without caseation even in the absence of acid fast bacilli.[6] The authors further recommend that necrotic features in suppurative abscesses and the smear however may show high acid fast bacilli positivity and the diagnosis of tuberculosis is still possible even in the absence of typical epithelioid granuloma. Due to high prevalence of tuberculosis in our country it is important to asses all cases of cervical lymphadenopathy. A pyogenic abscess is a frequent problem in our country. Such material should be sent for microbiological and bacteriological examination. Lesions diagnosed as reactive are nonspecific chronic inflammatory lesions and are usually benign. But, such lesions require further clinical examination for the evidence of septic and infective foci in head and neck. In young adults, chronic inflammatory lesions can be of tuberculous origin especially if past history of tuberculosis lesions in lungs are the coexisting clinical findings. If such lesions are present they should undergo biopsy, the material should undergo bacteriological examinations and culture study. Malignant causes of cervical lymphadenopathy are both diagnostically and prognostically important. 22 out of 50 cases (44%) were malignant lesion responsible for cervical lymphadenopathy. In this study, 7 cases (14%) were primary lymphomas, Hodgkins lymphoma (1), non-Hodgkins lymphoma (6) and 15 cases (30%) were secondary metastases. Jamal A et al, in his study on Hodgkin's lymphoma in cervical lymphadenopathy in 500 patients, 40 were diagnosed as Hodgkin's lymphoma (32 male and 8 female) among them in 8 patients it was difficult to differentiate it from tuberculosis clinically.[7] Primary malignancy of lymph nodes i.e. lymphoma both Hodgkins's lymphoma and non Hodgkins lymphoma were 7 (14%). Furthermore, the inability to evaluate the lymph node architectural changes in FNAC, low sensitivity in differentiating reactive hyperplasia from low grade non-Hodgkin's lymphoma or lymphocyte predominant form of Hodgkin's lymphoma and partial involvement of lymph nodes in some cases of lymphoma have been proposed as the main reasons for false negative results in cases of lymphoma. Though their prevalence is low, they pose a great diagnostic challenge. Once the lymphoma is diagnosed one should evaluate for the stage of the disease by appropriate investigations.

Metastatic malignant lesion was more common in male, 9 cases and among the age group more than 50 years. In metastatic lesions FNAC not only help to detect the lesion but also gives clue to the physician about the primary tumour. Metastases of unknown origin is a clinical diagnostic challenge and often manifest as cervical lymphadenopathy. The sensitivity of FNAC in diagnosing malignant lesions is high.[8] Since a positive cytologic diagnosis can support an important management decision, an attempt should be made to minimize the false positive diagnoses.

CONCLUSION

In this study, the utility of fine needle aspiration cytology in the evaluation of cervical lymphadenopathy has been well established. It is a reliable and convenient method with minimal complications in the management of patients presenting with cervical lymphadenopathy. The study analyses the various causes of cervical lymphadenopathy namely tuberculosis, secondary metastasis, primary malignancy of the lymph nodes and nonspecific reactive lymphadenitis. This study also supports the fact that tuberculosis is still a common cause of cervical lymphadenopathy in India.

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