

# BONE TUMOURS – RADIOLOGICAL EVALUATION

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### Abstract:

**Background:** Conventional Radiological diagnosis of bone tumours still have a upper hand to C.T. Scan or MRI which is seldom required. Authors have further established and convey the message how to read X-ray bone done for tumours. X-Ray alone is a single most diagnostic tool. The study group involved has 105 cases, out of which 65 cases were diagnosed as benign & 40 were malignant. Bone tumours are not uncommon. Malignant tumours increase morbidity and often fatal where as benign tumours are never fatal unless these turn into malignancy, hence a systematic approach to diagnose, needs to be highlighted .

**Aims / Objective:** Routine radiological investigation is the basis to diagnose bone tumours, remain our main objective. C.T. and MRI were done in selected cases only.

**Keywords:** Bone Tumors, Radiology, Evaluation

## Introduction

Bone tumours are relatively uncommon, constituting only 5% of the total world cancer incidence. Benign tumours out numbered malignant bone tumours in our series. Out of 105 cases 65 were benign where as 40 were malignant lesion. Among the benign lesions unicameral bone cyst being the commonest.<sup>1</sup>

In most of the cases X-ray bone alone is an important diagnostic tool, however, in some cases imaging technique like computed tomographic scan and magnetic resonance image further confirmed the diagnosis. Early detection of the bone tumours remain a daunting challenge for orthopedic surgeon radiologist and pathologists. Among different types of primary bone cancer, osteosarcoma constitutes the highest proportion (12.5%). Followed by Ewing's sarcoma (10%), chondrosarcoma (5%). multiple myeloma (5%), reticulum sarcoma (2.5%) &

secondaries bone (65%).

These malignant tumors can be classified according to the age also. Younger the age more chances of Ewing's sarcoma and osteosarcoma to occur, where as in 4<sup>th</sup> or 5<sup>th</sup> decade chondrosarcoma is common.

## Material & Methods

A retrospective study of the clinical and histopathological records of the patients with established diagnosis of bone tumours, a multi centre study at Jaipur & K.D. Medical College, Mathura during 1985 -2016 was done.

Between 1985 and 2016 the patients record having bone tumours were studied keeping in view about clinical presentation, diagnosis and treatment with reference to histological types. The clinical data such as age, sex, anatomical site, radiological and histo-pathological findings as well as

the record of other investigations and management were extracted from the clinical case notes of patients. Bone tumours of odontogenic origin and infectious lesions were excluded from this study. A total of 105 neoplasms were observed from the all age groups out of which 65 were benign & 40 were malignant, out of malignant tumours 26 were secondaries from other organs and 14 were primary.

The classification was based on the current world health organization (W.H.O.).<sup>2</sup>

Among the malignant tumours secondary lesions were 26 (65%) and primary were 14 (35%).

These results are similar to omololu et al.<sup>3</sup>

Total No. of cases in study group- 105

- (1) Benign Tumours = 65 (62%)
- (2) Malignant Tumours = 40 (38%),

- (i) Primary Tx. = 14 (35%)
- (ii) Secondaries = 26 (65%)

**Table No- 1: Benign Tumours out of 65 cases following were the types of benign bone tumours**

	Types	No of cases	Percentage
01	Unicameral bone cysts	20	30.8
02	Osteochondroma	15	23.0
03	Giant cell Tumour	08	12.3
04	Osteoid Osteoma	05	7.7
05	Enchondroma	05	7.7
06	Fibrous dysplasia	04	6.2
07	Non-Ossifying Fobroma (NO F)	04	6.2
08	Chondromyxoid Fibroma (CMF)	03	4.6
09	Aneurysmal Bone Cyst	01	1.5

**Table 2: Malignant Bone Tumours- Out of 40 cases following were the type of malignant bone tumours**

	Types	No. of cases	Percentage
01	Metastatic Bone Tumours	26	65
02	Osteosarcoma	05	12.5
03	Ewing's Sarcoma	04	10.0
04	Chondrosarcoma	02	5.0
05	Multiple Myeloma	02	5.0
06	Reticulum Cell Sarcoma	01	2.5

**Table 3 : Distribution According to age (Malignant tumours)**

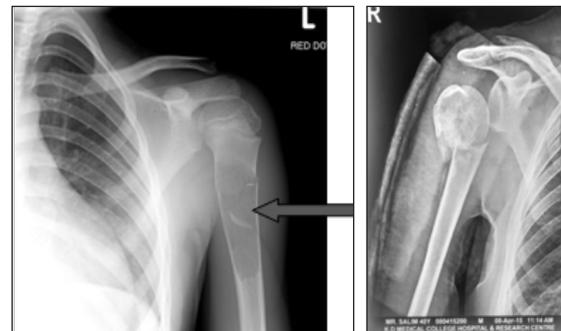
	Age Group (In year)	Types	No of Cases
01	05-10	Ewing's Sarcoma	04
02	10-30	Osteogenic Sarcoma	04
03	>40	Chondrosarcoma	02
		Reticulum Cell Sarcoma	01
		Fibrosarcoma	01
		Multiple Myeloma	02
04	>50	Metastatic Bone Tumours	26

Age distribution benign bone tumors- All cases were seen before the age of 20, of which the youngest patient was of 7 years.

Simple bone cyst more often occur in male with the peak prevalence approximately 11 years of ages.

Metastatic bone lesions were found more in females.

Sixty five of the tumors were benign. Among these, simple unicameral bone cyst (U.B.C) Figure (1) was the commonest, 20 cases (30.8%) osteochondroma was the next common, accounting for 15 cases (23%) followed by Giant cell tumor. Other benign tumors observed were enchondroma 5 (7.7%), osteoid osteoma 5 (7.7%). 14 cases of primary malignant tumors (35%) in this study. Osteosarcoma (5) accounted for (12.5%). Others were Ewing's sarcoma 4 (10%), chondrosarcoma 2 (5%), [Figure 4], multiple myeloma 2 (5%), and reticulum cell sarcoma 1 (2.5%).<sup>4</sup>



**Figure # 1**

**Figure # 2**



**Figure # 3**

**Figure # 4**

The peak age incidence for primary tumors was in the age group of 07-20 years. The lowest relative frequency of tumor occurrence was in the 0 -10 years range (three cases) and all of them were Ewing's sarcoma. Lower end of femur being the most common site for primary bone tumors, accounted for 2 cases (50%) followed by upper end of tibia and fibula 2 (50%).

Osteochondroma accounted for 15 (23%) of all the tumors, which made it the common benign tumor, next to UBC. the male to female ratio was 4.2:1. In U.B.C. Twelve of these occurred in the long bones of femur and 8 in humerus in the age range of 11-20 years.

Giant cell tumor accounted for 8 (12.3%) of all the tumors, which made it third most common benign tumor. The male to female ratio is 1:1. Three cases were observed at the distal end of femur, four cases at the proximal end of tibia, one case at the lower end of forearm. A majority of the cases were seen between 21 and 35 years.

Osteosarcoma accounted for (5=12.5%) of all the tumors and was found to be most common primary malignant bone tumor. The male to female ratio was 1.6:1. Three cases were observed at the proximal end of tibia, one case at the distal end of femur, one case at the proximal end of humerus and were in the age range of 16-25 years. 4 patients had conventional intramedullary osteosarcoma, while one had telangiectatic.

Multiple myeloma were seen in 2 cases (5 %) accounted for (5%) of all the tumors with a male to female ratio 8:1. Most of the myeloma cases had multiple sites involvement with predilection to the axial skeleton including skull and spine.

We had 26 cases of the metastatic bone tumors in our study with a man to woman ratio 3.3:1; a majority of the cases were of more than 50 years of age. The sites for the primary tumors were lung seen in 5, prostate in (5), breast ( 8 ), liver ( 3 ), gastrointestinal cancer (4), and unknown site (1). The common metastatic sites were femur with pelvis and spine. Of all the cases in the radiographic patterns, osteolytic types accounted for (80% ), followed by osteosclerotic (18%) and mixed (2%) types. Our results were similar to Rai KM et al.<sup>5</sup>

## Result

Age, sex distribution, and type of bone lesions encountered, with their relative frequencies are summarized in (Table 1 to 3). A total of 105 patients (age 5 to 82 years) with a mean age of 43.5 years were studied, sixty five patients were having benign lesions and forty were of malignant one which is similar to Bahebake et. Al.<sup>6</sup>

## Discussion

Benign tumours are more common than the malignant one. Among all the benign tumours unicameral bone cyst being the commonest having the incidence of 3% of all bone tumours.

Aetiology of unicameral bone cyst is unknown, most commonly seen in children between the age of 5 to 15 years. Some authors considered it as second most benign tumours and found osteochondroma Figure # 3, as the commonest.<sup>7</sup>

A unicameral bone cyst is most commonly involve either proximal humerus or femur an expansile metaphyseal-diaphyseal lesion leading to thinning of adjacent areas of bone resulting in fracture on trivial injury. Figure # 2, Spontaneous healing of unicameral bone cyst may occur following fracture.

Bone tumours are not common. Plain Radiological diagnosis is certain in most of the cases. A fundamental mnemonic has been evolved to study the X-ray film, as 4. 'P' are never seen in any normal X-ray film unless they are pathological. They are 1<sup>st</sup> 'P' stands for periosteum, 2<sup>nd</sup> 'P' stands for pleura, 3<sup>rd</sup> 'P' stands for pericardium, 4<sup>th</sup> 'P' stands for peritoneum.

## Besides any bone Tx. Has 5 Features

- (i) Soft tissue mass.
- (ii) Periosteum invasion.
- (iii) Cortex invasion.
- (iv) Medulla invasion
- (v) Never transgressing the joint & has great respect for the joint.

Imaging techniques like C.T. & MRI seldom required. Out of 65 cases of benign bone tumours unicameral bone

cysts were the most common. Accounting for 30.8 % of all benign Tumours.

Osteochondroma was the next common lesion, occurring in of children. (Figure # 4)

This finding is similar to Long bones of femur, tibia, and humerus were found to be the principal bones affected. Our findings are similar to reports by Omolol et al.,<sup>3</sup> and Mohammed et al.<sup>4</sup> in their studies of bone tumors in all age groups.

The etiology is unknown. Other tumours like osteochondroma (figure-3) giant cell tumour, osteoid ostoma, enchondroma, fibrous dysplasia, were mentioned according to tissue of origin as well. In other studies osteochondroma were found commonest, but our study differs with it, Senac et al.<sup>9</sup>

Among the malignant bone tumours secondaries were the most common and were found in the spine & pelvis, arising from carcinoma cervix, Breast, ovaries, lungs colon and prostate our study has matched with the available studies. Most secondary lesions were osteolytic them osteoblastic.<sup>8</sup>

Among primary tumours osteosarcoma was found more common than Ewings sarcoma.

All the cases were diagnosed correctly by Radiological method some of which were further confirmed by C.T, MRI and feedback by surgeons and histopathologists.

## Conclusion

Our study showed that primary bone tumors were mainly benign, occurred before the second decade of life with a male preponderance of simple unicameral bone cyst. Osteochondroma and osteosarcoma were the most common benign and primary malignant bone tumors, respectively.

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