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Pathology

HISTOPATHOLOGICAL STUDY OF BONE AND JOINTS LESIONS IN TERTIARY CARE HOSPITAL.

Dr Geetanjali Jeevangi*	Department of Pathology, ESIC &MC, Gulbarga *Corresponding Author
Dr Kumari. Bhuvaneshwari. S. A	Department of Pathology, ESIC &MC, Gulbarga
Dr Najmus Seher	Department of Pathology, ESIC &MC, Gulbarga
Dr Anil Sirasagi	Prof & HOD, Department of Pathology, ESIC &MC, Gulbarga

ABSTRACT **Background:** Tumors of bones and joints are rare. They pose a diagnostic challenge to orthopedic surgeons and pathologists due to their uncertain histogenesis and behavior. AIM: a) To study the spectrum of bone and joint lesions with respect to their demographic features like age and sex distributions, anatomical sites of occurrence and their relative frequencies. b) To correlate histo-morphological features with radiological findings. **Materials And Methods:** A retro prospective observational study was done in ESIC MEDICAL COLLEGE KALABURAGI of three- and half-year duration in Department of Pathology from Jan 2019 to August 2022. **Results:** A total of 62 cases were included in this study, out of which 41(66.13%) cases were of bone and 21(33.87%) were joint lesions. Age group ranged from 2 to 70 years, with peak incidence in 3nd decade 22 cases (35.48%) followed by 2nd decade (19.35%) with female predominance 34cases (54.84%). In bone lesions, chronic osteomyelitis 4(6.45%) was common non neoplastic lesion. Osteochondroma 9(14.52%) was most common benign neoplastic lesion followed by giant cell tumor. Osteosarcoma3(4.84%) was most common malignant tumor. Common bone affected was femur. In joints, Tenosynovial giant cell tumor 10(16.13%) was common entity. **Conclusion:** Correct diagnosis can be made in time if viewed in perspective of clinic- radiological and histopathological details which aids in further management appropriately.

KEYWORDS : Bone lesions, Giant cell tumor, Osteosarcoma, Joint lesions.

INTRODUCTION

Bone is a dynamic heterogeneous tissue, plays a major role in mineral homeostasis and hematopoiesis. Together, bones and joints provide mechanical support for movement, protect viscera, and determine the attributes of body size and shape [1].

Bone tumors are relatively rare than other tumors of the body [2] comprising 0.9% of total lesions [3], still rarer are the tumors of joints. Among them primary bone tumors are relatively uncommon constituting only 0.5% of the total world cancer incidence in India [2]. They often pose challenge to the pathologist as well as the Orthopedic surgeon. This challenge is magnified in an environment where resources are scarce.

Bone lesions have been found to occur mainly between the first and fourth decades of life. Hence these lesions have a potentially devastating effect on the most productive segment of the population [4]. When diagnosed early in adolescence and young adulthood, patients can be followed up for any further complications, including development of secondary cancers even after clinical cure [5].

The benign and non-neoplastic bony lesions are more common than malignant lesions. Many tumors present with pain or a mass. Few common benign lesions are frequently asymptomatic and are detected incidentally. In some circumstances sudden pathologic fracture would be the first clinical presentation [2]. A pathological bone lesion can present in any form from inflammatory to neoplastic conditions [6] and they pose a definite diagnostic challenge not only due to broad spectrum of bony lesions but also because of their varied presentation. It is important to remember that some benign processes such as osteomyelitis can mimic malignant tumors, and some malignant lesions such as metastases, can mimic benign [7].

Histopathological study enables us to understand the spectrum of bone and joint lesions and gives an idea of different tumors and tumor-like lesions in population among different age group and sex. 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. Bone lesions often pose diagnostic challenges to surgical pathologists [8]. 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].

The present research is done to study the incidence, age of presentation, and site of bone lesions, overview of the clinical, imaging, and pathologic findings, and to show that accurate pathologic diagnosis requires careful clinical, radiological, and histopathological correlation.

Aims And Objectives

1) To study the spectrum of lesions of bone and joints with respect to their demographic features like age and sex distributions, anatomical sites of occurrence and their relative frequencies.
2) To correlate their histo-morphological features with radiological findings wherever available.

MATERIALS AND METHOD

Study Design: Retro prospective type.
Study Setting: Department of pathology, ESIC Medical college, Kalaburagi.
Data Collection Period: January 2019 to August 2022.

Sample Size

Retrospective period -January 2019 to March 2022(2 year 3 months) - Number of cases – 52.
Prospective period April 2022 to August 2022(5 months) – 10 cases.

A retro prospective observational study was done in ESIC MEDICAL COLLEGE KALABURAGI of three- and half-year duration in Department of Pathology from Jan 2019 to August 2022. The study was conducted after approval of scientific and ethical committee. The study includes all the surgically resected specimens or open biopsy/ image guided biopsy material of bone and joints. Demographic data, clinical history and radiological findings (X-ray, CT scan and MRI) were collected from the medical records department files. Gross specimens and the hematoxylin and eosin (H and E) stained slides were reexamined for retrospective approach.

For prospective approach, the specimens received are put through routine tissue processing. Tissues are fixed, decalcified, processed and stained with Hematoxylin and Eosin stain and examined for histopathological evaluation. The final diagnosis was made into non neoplastic and neoplastic lesions of bone and joints accordingly.

Statistical Analysis

Data were analyzed and tabulated. Cohen's kappa test was applied to

determine the level of agreement between radiological and histopathological diagnosis [2,10].

RESULTS

A total of 62 cases were included in this study, out of which 41(66.13%) cases were of bone and 21(33.87%) were joint lesions.

Age group ranged from 2 to 70 years, with peak incidence in 3nd decade 22 cases (35.48%) followed by 2nd decade (19.35%) with female predominance 34cases (54.84%) (Table no.1).

Table 1: Age And Gender Distribution Of Bone And Joint Lesions

	Age in years							Gender		Total
	0-10	11-20	21-30	31-40	41-50	51-60	60-70	M	F	
BONE LESIONS										
Non-neoplastic	2	-	2	1	3	-	-	6	2	8
Benign	1	8	12	4	1	1	2	11	18	29
Malignant	-	1	2	-	-	-	1	1	3	4
	3	9	16	5	4	1	3	18	23	41
JOINT LESIONS										
Non-neoplastic	-	1	3	2	2	2	1	6	5	11
Benign	-	2	3	2	3	-	-	4	6	10
	-	3	6	4	5	2	1	10	11	21
Total (%)	3 (4.84%)	12 (19.35%)	22 (35.48%)	9 (14.52%)	9 (14.52%)	3 (4.84%)	4 (6.45%)	28 (45.16%)	34 (54.84%)	62

Among bone, non-neoplastic lesions were 8(12.9%), in which chronic osteomyelitis 4(6.45%), being common lesion mostly affected femur. In neoplastic bone tumors 33(53.2%), 29(46.77%) were benign and 4(6.45%) were malignant tumors. Osteochondroma (Fig 2) was most common benign tumor mostly involving metaphysis of long bones mainly femur with incidence of 9(14.52%) cases, followed by giant cell tumor of bone (Fig 1) mostly affected tibia with an incidence of 6(9.68%) cases. Osteosarcoma 3(4.84%) was most common malignant tumor of bone. In joints, non-neoplastic lesions accounted for 11(17.74%) cases in which osteoarthritis 4(6.45%) was common. Tenosynovial giant cell tumor 10(16.13%) were commonest neoplastic joint lesion found in this study. Knee joint was most commonly affected in diffuse type (PVNS) whereas localized type mainly involved the fingers.

Table 2: Spectrum Of Bone And Joint Lesions.

		Total	Percentage%
BONE		41	66.13
Non neoplastic (8)	Congenital pseudoarthrosis of tibia	2	3.22
	Giant cell reparative granuloma	2	3.22
	Chronic osteomyelitis	4	6.45
Neoplastic (33)	Osteoblastic tumors	4	6.45
	Benign		
	Osteoid osteoma	1	1.61
	Malignant		
	Osteosarcoma	3	4.84
	Cartilage tumors	14	22.6
	Benign		
	Chondroma	5	8.06
	Osteochondroma	9	14.52
	Non osteoblastic and non-cartilaginous tumors	15	24.2
	Benign		
	Giant cell tumor (Osteoclastoma)	6	9.68
	Aneurysmal bone cyst	3	4.84
	Ossifying fibroma	4	6.45
	Calcifying fibroma	1	1.61
	Malignant		
	Metastases	1	1.61
JOINTS		21	33.87
Non neoplastic (11)	Osteoarthritis	4	6.45
	Chronic gouty arthritis	1	1.61
	Synovitis	3	4.84
	Baker's cyst	3	4.84
Neoplastic (10)	Benign		
	Tenosynovial giant cell tumor	10	16.13
	Localized –7		
	Diffuse - 3		
	Total	62	100%

Radiological correlation was available in 21cases. In 19 cases, (90%) radiological diagnosis was consistent with histopathology. Cohen's kappa value (0.90) was calculated online and it showed good agreement between radiological and histological diagnoses of all bone lesions.

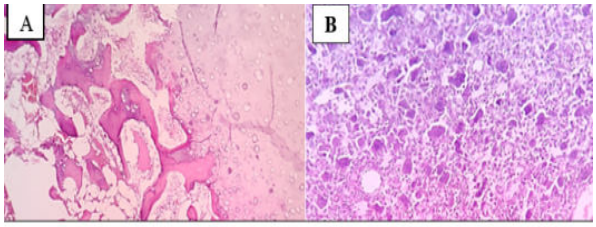

FIG1: A) Osteochondroma. B) Giant Cell Tumour of Bone. H&E (10x).

DISCUSSION

Bone and joint lesions are rare and form small proportion themselves of all existing lesions in population [2]. Complete clinical data along with histopathological findings are required to differentiate clinically confusing entities like pathological fracture and traumatic fracture, osteoblastoma and osteosarcoma, tuberculosis, and malignancy etc., [11] and to arrive at proper diagnosis.

In the present study, the incidence of bone lesions was more common in 3rd decade followed by 2nd decade similar to the study done by Hathila et al. and Sharma and Mehta [11,12]. But unlike other studies females were predominantly affected than males in this study. Metaphysis of long bones was common location mostly involving femur, similar to study done by Deoghare et al. and Patel et al. [13,14]. Non- neoplastic and benign lesions were more common than malignant lesions in present study. Chronic osteomyelitis was most

common non neoplastic bony lesion mostly affecting metaphysic of femur. It is similar to the study done by Deoghare et al. [13] but studies done by Patel et al. [14] shows tuberculous lesion as common non-neoplastic bony lesion. Among benign bone tumors, Osteochondroma was most common tumor followed by Giant cell tumor in this study, similar to the study done by Patel et al. [14] but as per study done by Sharma and Mehta and Deoghare et al. [12,13] Giant cell tumor as the common benign lesion. Others benign neoplastic lesions were osteoid osteoma, chondroma, aneurismal bone cyst, calcifying fibroma and ossifying fibroma. Osteosarcoma was the most common malignant tumor similar to studies done by Patel et al. [14].

In joint diseases, synovium is considered as primary site of inflammation. Synovial biopsy can help in early diagnosis and treatment of diseases significantly improving the outcome and prevent unnecessary invasive surgical procedure. In the study of synovial biopsies done by Tevatia MS et al. [15], Osteoarthritis (OA) was the most common histopathological diagnosis. Age group most affected was between 61 and 70 years, with male predominance. Where as in our study though Osteoarthritis is common non neoplastic lesion but in contrast Tenosynovial giant cell tumor was common neoplastic joint lesion.

Implications

This research was conducted to study and categorize bone and joint lesions with varied presentation. Age, sex and site are important clinical parameters. Radiology and imaging investigation is an essential step in diagnosis, prior to histopathological study which helps in further planning of Management. This study show that clinical findings, imaging and histopathology remains the key for diagnosing bone and joint lesions.

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