

Case Report

Giant Cell-rich Osteosarcoma: unravelling an elusive, enigmatic entity

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Abstract: Giant cell-rich osteosarcoma needs to be differentiated from malignant giant cell tumor as there are marked differences in prognoses and treatment. There is considerable overlap in signs, symptoms and histopathological features. We describe here a 16 year old girl who presented with pain and swelling below the knee joint and underwent an incisional biopsy. In the light of radiological and pathological features a diagnosis of Giant cell-rich osteosarcoma was made

Key words: Giant cell-rich osteosarcoma, Giant cell tumor, Osteoid, Tbia.

Introduction

Giant cell-rich osteosarcoma is a relatively new entity having been added to the medical literature by Bathurst et al in 1986.¹ It accounts for only 1-3% of conventional osteosarcoma cases.² It needs to be differentiated from malignant giant cell tumor owing to the vast differences in prognoses and treatment strategies between the two neoplasms. The two show considerable overlap in patient histories, physical findings, radiological and histopathological features, often rendering the task difficult.¹⁻³ We here report a case of a 16 year old female who presented with pain and swelling below the left knee joint. Incisional biopsy was taken and revealed a giant cell rich morphology. Giant cell-rich osteosarcoma and malignant giant cell tumor were the leading diagnostic candidates. The presence of neoplastic osteoid tilted the balance in favor of the former.

Case report

A 16 year old girl presented herself in Lahore General Hospital, Lahore in January 2012, with the complaint of increasing pain in her left knee joint.

The pain started one year back when it was mild in intensity and would be relieved by NSAIDs. But with the passage of time the intensity of pain increased, it became refractory to medicine and she was unable to bear weight on the effected side.

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On examination, an 8x8 cm swelling was detected 6 cm below the knee joint. Tenderness was positive. Overlying skin was intact. X ray revealed a geographic,

lytic lesion of the left proximal tibia (Fig 1). It involved the metaphysis and extended into the epiphysis.



Figure 1: The effected site in antero-posterior and lateral views showing geographic, lytic, metaphyseal lesion of the tibia.

The clinical diagnosis was osteosarcoma. An incisional biopsy was taken under general anesthesia and sent to Department of Pathology, PGMI, Lahore.

On gross examination, it was a single grey white soft tissue piece measuring 1.5x1x1 cm. The cut surface was grey white and smooth. No areas of hemorrhage, necrosis or bone formation were noted. Microscopic examination revealed a neoplasm comprised mainly of anaplastic stromal cells. These had pleomorphic nuclei and exhibited occasional mitosis. Interspersed among these were numerous osteoclast like giant cells foci of necrosis were noted. What was more interesting was the scanty but unmistakable production of lacy osteoid by the anaplastic stromal cells (Fig 2,3). No dilated blood filled channels or areas of hemorrhage were seen.

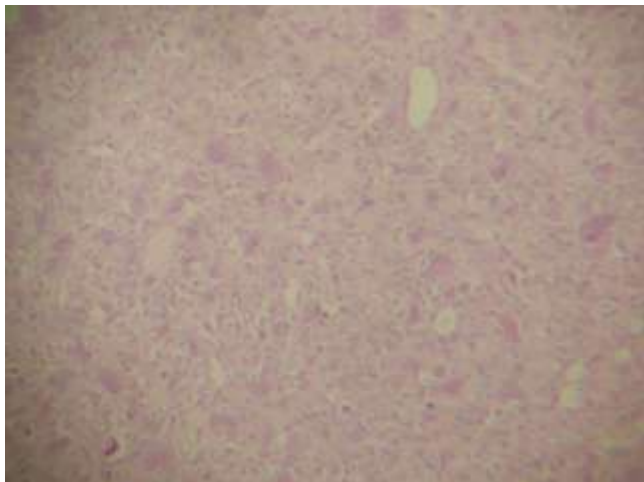


Figure 2: Photomicrograph showing evenly distributed osteoclast like giant cells in an anaplastic stroma. (H &E, x 40)

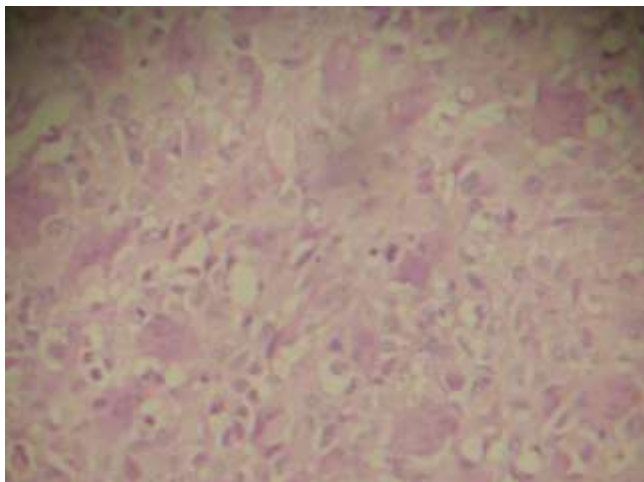


Figure 3: Photomicrograph showing neoplastic osteoid production by stromal cells. (H &E, x 100)

Keeping in view this osteoid production and the patients age a diagnosis of Giant cell-rich osteosarcoma was made.

Discussion

Osteosarcoma is the most common primary malignant tumors of bone and comprises a family of lesions with considerable diversity in histologic features and grades. Giant cell-rich osteosarcoma is one of the High-grade types and is morphologically characterized by a prolific scattering of osteoclast like giant cells.⁴ Such giant cells are seen in up to 13% of osteosarcomas but they are not distributed uniformly in conventional osteosarcomas. Hence, differential diagnosis between these two conditions is rarely a problem.⁵

The major challenge is to differentiate giant cell-rich osteosarcoma from malignant giant cell tumor. Both the lesions will have anaplastic, spindle shaped, stromal cells with a generous sprinkling of osteoclast like giant cells. The radiographs of both may show geographic, i.e., poorly defined lytic lesions as was seen in our case.^{2,4,6} This places a great burden on the shoulder of the histopathologists as the management for giant cell tumor is curettage while that for giant cell-rich osteosarcoma is amputation. Meticulous examination of slides is required to detect direct formation of osteoid by malignant spindle cells, a feature that tilts the balance in favor of the latter entity.⁷ Additional helpful criterion is young age of the patient, which favors giant cell-rich osteosarcoma as chances of developing giant cell tumor are remote in a patient who has not reached skeletal maturity.^{1,3} The radiological findings, albeit overlapping, may shed light on certain cases. Giant cell-rich osteosarcomas tend to arise at the metaphysis or the diaphysis and may extend into the epiphysis while malignant giant cell tumours tend to arise at epiphyseal ends of bones.^{1,2}(Table1)

Another condition that needs to be entertained as a differential would be telangiectatic osteosarcoma. Giant cell-rich osteosarcoma will lack the characteristic blood filled channels and will have a more uniform distribution of multinucleated giant cells.^{1,3,4} A giant cell endowed picture may be seen in other lesions of bone pathology including non ossifying fibroma, localized osteitis fibrosacystica, aneurysmal bone cyst, chondromyxoid fibroma, benign chondroblastoma, and the “brown tumor” of hyperparathyroidism, etc. But the characteristic anaplastic stroma and the uniform distribution of giant cells throughout the lesion renders differentiation from these lesions easy.⁹

Malignant fibrous histiocytoma is another giant cell neoplasm likely to have a similar picture, but these cases will have storiform areas and the basic proliferating component is fibrohistiocytic.²

Hence, the bottom line remains to be vigilant in differentiating the giant cell-rich osteosarcoma from malignant giant cell tumor. In doing so, malignant osteoid production, patient’s age and radiological findings especially location in bone may all add up to point the finger in the right direction.

Feature	Malignant Giant cell tumor	Giant cell-rich osteosarcoma
Peak Age	35-45 years	15-20 years

Bone compartment	Epiphysis-metaphysis	Metaphysis
Distribution of giant cells	Uniform	Non uniform
Intervening matrix	Absent/scanty	Malignant osteoid (may be scanty)
Mononuclear cells	Ovoid, uniform nuclei; Similar to giant cells	Polygonal to spindled; nuclei hyper chromatic, High nuclear cytoplasmic ratio
Mitosis	Scant to abundant	Abundant, atypical
Necrosis	May be present	May be present
Local recurrence	25%	<5%
Metastasis	<5%	35%
Treatment	Curettage/cement	Neo Adjuvant chemotherapy/resection

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Editor’s note: We believe that Giant cell tumor is not a true neoplasm but rather a reactive condition secondary to frequent hemorrhages resulting from aneurysmal cystic dilated vessels. In our opinion “malignant giant cell tumors” in fact represent some primary bone tumors such as giant cell rich osteosarcoma.

Ref: Haque AU, Moatasim A. Giant cell tumor of bone: a neoplasm or a reactive condition? *Int J Clin Exp Pathol*. 2008 Jan 1;1(6):489-501.