

A Study of Giant Cell Lesions of Bone

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ABSTRACT

Introduction: Giant cell lesions of bone include true giant cell tumors & numerous benign osteoclasts and pseudo-anaplastic-appearing giant cells containing variants. Many times it is difficult to differentiate between true giant cell tumor and other tumor like conditions.

Aims: To study histopathology of various giant cell rich tumour and tumour like conditions of bone.

Methods: Retrospective analysis of 50 cases of giant-cell rich lesions of bone diagnosed and treated at Smt. N.H.L. Municipal Medical College Ahmedabad, Gujarat during 1st January 2002 to 1st January 2003 included in the study. Patients' clinical, radiological details, histopathological examination were studied using structured proforma. The cases were classified in different categories according to age groups, types of tumour, benign versus malignant category.

Results: The most common giant cell containing benign tumor is giant cell tumor (19 cases) followed by Aneurysmal bone cyst (5), Most of the giant cell containing tumors of bone are found in younger age group and are located in epiphysis. The common giant cell containing malignant tumor is osteogenic sarcoma (7 cases) followed by Talangiectatic O.S (01). The majority of cases found in age between 15 - 28 years and most common sites are epiphysis of long bones.

Conclusion: The most common giant cell rich benign bone tumour is giant cell tumour and most common giant cell rich malignant bone tumour is osteosarcoma commonly occurs in younger age groups in the epiphysis region long bones.

Keywords: Osteoclast, Giant cell, Malignant

Introduction

Giant cell lesions of bone include true giant cell tumors & numerous benign as well as malignant conditions having osteoclasts and pseudo-anaplastic-appearing giant cells containing variants.^[1] The approach to any bony lesion should be established by clinical, radiological and pathological investigations, supplemented when necessary by biochemical and hematological studies.^[2] The five 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.^[3]

Osteoclast like giant cells may dominate the histological pattern not only in the giant cell tumour but also a variety of bone lesions namely aneurysmal bone cyst, giant cell-rich osteosarcoma, chondroblastoma^[4]

Most of these occurs in adult life (2nd-3rd decade), except for giant cell tumour and chondroblastoma. In young patient,

chondroblastoma and in patient older than 20 years, giant cell tumor should be included in differential diagnosis.^[5]

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.^[6]

Material and Methods

A retrospective study of 50 cases of giant cell rich lesions was done. Each case was investigated according to age, sex, clinical examination & type of specimen. Radiological findings (X ray, CT scan, MRI, etc.) of all patients are obtained from patient medical records. The specimens & 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 categorized into different groups according to age, sex, site of origin, type and benign versus malignant categories.

Results

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 in third and fourth decade. Most of the giant cell tumors are found between 15 to 40 years of age.

In present study, giant cell tumor of bone is located in epiphysis in most of the cases. Aneurysmal bone cyst is located in the epiphysis as well as metaphysis of long bones. Telangiectatic osteosarcoma is located near shaft of long bones. Langerhan's cell histiocytosis is located in the skull. Chondromyxoid fibroma has been detected in small bones of hands and foot.

The osteoclastoma is maximum of all benign lesions.

Statistical analysis: T test between age and type of lesion has been applied. The mean for benign giant cell lesion is 24.21 and for malignant tumor the mean is 19.50. 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 & Table 3)

The giant cell rich lesions are most common in tibia 17(34.0) followed by femur 14(28.0). Fisher's exact test = 5.821, p value = 1.00 (Table-4). According to present study, the most common giant cell rich lesion is true giant cell tumor (19) followed by osteosarcoma (07) (Table-5)

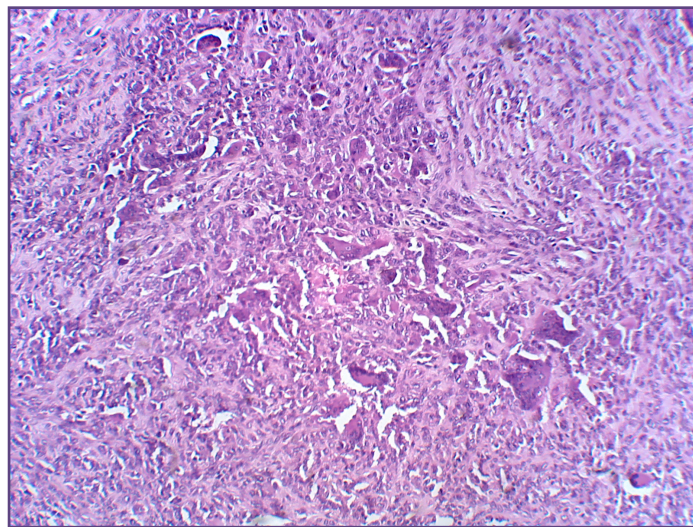


Fig. 1: shows numerous giant cells in Giant cell tumor of bone (Low power view)

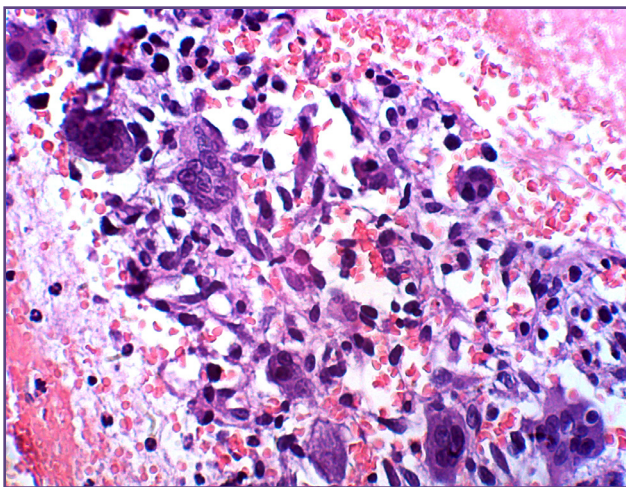


Fig. 2: Shows giant cells in wall of Aneurysmal bone cyst filled with RBC (High Power)

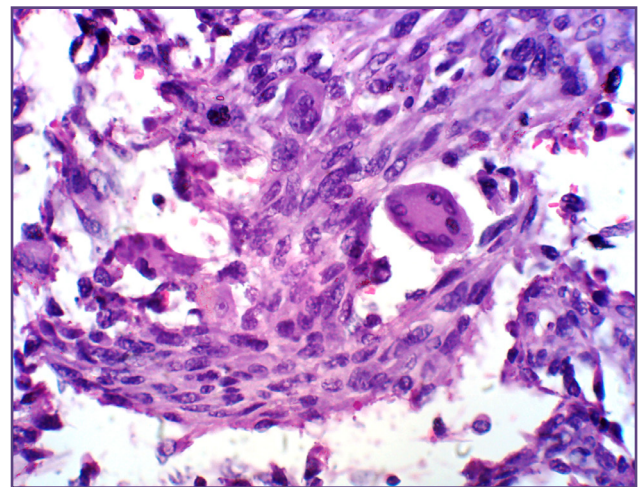


Fig. 3: Shows spindle shaped tumor cells with giant cells in Osteosarcoma (high power)

Table 1: Shows T test between age and type of lesion

Nature of lesion	N	Mean	Std. Deviation	Std. Error Mean
Benign	42	24.21	12.436	1.919
Malignant	8	19.50	5.182	1.832

There is no statistical significant difference seen between the ages and the nature of lesion

Table 2: Sex wise distribution of giant cell rich lesion

Bone	Sex		Total
	Female	Male	
Aneurysmal bone cyst	2(40.0)	3(60.0)	5(100.0)
Chondroblastoma	0(0.0)	1(100.0)	1(100.0)
Chondromyxoid fibroma	0(0.0)	1(100.0)	1(100.0)
Eosinophilic granuloma	0(0.0)	2(100.0)	2(100.0)
Giant cell tumor	9(47.4)	10(52.6)	19(100.0)
Langerhans' cell histiocytosis	0(0.0)	1(100.0)	1(100.0)
Nonossifying fibroma	2(40.0)	3(60.0)	5(100.0)
Osteogenic sarcoma	0(0.0)	7(100.0)	7(100.0)
Osteoid Osteoma	2(40.0)	3(60.0)	5(100.0)
Simple bone cyst	1(33.3)	2(66.7)	3(100.0)
Telangiectatic osteosarcoma	0(0.0)	1(100.0)	1(100.0)
Total	16(32.0)	34(68.0)	50(100.0)

Fisher's Exact Test= 8.844 p=0.566

Table 3: Sex wise distribution of benign and malignant lesion

Nature of lesion	Sex		Total
	Female	Male	
Benign	16(38.1)	26(61.9)	42(100.0)
Malignant	0(0.0)	8(100.0)	8(100.0)
Total	16(32.0)	34(68.0)	50(100.0)

Fisher's Exact Test p=0.043; The difference is significant

Table 4: Shows location of bone of giant cell rich lesion

Bones involved	Nature of lesion		Total
	Benign	Malignant	
Calcaneum	1(2.4)	0(0.0)	1(2.0)
Femur	11(26.2)	3(37.5)	14(28.0)
Fibula	1(2.4)	0(0.0)	1(2.0)
Frontal	1(2.4)	0(0.0)	1(2.0)
Humerus	6(14.3)	2(25.0)	8(16.0)
MC Bone	1(2.4)	0(0.0)	1(2.0)
Phalanx	1(2.4)	0(0.0)	1(2.0)
Radius	3(7.1)	0(0.0)	3(6.0)
Sacrum	1(2.4)	0(0.0)	1(2.0)
Skull	1(2.4)	0(0.0)	1(2.0)
Tibia	14(33.3)	3(37.5)	17(34.0)
Ulna	1(2.4)	0(0.0)	1(2.0)
Total	42(100.0)	8(100.0)	50(100.0)

Fishers exact test= 5.821, p value= 1.00

Table 5: Shows distribution of giant cell rich lesions

Histopathological Diagnosis	Nature of lesion		Total
	Benign	Malignant	
Aneurysmal bone cyst	5(11.90)	0(0.0)	5(10.0)
Chondroblastoma	1(2.3)	0(0.0)	1(2.0)
Chondromyxoid fibroma	1(2.3)	0(0.0)	1(2.0)
Eosinophilic granuloma	2(4.6)	0(0.0)	2(4.0)
Giant cell tumor	19(45.23)	0(0.0)	19(38.0)
Langerhans' cell histiocytosis	1(2.3)	0(0.0)	1(2.0)
Nonossifying fibroma	5(11.90)	0(0.0)	5(10.0)
Osteogenic sarcoma	0(0.0)	7(87.5)	7(14.0)
Osteoid Osteoma	5(11.90)	0(0.0)	5(10.0)
Simple bone cyst	3(7.14)	0(0.0)	3(6.0)
Telangiectatic osteosarcoma	0(0.0)	1(12.5)	1(2.0)
Total	42(100.0)	8(100.0)	50(100.0)

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.^[7] 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, giant-cell tumor in hyperparathyroidism or an aneurysmal bone cyst.^[8]

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.^[9] 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.^[10] Most of the giant cell containing tumors of bone are found in younger age group in second and third decade between 15 to 40 years of age while aneurysmal bone cyst is found in third and fourth decade.^[11] 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 located in the epiphysis as well as metaphysis of long bones. According to Modi et al^[12] osteoclast like giant cells may dominate the histologic 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.

Most of these occurs in adult life (2nd -3rd decade), except for giant cell tumor and chondroblastoma, Giant cell-rich lesions don't affect the epiphysis on primarily level. In young patient, chondroblastoma and in patient older than 20 years, giant cell tumor should be included in differential diagnosis.

According to Modi et al, the giant cell rich lesion of bone includes giant cell tumour of bone (41), aneurysmal bone cyst (04), giant cell-rich osteosarcoma (02), giant cell reparative granuloma (02), and fibrous dysplasia (01) noted at their institute. While in present study, the giant cell rich lesions includes giant cell tumor (19 cases), Aneurysmal bone cyst (5), osteogenic sarcoma (7 cases) and Talangiectatic osteosarcoma (01). Most of the giant cell containing tumors of bone are found in younger age group and are located in epiphysis. The majority of cases found in age between 15 - 28 years and most common sites are epiphysis of long bones.

According to Kumavat et al^[13] 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^[14]. The most common benign tumour is osteochondroma followed by giant cell tumour of all benign tumours. osteosarcoma is commonest malignant tumour.

Conclusion

Detailed histopathological study and clinico-radiological correlation is very helpful to arrive at precise and accurate diagnosis in giant cell rich lesions. The common giant cell rich bone lesion are true giant cell tumor

(osteoclastoma) and osteosarcoma which is common in younger age group.

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