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Original Research Article

Histopathological evaluation of small biopsy of bone: a retrospective study in tertiary care hospital of north east India

Junu Devi, Nayana Bora*

Department of Pathology, Gauhati Medical College and Hospital, Guwahati, Assam, India

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***Correspondence:**
Dr. Nayana Bora,
E-mail: nayanaboradr@gmail.com

ABSTRACT

Background: Bone tumors are infrequently encountered disease constituting only 0.5% of the total world cancer incidence. There are worldwide variations in different bone lesion and patterns of bone cancer. Histologic evaluation is one of the first prerequisites in evaluating any primary bone tumor.
Methods: The present study was carried out at the Gauhati Medical College and hospital (GMCH), Guwahati, Assam for a period of 2 years. Cases of bone biopsy from the histopathology section of GMCH were reviewed and analyzed.
Results: We found that bone lesions were common in <20 years of age, having a male predilection. Osteomyelitis was the most common non-neoplastic lesion; among neoplastic most common benign tumor was osteoclastoma and metastatic adenocarcinoma was the most common malignant bony lesion.
Conclusions: Preoperative histopathological analysis of bone biopsy is very valuable in diagnosis as well as planning of surgical procedure specifically in case of neoplastic bone lesion and proper management of non-neoplastic lesion. Therefore, biopsy and radiology together aid in correct diagnosis of bony lesions.

Keywords: Bone biopsy, non-neoplastic and neoplastic bone lesion

INTRODUCTION

A spectrum of pathological bone lesions can be presented in any form ranging from inflammatory to neoplastic conditions.[1] There are worldwide variations in different bone lesion and patterns of bone cancer.[2] It is important to understand that some benign processes such as osteomyelitis can mimic malignant lesions and malignant lesions such as metastasis or myeloma can mimic benign lesions.[3] Also, history of repeated trauma may point towards diagnosis of stress fracture, a lesion that may be confused with malignancy.

Histologic evaluation is one of the first prerequisites in evaluating any primary bone tumor. It is difficult to determine radiologically in plain films whether a lesion is benign or malignant.[4] Histopathological examination enables us to understand the spectrum of lesion and give an idea of different bone tumors in population and different age group and sex. Aim of the present study was to assess the variety of bone lesions and their relative frequency among 60 patients from various parts of North Eastern region.

METHODS

The present study was carried out at the Gauhati Medical College and hospital (GMCH), Guwahati, Assam for a period of 2 years (January 2020-December 2021). It is a retrospective study with a sample size of 60. All age groups and sex with complains of bony lesions were included and soft tissue tumors were excluded from the

study. Ethical approval was taken from institutional ethical committee of Gauhati Medical College and hospital. Cases of bone biopsy were taken from the histopathology section of GMCH. Histopathological sections of the all 60 cases were reviewed and analyzed. A detailed clinical and radiological history of the patients were assembled. All the sections were stained with hematoxylin and eosin. Faded slides were re-stained before reviewing. Statistical analysis was done in IBM SPSS version 25.

RESULTS

In the present study, bone lesions were more common in <20 years of age group (n-29, 48.4%) (Figure 1); P value was 0.028. Males were more commonly affected comprising (n=37, 61.6%) of total affected with male to female ratio being 1.6:1 (Table 1).

Table 1: Gender distributions of bony lesions.

	Non - neoplastic	Benign	Malignant	Total (%)
Male	21	11	5	37 (61.60)
Female	8	5	10	23 (38.40)

Table 2: Distribution of bony lesions according to location.

Location	Non-neoplastic	Neoplastic	Total (%)
Femur	16	11	27 (45)
Tibia	4	10	14 (23.33)
Humerus	5	3	8 (13.33)
Radius	0	4	4 (6.6)
Ulna	1	1	2 (3.3)
Hip bone	1	1	2 (3.3)
Malleolus	1	1	2 (3.3)
Fibula	1	0	1 (1.6)
Total	29	31	60

Overall, most bone lesions involved the femur (n=27, 45%) mostly lower end followed by tibia (n=14, 23.33%) (Table 2). Out of 60 bone lesions 29 non neoplastic lesions (n=29, 48.4%), 16 benign neoplastic lesions (n=16, 26.6%) and 15 malignant lesions (n=15, 25%). Amongst non-neoplastic lesions osteomyelitis was most common (n=20, 68.9%) followed by inflammatory lesions (n=6, 20.6%) and fibrous dysplasia (n=3, 10.3%). Among benign neoplastic lesions osteoclastoma (GCT) was most commonly encountered (n=10, 62.5%) followed by osteochondroma (n=5, 31.25%) and chondroblastoma (n=1, 6.25%) (Figure 2).

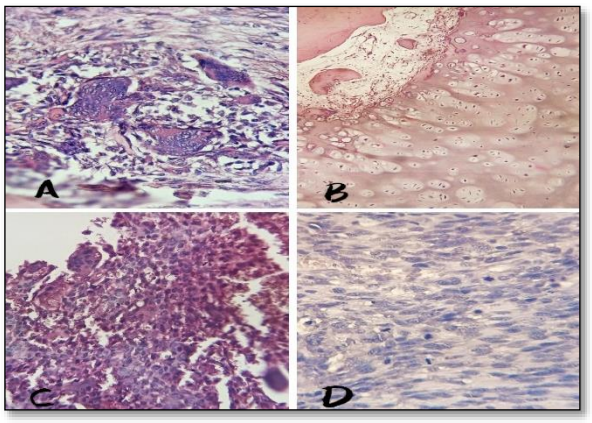

Figure 2: Photomicrographs of A) Giant cell tumor of bone, B) Osteochondroma, C) Chondroblastoma, D) transformation of osteosarcoma into high grade spindle cell sarcoma.

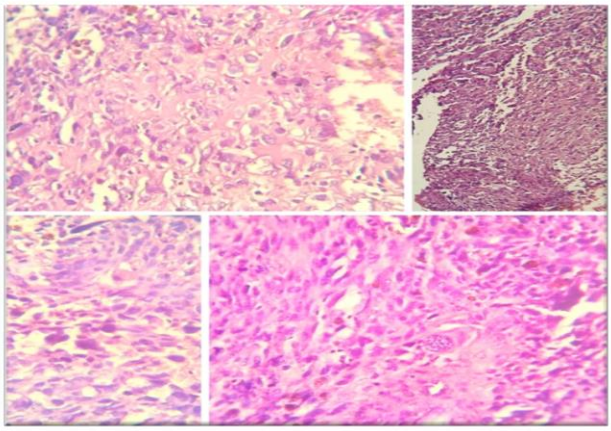

Figure 3: Photomicrograph of osteosarcoma.

However, a total of 15 cases were found to be malignant out of which 8 were metastatic lesions mostly adenocarcinoma ((n=8, 57.14%), followed by osteosarcoma (n=5, 28.57%) and Ewing's sarcoma (n=2, 14.29%) [Figure 3, 4]. Amongst osteosarcoma, 2 cases were that of fibroblastic variant (Table 3).

Table 3: Proportion of bony lesions.

Non-neoplastic		Neoplastic
	Benign	**Malignant**
Osteomyelitis- 20	Osteochondroma- 5	Ewing's sarcoma- 2
Inflammatory lesions- 6	Osteoclastoma- 10	Osteosarcoma-5
Fibrous dysplasia- 3	Chondroblastoma- 1	Metastasis- 8
Total- 29	Total- 16	Total- 15

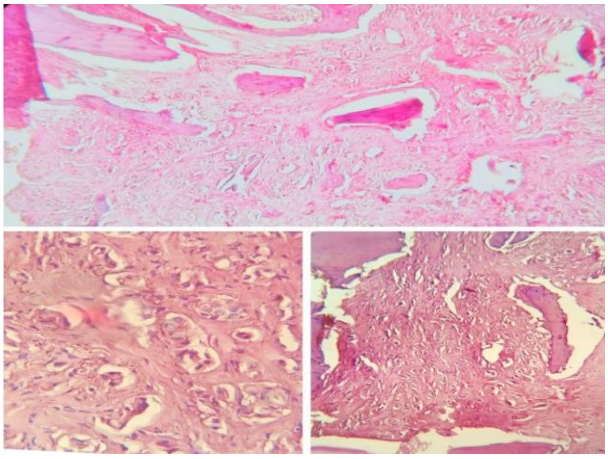

Figure 4: Photomicrograph showing metastatic adenocarcinoma of bone.

DISCUSSION

Bone tumors are infrequently encountered diseases constituting only 0.5% of the total world cancer incidence compared to the occurrence of other neoplastic lesions[5]. In this study, 60 cases were analyzed during the study period. The peak age incidence of primary bone tumors was seen in younger age group up to 20 years of age. Male preponderance was seen in most of the tumors with male to female ratio being 1.6:1. Benign lesions were slightly common than malignant lesions. Similar findings were reported in other studies also.[1,6,7] (Table 4).

In our study it was noticed that osteomyelitis was the most common non-neoplastic lesion. The most common benign tumor was osteoclastoma (giant cell tumor) followed by osteochondroma which is same as in other studies.[1,6,7] (Table 4). However, in our study metastatic tumors were found to be most common malignant lesion followed by osteosarcoma where as in other studies it was vice versa. Metastasis was seen in older age group i.e. beyond 50 years of age. Most common site of involvement was femur. It commonly originates from lung, gastrointestinal system, prostate, thyroid, breast, and liver. Femur, pelvis, vertebrae, humerus, and rib are the common sites of metastases.[8-10]

Table 4: Comparison of our study with other studies.

	Our study (%)	Manoja et al[1] (%)	Shubhi et al[6] (%)	Verma et al[7] (%)
Males	37 (61.6)	31 (62)	59 (53.6)	69 (55.6)
Females	23 (38.4)	19 (38)	51 (46.4)	55 (44.4)
Non neoplastic (infectious/inflammatory)	29 (48.4)	13 (26)	-	-
Neoplastic lesions:	-	-	-	-
Benign	16 (26.6)	34 (91.8)	79 (72)	64 (51.6)
Malignant	15 (25)	3 (8.1)	31 (28)	60 (48.4)
Giant cell tumor	10 (62.5)	10 (29.4)	17 (15)	25 (20.16)
Osteochondroma	5 (31.25)	22 (64.7)	15 (13)	17 (13.7)
Osteosarcoma	5 (33.3)	1 (2)	12 (38.6)	34 (27.4)
Total	60	50	110	124

CONCLUSION

Preoperative histopathological analysis of bone biopsy is very valuable in diagnosis as well as planning of surgical procedure specifically in case of neoplastic bone lesion and proper management of non-neoplastic lesion. Histopathology along with radiological investigation may increase the accuracy of diagnosing bone lesions. Further study with larger sample size with detailed history, clinicoradiological correlation and histopathological evaluation is recommended to get the more accurate diagnosis and frequency of various bone lesions in different categories.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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