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Giant Cell Tumor Arising from Anterior Arc of the Rib

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A primary giant cell tumor of the rib is very rare. The most common site of a giant cell tumor arising from the rib is the posterior arc. A giant cell tumor arising from the anterior arc of the rib is extremely rare. The treatment of a giant cell tumor of the rib is not well defined. Generally, a complete surgical resection is performed in a patient with a primary giant cell tumor of the rib. We report a case of a giant cell tumor arising from the anterior arc of the rib that was treated with a wide excision and chest wall reconstruction.

Key words: 1. Bone neoplasms
2. Giant cell tumors
3. Ribs

CASE REPORT

A 27-year-old man presented with a 9-month history of chest wall pain and a palpable growing mass in the anterior end of the left sixth rib. The mass was hard and fixed to the chest wall. There was mild tenderness. The overlying skin was normal. He had a history of contusion at the left anterior chest wall 9 months earlier. There were no specific pulmonary symptoms.

A chest X-ray demonstrated an expansile bony mass in the distal end of the left 6th rib. Computed tomography revealed a large irregular contoured and heterogeneously enhancing soft tissue mass in the anterior arc of the left 6th rib. The tumor contained peripheral calcification and bony destruction (Fig. 1). No abnormality was found on laboratory examinations.

A surgical resection was performed. The tumor was completely resected, including surrounding soft tissue. The tumor was adhered to the parietal pleura. There was no visceral pleural invasion. The distance of the margin from the tumor was 3 cm (medial) and 6 cm (lateral). The medial margin of the resected rib was the lateral border of the sternum. A frozen biopsy of the tumor was performed in the operating room, and the tumor was confirmed to be a giant cell tumor (GCT). Partial resection of the ribs above (5th) and below (7th) the GCT including the intercostal muscle and soft tissue was performed. The lengths of the resected ribs were 10.5 cm, 13.5 cm, and 13 cm (Fig. 2). The chest wall defect was covered with a 2-mmthick Gore-Tex Soft Tissue Patch (W. L. Gore & Associates Inc., Flagstaff, AZ, USA).

The tumor was 6×4.5×4.5 cm in size. There were focal hemorrhage and a yellowish mass-like lesion in gross findings. The tumor was composed of round, oval, or spindle-shaped stromal mononuclear cells and uniformly interspersed multinucleated giant cells (Fig. 3). The pathological diagnosis was a primary GCT of the left sixth rib.

No adjuvant treatment was performed. The patient has been receiving follow-up care for 3 months since the surgery with-

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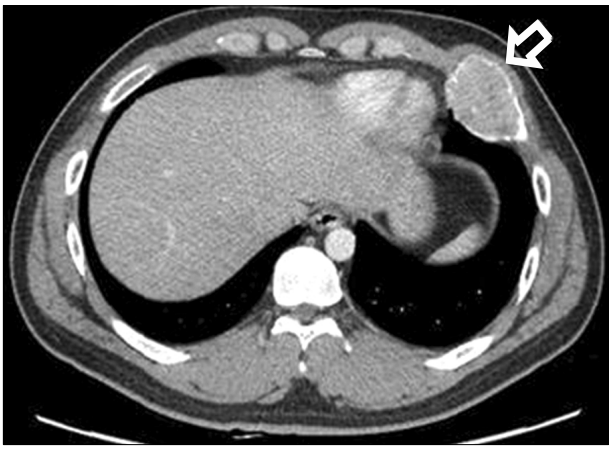

Fig. 1. Computed tomography demonstrates a large irregular contoured, heterogeneously enhancing soft tissue mass with peripheral calcification and bony destruction in the anterior arc of the left 6th rib (arrow).

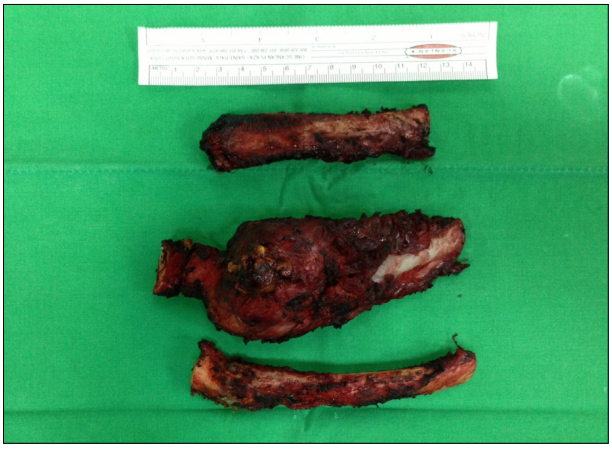

Fig. 2. Gross specimens after surgical resection.

out evidence of recurrence.

DISCUSSION

GCT represents 5% of all primary bone tumors and 20% of benign bone tumors. GCT typically occurs in patients 20 to 40 years old and develops in the epiphysis of a long bone. The most common location for GCT is the distal femur. GCT rarely involves the rib (1% of all cases of GCT). Even in cases involving the rib, most tumors have been located in the posterior arc of the rib, the head (epiphysis), or the tubercle

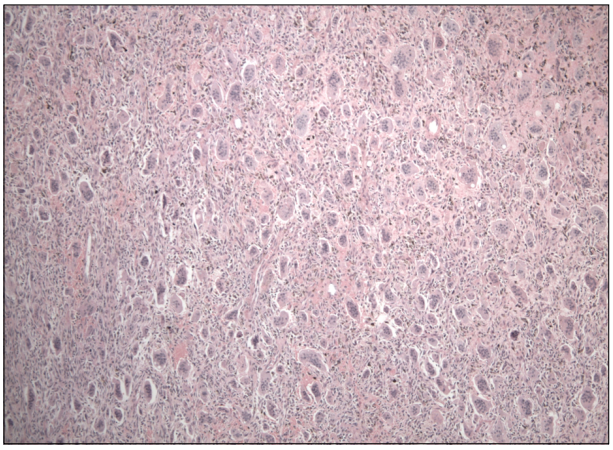

Fig. 3. Microscopically, the tumor shows oval, spindle shaped stromal mononuclear cells and uniformly interspersed multinucleated giant cells (H&E, ×40).

of the rib [1-4]. Because of its rarity, GCT arising from the rib is difficult to diagnose, especially when the tumor is located in the anterior arc of the rib.

The serum acid phosphatase (AcP) value is suggested to be a useful marker for the diagnosis of GCT and for the evaluation of the efficacy of treatment. Elevation of the serum AcP level in the patient with GCT is caused by the secretion or release of AcP from multinucleated giant cells contained in the tumor. Goto et al. [5] reported that there was a statistically significant positive correlation between the volume of the tumor parenchyma and the preoperative serum AcP level. However, in this case, the level of the serum AcP was not evaluated before the surgery and the postoperative AcP level was normal.

Traditionally, GCT of bone has been treated with a surgical resection. However, no standard treatment for GCT of the rib has been established. Some authors have reported that a wide excision with chest wall reconstruction had been successful for treating GCT arising from the rib [1-4,6].

Radiotherapy for GCT is controversial. Dahlin [7] reported that radiotherapy was not recommended because most of the malignant transformations in GCT were associated with previous radiotherapy. However, in patients with GCT who cannot undergo surgery due to medical comorbidity, the extent of the tumor, or predicted unacceptable functional outcome, radiotherapy has been recommended [8].

In our case, wide excision of the tumor with chest wall reconstruction was performed, but adjuvant radiotherapy was not performed. A longer follow-up period will be required to evaluate the outcome of the treatment.

In conclusion, even if radiologic findings show a soft tissue mass in the anterior arc of the rib, the possibility of GCT should be considered. When a tumor is confirmed as GCT, complete resection and chest wall reconstruction should be considered, if possible. To evaluate the outcome of treatment for GCT of the rib, more experience will be required.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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