

## CLINICO-PATHOLOGICAL PROFILE OF GIANT CELL LESIONS OF BONE ALONG WITH RADIOLOGICAL CORRELATION: A RETROSPECTIVE STUDY FROM A TERTIARY CARE CENTER OF BIHAR

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### Abstract

**Background:** Giant cell lesions of bone include true giant cell tumors & numerous benign as well as malignant conditions having osteoclasts and multinucleated giant cells. **Materials and Methods:** A retrospective study of giant cell rich lesions was done at Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar. Giant cell containing lesions of bone between May 2019 to April 2021 were recollected from the records. Secondary data regarding age, sex, clinical examination & type of specimen were obtained from the records. Radiological findings (X ray, CT scan, MRI, etc.) of all patients were also obtained. **Result:** Most of the giant cell containing lesions of bone is found in younger age group in second and third decade while aneurysmal bone cysts occur prior to 20 years of age. Most of the giant cell tumors are found between 20 to 40 years of age. **Conclusion:** Detailed histopathological study and clinico-radiological correlation is very helpful to arrive at precise and accurate diagnosis in giant cell rich lesions.

## INTRODUCTION

Giant cell lesions of bone include true giant cell tumors & numerous benign as well as malignant conditions having osteoclasts and multinucleated giant cells.<sup>[1]</sup> The approach to any bony lesion should be established by clinical, radiological and pathological investigations.<sup>[2]</sup> The basic parameters of importance are the age of the patient, bone and specific areas involved within the bone, radiographic appearance and microscopic appearance. Histological study is essential for the precise diagnosis of bony lesions. It usually involves examinations of a biopsy specimen, either open surgical biopsy or needle biopsy. In this study, true giant cell tumor as well as other giant cell containing bony lesions are included.<sup>[3]</sup> Giant Cell Tumor is the most common lesion in our study. It is located in epiphysis of bone. Its peak incidence is 20 to 40years. Histologically comprises of sheets of elongated mononuclear cells intermixed with numerous osteoclast like giant cell.<sup>[4]</sup> Aneurysmal bone cyst mostly occur prior to age 20. They usually involves metaphysis of long bones. Histologically they comprises of blood filled spaces separated by fibro-osseous septa containing multinucleated giant cell. Non-ossifying fibroma involves metaphysis of bones. Histological picture comprises of spindle cells arranged in a distinctly storiform pattern

intermixed with fair number of multinucleated giant cell. Osteogenic sarcoma is the most common malignant bone tumor in our study. Histological section shows pleomorphic tumor cells arranged in fascicular pattern intermixed with numerous giant cells. Osteoid formation by tumor cells also seen.<sup>[5]</sup> However, to avoid confusion and to reach to a definitive diagnosis in such cases, it is necessary to take into account histological features, clinico-radiologic correlation, and age of patient and site of lesions.<sup>[6]</sup> Each type of bone tumor has its own age predilection which is very useful from a differential diagnostic standpoint.

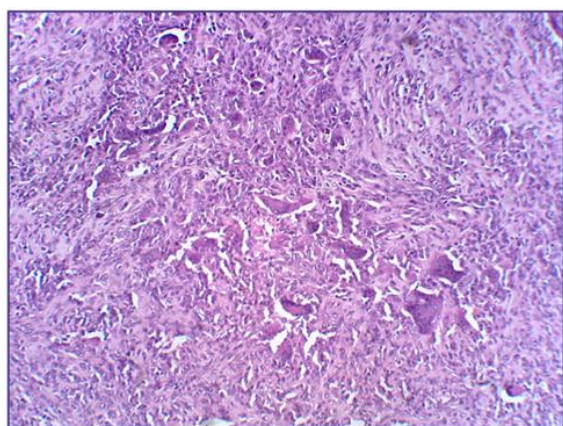
## MATERIALS AND METHODS

A retrospective study of giant cell rich lesions was done at Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar. The entire sample diagnosed as giant cell tumors of bone between May 2019 to April 2021 were recollected from the records. Secondary data regarding age, sex, clinical examination & type of specimen were obtained from the records. Radiological findings (X ray, CT scan, MRI, etc.) of all patients were also obtained. The specimens and biopsies were fixed in 10% neutral formalin, bony bits transferred to a large volume of 10% nitric acid, decalcified and after proper decalcification embedded in paraffin wax,

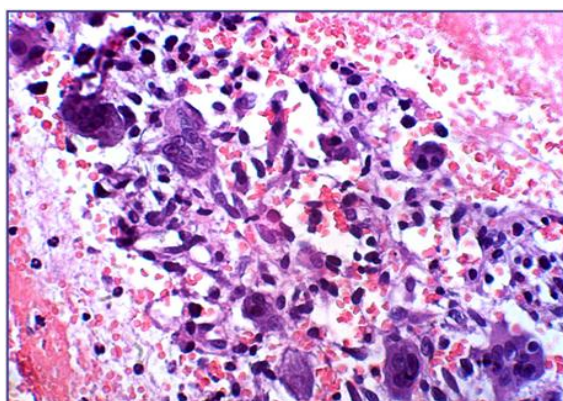
stained with Haematoxylin and eosin (H & E) & mounted with DPX which were examined for growth pattern, cell size, cell shape, nuclear characteristics, pleomorphism, mitosis, stroma & necrosis.

The cases were categorized into different groups according to age, sex, site of origin, type and benign versus malignant categories. Descriptive statistics in terms of number and percentage was performed. Results have been depicted in tabular forms.

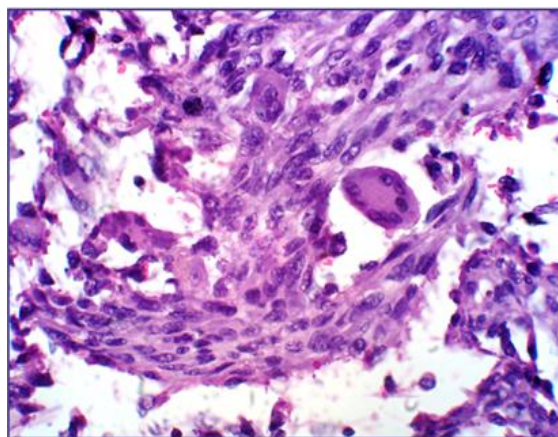
## RESULTS



**Figure 1: shows numerous giant cells in Giant cell tumor of bone (Low power view)**



**Figure 2: Shows giant cells in wall of Aneurysmal bone cyst filled with RBC (High Power)**



**Figure 3: Shows spindle shaped tumor cells with giant cells in Osteosarcoma (high power)**

Most of the giant cell containing tumors of bone is found in younger age group in second and third decade while aneurysmal bone cyst is found prior to 20 years of age. Most of the giant cell tumors are found between 20 to 40 years of age. In present study, giant cell tumor of bone is located in epiphysis of long bones in most of the cases. Aneurysmal bone cyst is located in the metaphysis of long bones. Langerhan's cell histiocytosis is located in the skull. Chondromyxoid fibroma present in metaphysis of growing bones. The osteoclastoma is maximum of all benign lesions.

T test between age and type of lesion has been applied. The mean for benign giant cell lesion is 26.7 and for malignant tumor the mean is 29.2. There is no statistically significant difference seen between the ages and the nature of lesion [Table 1]. The giant cell tumor of bone and other giant cell rich lesions of bone are more common in male. [Table 2-3] The giant cell rich lesions are most common in tibia followed by femur. Fishers exact test showed a value of 5.821, p value of 1.00 [Table 4]. According to present study, the most common giant cell rich lesion is true giant cell tumor followed by osteosarcoma and Aneurysmal Bone Cyst [Table 5]. All the patients' records was looked for the radiological characteristics of the giant cell lesion of the bone involved [Table 6].

**Table 1: Table showing T test between age and type of lesion**

Nature of lesion	N	Mean age in years	Standard Deviation
Benign	45	26.7	4.3
Malignant	5	29.2	3.7

**Table 2: Sex wise distribution of giant cell rich lesion**

Various lesion	Sex		Total
	Female	Male	
Aneurysmal bone cyst	2	3	5
Chondroblastoma	0	1	1
Chondromyxoid fibroma	0	1	1
Giant cell tumor	6	20	26
Langerhans cell histiocytosis	0	2	1
Non-ossifying fibroma	2	3	5
Osteogenic sarcoma	1	4	5
Osteoid osteoma	1	4	5
Total	12 (24%)	38 (76%)	50 (100%)

**Table 3: Table showing sex wise distribution of benign and malignant lesions**

Nature of lesion	Sex		Total
	Female	Male	
Benign	11 (24.4%)	34 (75.6%)	45 (90%)
Malignant	1 (20%)	4 (80%)	5 (10%)
Total	12 (24%)	38 (76%)	50 (100%)

**Table 4: Table showing location of bone tumor of giant cell rich lesion**

Bone involved	Nature of lesion		Total
	Benign	Malignant	
Calcaneum	2	0	2 (4%)
Femur	14	2	16 (32%)
Fibula	1	0	1 (2%)
Frontal	1	0	1 (2%)
Humerus	4	2	6 (12%)
Metacarpals	1	0	1 (2%)
Phalanx	1	0	1 (2%)
Radius	2	0	2 (4%)
Sacrum	1	0	1 (2%)
Skull	1	0	1 (2%)
Tibia	16	1	17 (34%)
Ulna	1	0	1 (2%)
Total	45 (90%)	5 (10%)	50 (100%)

**Table 5: Table showing various types of giant cell lesions**

Various type of lesion	Nature of lesion		Total
	Benign	Malignant	
Aneurysmal bone cyst	5	0	5
Chondroblastoma	1	0	1
Chondromyxoid fibroma	1	0	1
Giant cell tumor	26	0	26
Langerhans cell histiocytosis	2	0	2
Non-ossifying fibroma	5	0	5
Osteogenic sarcoma	0	5	5
Osteoid osteoma	5	0	5
Total	45 (90%)	5 (10%)	50 (100%)

**Table 6: Table showing distribution of cases according to their radiological findings**

Radiological finding	Total
Multilocular radiolucency	13 (26%)
Unilocular radiolucency	10 (20%)
Diffused radiolucency	10 (20%)
Cortical expansion	8 (16%)
Erosion of bone	7 (14%)
Cortical perforation	4 (8%)
Total	50 (100%)

## DISCUSSION

The diagnosis of giant cell-rich lesions of bone is often problematic even for the experienced pathologist. The diagnostic key lies in multinucleated osteoclast-like giant cells and a mononuclear stroma.<sup>[7]</sup> From the histological picture alone it is often difficult to distinguish between individual entities such as conventional giant-cell tumor of bone, non-ossifying fibroma or an aneurysmal bone cyst.<sup>[8]</sup>

Total 50 bone lesions were studied and divided into benign and malignant tumors. The incidence of true giant cell tumor (osteoclastoma) is maximum of all lesions in present study which is higher than Goldenberg and Dahlin et al.<sup>[9]</sup> Although giant cell tumor is considered as potentially malignant tumor, it is considered in benign because all giant cell tumors in this study show no atypical features in stroma.<sup>[10]</sup> Most of the giant cell containing tumors

of bone is found in younger age group in second and third decade while aneurysmal bone cyst is found prior to 20 years age.<sup>[11]</sup> In present study, giant cell tumor of bone is located in epiphysis in most of the cases. Giant cell tumors have higher incidence in male population in present study. Aneurysmal bone cyst is more common in males in the present study. Aneurysmal bone cyst is usually located in metaphysis of long bones. According to Modi et al,<sup>[12]</sup> osteoclast like giant cells may dominate the histological pattern not only in the giant cell tumor but also a variety of bone lesions namely aneurysmal bone cyst, giant cell-rich osteosarcoma, chondroblastoma, giant cell reparative granuloma and fibrous dysplasia.

According to Kumavat et al,<sup>[13]</sup> out of 216 cases of bone tumors Out of 216 cases, primary bone tumors were 151 (69.91%), metastatic tumors were 40 cases (18.52%) and tumor like conditions were 25 cases (11.58%). According to Sunita A. Bamanikar et

al.<sup>[14]</sup> The most common benign tumor is osteochondroma followed by giant cell tumor of all benign tumors. Osteosarcoma is commonest malignant tumor.

## CONCLUSION

Detailed histopathological study and clinico-radiological correlation is very helpful to arrive at precise and accurate diagnosis in giant cell rich lesions. Also site of lesion, age of patient helps in final conclusion. The commonest benign giant cell rich bony lesion is Osteoclastoma (Giant cell Tumor). Osteosarcoma is the commonest Malignant Tumor.

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