GIANT CELL TUMOR OF THE RIB : A CASE REPORT

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ABSTRACT

A giant cell tumor involving the left anterior 4th rib was diagnosed in a 42-year-old female who presented with a large mass at left anterior chest wall. Plain radiographs demonstrated an expansile osteolytic lesion at anterior aspect of left 4th rib. CT scan revealed an expanding mass originating from anterior aspect of left 4th rib, suggestive of a benign bone lesion. On MRI, the appearance was non specific and the diagnosis was established by histological examination after removal of the tumor.

INTRODUCTION

Giant cell tumor of the rib is extremely rare and accounts for less than 0.6 % of all giant cell tumours.[1] We report a 42-year-old woman having a giant cell tumor of the rib with illustrations by plain radiographs, computed tomography and magnetic resonance imaging findings.

CASE REPORT

A 42-year-old woman without any underlying medical history presented with a 6-month history of non movable painless mass at left side of the chest wall which was thought to be a breast mass.

Physical examination revealed a non-tender, firm, fixed mass at left anterior chest wall measuring approximately 4x5 cms. The surface of the mass was smooth and the skin over it was stretched but not warm.

Ultrasonography was initially requested to rule out a breast mass. The ultrasonography of both breasts showed a lobulated-border lesion of inhomogeneous echogenicity with multiple internal septation in the region of left anterior rib which is suggestive of an expansile destruction of the rib. This mass was about 1.5x2.6 cm in size, abutted and displaced the overlying muscle and left breast anteriorly. No evidence of left breast invasion was seen Rt. Breast was normal.

PA and left lateral plain chest radiographs showed a markedly expansile osteolytic lesion at the anterior aspect of 4th rib left side near costosternal junction. No evidence of matrix mineralization was observed (Fig. 1).

Plain computed tomography scan showed an expanding mass originating from anterior aspect of left 4th rib. Irregular but complete calcific shell at its periphery was observed (Fig 2). The mass extended anteriorly displacing the chest wall muscle, and posteriorly with mild compression of the lung beneath.

MRI was performed with T1-weighted and T2-weighted sequences in the axial and coronal

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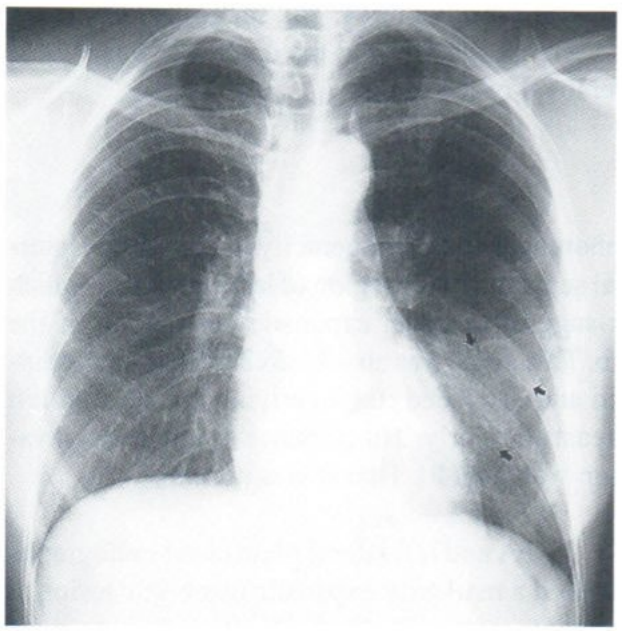
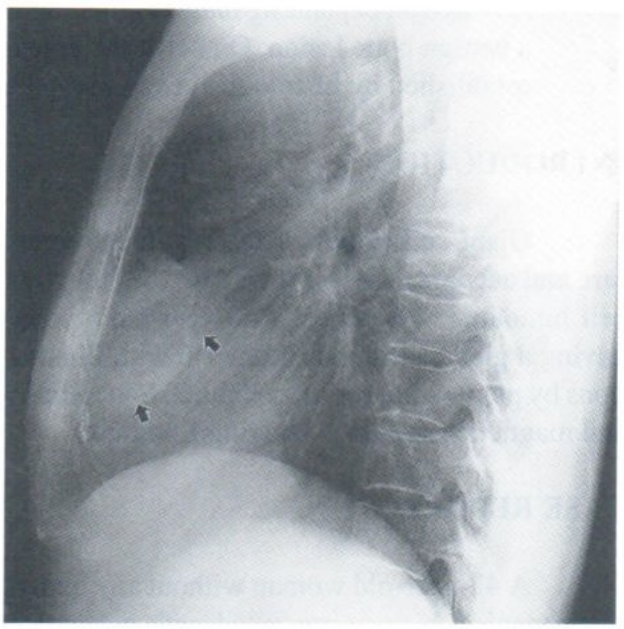
planes and GRE sequence in the axial plane. It demonstrated the mass arising from the left anterior 4th rib displacing the overlying muscle and left breast anteriorly. The tumor gave low signal intensity on T1-weighted images and heterogeneous signal intensity on T2-weighted images and GRE images (Fig.3), and was markedly enhanced with GdDTPA (Fig. 4). There were areas of dark signal intensity on GRE images, which were corresponded with foci of hemorrhage from the pathologic specimen.

A segmental resection of the tumor was performed. The specimen was submitted for pathological examination. The gross examination disclosed a portion of rib, measuring 8.0 cm in length. The expansile area with remaining peripheral bone was measured 5.0x5.0x4.0 cm. It revealed bright yellow anterior surface with scattered foci of hemorrhage (Fig. 5). Microscopic examination showed diffuse polygonal and spindle-shaped stromal cells with numerous multinucleated giant cell (Fig. 6 A,B).



1A



1B

Fig. 1. Posteroanterior (A) and left lateral (B) chest radiographs show an expansile, faintly trabeculated lytic lesion at anterior aspect of left 4th rib without matrix calcification. The cortex is thin but appears intact.

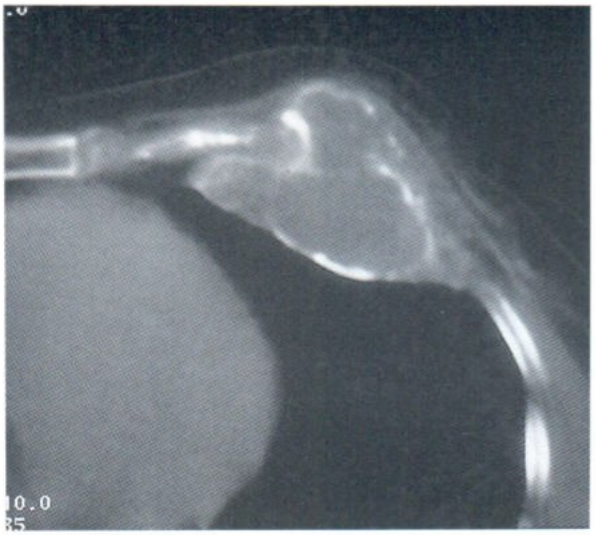
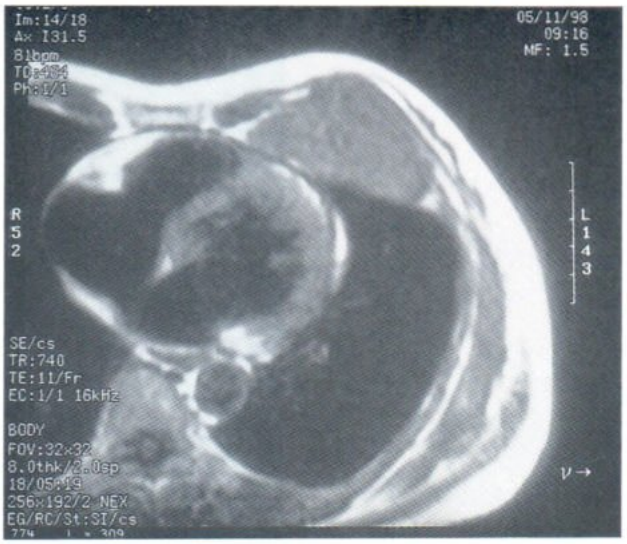
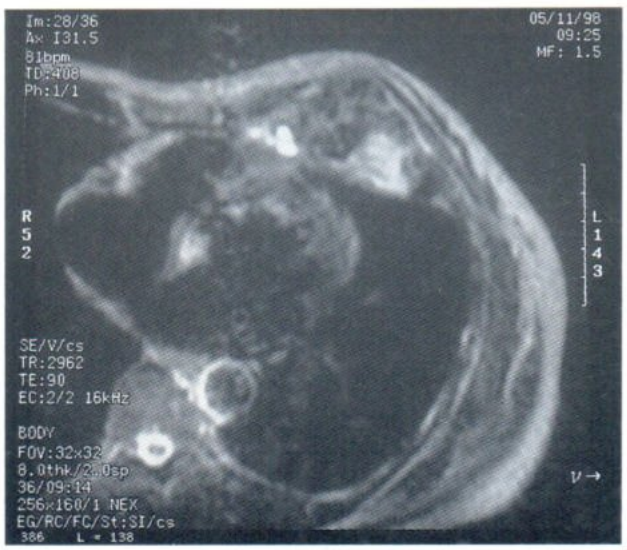


Fig. 2. A bone-windowed image of plain CT scan shows a large, expanding mass originating from the anterior aspect of the rib. A complete rim of bone surrounds the mass is seen.



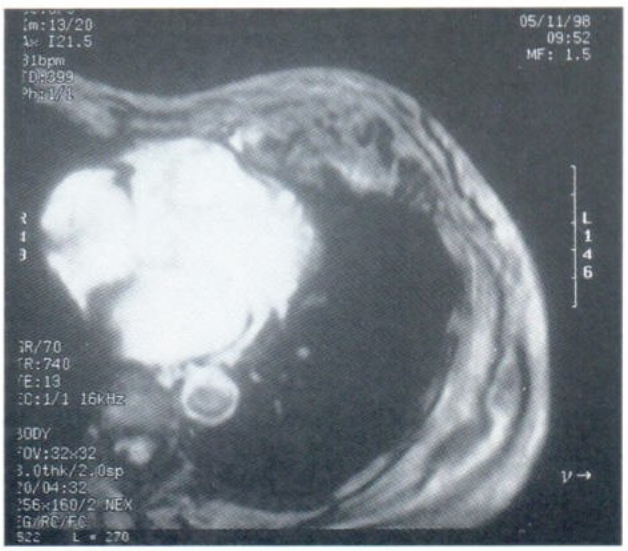
3A

Fig. 3A. Axial T1-weighted spin echo image shows a low signal intensity mass arising from the anterior aspect of left fourth rib.



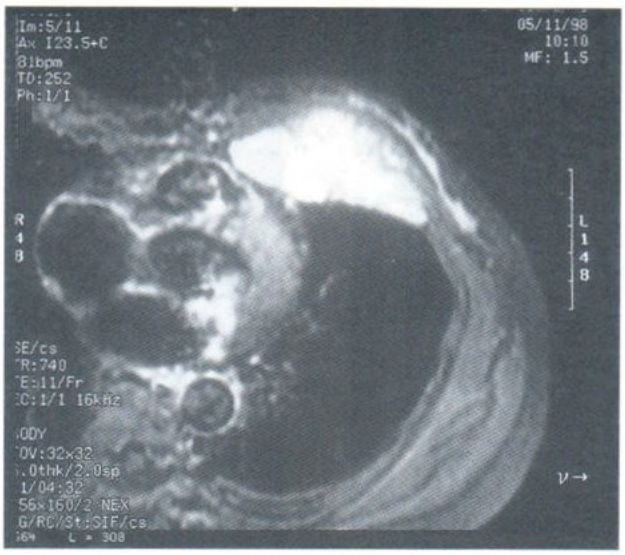
3B

Fig. 3B. Axial T2-weighted spin echo MR image reveals a heterogeneous signal intensity of the mass.



3C

Fig. 3C. Axial GRE image shows areas of dark signal intensity which are correlated with hemosiderin deposits.



3D

Fig. 3D. Axial T1-weighted spin echo image with fat saturation obtained after intravenous GdDTPA administration shows intense enhancement of the tumor.

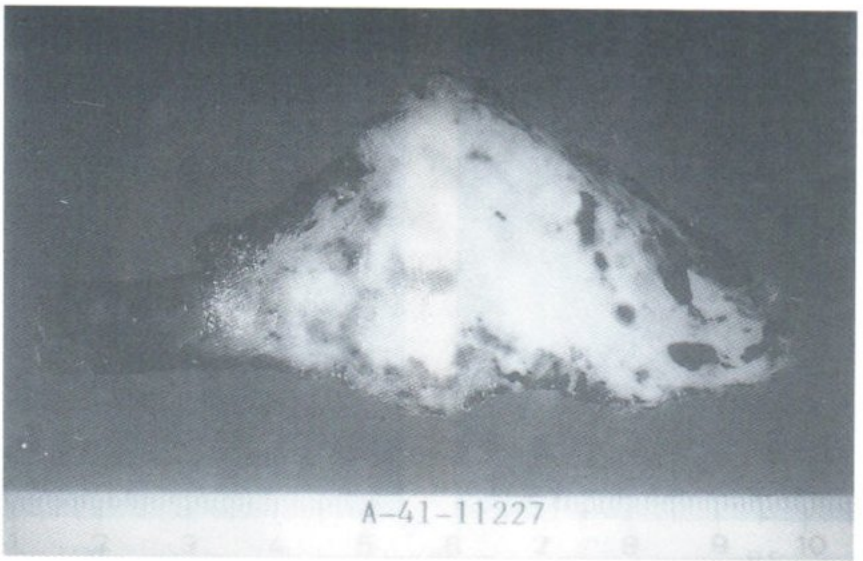
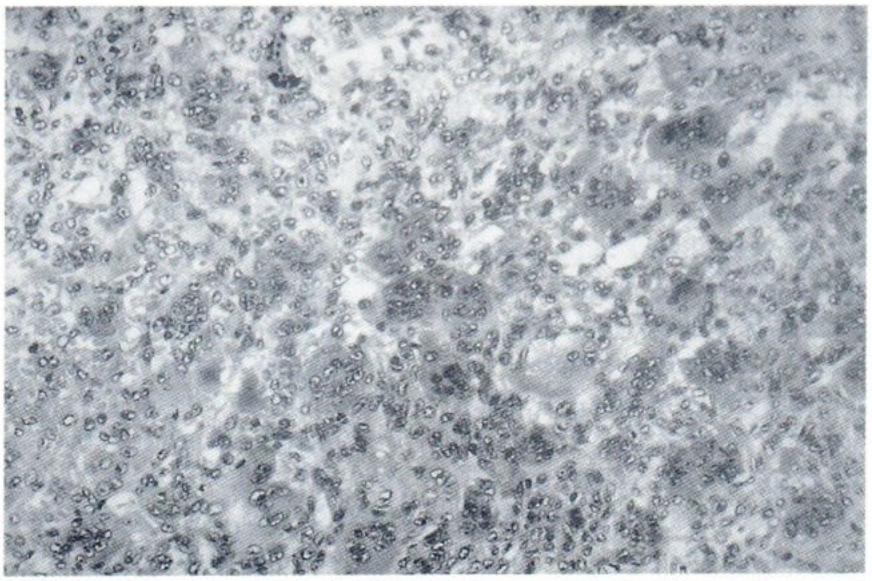
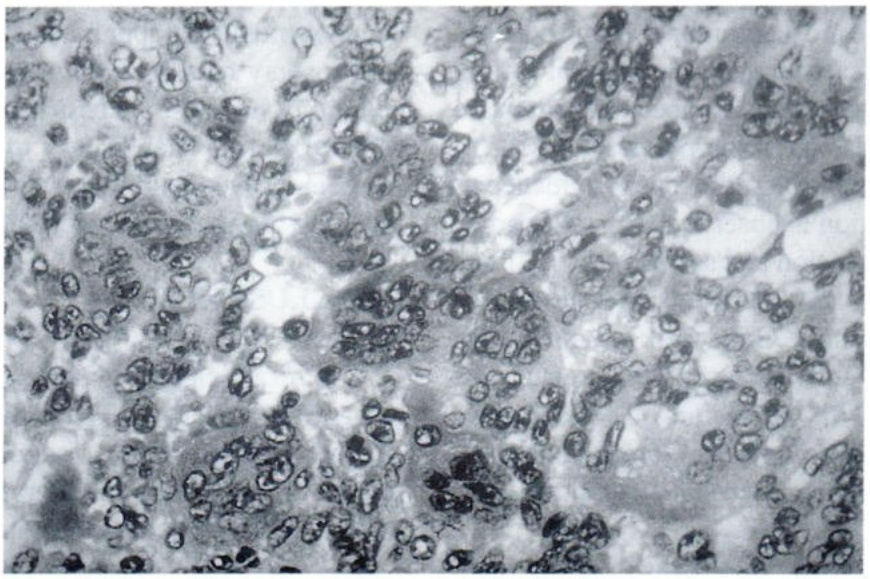


Fig. 4. A cross section of an expanded rib which was resected. The cortex is intact.



5A

Fig. 5A. This low-power microscopic field shows polygonal and spindleshaped stromal cells and mixed with multinucleated giant cell (x200).



5B

Fig. 5B. The numerous giant cells with large number of nuclei are demonstrated (x400).

DISCUSSION

Giant cell tumor comprises about 5% of bone tumors and 90% of these involve the end of the long tubular bones such as the distal femur, proximal tibia and fibula, and distal radius and ulna, usually in patient with closed epiphyses.[2,3,4] Giant cell tumor most commonly occurs in third and fourth decades of life with a female preponderance.[5] They are histologically variable, but usually benign, although locally aggressive. Metastasis appears in 2 % of cases.[6] Giant cell tumor of the rib is extremely rare. In a review of 8 large series of giant cell tumors, each containing over 100 cases, Hanna et al found only 12 (0.6%) originated in the rib.[7] In a tabular summary of the Mayo Clinic experience, Dahlin and Unni list 88 benign tumors or tumor-like conditions of the rib. The most frequent of these, in descending order, was fibrous dysplasia, osteochondroma, aneurysmal bone cyst and chondroma.[8]

Radiographically, giant cell tumor of a long tubular bone most commonly is an eccentric osteolytic lesion extending to subchondral region. Bony expansion and delicate trabecular pattern are usually seen. It also has a sharply defined zone of transition that is not sclerotic and no evidence of new bone formation is observed.[5,9] In a flat bone, a large osteolytic lesion and associated soft tissue component may simulate the appearance of malignant neoplasm.[5] Giant cell tumour of the spine presents as a lytic appearance at the vertebral body with expansion of both cortices which may simulate an aneurysmal bone cyst, multiple myeloma and metastatic carcinoma.[10]

Radiological aggressiveness is not useful in distinguishing benign from malignant forms of giant cell tumor, as the benign forms may have cortical expansion and disruption with invasion of the soft tissue.[1,8] In our case, the presence of complete shell of bone around the tumor suggests benign character.

On MRI, the giant cell tumor has no specific appearance. MRI is useful to show the extension and displacement of the adjacent structures for planning complete resection. Both the excellent soft tissue contrast resolution and the multiplanar images make MRI superior to CT in demonstrating accurately the tumor extent both in the bone marrow and in the surrounding soft tissue.[11,12] However, CT is superior in demonstrating cortical thinning. In our case, the signal intensity of the tumor is non specific. Hyposignal intensity on T1-weighted images and heterogeneous signal intensity on T2-weighted images with areas of dark signal intensity on GRE images are observed. The dark signal intensities on GRE images are corresponded with areas of hemosiderin deposit secondary to hemorrhage on the pathologic specimen.

Optimal management of giant cell tumor is wide surgical excision. Local recurrence is a common problem in approximately 30 % of cases.[1,10] Controversy regarding the management of giant cell tumor persists. Success has been claimed for surgical alone.[2] The efficacy of radiotherapy has not been proved and it carries a potential risk of inducing malignant transformation.[2]

CONCLUSION

A rare case of giant cell tumor originated in a rib is presented. The radiological findings suggest a benign form, so segmental resection of the tumor was done. The literatures on giant cell tumors of the rib are reviewed.

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