



GIANT CELL TUMOR OF BONE: HISTOPATHOLOGICAL ANALYSIS AND A FEW CASES WITH UNUSUAL PRESENTATION.

Dr. Farzana Siddiqui*, Dr. Dinesh Sodhi, Dr. S. P. Vyas,*****

*Resident, Pathology; **Professor, Neurosurgery; ***Senior Professor, Pathology, Sardar Patel Medical College, Bikaner, Rajasthan

Article Info: Received 10 May 2020; Accepted 11 July 2020

DOI: <https://doi.org/10.32553/ijmbs.v4i7.1293>

Corresponding author: Dr. S.P. Vyas

Conflict of interest: No conflict of interest.

Abstract

Introduction: Giant cell tumor of bone involves the epiphysis of long bones commonly. Axial skeleton is the rare site for the tumor. Metastasis of this tumor is very rare which is seen in lungs, lymph nodes and liver. It is extremely rare to find metastasis in the occipital bone.

Material and method: A retrospective study of giant cell tumor of bone was done over a period of two years. We found a total of 65 cases in the study period. Each case was analysed according to age, sex and site.

Result: A total of 65 cases were studied in two year period. Most of the cases (49.23%) were seen in the third decade and had a little female predilection (55.38%). The most common location in our study was around the knee (70.77%) followed by distal radius and proximal humerus. We also had two cases involving rare location i.e. C7 vertebra and temporal bone. Interestingly one of our cases also presented with pulmonary metastasis followed by occipital bone metastasis six and twenty year after primary tumor respectively.

Conclusion: Giant cell tumor of bone is a tumor of epiphysis of long bones but can be found in other parts of other bones too. It is a benign tumor but has the potential for distal metastasis so follow up of the patients is required especially in case of primary tumor of upper limbs.

Keywords: Giant cell tumor, Rare location, Skull metastasis.

Introduction

Giant cell tumor is an intramedullary neoplasm which accounts for 5% of all the primary bone tumors and 20% of benign bone tumors. There is a little female predilection. The prevalence of GCT peaks during the 3rd decade, 80% cases occur between 20 and 50 years of age. 2.7% of cases occur before the age of 14 years and 13% of cases occur in patients above the age of 50 years.

This tumor has a strong predilection for epiphysis of long bones after closure of growth plate with the majority of cases (50%–65%) occurring about the knee. The three most common locations are the distal femur, proximal tibia and distal radius respectively.¹ In total, <1% of GCTs are found in the cranial bones. The majority of which was observed in the sphenoid and temporal bones.² In the spine, the sacrum has been reported as the most common location.³ The course of the progression of giant cell tumor of bone varies and can range from local bony destruction to local metastasis. The distant metastasis and malignant transformation are extremely rare conditions. Rare cases of metastases to other sites have been described in the literature. Those reported include the lung, lymph nodes, liver, soft tissue, brain, mediastinum, scalp, kidney and penis.⁴ These metastases generally have the same benign histologic appearance as the index tumor.⁵

We studied a total of 65 cases of giant cell tumor of bones over a period of two year and found most of them involving the epiphysis of long tubular bones two of our cases were seen on unusual location of axial skeleton and one case of primary long bone gct presented with pulmonary and occipital bone metastasis.

Material and Methods

A retrospective study of giant cell tumor of bone was done over a period of two years. We found a total of 65 cases in the study period. Each case was analysed according to age, sex and site. Radiological and histological findings of all patients were obtained from medical records.

Observation and Results

Total 65 cases of Giant cell tumor were studied. Most of the cases were found in the third decade. Mean age of patients was 26.42±7.40 years.

Table 1: Age wise prevalence of giant cell tumor

Age group	No.of patients	Percentage
0-10	0	0%
10-20	15	23.07%
20-30	32	49.23%
30-40	14	21.54%
40-50	04	6.15%

In present study the tumor had a higher incidence in female population (55.38%) as compared to male population (44.62%).

Table 2: Gender wise distribution of GCT

Gender	No. of cases	Percentage
Female	36	55.38%
Male	29	44.62%

Most of the giant cell tumors (95.38%) are located at the ends of tubular bone in present study but two cases (3.08%) occurred at unusual locations. One of our cases (1.54%) presented with metastatic tumor in parietal bone

Table 3: Site wise prevalence of GCT

Location of tumor	No. of cases	Percentage
Distal femur	25	38.46%
Proximal tibia	21	32.31%
Distal radius	11	16.92%
Proximal humerus	5	7.70%
Vertebral body	1	1.54%
Temporal bone	1	1.54%
Occipital bone	1	1.54%

Cases with unusual locations

Case 1- A 36 yr old male presented with a five month history of headache and dizziness. General physical examination was normal and neurological examination revealed no obvious abnormality. Brain M.R.I showed an heterogeneous lesion measuring 5x4.5x4 cm in relation to left temporal bone (fig1). The patient underwent surgical resection of the bony mass from the temporal bone . A subtotal removal of the tumor was achieved. Intra operative findings mentioned that the tumour was extradural, highly vascular and firm in consistency.The patient's postoperative course was uneventful. No neurological complications occurred. On histopathological examination the tumor was confirmed to be a giant cell tumor (fig2).

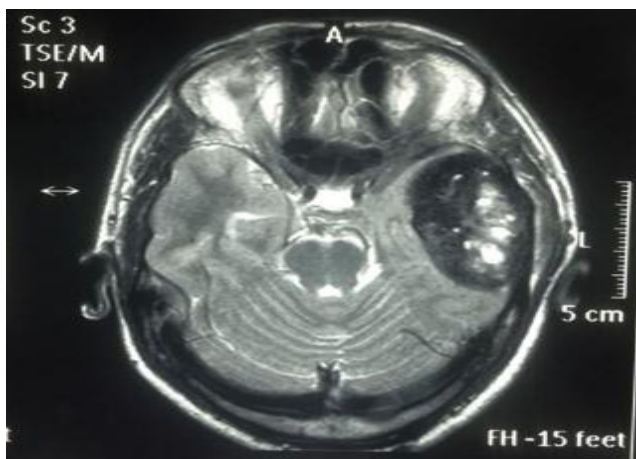


Figure 1: MRI brain-a non enhancing lesion measuring 5x4.5x4 cm.with heterogeneous signal.

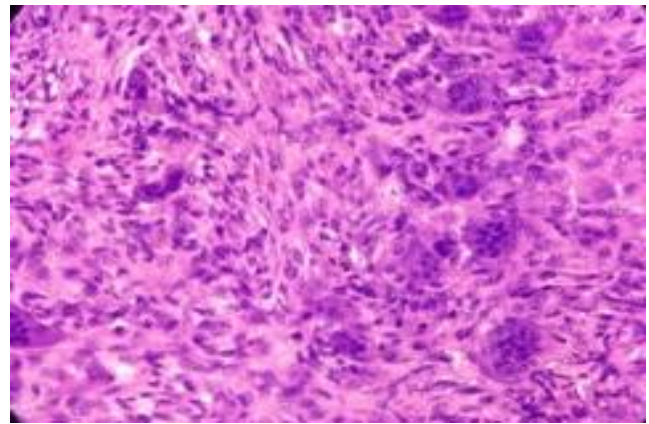


Figure 2: Microscopy- multinucleated giant cells and mononuclear stromal cells (H&E, 40x)

Case 2- A 16 yr old female presented with history of weakness in both upper and lower limbs since two months. MRI spine showed collapse of C7 vertebral body with soft tissue component protrusion both anteriorly and posteriorly causing marked compression and displacement of spinal cord. Histopathological examination confirmed the presence of giant cell tumor.



Figure 3: MRI spine- showing collapse of C7 vertebrae.

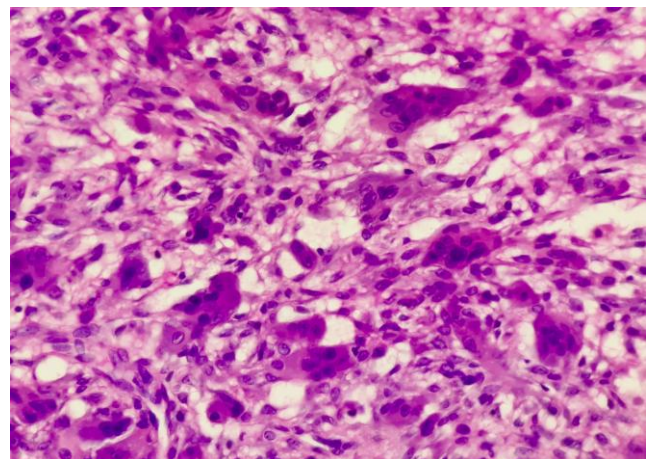


Figure 4: fibroblastic spindle cells with clustered multinucleated giant cells (H&E 40X)

Case 3- A 42 year old female presented with swelling in the occipital region which was gradually increasing in size since 6 month. MRI brain demonstrated an extra-axial predominantly bony lesion in the occipital bone which appeared hyperintense on T2W and FLAIR imaging while isointense on T1W images. On contrast administration there was intense enhancement of lesion which was 4.4*3.2*2.4 cm in size (fig 5). On the fnac of lesion, a giant cell containing lesion was diagnosed which was confirmed to be giant cell tumor grade 2 on biopsy. The patient underwent surgery and the tumor was resected which was confirmed as giant cell tumor on histopathological examination (fig 6).The patient had a history of giant cell tumor of distal end of radius 20 years back. She had below elbow amputation but bilateral pulmonary metastasis occurred six years after surgery for which she got chemotherapy.



Figure 5: MRI brain- 4.4*3.2*2.4 cm mass in occipital bone

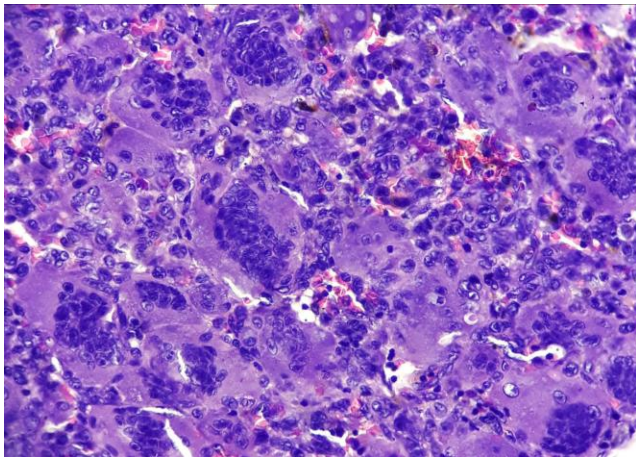


Figure 6: Multinucleated giant cells surrounded by haemorrhage. (H&E, 40x)

Discussion

This series of Giant Cell Tumor of Bones reports 65 patients over a period of two years. All the cases were with proven

histopathological diagnosis of giant cell tumor in our referral hospital.

Female predilection in GCTB has been reported by other series.^{6,7} In our study also females represented 55.38% of the patients. Giant cell tumors are commonly diagnosed in patients between 20 and 45 years of age.^{8,9} Although few patients in this series (15/65) were diagnosed during the second decade of life, most patients (46/65) were diagnosed during their third and fourth decades.

The ends of long bones were the most common locations in this series with tumors around the knee being the most common. This distribution is similar to that reported in the literature.^{8,9} In the spine, the sacrum has been found as the most common location.³ However, in this series, one tumor involves the spine but at the C7 location. Less than 1% of GCTs are found in the cranial bones.¹⁰ The majority of which were observed in the sphenoid and temporal bones.² One of our case was found involving temporal bone. Other unusually reported locations include the patella and the scapula.¹¹

Local recurrence at the initial site of the primary giant cell tumour usually occurs before distant metastasis. Metastatic tumours are histopathologically identical to the original neoplasm. Metastasis usually occurs in lungs, followed by lymph nodes, skin and breast. Some cases have been reported of metastasis to other long bones and rarely the skull, where the sphenoid bone is most commonly involved.¹² In our study one patient had bilateral pulmonary metastasis six years after primary and occipital bone metastasis 20 year after the detection of primary tumor.

The present study relates to previous studies, majority of GCT are located in the long bones i.e 62 cases out of 65 cases but we found two cases of GCT at rare location i.e temporal bone of skull and the C7 vertebral body and one case presented with metastasis of gct in occipital bone.

References

1. Corey J. Chakarun; Deborah M. Forrester; Christopher J. Gottsegen; Dakshesh B. Patel; Eric A. White; George R. Matcuk, Jr. Giant Cell Tumor of Bone: Review, Mimics, and New Developments in Treatment. DOI: <http://dx.doi.org/10.1148/rg.331125089>
2. Uslu, G. H., Canyilmaz, E., Yöney, A., Aydın, S., Sahbaz, A., & Sari, A. (2014). Giant cell tumor of the occipital bone: A case report and review of the literature. *Oncology letters*, 8(1), 151–154. <https://doi.org/10.3892/ol.2014.2086>
3. Mohaidat, Z. M., Al-Jamal, H. Z., Bany-Khalaf, A. M., Radaideh, A. M., & Audat, Z. A. (2019). Giant cell tumor of bone: Unusual features of a rare tumor. *Rare tumors*, 11, 2036361319878894. <https://doi.org/10.1177/2036361319878894>
4. Muheremu A, Niu X. Pulmonary metastasis of giant cell tumor of bones. *World J Surg Oncol*. 2014 Aug 20;12:261. doi: 10.1186/1477-7819-12-261. PMID: 25139054; PMCID: PMC4155080.
5. Ghostine, B., Sebaaly, A., & Ghanem, I. (2014). Multifocal metachronous giant cell tumor: case report and review of the literature. *Case reports in medicine*, 2014, 678035. doi:10.1155/2014/678035

6. Amanatullah DF, Clark TR, Lopez MJ, et al. Giant cell tumor of bone. *Orthopedics* 2014; 37(2): 112–120.
7. Balke M, Schremper L, Gebert C, et al. Giant cell tumor of bone: treatment and outcome of 214 cases. *J Cancer Res Clin Oncol* 2008; 134(9): 969–978.
8. Futamura N, Urakawa H, Tsukushi S, et al. Giant cell tumor of bone arising in long bones possibly originates from the metaphyseal region. *Oncol Lett* 2016; 11(4): 2629–2634.
9. Turcotte RE. Giant cell tumor of bone. *Orthop Clin North Am* 2006; 37(1): 35–51.
10. Sherwani RK, Zaheer S, Sabir AB, et al. Giant cell tumor along with secondary aneurysmal bone cyst of scapula: a rare presentation. *Int J Shoulder Surg* 2008; 2(3): 59–61.
11. Viswanathan S, Jambhekar NA. Metastatic giant cell tumor of bone: are there associated factors and best treatment modalities. *Clin Orthop Relat Res* 2010; 468: 827–833.
12. Kalani, A., Lovett, M., Stewart, L., Popovic, S., & Panju, A. (2017). A remote metastatic giant cell tumour to the skull. *JRSM open*, 8 (7), 2054270417702567. <https://doi.org/10.1177/2054270417702567>