CHONDROBLASTIC OSTEOSARCOMA OF THE RIGHT CLAVICLE: CASE REPORT AND LITERATURE REVIEW

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INTRODUCTION

Chondroblastic osteosarcoma is a rare, high-grade bone tumor in which a substantial volume(up to 90%) of tumor tissue is a chondrosarcomatous phenotype growing next to osteoid-forming areas.[1] Its prevalence ranges from 4.2[2] to 25[3] percent of all osteosarcomas. Primary tumors of this type of the clavicle represents only 1% of primary osteosarcoma.[4] Chondrosarcoma at this location is also infrequent.[2] In cartilaginous-forming tumor, the chondroid calcifications can be detected on plain radiographs. Well-differentiated tumor cartilage has also been identified by septal or septonodular enhancement pattern on gadolinium-DTPA enhanced MR images.[5,6] Differentiating chondroblastic osteosarcoma from chondrosarcoma is of clinical importance because of the substantial difference in treatment and prognosis, the former having a poorer prognosis and requiring resection and chemotherapy.[1,2]

Our aim is to report a rare case of chondroblastic osteosarcoma of the clavicle recognized on plain radiographs, computed tomography (CT) and magnetic resonance (MR) imaging.

CASE REPORT

CLINICAL INFORMATION

A 32-year-old man presented with a 6-month history of a gradually enlarging palpable mass on his right shoulder. His medical history was unremarkable and he did not recall any trauma to this area. Physical examination revealed a large, lobulated, firm mass over the right clavicle and shoulder area with superficial venous dilatation.

Laboratory findings were within normal limits, except for elevated level of serum alkaline phosphatase.

RADIOLOGICAL FINDINGS

The plain radiograph demonstrated a large soft tissue mass over the right clavicular region, containing chondroid calcifications. The entire clavicle was almost completely destroyed (figure 1). CT scans revealed the destruction and the broken through cortex at the medial end of the clavicle, osteoblastic lesions and a perpendicular type periosteal reaction (figure 2A). Discrete chondroid calcifications were detected through out the mass (figure 2B). MRI was performed and produced a heterogeneous, intermediate signal intensity indicating a mass surrounding the clavicle with high signal intensity within the medullary cavity and loss of cortical dark signal at the medial end of the clavicle (figure 3A and 3B). Septonodular enhancement of the mass was observed on post gadolinium enhanced T1-weighted MR images (figure 4).

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The differential diagnosis was chondrosarcoma .

THE PATHOLOGICAL DIAGNOSIS

The patient underwent open biopsy of the mass. The histopathological examination revealed large areas of low-grade chondrosarcoma showing atypical, multinucleated chondrocytes in a hyaline cartilaginous matrix. Areas of unequivocal osteoid production by neoplastic cells were presented elsewhere (figure 5A and 5B). The pathological diagnosis in this case was chondroblastic osteosarcoma .

Within the one month follow-up period, the mass had enlarged so rapidly that it was too large for resection. The surgeon advised neoadjuvant chemotherapy but the patient did not return for follow-up.

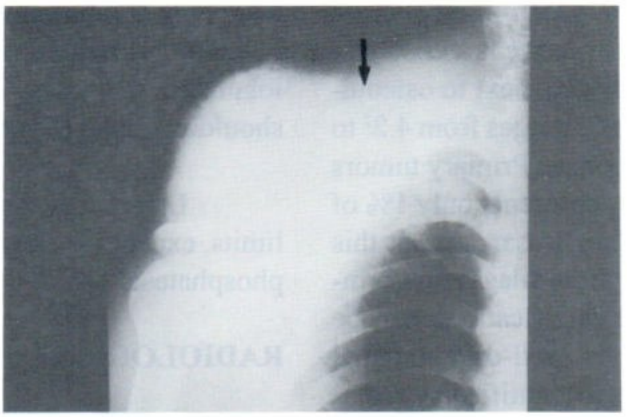
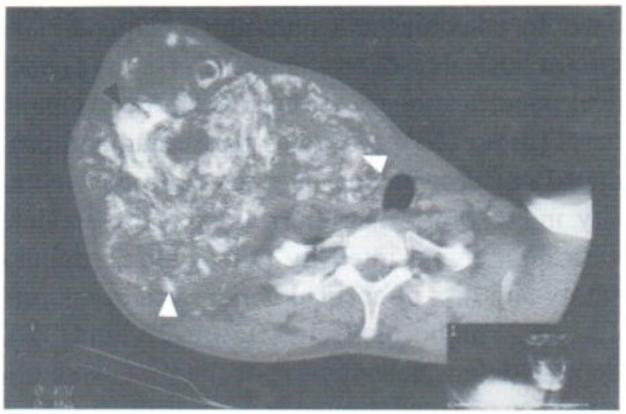
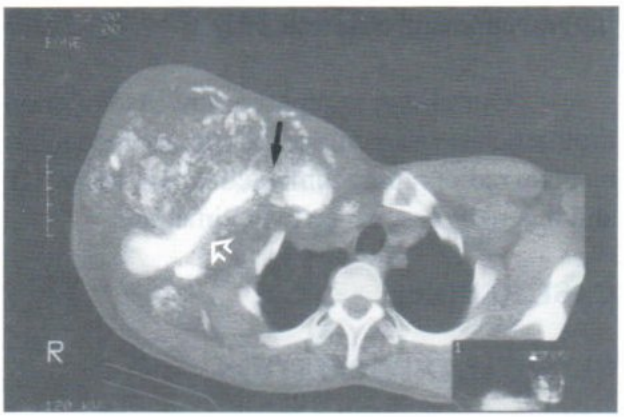


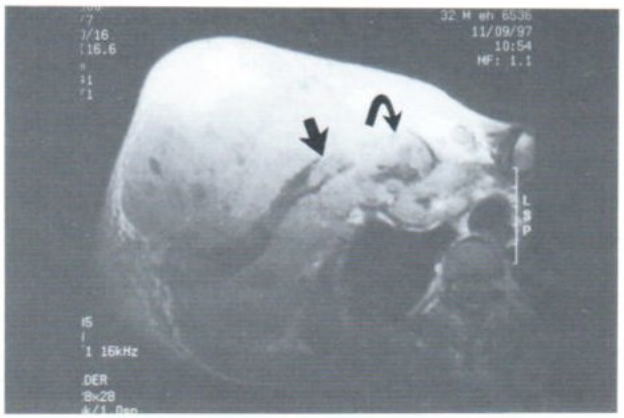
Fig. 1. Plain radiograph of the right clavicle demonstrated a large soft tissue mass containing chondroid calcifications. The entire clavicle was almost completely destroyed.





2A **2B**

Fig. 2A,B. Axial CT images demonstrated destruction and breaking through the cortex at the medial end of the clavicle (black arrow), osteoblastic lesion in the remainder, a perpendicular type periosteal reaction (open arrow) and discrete chondroid calcifications (arrowhead) through out the mass.



3A

Fig. 3A. Axial T1-weighted (TR/TE; 895/20) MR image revealed heterogeneous, intermediate signal intensity indicating a mass surrounding the clavicle and a hyperintense lesion (arrow) within the medullary cavity and loss of cortical dark signal (curve arrow) at the medial end of the clavicle.

3B

Fig. 3B. Coronal T2-weighted (TR/TE; 5454/96) MR image showed heterogeneous increased signal intensity of the mass.

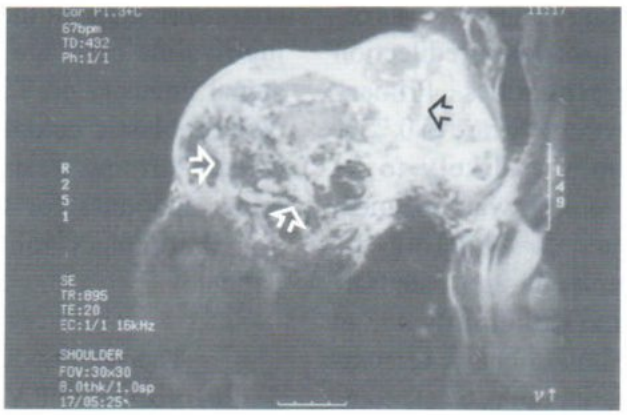
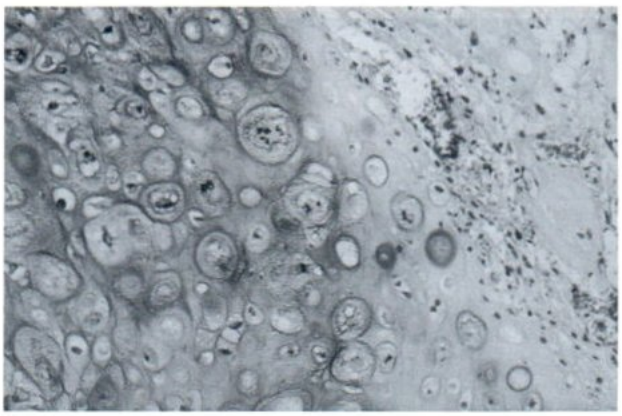
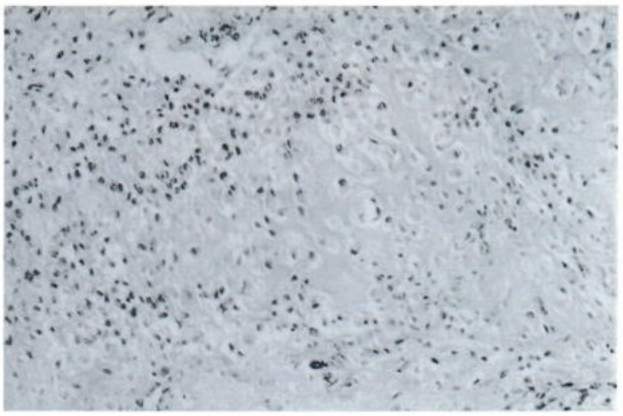


Fig. 4. Post gadolinium-enhanced coronal T1-weighted (TR/TE; 700/20) MR image revealed septonodular enhancement of the mass.



5A

Fig. 5A. A large area of low-grade chondrosarcoma showing atypical multinucleated chondrocytes in hyaline cartilaginous matrix.



5B

Fig. 5B. Areas of unequivocal osteoid production by neoplastic cells.

DISCUSSION

Osteosarcoma is a relatively stereotypic entity, with some exceptions. This neoplasm is a disease of the young, affecting males twice as often as females and shows a marked predilection for the long bones of the extremities.[1] Primary tumors of the clavicle are extremely rare (a 0.73% frequency), and four times as likely to be malignant as benign.[2] Myeloma was the most common primary malignancy affecting the clavicle, followed by lymphoma and osteosarcoma; the clavicle being the site of only 1% of primary osteosarcomas.[1,2] Chondroblastic osteosarcoma is a relatively rare variant of osteosarcoma with a reported incidence of 4.2%.[3]

In our patient, the tumor produced a large calcified cartilaginous matrix, which was detectable using plain radiograph and CT scan, so we suspected a malignant cartilaginous-forming tumor. Among this group of tumors, chondrosarcoma is more common than chondroblastic osteosarcoma, however, the location of the tumor was uncommon and our patient was younger than average for a central chondrosarcoma.[1,5,9]

Non-enhanced and Gadolinium-DTPA-enhanced MR imaging provide increased tissue characterization of the tumor.[5-8] Tumors containing hyaline cartilage appear as lobules of high signal intensity on T2-weighted images as does chondroblastic osteosarcoma.[7] The presence of osteoid forming areas in chondroblastic osteosarcoma accounts for the absence of very high signal intensity lobules[6] as was seen in our patient.

The septonodular enhancement pattern in Gadolinium-DTPA-enhanced MR images observed, as in our patient, characterizes a tumor that has a substantial hyaline cartilaginous matrix.

In summary, a 32-year-old man was diagnosed with chondroblastic osteosarcoma of the right clavicle. The rarity of primary tumor at this site and the diagnostic problems of this tumor on conventional radiographs are discussed. The Gadolinium-DTPA-enhanced MR images supported the diagnosis of a cartilaginous-form-

ing tumor by revealing septonodular enhancement of the mass. The identification of osteoid-forming tumor tissue in the biopsied specimen was crucial to the diagnosis of chondroblastic osteosarcoma.

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