Original Research Article

Indian Journal of Pathology: Research and Practice
Volume 7 Number 1, January 2018
DOI: http://dx.doi.org/10.21088/ijprp.2278.148X.7118.12

Histopathological Study of Spectrum of Bone Lesions: An Experience at Tertiary Care Hospital

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Abstract

Background: The pathological bone lesions are wide array from inflammatory to neoplastic conditions. The X-ray helps in exact location of lesion, but most often times it is very difficult to diagnose and differentiate. This problem can be overcome with the help of histopathological study. *Objective:* To study histopathological spectrum of bone lesions and correlate them with age, gender, site and type of lesion. *Materials and Methods:* The present Descriptive, Cross sectional study was carried out at Dr. PSIMS and RF from December 2014 to November 2016. A total of 82 bone biopsies were received. Histopathological examination of the bone specimens was performed after detailed clinical and radiological examination. After fixation, decalcification, processing and H&E staining, histopathological diagnosis was made. This study was approved by the institutional ethical committee. *Result:* Total 82 cases of bone biopsies were analyzed. Out of 82 bone lesions 65(79.3%) were Non-neoplastic, 16(19.5%) cases were Neoplastic and 1 (1.2%) case was inadequate for diagnostic evaluation. Benign bone lesions were more preponderant than malignant with 13(15.5%) and 3(3.7%) cases respectively. Chronic osteomyelitis was the most common non- neoplastic lesion. Osteochondroma and Osteosarcoma were most common benign and malignant lesions respectively. Tibia was most common bone involved in benign lesions and femur for malignant lesions. Maximum number of bone lesions present in the age group between 40-60 years, with male preponderance. *Conclusion:* An integrated use of clinical, radiological, and histopathological findings were recommended to increase accuracy of diagnosis and for better management of the patient

Keywords: Bone Lesions; Osteochondroma; Chronic Osteomyelitis; Histopathology; Osteosarcoma; Chondrosarcoma.

Introduction

Spectrum of pathological bone lesions can presents wide array from inflammatory to neoplastic conditions [1]. Bone lesions are relatively uncommon, can affect any age group: children, adult or the elderly people. Definitive diagnosis of bone lesions are often difficult [2]. The X- ray helps in location of lesion but it is very difficult to diagnose in routine X-ray films and to differentiate benign and malignant lesions [2]. Metastatic tumors are more common than primary tumors of bone. Routine clinical examination of bone lesions can present as palpable mass, pain, or by restriction of movements and fractures. Sometimes inflammatory lesions of bone can mimic as malignant and malignant can be a benign vice versa [3]. Relevant demographic history like age, gender and site of lesion are most important factors in diagnostic evaluation [4,5]. It is also very much important in deciding the type of treatment. For correct diagnosis, decision of treatment plan and for the prognosis, interpretation of histopathological examination of bone lesion proves to be essential [2].

Materials & Methods

This was an descriptive, cross sectional study over a period of 2 years from December 2014 to November 2016 referred to the Department of Pathology, Dr. PSIMS & RF Chinnaoutpalli, Vijayawada, India. Total 82 cases of bone biopsies were analyzed. All

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(Received on 01.11.2017, **Accepted on** 25.11.2017)

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histopathological reports and slides of bone biopsies were reviewed for relevant information of age, gender and anatomical site of occurrence. The biopsy specimens received were fixed in 10% buffered formalin and decalcified in 5% nitric acid for 2-3 days. Then the tissue was processed routinely and paraffin blocks were prepared. Sections were cut, stained with hematoxylin and eosin and examined under microscope for histopathological examination.

The final diagnosis was made, based on morphological examination of lesions into inflammatory, benign and malignant. Data tabulated and analyzed to know the relative frequencies of lesion presentation.

Results

Total 82 cases of bone biopsies were analyzed, 65 (79.3%) were Non-neoplastic, 16 (19.5%) cases were Neoplastic and 1 (1.2%) case was inadequate for diagnostic evaluation. Benign bone lesions were more preponderant than malignant with 13 (15.5%) and 3 (3.7%) cases respectively. Maximum number of bone lesions presented in the age group between 40-60 years. Males 43 (52.4%) were slightly affected more common than females 38 (46.4%) with M:F ratio 1.1:1.

Non-neoplastic lesions comprise of Chronic osteomyelitis 32 (39%) cases, tubercular osteomyelitis 15 (18.3%) cases, avascular necrosis 10 (12.2%) cases, aneurysmal bone cyst 5 (6.1%) cases and 3 (3.7%) cases of fibrous dysplasia. These lesions were found most common in the age group between 40 -60 years, with maximum number of cases of chronic osteomyelitis followed by tuberculous lesions. Males were commonly affected than females with ratio of 1.2:1. Tibia is the common site for chronic osteomylitis of bone.

Out of 16 neoplastic bone lesions, 13 (15.8%) were benign and 3 (3.7%) were malignant. Benign lesions are osteochondroma 6 (7.3%), giant cell tumor 3 (3.7%), enchondroma 2 (2.4%) and each 1 (1.2%) case of osteoid osteoma and non ossifying fibroma. Most common age group involved in benign bone lesions was 30-50 years and maximum number of cases were of Osteochondroma. Females were more commonly affected than Males with M:F ratio 1:1.2. Femur is the most common bone involved and maximum number of cases being Osteochondroma.

Table 1: Age and gender distribution of bone lesions

Histological Types	Age in years							Gender		Total
	0-10	11-20	21-30	31-40	41-50	51-60	>60	M	F	
Non- Neoplastic	2	9	11	6	12	17	8	36	29	65
Benign	1	2	2	3	4	1		6	7	13
Malignant						1	2	1	2	3
Total (%)	3(3.6)	11(13.4)	13(15.8)	9(11.0)	16(19.5)	19(23.2)	10(12.2)	43(52.4)	38(46.4)	81

Table 2: Proportion of Different Bone Lesions

Non-neoplastic (65 cases)		Neoplastic (16 cases)			
		Benign (13 cases)		Malignant (3 cases)	
Chronic osteomyelitis	32	Osteochondroma	6	Osteosarcoma	2
Tubercular osteomyelitis –	15	Giant cell tumor	3	Chondrosarcoma	1
Avascular necrosis	10	Enchondroma	2		
Aneurismal bone cyst	5	Osteoid osteoma	1		
Fibrous dysplasia	3	Non ossifying fibroma	1		
Total %	(79.3)		(15.8)		(3.7%)

Table 3: Distribution of Bone Lesions According to Location

Location	Non-neoplastic	Neoplastic	Total
Femur	20	5	25
Tibia	28	4	32
Humerus	12	3	15
Radius	3	2	5
Small bones	2	1	3
skull		1	1
Total	65	16	81

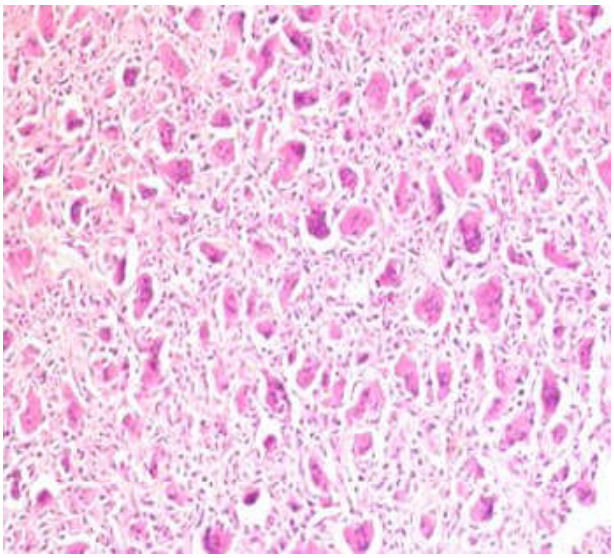

Fig. 1: Giant cell tumor (H& E 40x)

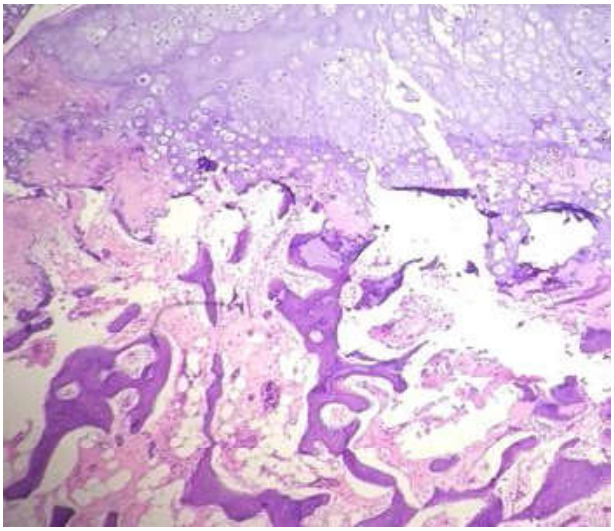

Fig. 2: Osteochondroma (H & E 40x)

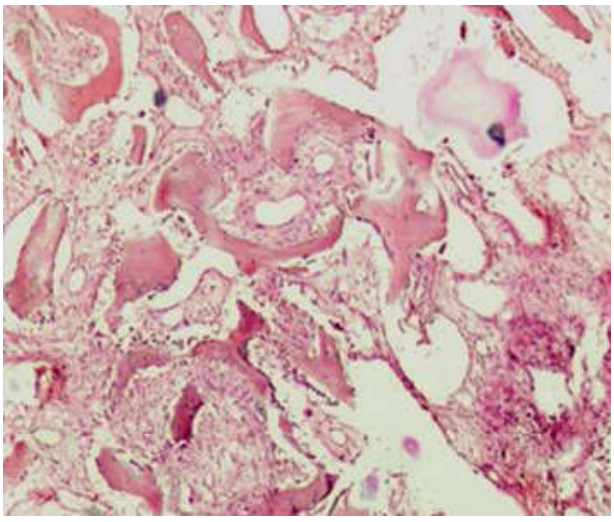

Fig. 3: Fibrous dysplasia (H& E 40x)

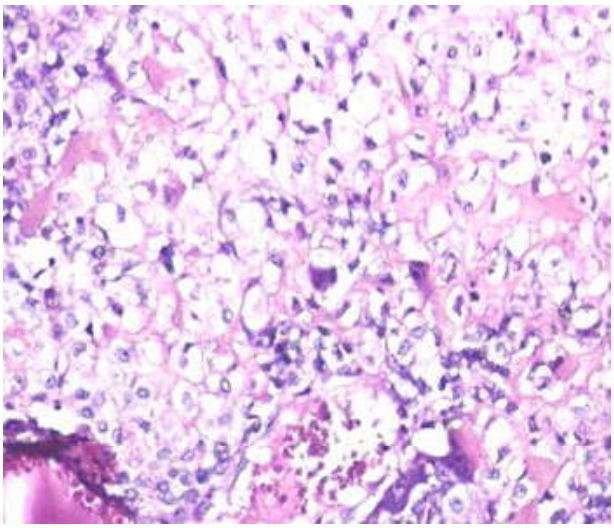

Fig. 4: Clearcell Chondrosarcoma(H&E40x)

Malignant lesions in this present study observed were Osteosarcoma 2 (2.4%) and chondrosarcoma 1 (1.2%.). Malignant bone lesions presented at the age of above 60 years. Femur is the bone involved in cases of Osteosarcoma. Malignant lesions in this present study showed female preponderance with M:F ratio 2:1.

Discussion

Though bone tumors are less common, constitute a small fraction of the all the lesions of body. Bone lesions are diagnostic dilemmas, it is absolute need of information regarding the clinical history i.e.age, gender,site and radiological findings before diagnosis. Some of bone lesions can be confused clinically like ostoemyelitis and ewing sarcoma, traumatic fracture or pathological fracture, osteosarcoma and tuberculosis or malignancy.

Therefore histopathological diagnosis is must in all bone lesions to differentiate above mentioned lesions, to confirm the diagnosis of radiologist and clinician and to predict the outcome of bone lesions on the basis of different cytomorphological criteria [6].

The present study was undertaken with a view to find out incidence of different bone lesions in patients presenting to a tertiary care teaching hospital and to find out common type of lesions and various tumors. In the present study bone tumors are common in the age group between 40 -60 years.

Males were predominantly involved than females with M:F ratio 1.1:1. Similar fining were reported in other studies [7]. Tibia was most common bone

involved in most of the bone lesions in this present study and femur is commonly involved in malignant lesions. Non-neoplastic lesions were more common than neoplastic lesions. This was similar to other studies [2]. Chronic osteomyelitis was most common non-neoplastic conditions affecting 32 patients (39%). But studies done by Modi et al [3]. and Patel et al [2]. tuberculous lesions was the common non neoplastic bone lesion.

Bening lesions were more common as compared to malignant lesions . This was similar to other studies done by Rao et al [7] and Mohammad et al [8]. Ostochondroma was most common benign tumor in present study. This was similar to study done by Mohammad et al [8]., but Patel et al [2] have got giant cell tumor was most common benign lesion. Femur was most commonly affected. Males are affected more than females. Other benign tumors were giant cell tumor, enchondroma and osteoid osteoma.

Osteosarcoma was the most common malignant tumor and affected femur in 2 (2.4%) cases. Other like Modi et al [3] and Patel et al [2] also reported similar findings. Other malignant bone lesions included chondrosarcoma. Females were commonly affected and femur was the most common site.

Conclusion

Histopathology is the gold standard for precise confirmation of bone lesions. Even an clinician and radiologist together will not be able to reach the final diagnosis and treatment. All the lesions were quiet consistent in their occurrence with relation to age, sex, site and show little deviation from usual presentation. The demographic pattern and distribution of bone lesions in this present study was similar to those reported from other national and international studies. To achieve final diagnosis and better treatment of patients require integrated team up with all clinical, radiological and pathological departments.

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