

CASE REPORT

Multifocal Giant Cell Tumor of the Ribs Presenting with Chest Pain and Fever: A Rare Case

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Abstract

Giant cell tumor of bone (GCTB) is an uncommon, usually benign tumor, which can be locally aggressive. It mostly affects long bone, rib involvement is rare & having multiple rib lesions is very unusual. We report the case of a 47 years old man who presented with chest pain & fever. Initial chest imaging showed opacities along both side of the chest wall. Further tests revealed multifocal GCTB affecting several ribs.

Keywords: Giant cell tumor, bone tumor, ribs, lytic lesion.

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Introduction

Giant cell tumor of bone (GCTB) is a rare tumor that is often benign but may be aggressive¹. It accounts for about 5% of all bone tumors and 20% of benign tumors^{1,2}. GCTB usually affects the meta-epiphyseal region of long bones, particularly in the distal femur, proximal tibia, and distal radius². It mostly occurs in young adults aged 20 to 40 years^{2,3}. Involvement of flat bones like the ribs is rare³, and multifocal rib lesions are exceedingly rare, making up less than 1% of cases^{4,5}. We report a unique case of multifocal GCTB affecting several ribs, which presented with severe chest pain and other systemic symptoms.

Case Presentation

A 47-year-old otherwise healthy male was admitted at National Institute of Diseases of the Chest & Hospital (NIDCH) with severe chest pain, more intense on the left side, along with fever lasting

15 days and generalized body aches. He did not have trauma, cough, weight loss, or any prior chronic illnesses. During the examination, vital signs were mostly normal; however, there was localized tenderness and mild warmth over the left anterior chest wall. No lymphadenopathy or respiratory distress was observed.

A chest X-ray revealed bilateral pleural-based opacities. Laboratory tests showed normocytic normochromic anemia, an elevated ESR, leukocytosis (11,490/cmm), and increased serum creatinine levels (2.61 mg/dL). Other tests, including random blood sugar and liver function, returned normal results.

A CT scan of the chest showed multiple irregular, expansive lytic lesions impacting the lateral aspects of several ribs, mainly on the left side. The lung tissue appeared normal.

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Figure 1: *Chest x-ray showing bilateral pleural based opacity*

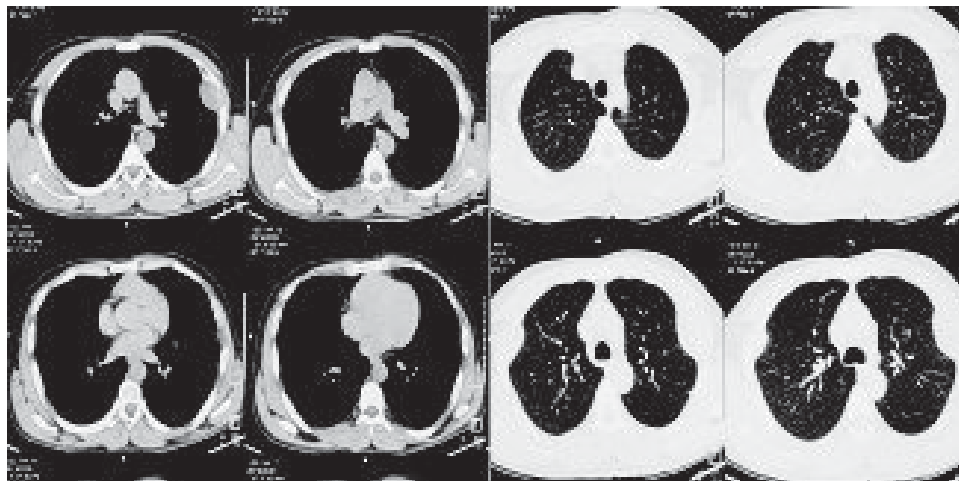


Figure 2: *CT scan of the chest*

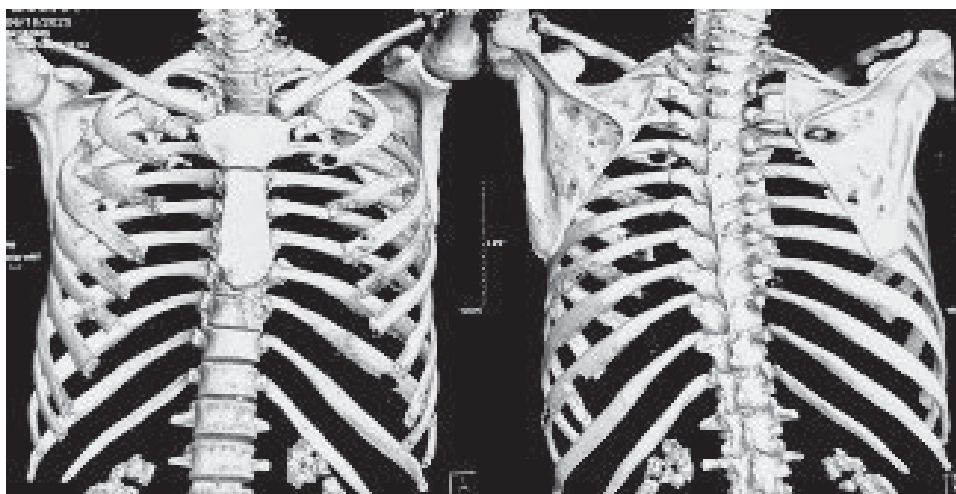


Figure 3: *Bony reconstruction of the rib lesions*

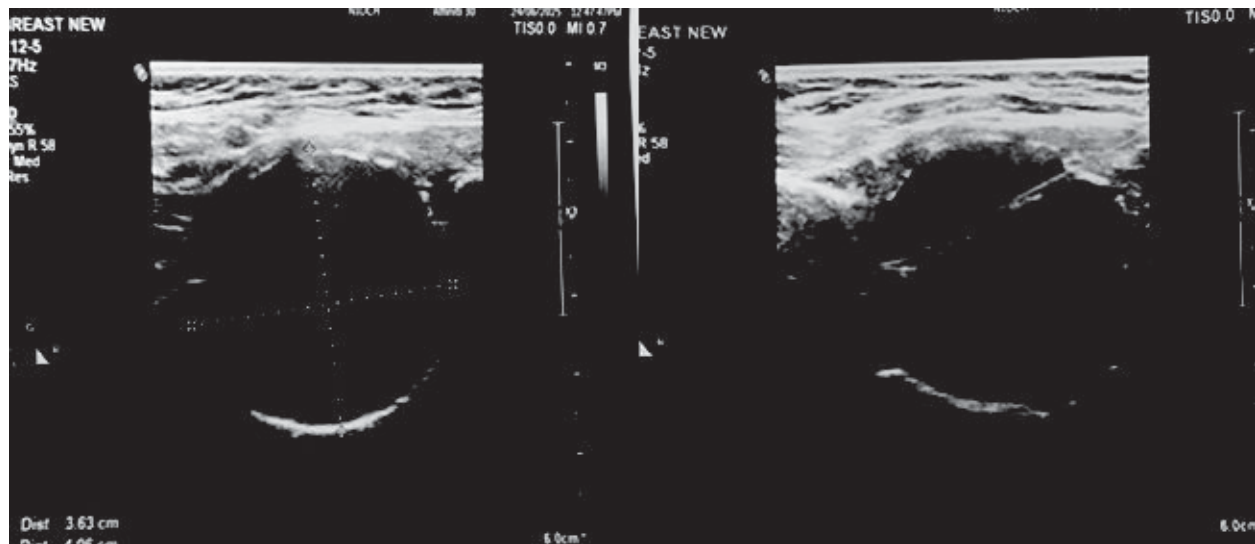


Figure 3: *USG guided aspiration from lesion*

An ultrasound-guided core biopsy from the left sided rib lesion confirmed the giant cell tumor of bone. This histopathology revealed many multinucleated giant cells distributed evenly among mononuclear stromal cells, which were spindle or ovoid and arranged in a storiform pattern.

Discussion

We present an uncommon case of multifocal giant cell tumor of bone (GCTB) affecting the ribs in a 47-year-old man who presented with chest pain and fever. GCTB constitutes about 5% of all primary bone tumors and roughly 20% of benign bone tumors¹. It most commonly occurs in the meta-epiphyseal areas of long bones like the distal femur, proximal tibia, and distal radius. The highest incidence is seen in individuals aged 20 to 40 years² of age. Rib involvement is very rare, appearing in less than 1% of cases⁴, and multifocal rib occurrences are even more unusual⁵.

The pathogenesis of GCTB involves the interaction between neoplastic stromal cells and osteoclast-like giant cells. The stromal cells express receptor activator of nuclear factor-kappa B ligand (RANKL), which encourages osteoclast differentiation and bone loss. This activity accounts for the tumor's locally destructive nature⁶. Although GCTB is classified as benign, it can behave aggressively, leading to destruction of the cortex, soft-tissue growth, recurrence, and lung metastases in up to 5% of patients⁷. The chance of

recurrence is strongly influenced by the surgical method, with wide excision associated with a lower recurrence rate compared to simple curettage².

Clinical signs of rib GCTB often nonspecific. Patients might feel localized pain, swelling, or tenderness, but systemic symptoms like fever are rare and can mislead into thinking it is an infectious or pleural pathology^{3,4}. In our case, the fever and raised ESR initially pointed to an inflammatory process, delaying the identification of a bone tumor. Similar issues with diagnosis have been noted in previous reports of rib GCTB⁵.

Radiology is crucial for diagnosis. While regular X-rays can show lytic lesions, these may be less clear in the ribs. CT scans provide better details of cortical damage, number of lesions, and any soft-tissue involvement. Three-dimensional images help with surgical planning^{5,8}. In this situation, CT scans clearly indicated multiple rib lesions while sparing the lung tissue, suggesting a primary bone issue.

Confirming the diagnosis through histopathology is important. Under the microscope, GCTB shows many multinucleated osteoclast-like giant cells among mononuclear stromal cells, often arranged in a storiform pattern^{1,6}. These characteristics were seen in our patient's biopsy.

The differential diagnosis for lytic rib lesions includes metastatic cancer, multiple myeloma, aneurysmal bone cysts, brown tumors related to hyperparathyroidism, and chronic osteomyelitis^{6,8}.

Therefore, careful consideration of clinical, imaging, and histological findings is essential for an accurate diagnosis.

Managing rib GCTB is challenging. Complete surgical removal is the best option, with wide resection lowering the chance of recurrence². For cases that cannot be surgically treated, systemic therapy with denosumab, a monoclonal antibody aimed at RANKL, has shown promise in shrinking tumors, easing symptoms, and can facilitate in subsequent surgeries^{6,9}. A recent systematic review from 2025 confirmed that denosumab consistently provides clinical and imaging benefits across different dosing methods, with generally mild side effects, highlighting its effectiveness as a supportive treatment for GCTB¹⁰.

Radiation therapy may be an option for lesions that cannot be removed surgically, but it is usually avoided due to the risk of sarcomatous transformation⁷. The prognosis depends on factors such as the completeness of the surgical excision, the lesion's location, and whether metastasis present or not. GCTBs in flat bones often show up later and present a higher recurrence risk compared to those in long bones^{4,5}. Our case highlights the need to include GCTB in the differential diagnosis for chest wall pain and fluid in the pleura. It also emphasizes the urgency of imaging and biopsy for prompt diagnosis and treatment.

Conclusion

This case highlights a rare multifocal presentation of GCTB in the ribs, accompanied by chest pain and fever. It emphasizes the need to consider bone tumors when diagnosing pleuritic chest pain and pleural abnormalities found on imaging. Early imaging and biopsy are essential for prompt diagnosis and treatment.

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