



ORIGINAL RESEARCH PAPER

Pathology

HISTOPATHOLOGICAL EVALUATION OF BONE TUMORS IN A TERTIARY CARE HOSPITAL IN GWALIOR, INDIA

KEY WORDS: Bone, Fibrous dysplasia, Histopathology, Osteochondroma, giant cell tumor, non ossifying fibroma.

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ABSTRACT

Background : Bone lesions are diagnostic challenges to surgical pathologists. Correlation of Histopathological study enables us to understand the spectrum of bone lesions and gives an idea of different bone tumors and tumor-like lesions in population among different age group and sex. **Objective:** To determine the spectrum of various bone tumors and their relative frequency at Gajraraja Medical College, Gwalior (M.P.). **Materials and Methods:** A retrospective review of histopathological reports of all bone specimens received in the Department of Pathology Gajra Raja Medical College, Gwalior for a period of 1 years from August 2021- July 2022 was done. Results: Of the 55 histopathologically diagnosed bone lesions, male to female ratio was of 2.77:1. Age ranged from 6-83 years. Nonneoplastic lesions accounted for 38.18%, while neoplastic lesions accounted for 61.82%. Osteomyelitis was the most common and only nonneoplastic lesion encountered with 21 cases (38.18%). Out of 34 cases of bone tumors, benign tumors made up to 67.65%, while the malignant tumor and tumor-like lesions made up 8.82% and 23.52%, respectively. Giant cell tumours with 10 cases (29.41%) and Ewing sarcoma with 3 cases (8.82%) were the most common benign and malignant tumors, respectively; while non ossifying fibroma with six cases (17.64%) was the most common tumor-like lesion. Femur was the most common site with 13(38.23%) occurrences followed by tibia with 6 (17.64%). **Conclusion:** Chronic osteomyelitis was the commonest nonneoplastic lesion. Among the bone tumors, giant cell tumour and Ewing sarcoma was the most common benign and malignant bone tumor, respectively.

INTRODUCTION

Bone has cartilaginous, osteoid, fibrous tissue, and bone marrow elements. Each tissue can give form benign or malignant tumors. Bone tumors can be primary which originate in the bone or secondary. The important causes implicated include chemotherapy, [2] irradiation, [3] preexisting bone lesions, [4],[5] and less commonly trauma, [6] foreign bodies, [7] and viruses. [8]

Correlation of Histopathological study enables us to understand the spectrum of bone lesions and gives an idea of different bone tumors and tumor-like lesions in population among different age group and sex. Bone lesions are diagnostic challenges to surgical pathologists. Therefore, an integrated approach involving radiographic, histologic, and clinical data are necessary to form an accurate diagnosis and to determine the degree of activity and malignancy of each lesion. [9] A proper histopathological diagnosis is useful in confirming the diagnosis and helps in staging the tumor and aid the surgeon in planning limb salvage surgery for early malignant and benign bone lesions. [9]

The present retrospective study was carried out to assess the patterns of various bone lesions and their relative frequency among already existing data of 55 patients whose biopsy specimens were received in the Department of Pathology at Gajraraja Medical College, Gwalior during a period of 1 years (August 2021 - July 2022)

Materials and Methods

This is a retrospective study conducted in the Department of Pathology (histopathology section) at Gajraraja Medical College, Gwalior covering a period of 1 years from (August 2021 - July 2022). All the histopathological reports and slides of patients who had bone tissue biopsies were reviewed to provide relevant information on age, sex, histopathological interpretation, and the anatomical site of occurrence. Data tabulation and analysis was done to deduce the relative frequency of all observed parameters. All tumors of hematopoietic and odontogenic origin were excluded in this

study.

Results

A total of 55 histopathological specimens were received in the department during the period under review. By far the majority, 34 (61.8%) of the bone lesion were neoplastic; whereas 21 (38.2%) of the lesions were nonneoplastic. The histopathological diagnosis showed that chronic osteomyelitis was the most common diagnosis on nonneoplastic lesion. After exclusion by criteria, of the 34 neoplastic bone lesions, benign lesions accounted for 23 (67.65%) cases and malignant tumors accounted for 03(8.82%) cases, while 8 (23.52%) cases were tumor-like lesions.

Out of the 34 cases of neoplastic bone lesions, the most common benign and malignant tumors were Giant cell tumor 10 cases (29.41%) and ewings Sarcoma 3 (8.82 %), respectively; while the most common tumor-like lesion was non ossifying fibroma (17.64 %). [Table 1].

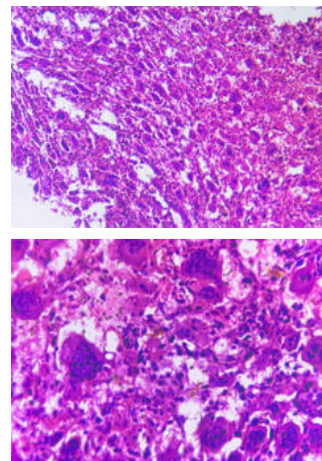


Figure 1: Giant Cell Tumor

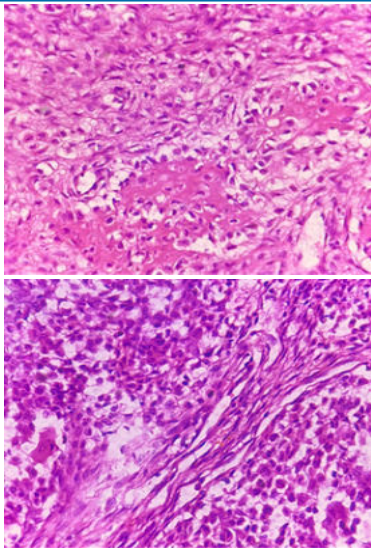


Figure 2: Chondroblastoma

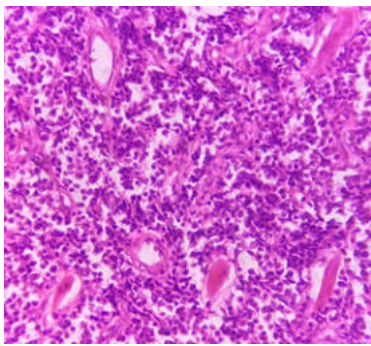


Figure 3: Ewings Sarcoma 400x

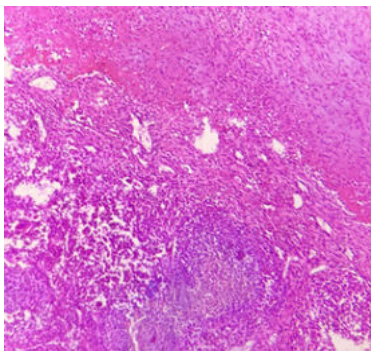


Figure 4: Non Ossifying Fibroma 400x

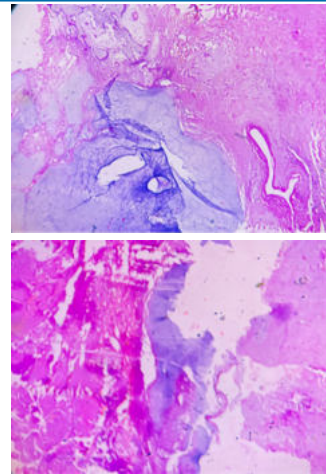


Figure 5: Enchondroma 400x

Table 1: Frequency of histological types of bone lesions by sex

Histological type	Male	Female	Total
Benign 23 cases(67.65%)			
Osteochondroma	7 (20.58%)	1 (2.94%)	8 (23.52%)
Giant cell tumour	6 (17.64%)	4 (11.76%)	10 (29.41%)
Osteoid osteoma	2 (5.88%)	0	2 (5.88%)
Chondroblastoma	1 (2.94%)	0	1 (2.94%)
Enchondroma	1 (2.94%)	0	1 (2.94%)
Osteofibrous dysplasia	1 (2.94%)	0	1 (2.94%)
Malignant 3 cases(8.82%)			
Ewing sarcoma	3 (8.82%)	0	3 (8.82%)
Tumor like lesion 8 cases(23.52%)			
Fibrous dysplasia	0	1 (2.94%)	1 (2.94%)
ABC	1 (2.94%)	0	1 (2.94%)
Nonossifying Fibroma	3 (8.82%)	3 (8.82%)	6 (17.64%)
Total	25 (73.52%)	9 (26.47%)	34 (100%)

The age range of neoplastic bone lesions was from 6 years-83 years, in which 25 cases (55%) were males and 9 (26.47 %) were females with M: F ratio of 2.7:1. The peak incidence for most lesions was between 2 nd and 3 rd decade of life accounting for maximum cases [Table 2].

Table 2: Age (in years) frequency of various benign, tumor like and malignant lesion of bone lesions

	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	Total
Benign Tumor										
Osteochondroma	3	3	1	1	-	-	-	-	-	8
Giant cell tumor	-	1	3	2	4	-	-	-	-	10
Osteoid osteoma	2	-	-	-	-	-	-	-	-	2
Chondroblastoma	-	1	-	-	-	-	-	-	-	1
Enchondroma	-	-	-	-	-	-	-	-	1	1
Osteofibrous dysplasia	1	-	-	-	-	-	-	-	-	1
Tumor like lesion										
Fibrous Dysplasia	-	1	-	-	-	-	-	-	-	1
ABC	-	1	-	-	-	-	-	-	-	1
Non ossifying fibroma	-	2	2	-	-	2	-	-	-	6
Malignant										
Ewing Sarcoma	-	3	-	-	-	-	-	-	-	3
Total	6 (17.64%)	12 (35.29%)	6 (17.64%)	3 (8.82%)	4 (11.76%)	2 (5.88%)	00	00	1 (2.94%)	34

Table 3: Anatomical distribution of benign, tumor like and malignant bone lesions with anatomical site

	Femur	Femur (bone)	Tibia	Tibia (bone)	Tibia	Ulna	Tarsal	Mandible	Humeral	Radius	Skull	Flank	Total
Benign Tumor													
Osteochondroma	3	2	2	1	-	-	-	-	-	-	-	-	8
Giant cell tumor	4	-	2	2	1	-	-	-	-	1	-	-	10
Osteoid osteoma	-	-	-	-	-	-	-	2	-	-	-	-	2
Chondroblastoma	-	-	-	-	-	-	-	-	1	-	-	-	1
Enchondroma	1	-	-	-	-	-	-	-	-	-	-	-	1
Osteofibrous dysplasia	1	-	-	-	-	-	-	-	-	-	-	-	1
Tumor like lesion													
Fibrous Dysplasia	-	-	-	-	-	-	-	-	-	-	1	-	1
ABC	1	-	-	-	-	-	-	-	-	-	-	-	1
Non ossifying fibroma	-	-	1	-	-	-	1	-	-	-	-	-	2
Fibroma	2	-	-	-	-	-	2	-	-	-	-	-	4
Malignant													
Ewing Sarcoma	1	-	1	-	-	-	-	-	-	-	-	1	3

The most common site of occurrence of tumor was in the femur 13 (38.23%) followed by tibia 6 (17.64%). [Table 4] and [Table 5].

Discussion

This retrospective study was done to study the spectrum and relative frequency of various bone lesions. The study was carried out by reassessing all the slides of received bone specimens that were sent from the Department of Orthopedics of this institute to Pathology Department, Gajraraja Medical College for the study period.

In this study, out of the 55 bone specimens received during the study period neoplastic lesions were found to be more common than nonneoplastic lesions which is in conformity with studies done by Settakom et al., [10] Most tumors of the bone showed male preponderance with male to female ratio of 2.77 :1 Similar findings were reported in other studies. [11],[12],[13],[14],[15],[16]

The peak age incidence of primary bone tumors in our study was seen in the 2 nd decade. Similar findings in age incidence were also reported in other studies. [12],[17],[18],[19]

Benign tumors were more common than malignant which are in conformity with other studies; [12],[18],[20] whereas, the reverse is true in other studies where malignant bone tumors was found to be more common than benign. [11],[15],[19],[21] This disparity may be due to the fact that hematopoietic tumor is dealt by hematology section and are not included in our study.

There were no metastasis cases reported in our study. The likely reason may be due to the fact that our study was based on a small number of cases. It may be also due to lack of care in old age, no access to hospital because of poverty. and inadequate medical facilities.

Osteochondroma was the most common benign lesion with male preponderance. Most of the patients fell within 01 -20 years of age and long bones were commonly involved. This corresponds to study done by others. [11],[12],[15],[17],[19],[20],[23],[24],[25] However, in a study conducted by Settakom et al., [10] giant cell tumor was found to be the commonest benign bone tumor.

The most common malignant bone tumor was ewings sarcoma 03 malignancies. Male preponderance was seen and long bones were commonly involved. Similar findings were observed in other studies. [10],[11],[12],[14],[16],[17],[19],[20],[21],[24],[26],[1] We found maximum cases in 11-20 years age group

Among the tumor-like lesions, Non ossifying fibroma was found to be the commonest with total of six (17.6 %) cases. Other tumor-like lesions include aneurysmal bone cyst and

Giant cell tumor made up ten (29.41 %) of the total bone tumors. Patients were mostly 41-50 years of age with a male preponderance. These findings were in agreement with the study done by others. [11],[19] Long bones were mostly affected. Most commonly femur followed by tibia which is in conformity with other studies. [11],[12],[15],[17],[18],[24]

CONCLUSION

In our study, we have found that the pathology department (histopathological section) has reported spectrum of 10 different types of histopathological bone tumors during the study period of one year which indicate the presence of different types of bone tumors in our institute. Specific tumor has predilection for certain age, sex, and site which are in conformity with our study from the data reviewed. Lastly, an exact diagnosis of bone tumors is at times difficult. Therefore, an integrated use of clinical, radiological, and

histopathological finding is recommended to increase accuracy of diagnosis and for better management of the patient.

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