



ORIGINAL RESEARCH PAPER

Pathology

A CORRELATIVE STUDY OF FNAC AND RADIOLOGICAL IMAGING OF BONY LESION IN THE TERTIARY HEALTH CENTRE RIMS, RANCHI, JHARKHAND: A PROSPECTIVE STUDY

KEY WORDS: FNAC, Radiological Imaging And Bony Lesions

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ABSTRACT

INTRODUCTION : Nowadays; fine needle aspiration cytology (FNAC) is gaining increasing popularity in the diagnosis of bony lesions (1). In the majority of patients, the combined evaluation of clinical and radiologic data together with the FNAC result has been sufficient for making treatment decisions. Only in a minority of patients, it has been necessary to perform biopsy before definitive treatment (2, 3). Many specific bone tumors either benign or malignant can be diagnosed correctly by FNAC alone (4).

AIM : To determine the correlation between different FNAC and Radiological Imaging of Bony lesion.

MATERIAL AND METHODS: We have selected fifty cases that suspected to be bony lesion either clinically or radiologically. Prior doing FNAC, radiologic imaging done on these patients. Then FNAC was done in the Cytopathology section of department of Pathology, RIMS, Ranchi.

RESULTS: Out of 50 cases cytological diagnosis made possible in 47 cases. Maximum no of cases 20 (40%) were in the age group 11-20 years. Male: female ratio of 1.6:1. Most common bone involved was tibia followed by femur. Osteoclastoma (46%) was the most common benign bony whereas Osteosarcoma (43%) was most malignant bone tumor followed by Ewing's sarcoma (36%). Out of 50 cases radiological diagnosis was available only in 40 cases. In 40 cases, 23 cases (57.50%) have similar Cytological diagnosis as that of radiological diagnosis. The sensitivity, specificity, positive predictive value and negative predictive value were 80%, 88%, 86.9% and 81.4% respectively. The accuracy was 84%.

INTRODUCTION:

Bone is a type of connective tissue giving mechanical supports to the body. The complexity of its growth, development and maintenance makes it susceptible to circulatory, inflammatory, neoplastic, metabolic and congenital disorder. Nowadays; fine needle aspiration cytology (FNAC) is gaining increasing popularity in the diagnosis of bony lesions⁽¹⁾. In the majority of patients, the combined evaluation of clinical and radiologic data together with the FNAC result has been sufficient for making treatment decisions. Only in a minority of patients, it has been necessary to perform biopsy before definitive treatment^(2, 3). Many specific bone tumors either benign or malignant can be diagnosed correctly by FNAC alone⁽⁴⁾. Martin and Ellis first applied FNAC technique to the diagnosis of bone lesions in 1930⁽⁵⁾, but true fine needle for aspiration (23-24 gauge) were first introduced in Europe in 1950 by Lopez Cardzo⁽⁶⁾ in Netherland and Soderstrom in Sweden⁽⁷⁾.

MATERIAL AND METHODS

FNAC was performed fifty patients who came to cytopathology section with requisition of FNAC of bony lesion in department of Pathology, RIMS, Ranchi. Duration of study was 6 months from April 2019 to September 2019.

The patient complains with palpable bony mass lesion and pathological fracture of all ages and both genders were included. Previously diagnosed case of receiving therapy, recurrence of lesion and Patients not willing to participate in the study were excluded from the study.

Procedure of FNAC after making the patient comfortable on a couch. A hollow needle of fine gauge (22G) is attached to a syringe (10cc). The needle is inserted into the lesion and suction is applied by pulling back the plunger of the syringe. The needle is then passed back and forth through the lesion several times. On completion of aspiration, suction is released and pressure within the syringe allowed equalizing. The needle is then withdrawn; the contents of the needle are then

sprayed onto a glass slide for examination. Some of the smears were fixed in methanol and stained by Hematoxylin & Eosin, the others were air dried and stained by Leishman Giemsa (LG) stain.

RESULTS

In the present study, out of 50 cases, majority 20(40%) were belonged to age-group 11-20 years followed by 7(14%) in each age-group of 0-10 and 21-30 years respectively. The least cases 5(10%) were belonged to age-group 41-50 years. The minimum age of case was 4 years and maximum was 60 years. The mean age of case was found 25±16.18 (mean ± SD) years. In the present study, out of 50 cases, majority 31(62%) were Male; whereas 19(38%) were Female. Slightly male preponderance was noticed with a male: female ratio of 1.6:1. More than half 28(56%) cases site of lesion was lower limbs; whereas in 18(36%) cases, upper limb was the site of lesion. While in 4 (8%) cases site of lesions were clavicle, scapula, ribs, and hands. Most common nature of lesion was benign neoplastic 18 (36%) followed by malignant lesion 14 (28%). 7(14%) cases were inflammatory; whereas 3 (6%) of cases were inadequate for diagnosis containing only blood clots. Out of 7 cases of inflammatory lesions, 4(57%) cases were Chronic Osteomyelitis and 3 (43%) cases were Tubercular Osteomyelitis. Out of 26 cases, the most common benign neoplastic lesion was benign Osteoclastoma 12(46%), whereas 2 (8%) cases of Enchondroma. In benign non-neoplastic condition Aneurysmal bone cyst was 5(19) followed by Simple bone cyst. Out of 14 cases of malignant lesions, Osteosarcoma 6 (43%) was most common malignant tumor followed by Ewing's Sarcoma 5 (36%). Out of 50 cases radiological diagnosis was available only in 40 cases. Out of 40 cases, 23 cases (57.50%) have similar Cytological diagnosis as that of radiological diagnosis whereas 17 cases (42.50%) have different cytological diagnosis. The sensitivity, specificity, positive predictive value and negative predictive value when correlated with radiological diagnosis were found to be 80%, 88%, 86.9% and 81.4% respectively.

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All of above discussion have been tabulated as follow.

Table no- 1 Distribution of cases according to Age group.

AGE-GROUP	NO. OF CASES(n=50)	PERCENTAGE (%)
0-10	7	14.0
11-20	20	40.0
21-30	7	14.0
31-40	6	12.0
41-50	5	10.0
51-60	5	10.0
TOTAL	50	100

Table no- 2 Distribution of cases according to Gender

GENDER	NO. OF CASES(n=50)	PERCENTAGE (%)
FEMALE	19	38.0
MALE	31	62.0
TOTAL	50	100.0

Table no- 3 Distribution of cases according to Nature of Lesions.

NATURE OF LESION	NO OF CASES (n = 50)	PERCENTAGE (%)
BENIGN NEOPLASTIC	18	36
BENIGN NON-NEOPLASTIC	8	16
INADEQUATE	3	6
INFLAMMATORY	7	14
MALIGNANT	14	28
TOTAL	50	100

Table no- 4 Showing Radiological correlation

RADIOLOGICAL DIAGNOSIS	NO OF CASES(n=40)	PERCENTAGE
SAME	23	57.50%
DIFFERENT	17	42.50%
TOTAL	40	100%

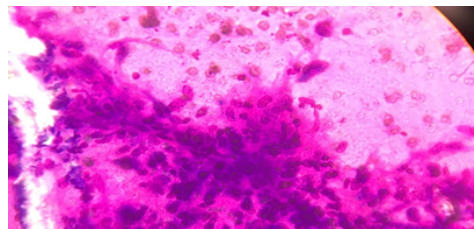


Fig . 1 LGX40: Smear showing cluters of Epithelioid cells (Tubercular osteomyelitis)

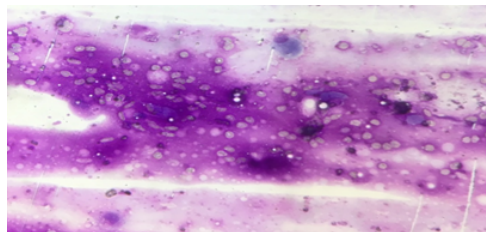


Fig. 2: LGX40, Smear showing myxoid background with cartilaginous cells and osteoblasts (Osteochondroma)

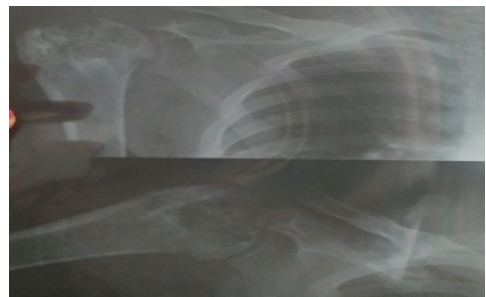


Fig. 3 X-Ray of shoulder showing soap bubble appearance

s/o Osteoclastoma

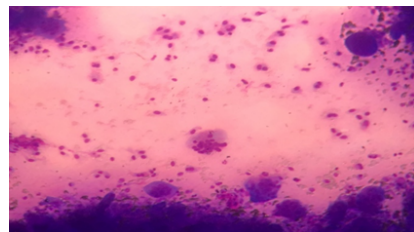


Fig. 4; LGX 10; Smear showing many Osteoclast like giant cells (Osteoclastoma)



Fig. 5; X-Ray of femur showing Onion peel Appearance s/o Ewing's Sarcoma

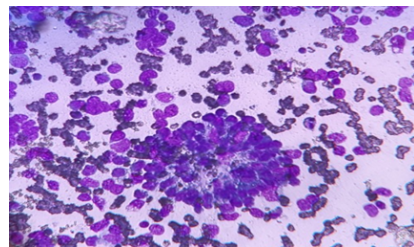


Fig. 6; LGX40; Smear showing Rosette rosette-like structures (Ewing's Sarcoma)



Fig 7 ; X-Ray of Tibia showing Sunburst appearance s/o Osteosarcoma

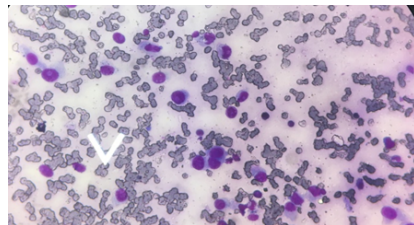


Fig. 8; Smear showing pleomorphic rounded cells& Tumor cells, more or less resembling osteoblasts (Osteosarcoma)

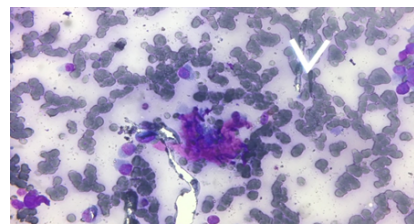


Fig 9 : Smear showing Clumps of amorphous, faintly eosinophilic material in the background (osteoid), (Osteosarcoma)

DISCUSSION:

In the present study, we found that adequacy of smears was 94%. Most common age group was 11-20 years. Among 50 cases, male patients were 31 which were greater than females (19). Male:Female ratio was to be 1.6: 1. Male preponderance has been seen. Maximum no of bony lesions involved the lower limbs (56%). No of cases involving upper limbs were 18 (36%). Most common benign tumor was Osteoclastoma and most common malignant tumor was Osteosarcoma. Accuracy of FNAC to diagnose true benign and malignant neoplastic lesion was found to be 84%. sensitivity and positive predictive value found to be 80% and 86.9% respectively which are more than the study done by Ramana S.V *et al*⁽¹⁰⁾, but lesser than other studies like Obiageli E Nnodu O E *et al*⁽⁹⁾ and Jain *Vet al*⁽¹¹⁾.

One more study done by Kujur P *et al*⁽⁶⁾ they found that male: female ratio was 1.9:1. Overall diagnostic accuracy was reported sensitivity, specificity, positive predictive value and diagnostic accuracy as 96.66%, 95.23%, 97.75% and 96.92% in their study.

The study done by Obiageli E Nnodu O E *et al*⁽⁹⁾ they found that adequacy of sample was 93.75%. Also having male preponderance, mostly involving lower limb. They found that most common lesion was metastatic tumor followed by Osteosarcoma.

The study done by Jain *Vet al*⁽¹¹⁾, their study show that age ranged between 5 – 75 years with a male to female ratio 1.84 :1. The overall diagnostic accuracy was 95.92%, with 100% sensitivity and specificity. The predictive values of positive as well as negative test were 100%.

The study done by Wahane R N. *et al*⁽¹²⁾. Their study show diagnostic accuracy of FNAC was 90.5%. Osteoid or osteoid-like material was demonstrable in 63.6% cases of osteogenic sarcoma

CONCLUSION:

FNAC is a simple, reliable, time-saving and cost effective diagnostic technique that can facilitate patient management and preoperative decision-making and / or avoid unnecessary invasive procedures for with primary or metastatic bone lesions. With detailed clinical data, radiographical data and analysis FNAC can be accurate in most of the lesions. Considering the overall advantages and cost-analysis, FNAC may be suggested as the initial method of choice for evaluation of bone lesions in most clinical settings. FNAC of bone lesion is safe, quick, easy, economical and helpful in planning the correct therapy.

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