Case Report

Malignant Giant Cell Tumour of Bone with Axillary Metastasis

Ogbole G.I[1], Ogunseyinde O.A[1], Okolo C.A[2] Ogunlade S.O[3], Osuagwu Y.U[1]
Departments of Radiology[1], Pathology[2] and Surgery[3].
University College Hospital Ibadan, Nigeria.

SUMMARY

Giant Cell Tumour of bone is a typically benign and solitary tumour. However, multiple lesions have been described and 5–10% of lesions may be malignant.

We present a case of a malignant giant cell tumour of the distal radius with metastasis to the ipsilateral axilla (an uncommon location) in a 29-year-old male student. The radiological and histological characteristics are discussed.

Keywords: *Malignant Giant Cell Tumour, Axilla*

INTRODUCTION

Giant cell tumor (GCT) of bone was first described by Sir Astley Cooper in 1818 [1]. Historically, the lesion has been referred to by numerous terms, including *myeloid sarcoma*, *tumor of myeloplaxus*, *osteoblastoclastoma*, and *osteoclastoma* [1].

GCT is a relatively uncommon skeletal tumour, accounting for 4–9.5% of all primary osseous neoplasms and 18–23% of benign bone neoplasms [2-4]. It is characterized by the presence of multinucleated giant cells. The tumour is usually regarded as benign. In most patients, giant cell tumors have an indolent course, but tumors recur locally in as many as 50% of cases [2].

Radiography often strongly suggests the diagnosis and reveals an eccentric, lytic lesion centered in the metaepiphysis and extending to subchondral bone with expansile remodeling but lacking internal mineralization usually involving a long bone in a skeletally mature patient. GCT is typically benign and solitary. However, multiple lesions have been described and 5–10% of lesions may be malignant [3], [4].

Presented below is the case of a malignant Giant Cell Tumour of the right radius with metastasis to the ipsilateral axilla (an uncommon location) in a young male student.

CASE REPORT

E.W is a 29 year old student, who presented with a one year history of progressive right wrist swelling with no associated pain or fever. About 6 months before presentation he also noticed another swelling in the right axillary region. This was also not painful and caused him no discomfort.

Examination revealed a young man in no obvious distress; the right wrist had a fairly large mass over the palmar surface.

There was mild differential warmth but no tenderness over it. Transmitted impulse of the radial artery was felt but there was no neural deficit distally, power in the hand was grade 4. Chest was clinically clear, there was however a 2-3 cm swelling in the anterior aspect of the right axilla which was not attached to the overlying skin.

The chest radiograph showed clear lung fields but an increased soft tissue opacity with no calcifications or lucency within it was noted over the right axillary region.

The x-ray of the right wrist (Fig.1) revealed a huge soft tissue swelling extending from the distal one-fifth of the forearm to the palmar aspect of the wrist and hand. It showed a smooth regular outline. There was associated expansile lytic destruction of the cortices of the diametaphyseal end of the radius with bone spiculations and Codman's triangles seen at the cortical junction of the distal one-fifth of the radius. There was postero- lateral dislocation of the radio- carpal joint. The carpal and metacarpal bones showed reduction in bone density probably due to disuse.

All Correspondence to Dr G.I. Ogbole

Department of Radiology, University College Hospital, Ibadan. PMB 5116 Ibadan,Nigeria. Email: gogbole@yahoo.com

Abdominal ultrasound scan revealed no abnormality.

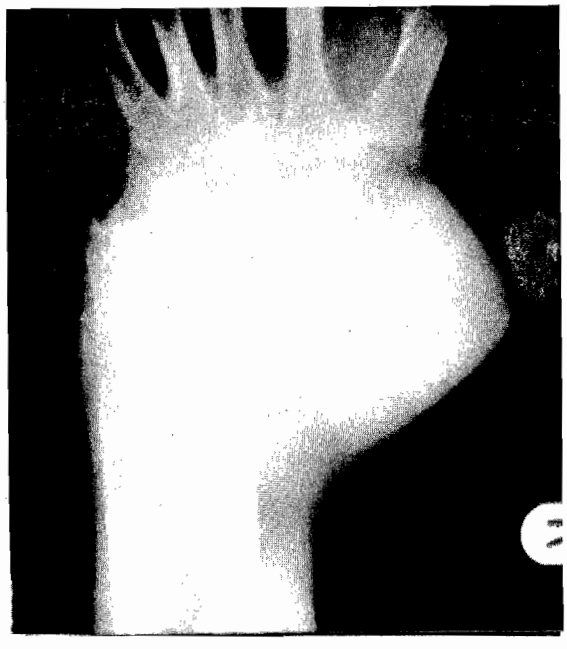

Fig. 1 *Anterio-posterior radiograph showing expansile lytic destruction of the distal radius with extensive overlying huge soft tissue swelling. There is dislocation of the radio-ulnar and radio-carpal joints with spiculated periosteal reaction.*

Incisional biopsy of the wrist revealed a giant cell tumour and histology of right axillary masses was reported as metastatic giant cell tumour being lymph nodes to which the tumour had metastasized. The lymph nodes (fig 2a and 2b) showed

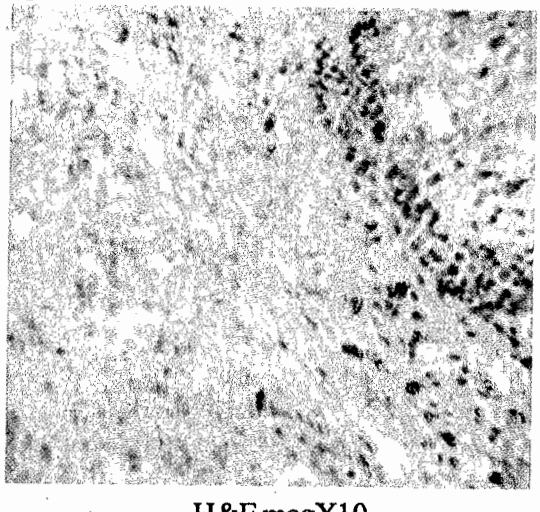

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Fig.2a *Metastatic giant cell tumour in lymph node showing sheets of giant cells with multiple nuclei. At the top right of the field are several native lymphoid cell.*

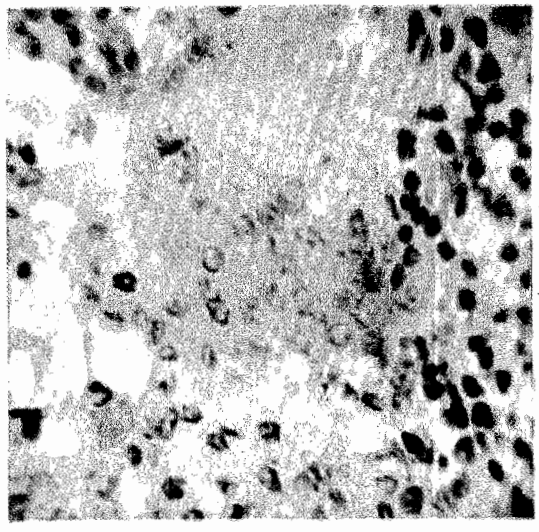

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Fig.2b *High power view of fig.3 showing multinucleated giant cell with abnormal stellate mitosis in the cytoplasm.*

replacement of the parenchyma by sheets of multinucleated giant cells with abundant eosinophilic cytoplasm.

A repeat radiograph of the wrist, 5 weeks later following the histology report showed worsening lytic destruction of the radius with only a ghost remnant of the cortices of the distal radius, and osteopenia of the carpal and metacarpal bones.

Patient was to be scheduled for surgery at the next clinic visit but defaulted and failed to turn up subsequently.

DISCUSSION

GCT is a relatively common skeletal tumor. Although GCT affects all races, there is an unusually high prevalence in China and southern India (state of Andhra Pradesh) [5].

Unlike the majority of osseous neoplasms, benign GCT affects women more commonly than men in most series, with ratios ranging from 1.1:1 to 1.5:1 [3], [6].

Lesions in younger patients and those involving the spine demonstrate an even higher female

predilection (2.3–2.5:1 ratio) [7].

In contrast, malignant GCT occurs more frequently in men (3:1 ratio) [8] and the vast majority of GCTs affect skeletally mature patients, with approximately 80% occurring in patients between 20 and 50 years of age [3], [9]. The peak prevalence is in the third decade of life. Our patient in this report is a male in his third decade.

A diagnosis of GCT in patients under 14 years old, who are skeletally immature, should be viewed with caution and skepticism because only 1–3% of GCTs are reported in patients in this age range [3], [10].

The location of GCT is one of the most important features suggesting the diagnosis because approximately 84–99% of lesions extend to within 1 cm of subarticular bone [11].

Most giant cell tumors (60%) occur in the long bones, and almost all of the tumors are located at the articular end of the bone. Common sites include the proximal tibia, distal femur, distal radius, as in our patient, and proximal humerus [2], [3]. Less frequent sites of involvement include the proximal femur (4% of cases), innominate bone (3%), vertebral bodies (3–6%), distal tibia (2–5%), proximal fibula (3–4%), hand and wrist (1–5%), and foot (1–2%) [12].

GCTs can also occur in sesamoid bones, particularly the patella (the largest sesamoid bone) and apophyses, like the greater trochanter, which are considered epiphyseal equivalents in terms of bone neoplasm origin [13].

Radiographically, they appear as well-delineated, purely lytic, eccentric lesions. There is an expanding zone of radiolucency at the epiphsyeometaphsyeal end of a long bone often bordering subchondral bone. There is no matrix calcification or reactive host bone at the periphery of the lesion. The endosteal margins are irregular appearing as an indistinct, permeative surface with surrounding bone. According to Campanaci's staging system, a majority of GCT present as stage 2 (cortical thinning with with aneurysmal appearance), or stage 3 (aggressive form of disease) [14].

Histologically, there are abundant osteoclast-like giant cells within a backdrop of mononuclear cells that are polyhedral or spindle-shaped. There may be mitotic figures and peripheral osteiod. There is little evidence of matrix production.

As with other bone tumors, the differential diagnosis of GCT is usually based on its radiographic appearance and location. Lesions invariably demonstrate geographic bone lysis, most commonly associated with a narrow zone of transition and lacking surrounding sclerosis (80–85% of cases). Although the majority (42– 93%) of lesions are eccentrically located, lesions that are large at presentation more frequently appear central in location [11].

Identification of the so-called 'malignant giant cell' is a great challenge as the radiological appearances are the same as the low grade tumour.

Probably about one per cent of GCT produces lung metastases of the same histological pattern as the parent tumour [15].

Malignant GCT accounts for 5%–10% of all GCTs and is usually secondary to previous irradiation of benign GCT [1]. Tubbs et al in a study showed that benign giant-cell tumor of bone can produce pulmonary metastases, and that metastases most often occurred with recurrent local disease and distal radial lesion [16]. Our patient however had axillary metastasis from a radial lesion but clear lung fields. Our review of literature did not reveal any documented evidence of axillary nodal metastasis from malignant giant cell tumour of bone.

Mirra [17] divided malignant GCT into multiple entities, some of which are related to benign (conventional) GCT, whereas others represent giant cell– containing sarcomas. These entities include benign metastasizing GCT, primary de novo malignant transformation of conventional GCT, secondary malignant GCT (representing malignant transformation following irradiation or some other intervention), and osteoclastic (giant cell) sarcoma. Benign metastasizing GCT is a form of malignant GCT in which the metastases demonstrate a histologically benign appearance identical to that of conventional GCT.

In a review of the literature in 1994, Nojima *et al* reported a prevalence of 1.8%–5.0% of pulmonary metastases in benign metastasizing GCT

of bone [1]. In patients with benign metastasizing GCT, pulmonary metastases may regress spontaneously or remain stable. Although the contradiction inherent in "benign metastasizing tumor" remains well established, the features that predispose to this behavior are not. Tubbs *et al* [16] noted that lesions in the distal radius seem more likely to demonstrate this behavior, noting that only 12% of GCTs occur in this location, whereas 38% of patients with pulmonary metastases have lesions at this site. Pulmonary metastases were seen in 17 (3%) of 568 patients with benign GCT in a Mayo Clinic series [1].

Pulmonary nodules in these patients may demonstrate peripheral ossification at both radiology and pathologic analysis but otherwise have a nonspecific imaging appearance. The five primary malignant GCTs in the Mayo Clinic series demonstrated foci of sarcoma at the time of initial diagnosis [1].

In general, patients with malignant GCTs are older than those with benign tumors, likely reflecting the history of previous treatment in the majority of patients.

The skeletal distribution of these tumors mirrors that of conventional GCT. The prognosis of primary malignant GCT (median survival time, 4 years) is better than that of secondary malignant GCT (median survival time, 1 year) [17]. The final type of malignant GCT is osteoclastic (giant cell) sarcoma. Mirra [17] defines this lesion as "a highly malignant tumor composed of anaplastic stromal and anaplastic osteoclast-like giant cells in which there is no evidence of tumor osteoid, bone or cartilage," considering it to be the anaplastic counterpart of benign GCT of bone. These rare tumors may be seen de novo (primary osteoclastic sarcoma) or, more commonly, in association with other processes such as severe polyostotic Paget disease (secondary osteoclastic sarcoma). Osteoclastic sarcomas have a guarded prognosis and must be histologically differentiated.

CONCLUSION

Malignant giant cell tumour of the distal radius with metastasis to the right axilla in a 29-year-old man has been presented. Radiograph showed expansile lytic destruction of the distal radius with extensive soft tissue swelling and dislocation of the radio-ulna joint. Patient was lost to follow up before the establishment of definitive therapy.

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