Giant cell tumor of the sternum: a case report

Takahiro Segawa1, Masahiko Kanamori1, Kazuo Ohmori1, Masanori Nobukiy1, Shigeharu Nogami1, Tomoatsu Kimura1, Yoshinori Doki2, and Shinichi Nakato3

1 Department of Orthopaedic Surgery, Toyama Medical and Pharmaceutical University, 2630 Sugitani, Toyama 930-0194, Japan
2 Department of Surgery, Toyama Medical and Pharmaceutical University, Toyama, Japan
3 Department of Orthopaedic Surgery, Asahi General Hospital, Toyama, Japan

Abstract We report a rare case of giant cell tumor (GCT) of the sternum in a 55-year-old man. He presented with a bony mass in the body of the sternum that had been slowly growing over 6 months. The patient was treated by surgical curettage and cementation. Histological study showed typical GCT findings with cytogenetic abnormalities of many telomeric associations of chromosomes, predominantly the 19q arm.

Key words Giant cell tumor · Sternum · Cytogenetics

Introduction

A giant cell tumor (GCT) contributes to 5%–10% of all primary bone tumors and 20% of all benign bone tumors.1 It occurs primarily in young adults, with a slight predilection for females. GCT mostly occurs at the end of long bones. Fifty-five percent of GCTs involve an epiphysis around the knee.5 The recurrence rate ranges from 35% to 50% following treatment by curettage and bone graft.2 This article presents a rare GCT that occurred in the body of the sternum.

Case report

A 55-year-old man presented with anterior chest pain of over 6 months’ duration. He felt a bony mass of the sternum that had been growing slowly. Physical examination revealed tenderness over the sternal mass, which was bony hard, swelling, and measured 3.5 × 3.0 cm. The surface was felt to be smooth, but the border was unclear. He had no history of hemodialysis and hyperparathyroidism. Radiographs revealed a radiolucent expanding osteolytic lesion of the body of the sternum (Fig. 1). The lesion spread out between the anterior and posterior cortices. Computed tomography (CT) disclosed a tumor involving the lateral cortex and expanding to the soft tissue (Fig. 2). Angiography demonstrated a hypervascular tumor fed mainly by the right intrathoracic artery (Fig. 3). 99mTc bone scanning showed whole uptake in the sternum. Chest radiographs and CT findings demonstrated no evidence of lung metastasis. Laboratory findings were normal: red blood cell (RBC) count 414 × 10^12/mm^3, white blood cell (WBC) count 5130/mm^3, hemoglobin 12.5 mg/dl, C-reactive protein 0.4 mg/dl, erythrocyte sedimentation rate 9 mm/h, Ca 8.6 mg/dl, P 3.5 mg/dl, alkaline phosphatase (ALP), 293 IU/l. The pathological diagnosis by incisional biopsy was typical GCT.

After embolization of bilateral intrathoracic arteries, curettage and cementing were performed. The tumor was covered by thin cortex of the sternum. The tumor was soft, friable, and, yellowish-dark in color. Parietal pleurae were not invaded. After curettage with an oval steel barr and an argon beam coagulator, the defect of the sternum was filled with polymethylmethacrylate. The anterior cortex was reconstructed with a polypropylene mesh (Davol, Cranston, RI, USA) and a titanium mesh plate (Bioplate, Los Angeles, CA, USA).

Histological study of the biopsied specimens disclosed GCT. Spindle-shaped or ovoid stromal cells were heavily intermingled with multinucleated giant cells and variable numbers of vessels. There were no atypical cell (Fig. 4). A cytogenetic study revealed many telomeric associations of chromosomes 2, 5, 6, 9, 13, 14, 15, 17, 18, 19, 21, and 22. The long arm of chromosome 19 was most frequently involved (Fig. 5). The patient was followed for more than 1 year. Currently, he is free of symptoms with no evidence of tumor recurrence.
Fig. 1. Radiograph of the sternum in the lateral view shows an expanding, lytic lesion in the body of the sternum (arrow)

Fig. 2. Computed tomography scan shows a tumor involving the lateral cortex of the sternum and expanding into the soft tissue

Fig. 3. Angiography shows a hypervascular tumor mainly fed by the right intrathoracic artery

Fig. 4. Photomicrograph shows multinucleated giant cells interspersed among spindle-shaped or ovoid stromal cells with hypervascularity. H&E ×100

Fig. 5. Karyotype showing tas(19;22)(q13;p13) and der(2;21)(2pter→2q37::::21q22→21pter) (arrows)