IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 21, Issue 8 Ser.1 (August. 2022), PP 20-23
www.iosrjournals.org

A Cytohistopathological Correlation of Bone Tumors and Tumor-Like Lesions in RIMS, Ranchi, Jharkhand: A Case Series

Dr.Nisha Kumari*: Post-graduate Student, Department of Pathology, Rajendra Institute of Medical Sciences, Ranchi.*

Dr.K.P SINHA*: Professor, Department of Pathology, Rajendra Institute of Medical Sciences, Ranchi.*

***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 establish the correlation between histopathological findings with FNAC of Bone tumors and bone tumor like lesions.*

***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 and histopathology were done 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 histopathological diagnosis was available only in 28 cases. Out of 28 cases, 24 cases (85.70%) have similar histological diagnosis as that of cytological diagnosis. The sensitivity, specificity, positive predictive value and negative predictive value were 80%, 88%, 86.9% and 81.4% respectively. The accuracy was 84%.*

***Keywords:** FNAC, histopathology, Bone tumors and bone tumor like lesions.*

Date of Submission: 21-07-2022 Date of Acceptance: 05-08-2022

I. Introduction

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)] .

II. 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. The findings will be compared with that of histolgical specimen whenever available.

III. 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 Simplebone cyst. Out of 14 cases of malignant lesions, Osteosarcoma 6 (43%) was most common malignant tumor followed by Ewing's sarcoma (36%). Out of 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. The most of the patients were complaint palpable bony mass and bony pain (80%), followed by pathological fracture (20%).

Out of 50cases, the cytohistopathological correlation were observed 56 %(28 cases) The majority of cases of osteosarcoma, giant cell tumor and Ewing's sarcoma were observed cytohistopathological correlation.
Out of 7 non-neoplastic bone lesions, most common lesions were chronic osteomyelitis, biopsy were available of 4 lesions and 100% correlated with FNAC, only two cases showed positivity
for Zheel–Nelson stain of acid-fast bacilli, followed by chronic osteomyelitis 2 biopsy were available. (table no 5)

Out of 26 benign bone lesions, 12 cases of giant cell tumor was the most common diagnosis, biopsy
were available 9, 6 were correlated with cytology but one was turned out to be osteosarcoma and two were turned out to be aneurysmal bone cyst, smears were highly hemorrhagic and obscured the large part of
smear, only few osteoclastic giant cells were seen along with some mesenchymal element
About 100% cytohistopathological correlations observed in benign tumors such as aneurysmal bone cyst 2cases, Osteochondroma 1 case and Enchondroma 1 case (Table no 6).

Out of 14 malignant bone lesions, osteosarcoma 6 was the most common diagnosis, biopsy were available 5 cases, 4 cases were correlated with cytology but 1 were turned out to be giant cell tumor, on review it was found paucicellular smears and lack of clinico-radiological correlation was the reason for misdiagnosis. Ewing's/ PNET 5 cases were the second most common diagnosis, biopsy were available 4 cases, all were correlated with cytology. Other malignant tumors were correlated with cytology 100 %.(table no 7)

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 histopathological correlation

HISTOPATHOLOGICAL DIAGNOSIS	NO OF CASES(n=40)	PERCENTAGE
SAME	24	85.70%
DIFFERENT	4	14.30%
TOTAL	28	100%

Table no -5 FNAC and histopathological diagnosis of non-neoplastic bone lesion

Cytological diagnosis	Number of cases	Biopsy available	Histological diagnosis concordance	Histological diagnosis disconcordance
Granulomatous osteomyelitis (tubercular)	3	**2**	**2**	**0**
Chronic osteomyelitis	4	**2**	**2**	**0**
Total	**7**	**4**	**4**	**0**

Table no -6 FNAC and histopathological diagnosis of benign bone tumors

Cytological diagnosis	Number of cases	Biopsy available	Histological diagnosis concordance	Histological diagnosis disconcordance
Osteoclastoma (GCT)	**12**	**9**	**6**	**2**Aneurysmal bone cyst,1 osteosarcoma
Aneurysmal bone cyst	**5**	**2**	**2**	**0**
Chondroblastoma	**1**	**0**	**0**	**0**
Osteochondroma	**1**	**1**	**1**	**0**
Osteoid osteoma	**1**	**0**	**0**	**0**
Enchondroma	**2**	**1**	**1**	**0**
osteoblastoma	**1**	**0**	**0**	**0**
Simple bone cyst	**3**	**0**	**0**	**0**
Total	**26**	**13**	**10**	**3**

Table no -7 FNAC and histopathological diagnosis of malignant bone tumors

Cytological diagnosis	Number of cases	Biopsy available	Histological diagnosis concordance	Histological diagnosis disconcordance
Osteosarcoma	**6**	**5**	**4**	**1 Osteoclastoma**
Ewing's sarcoma	**5**	**4**	**4**	**0**
Malignant Osteoclastoma	**2**	**1**	**1**	**0**
chondrosarcoma	**1**	**1**	**1**	**0**
total	**14**	**11**	**10**	**1**

IV. 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 V*et 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 this 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 V*et 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

V. 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. Only in a minority of patients, it has been necessary to perform biopsy before definitive treatment. 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.

References :

[1]. Kreicbergs A, Bauer H, Brosjo O, Lindholm J, Skoog L,Soderlund V. Cytological diagnosis of bone tumors. J Bone Joint Surg 1996;78-B(2):258–63.

[2]. Domanski H, Ma˚ ns A , Birgitta C, et al. Core-needle biopsy performed by the cytopathologist: a technique to complement fine-needle aspiration of soft tissue and bone lesions. CancerCytopathol 2005;105:229–39.

[3]. Rougraff B, Albert A, Biermann J, Healey J. Biopsy of soft tissue masses evidence-based medicine for the musculoskeletal tumor society. Clin Orthop Relat Res 2009;467:2783–91.

[4]. Sa´ pi Z, Antal I, Pa´ pai Z, et al. Diagnosis of soft tissue tumors by fine-needle aspiration with combination Cytopathology and ancillary techniques. Diagn Cytopathol 2002;26: 232–42. Mostassim A, Ulhaque A; Spectrum of bone lesions diagnosed on Fine Needle Aspiration Cytology, International Journal of pathology;(cited in Dec, 2017); 2005;3(2):57-64.

[5]. Mostassim A, Ulhaque A; Spectrum of bone lesions diagnosed on Fine Needle Aspiration Cytology, International Journal of pathology;(cited in Dec, 2017); 2005;3(2):57-64.

[6]. Kujur P, Kosam S; Fine Needle Aspiration Cytological Study of Bone Tumors and Tumor-like Lesions; International Journal of scientific study. (cited in nov. 2017) May 2016;vol-4(2); 214-218

[7]. Lopez-Cardozo, P clinical cytology lesion; stafleu,1954.

[8]. Soderstrom N. Punctures of goiters for aspiration biopsy. Acta Med Scand 1952;144:235-44.

[9]. Obiageli E Nnodu, SO Giwa, Samuel U Eyesan1 and Fatima B Abdulkareem1, Fine needle aspiration cytology of bone tumours-the experience from the National Orthopaedic and Lagos University Teaching Hospitals, Lagos, Nigeria *CytoJournal* 2006, 3:16 doi:10.1186/1742-6413-3-16.

[10]. S V Ramana, Y Sudhasree. A study of fine needle aspiration cytology in diagnosis of various tumors of bone and center. *MedPulse International Journal of Pathology.* November 2017; 4(2): 41

[11]. Jain V, Agarwal T. Role of fine needle aspiration cytology in bone lesions. Int J Res Orthop 2017;3:26-9.

[12]. R.N.Wahane, M.D., V.R. Lele, M.D., and S.K. Bobhate, M.D. Fine Needle Aspiration Cytology of BoneTumors ACTA CYTOLOGICA Vol- 51 Number 5 Sep–Oct 2007.

Dr.Nisha Kumari, et. al. "A Cytohistopathological Correlation of Bone Tumors and Tumor-Like Lesions in RIMS, Ranchi, Jharkhand: A Case Series." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(08), 2022, pp. 20-23.