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Fine needle aspiration cytology in the diagnosis of suspected bone lesions

Pathology

Adity Sharma Professor Department of Pathology, Assam Medical College and Hospital, Dibrugarh, Assam India

AlankritaDeka PGT ; Department of Pathology, Assam Medical College and Hospital, Dibrugarh, Assam India Corresponding author

ABSTRACT

Introduction: Fine needle aspiration cytology provides early diagnosis, evaluation, planning and institution of treatment. Most bone lesions are amenable to the FNAC procedure.

Objective: The aim of the study is to emphasize the usefulness of FNAC in the diagnosis of suspected bone lesions both benign and malignant, and compare it with clinico-radiological diagnosis and histopathology.

Results: Present study was conducted in 47 cases, sensitivity of FNAC in the diagnosis of bone lesions was found to be 74.46%, there were 35 true positive cases and 12 false negative cases. Greatest numbers of cases diagnosed correctly were of Giant cell tumor, followed by Metastatic tumor, Inflammatory lesions, Chondroma and Chondrosarcoma. Male : female is 2.35:1. Most cases in the age group of 21-30 years.

Conclusion: Cytopathology assessment with the clinical and radiology findings together can yield almost the same diagnostic accuracy in majority of lesions when compared with that of histopathology diagnosis.

KEYWORDS:

fine needle aspiration cytology, bone lesions

INTRODUCTION

Early diagnosis of any ailment is a pre-requisite to proper treatment, rehabilitation and favorable prognosis. FNAC takes a step towards this direction. FNAC has been used since 1930 , however, it is seldom used in the diagnosis of bone lesions, the reason being unfamiliarity, rarity and inadequate material aspirate.

Aspiration cytology is the study of cells on a smear and has the advantage over open biopsy in being less disruptive, permitting multiple sampling, without complication and leaving scar. Although histopathology is considered as gold standard, but FNAC as a diagnostic tool can lower the cost and time yet provide results with high degree of accuracy.

Bone lesions include benign, primary malignant, metastatic, lymphoproliferative, inflammatory and granulomatous entities of the spectrum of suspected lesions.

The Orthopaedics Department of Assam Medical College and Hospital caters a large number of patient presenting with clinico-radiological evidence of lesions of the bone. Open biopsy is done to confirm most of the diagnosis. To help both the patient and clinician to have a less time consuming, with a relative accuracy of diagnosis and avoid number of open biopsy this study was conducted.

AIMS AND OBJECTIVES

To emphasize the usefulness of Fine needle Aspiration Cytology in the diagnosis of suspected bone lesions and compare it with clinico-radiological and histopathology diagnosis.

MATERIAL AND METHOD

The study was conducted in the Department of Pathology, Assam Medical College and Hospital Dibrugarh for a period of one year. A total of 47 cases were subjected to FNAC procedure, histopathology correlation present in 33 cases. Every patient selected in this series irrespective of age and sex was diagnosed clinically and had radiological findings with thinned out cortex, cortical break or sclerosis.

Standard disposable 22 gauge with 3cm long needle was used. 10-20ml plastic syringe were used, it produces good negative pressure.

RESULTS

47 case of bone lesions diagnosed clinically and correlated with radiology were aspirated with the fine needle. They were diagnosed on the MGG stained cytology smear and then compared with the histopathology diagnosis that was taken as the gold standard for confirmation. Out of the total number of 47 cases histopathology confirmation was available in 33 cases.

Table 1: Showing total distribution of cases

LESION	NO. OF CASES
Giant cell tumor	11
Inflammatory	07
Metastatic	06
Osteosarcoma	06
Ewing's sarcoma	03
Fibrous dysplasia	03
Aneurysmal bone cyst	03
Chondroma	02
Granulomatous	02
Plasmacytoma	02
Chondrosarcoma	01
Synovial sarcoma	01

Male: female ratio was 2.35: 1. Maximum number of cases were between 21-30 years. Most common clinical features were swelling (100%), pain (73.3%), local rise of temperature (40.04%) and loss of function (17.02%). The complication seen were bleeding (7 cases), bruises (2 cases), haematoma (1 case), no other complications like infection, nerve injury or vascular injury were seen.

Table 2: Showing the Co-relation and discrepancy in Clinicoradiologic diagnosis, FNAC diagnosis and Histopathological diagnosis

Lesion	Clinicoradiologic diagnosis	FNAC diagnosis	Histopathological diagnosis
Giant Cell Tumor	9 out of 11	8 out of 11	11 out of 11
Inflammatory	7 out of 7	7 out of 7	7 out of 7
Metastatic	6 out of 6	6 out of 6	HPE not done
Osteosarcoma	3 out of 6	3 out of 6	6 out of 6
Plasmacytoma	0 out of 2	2 out of 2	HPE not done
Ewing's Sarcoma	3 out of 3	1 out of 3	3 out of 3
Fibrous Dysplasia	3 out of 3	1 out of 3	3 out of3
Aneurysmal bone cyst	2 out of 3	1 out of 3	3 out of 3
Chondroma	2 out of 2	2 out of 2	2 out of 2
Granulomatous	1 out of 2	2 out of 2	HPE not done
Chondrosarcoma	1 out of 1	1 out of 1	1 out of 1
Synovial Sarcoma	1 out of 1	1 out of 1	1 out of 1

35 cases out of 47 cases are true positive. There were no false positive cases. 12 cases were false negative.

Table 3: Showing incidence of false negative cases

No. of cases	Lesion/diagnosed by HPE	FNAC
3	Osteosarcoma	Inconclusive/Impenetrable/Spindle cell sarcoma
2	Ewing's	Inconclusive/Inflammatory
3	Giant Cell Tumor	Inflammatory/Non-representive sampling
2	Aneurysmal Bone Cyst	Giant cell containing lesion/Haemorrhagic smear
2	Fibrous dysplasia	Inconclusive/Giant cell lesion

DISCUSSION

This study was undertaken with a view to prove the efficiency of FNAC in the diagnosis of bone lesions with a clinic radiological and histopathology correlation. Diagnosis of bone lesions is challenging task on FNAC. Bony tissue is formidable barrier to introduction of the fine needle. But any involvement of the bone whether due to tumor, infection or metastasis breaks the cortex and it becomes somewhat easier to penetrate the bone.

In our study the maximum number of cases recorded were of Giant cell tumor(25.5%), 32% in Agarwal et al study, of these 3 lesions could not be diagnosed correctly as because other giant cell containing lesions mimicked that of GCT and were provisionally diagnosed as aneurysmal bone cyst. There were 6 cases of osteosarcoma of which 3 cases could not be diagnosed due inadequate sample, impenetrable lesion and one was a case of telengiactic osteosarcoma which was diagnosed as pleomorphic spindle cell sarcoma due to absence of osteoid.

We had 6 cases of metastatic tumors. A case each of bronchogenic carcinoma, follicular carcinoma thyroid, renal cell carcinoma, prostatic carcinoma and squamous cell carcinoma with metastasis were diagnosed and the primary identified. A case which could not be identified was a patient with a lytic lesion in the humerus and had an amputation. This was due to presence of very immature cells.

One case each of Chondrosarcoma and synovial sarcoma the diagnosis by FNAC was possible. Out of 3 Ewing's sarcoma only one was diagnose correctly, one had extensive inflammatory cells and the other had inadequate smear. 2 case of multiple myeloma was diagnosed correctly, smears were highly cellular composed of plasma cells. However these 2 cases were misdiagnosed both clinically and radiologically as cases of metastasis.

2 out of 3 cases of fibrous dysplasia were misdiagnosed .One due to presence of giant cells and the other diagnosed as spindle cell tumor with fibrous tissue. Aneurysmal bone cyst was differentially diagnosed as GCT.

In this study granulomatous lesions and inflammatory lesions were diagnosed to 100% accuracy and histology was not done.

It has been seen that it is easier to diagnose malignant bone lesions and especially metastatic lesion to a higher degree of accuracy as they almost always invade the soft tissue, which aid in easier penetration and collection of material.

The overall accuracy in our study was found to be 74.46%.

CONCLUSION

FNAC is a simple, cheap, time saving almost atraumatic procedure, and can always be used as preliminary tool in initial diagnosis of bone lesions. FNAC of metastatic bone lesions is a major step in pretreatment diagnosis. Cytopathology assessment with the clinical and radiologic findings, together, can yield almost the same diagnostic accuracy in the majority of the lesions when compared with that of histopathology diagnosis.

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