Giant Cell Tumor Bone in an Elderly Male- an Unusual Case Misdiagnosed on MRI as a Malignant Sarcoma

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Abstract Giant cell tumor (GCT) of the bone is a benign locally aggressive neoplasm which accounts for 3–8 % of all primary bone tumors. 60–70 % of the patients with giant cell tumor of the bone occur in the age group of 20–40 years. Patients older than 55 years of age very rarely develop GCT. Although many case series have been published on giant cell tumor of the bone, even on extensive search of literature, we found only a single series of 10 cases focusing exclusively on giant cell tumors in elderly. They observed that there was no difference in behavior of GCT in elderly and younger patients in terms of location of tumor, radiographic features and clinical course. We present a case of GCT of tibia in an elderly male without any evidence of malignant transformation or dedifferentiation, despite magnetic resonance imaging revealing features of a malignant lesion.

Keywords Giant cell tumor · Elderly · Bone tumor

Introduction

Giant Cell tumor of bone, also known as osteoclastoma, is a locally invasive, usually benign tumor arising in the epiphysis of bones. Giant cell tumor (GCT) of bone accounts for 3 to 8 % of all bone tumors. It usually affects young adults in their third to fourth decades of life. GCT is very rare in patients who

are either too young or too old [1]. We hereby report a rare case of giant cell tumor of proximal tibia in a 75 year old male which was misdiagnosed on magnetic resonance imaging (MRI) as an osteosarcoma or a metastasis.

Case Summary

A 75 year old male presented to the orthopedics clinic with complaints of pain and swelling in the upper left leg progressively increasing for the last 6–8 months. There was no history of fever, loss of appetite, loss of weight or past evidence of tuberculosis. Swelling was located over left proximal tibia, 3 cm below knee joint and 10 cm from tibial tubercle. Swelling was bony hard, tender, fixed to bone measuring 8x4cm. However, overlying skin did not show any sinus or scar. Hematological and biochemical investigations were within normal limits.

X ray revealed a well defined expansile lytic lesion at proximal end of tibia extending from epiphysis to metaphysis (Fig. 1a). The classical soap bubble appearance on X ray films suggested a diagnosis of giant cell tumor, tibia. Contrast enhanced magnetic resonance imaging (MRI) leg revealed a well defined globular lesion in proximal metaphyseal and epiphyseal region with destruction of lateral cortex suggestive of an aggressive lesion either osteosarcoma or metastasis. On computed tomography of chest, sequelae of old lung infection were detected, however, no space occupying lesion was found.

Fine needle aspiration cytology was inconclusive. Biopsy performed elsewhere revealed giant cell tumor of tibia. Hence, intralesional excision and curettage was performed and the bony cavity was replaced by bone cement (Fig. 1b). Multiple gray brown soft tissue pieces admixed with few bony bits were received. Sections show a tumor composed of uniformly

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Fig. 1 **a** Preoperative X ray showing a well defined expansile lytic lesion at proximal end of tibia, **b** Postoperative X ray shows the cavity replaced by bone cement

distributed osteoclastic giant cells interspersed with mononuclear stromal cells. Both types of cells had similar nuclei which are round to oval, vesicular with inconspicuous nucleoli (Fig. 2a and b). Many areas of hemorrhage with hemosiderin laden macrophages, necrosis and degenerated bony trabeculae also seen. The entire tissue was processed to rule out any evidence of malignant transformation in a giant cell tumor or any other coexistent pathology. A final diagnosis of giant cell tumor, tibia was rendered.

Discussion

Giant cell tumor of the bone usually affects young adults, 60–70 % of the patients being in the age group of 20–40 years.

Patients older than 55 years of age very rarely develop GCT [1]. Many large reviews [2, 3] have been published on giant cell tumor, however, they include only a few elderly patients. Few isolated cases of GCT in old age have been reported either in an unusual location [4, 5] or associated with chromosomal abnormalities [6]. On extensive search of literature, we came across only a single case series focusing on giant cell tumor of bone in elderly patients [7]. McCarthy et al. [7] reported ten such patients ranging in age from 62 to 78 years. They concluded that the behavior of GCT in elderly patients is similar to lesions occurring in younger patients in terms of location of tumor, radiographic features and clinical course. Infact, tumors in older age group may have less aggressive course on account of lack of recurrences in them compared to younger patients.

Fig. 2 **a** Photomicrograph shows a tumor composed of uniformly distributed osteoclastic giant cells interspersed with mononuclear stromal cells along with dead bone (Hematoxylin & Eosin, 100×), **b** Both multinucleated and stromal cells have similar nuclei which are round to oval, vesicular with inconspicuous nucleoli (Hematoxylin & Eosin, 400×)

The list of differentials to be considered for giant cell tumor is quite elaborate. However, considering the older age of patients, possibilities can be narrowed down to metastatic carcinoma, osteoarthritic cyst, pigmented villonodular synovitis and brown tumor of hyperparathyroidism. The most common bone tumor in older patients is metastatic carcinoma. The fact that further complicates the differentiation of GCT from other metastatic carcinomas is that some carcinomas of kidney, breast and lung have variants rich in osteoclast like giant cells [8, 9]. However, in the present case, there was no evidence of atypical cells or abnormal mitoses.

Another diagnostic problem in elderly is the possibility of an osteoarthritic cyst, which occurs at similar location and has identical X ray findings. MRI provides useful clues to establish a diagnosis of GCT. Pigmented villonodular synovitis (PVNS) can also sometimes be misdiagnosed as GCT due to its involvement of epiphysis and metaphysis. PVNS shows secondary bone invasion evident on MRI [7]. The possibility of giant cell rich variant of osteosarcoma can be excluded by the absence of malignant osteoid being produced by malignant tumor cells. Moreover, uniform distribution of osteoclast like giant cells, as seen in the present case, is not a feature of osteosarcoma.

MRI is considered to be the best imaging modality for GCT due to its superior contrast resolution and multiplanar imaging capabilities that allow accurate tumor delineation. MRI is useful in determining extraosseous extent and articular surface involvement, however subtle cortical destruction is better demonstrated by Computed Tomography. GCT shows low intensity on T1 and heterogeneous high intensity on T2 weighted images. Therefore intramedullary tumor is best seen on T1W, while its extraosseous portion is best appreciated on T2W images [10]. In the present case, MRI revealed a well defined globular lesion in proximal metaphyseal and epiphyseal region with destruction of lateral cortex suggestive of an aggressive lesion either osteosarcoma or metastasis.

To summarize, this is a case of GCT of bone at a common location, that is, proximal tibia, with typical X ray and histopathological features in an unusual age group, which was misdiagnosed on MRI as a malignancy. Through this case, we wish to highlight that the possibility of giant cell tumor, although very unusual in the old, should be considered after taking into account the classical radiological findings and excluding other differential diagnosis in this age group.

Conflicts of Interest None

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