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Parosteal Osteosarcoma of the Scapula

Parosteal osteosarcoma is a low-grade osteosarcoma, which occurs on the surface of the bone. We had experienced a parosteal osteosarcoma involving the flat bone, the scapula of a 21-year-old man. This is an extremely rare location for a parosteal osteosarcoma. Plain radiograph showed broad-based, well-defined radiodense lesion at the scapula. Computed tomogram demonstrated an intact cortex and absence of a medullary involvement. Tumor showed a lobulated, high-density lesion, indicating bone formation. Histologically, parosteal osteosarcoma is a well-differentiated osteosarcoma. The tumor is composed of a hypocellular proliferation of spindle cells, with minimal cytologic atypia. The bone is in the form of a well-formed bony trabeculae. Occasional cartilage is present in the form of a cap.

Key Words: *Osteosarcoma; Scapula*

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INTRODUCTION

Parosteal osteosarcoma is a low-grade, slow-growing neoplasm that originates from the surface of the cortex and forms a bony mass in the soft tissue. This rare neoplasm accounts for approximately 3% of all osteosarcomas. It typically occurs in skeletally mature patients. The peak incidence occurs during the third and fourth decades of life. Approximately 20% of cases occur during the second decade of life, and there is a clear female predominance (1-3). Parosteal osteosarcoma has a peculiar anatomic distribution, with more than 80% of cases located in the distal portion of the femoral shaft on its posterior aspect, within the superior popliteal area. Flat bone involvement of the parosteal osteosarcoma is extremely rare. None of the flat bone, the scapula involvement of the parosteal osteosarcoma were reported in the English literature. In this report, we experienced a parosteal osteosarcoma involving the flat bone, the scapula. We dealt with radiological appearances as well as histological characteristics of this neoplasm in these rare locations.

CASE REPORT

A 21-year-old man had pain and swelling on his shoulder for several months. A plain x-ray and CT scan were done on his shoulder. Plain radiograph of the left shoulder showed a broad-based, well-defined radiodense lesion at the shoulder (Fig. 1). Computed tomogram demonstrated an intact cortex and absence of medullary involvement. The tumor showed a lobulated, high-density lesion, indicating bone formation (Fig. 2).

The mass was removed. Histologically, the tumor showed a spindle-cell fibroblastic component admixed with a relatively well-developed tumor bone trabeculae (Fig. 3). In some area, the bony trabeculae coalesced and

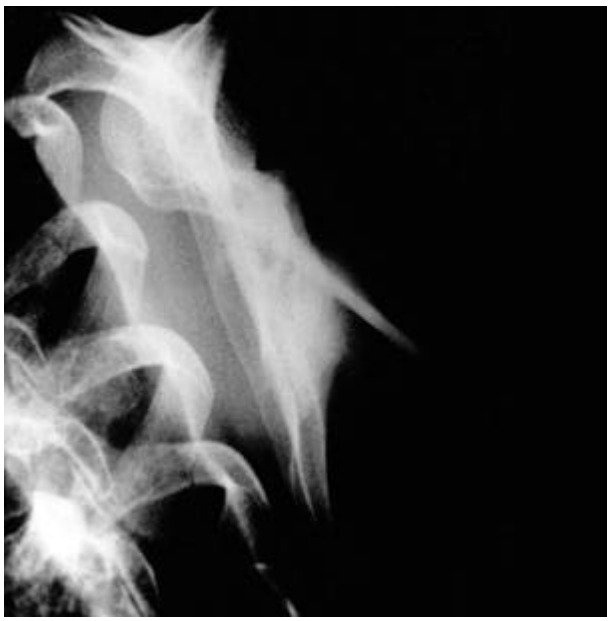

Fig. 1. Plain radiograph of the left shoulder shows a broad-based, well-defined radiodense lesion at the scapula.

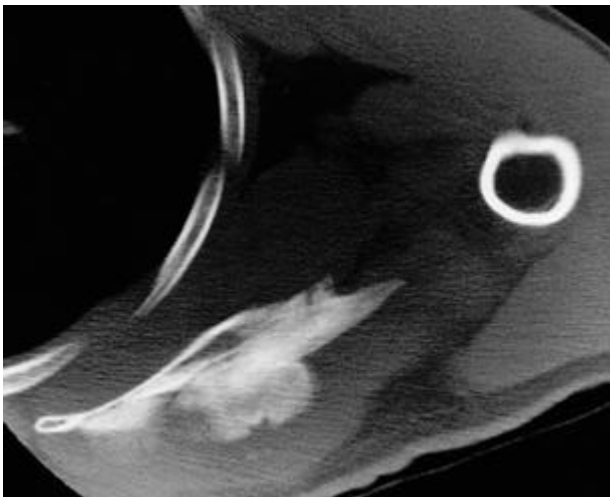

Fig. 2. Computed tomogram demonstrates an intact cortex and absence of medullary involvement. The tumor shows a lobulated, high-density lesion, indicating bone formation.

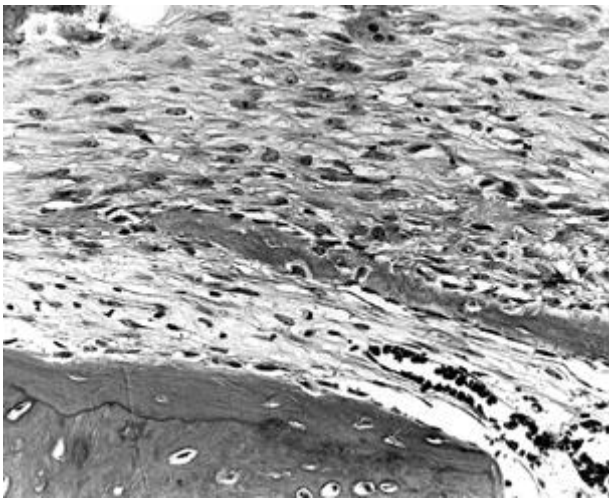

Fig. 4. At higher magnification, the spindle cell component of the tumor shows minimal cytological atypia and mature bone (H&E, ×400).

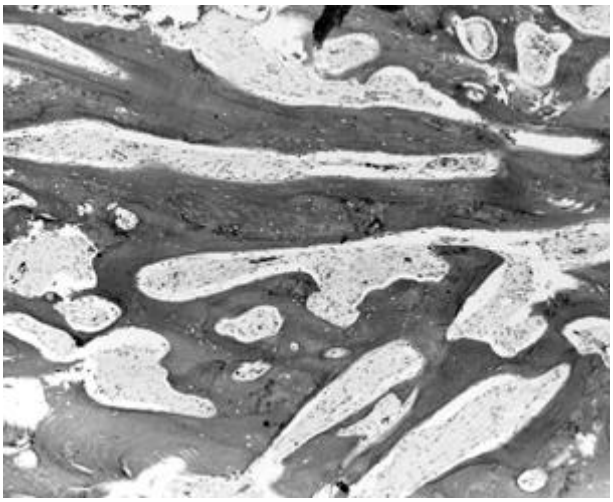

Fig. 3. The lesion shows orderly appearance, with a hypocellular spindle cell component merging with mature-appearing, "normalized" bony trabeculae (H&E, ×40).

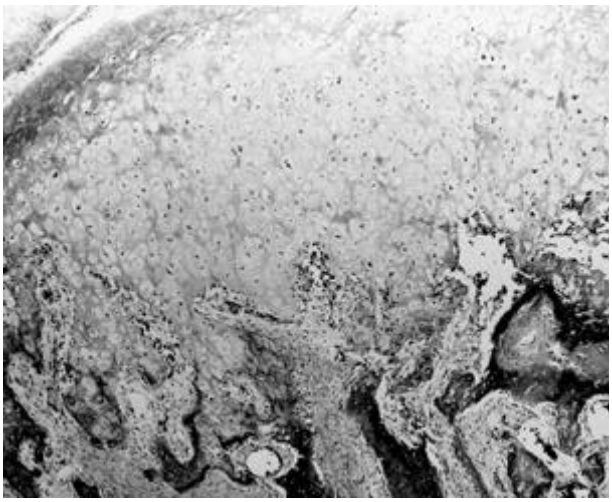

Fig. 5. In area, there is cartilaginous cap with mature bone reminiscent osteochondroma (H&E, ×40).

formed solid bony masses. Between these bony trabeculae were slightly atypical proliferating spindle cells (Fig. 4). Mitotic figures were not found. The periphery of the lesion showed cartilaginous tissue and tended to have a plate-like arrangement (Fig. 5). The chondrocytes were irregularly arranged.

DISCUSSION

Parosteal osteosarcoma was first reported by Geschickter and Copeland in 1951 as a "benign and malignant parosteal osteoma" (4).

The clinical history of patients, who have parosteal osteosarcoma, is characteristic and distinctly different from that of patients who have conventional osteosarcoma. As other authors have reported, the most common symptom is painless swelling, and the symptoms are most often of prolonged duration (2, 3, 5). This tumor arises on the external surface of a bone and has a better prognosis than conventional osteosarcoma.

Approximately three-quarters of all parosteal osteosarcoma occur on the posterior aspect of the distal femur. The second most common site of involvement is in the tibia, where nearly all cases involve the proximal shaft and proximal metaphyseal region. Rare examples of parosteal osteosarcoma, involving the acral skeleton and craniofacial bones, are also described (6-12). In 1984, 41

cases of parosteal osteosarcoma were reported and none of the scapula lesion were included (1). Schajowicz et al. reported 64 cases of parosteal osteosarcoma. All the lesions were from the long bones in their report (13). Recently, in their most extensive review of 226 cases of parosteal osteosarcoma from the Mayo Clinic, none of the scapula lesion was included (2).

Radiographic findings show a well-defined, densely osseous mass with irregular lobulation. A characteristic finding is a linear lucent zone, separating the tumor from the subjacent cortex, except at its site of attachment. Periosteal and high-grade surface osteosarcomas must be distinguished from parosteal osteosarcoma. The radiographic pattern of periosteal osteosarcoma growth is significantly different because the tumor elevates the periosteum to produce Codman's triangles and a fusiform surface enlargement. In addition, the mineralization pattern of periosteal osteosarcoma is more delicate, feathery, and often shows perpendicular striations. Parosteal osteosarcoma can usually be distinguished from high-grade surface osteosarcoma on purely histological grounds in biopsy samples (14).

Several studies have documented the difficulties in diagnosing parosteal osteosarcoma. The inability to diagnose the lesion correctly often leads to inadequate initial operative procedures. The differential diagnosis may include diverse entities such as myositis ossificans, fracture callus, ossifying hematoma, osteochondroma, extraosseous osteosarcoma, desmoplastic fibroma, and osteoma (1, 15-17). In osteochondroma, roentgenograms show continuity between the bone and the osteochondroma. In parosteal osteosarcoma there is no such continuity. In osteochondroma the intertrabecular spaces contain fatty or hematopoietic marrow, whereas in parosteal osteosarcoma they contain spindle cells. Myositis ossificans does not involve the cortex of the bone but rather is a soft tissue mass. Myositis ossificans shows much more cellularity than a parosteal osteosarcoma. Most of the physicians did not have much experience to dealt with this rare location of the parosteal osteosarcoma. They may be mistaken this lesion as myositis ossificans or osteochondroma leading to wrong treatment on that patient.

It is now recognized that cartilage may be an important component in parosteal osteosarcoma (1, 2, 13, 15, 16, 18). More than 50% of all parosteal osteosarcomas have a cartilaginous component, and in approximately 25 percent, the component is on the surface of the tumor. It is important for pathologists and surgeons to recognize the cartilaginous component so as not to mistake parosteal osteosarcomas for osteochondromas. In this particular case, we were able to identify the cartilage cap at the periphery of the tumor.

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