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Traumatic Giant cell Tumor of Rib: A case report

Giant cell tumor of the rib

Ying-Shian Chen, Hon-We Kao, Hsin-Ya Huang, Tsai-Wang Huang

Abstract

BACKGROUND

Giant cell tumor (GCT) of the anterior rib origin is extremely rare. We report the first case of trauma-induced GCT of the rib.

CASE SUMMARY

A 22-year-old female developed a mass over the right anterior chest wall with pain 3 mo after a falling injury with blunt trauma of the right chest wall. Chest computed tomography (CT) showed a tumor originating from the right 6th rib with bony destruction, and a CT-guided needle biopsy revealed a GCT. We completely resected the tumor with chest wall and performed reconstruction. The pathological diagnosis was GCT of the bone. Twelve months after surgery, no signs of recurrence were observed.

CONCLUSION

GCT of the rib after trauma has not been reported. Meticulous history-taking and image evaluation are essential for the differential diagnosis of unusual chest wall tumors.

Key Words: Chest wall tumor**;** Giant cell tumor; Trauma; Rib; Bone neoplasm

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Core Tip: We report the first case of trauma-induced giant cell tumor of the anterior rib.

INTRODUCTION

Giant cell tumor (GCT) of the bone accounts for approximately 3%–5% of all primary bone tumors. Occurrence in the ribs, especially the anterior rib, is extremely rare[1]. GCT is generally a benign tumor; however, it can progress locally, underscoring the need for

a long-term resolution. Risk factors are generally unknown, although Paget disease and Noonan syndrome as risk factors have been reported[2,3]. GCT of the rib after trauma has not been reported.

Herein, we report the first case of trauma-induced rib GCT with rapid progression in a young female patient. We aim to raise awareness among clinicians about this pathology and possible risk factor of GCT.

CASE PRESENTATION

Chief complaints

A 22-year-old woman, complaining of right chest pain that had persisted for about 3 mo, was referred from the thoracic surgery clinic to the inpatient department.

History of present illness

A 22-year-old female patient complained of right chest pain, which began after a fall injury (3 mo before admission). Chest radiography after the trauma showed no remarkable abnormality (Figure 1A). Despite appropriate analgesia, no sufficient pain relief had been achieved.

History of past illness

The patient had no significant prior medical history.

Personal and family history

The patient had no relevant personal or family history.

Physical examination

A palpable mass was detected over the inframammary line. The mass was 5 cm in size, hard in consistency, tender, and adherent to profound planes (unmovable).

Laboratory examinations

Findings from laboratory examinations were unremarkable.

Imaging examinations

Chest radiography revealed an opacity in the right lower chest wall, with bony destruction (Figure 1B). Computed tomography (CT) indicated a 5-cm tumor in the right anterior chest wall, with destruction of the right 6th rib (Figure 2). Whole-body bone scan revealed increased uptake in the 5th-7th ribs (Figure 3).

FINAL DIAGNOSIS

Histopathology indicated scattered multinucleated giant cells, intermixed with hypercellular spindle to ovoid tumor cells with moderate pleomorphism and extension to the skeletal muscle and bone tissue (Figure 5), consistent with a GCT.

TREATMENT

The patient underwent surgery with excision of the chest wall tumor. Grossly, the tumor was located at the 6th rib without invasion to the adjacent structure. The tumor was a soft mass lesion, intermingled with a yellow and black area of 5.5 cm^3 × 5.5 cm^3 × 5 cm^3 in size (Figure 4). The tumor was excised from the 5th-7th ribs, with a free margin. The defect was reconstructed primarily.

OUTCOME AND FOLLOW-UP

The surgery was successful, without complications. No signs of recurrence were observed at the 12-mo follow-up.

DISCUSSION

GCT of the bone is a benign but locally aggressive tumor. The meta-epiphyses of the long bones are most affected. Moreover, the most common locations, in decreasing order, are the distal femur, proximal tibia, distal radius, and sacrum[4]. This type of tumor rarely involves the ribs, accounting for only 1% of all cases reported. When

located in the rib, most tumors involve the posterior arc of the rib, having an epiphyseal location[5]. Although the histogenesis and pathogenesis of GCT remain incompletely clarified, mononuclear stromal cells are believed to be the neoplastic component of GCT. These cells produce substances that can prevent or regulate osteoclastogenesis, including osteoprotegerin ligands, which function as a secreted natural negative regulator of the receptor activator of nuclear factor-kappa B[6].

For the case presented herein, GCT developed in 3 mo in the anterior ribs following trauma. Although no fracture or bony destruction was initially detected, we assume that the physical damage had induced the stromal cells to produce certain substances. Of note, few cases in the literature have a trauma history. In one such case, GCT developed in the distal ulna 1 year after a scaphoid fracture[7]. Another case had GCT located in the first metacarpal bone following a traumatic event[8]. In the present case, rapid progression with pain symptom mimicked bony malignancy.

The therapeutic strategy for GCT in most patients with potentially completely resectable tumors is surgery. Although GCT of the anterior ribs is rare, the location is relatively excisable, potentially increasing the rate of complete resection which will result in a favorable prognosis. Preoperative tissue evidence from needle biopsy may be helpful but is optional, as surgical resection is indicated regardless of whether the tumor is malignant. Intra-operative pathological consultation may be sufficient to guide the surgical management of each case.

CONCLUSION

Traumatic GCT of the ribs is rare. The manifestation of GCT mimics a malignant bone tumor. Differential diagnoses include metastasis to bone, chondroblastoma, clear cell chondrosarcoma, aneurysmal bone cysts, and lymphoma. Meticulous history-taking, image evaluation, and histological confirmation are essential for the differential diagnosis of unusual chest wall tumors.

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