Case Report

Chondroblastoma: Report of two cases diagnosed by cytology

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ABSTRACT

Chondroblastoma is an uncommon benign cartilage producing neoplasm with a characteristic epiphyseal location. This report documents the cytological features of two cases of chondroblastomas diagnosed by cytology. One of the two cases had an unusual location in the temporomandibular region and the other was located in the epi-metaphyseal region of the right humerus. Smears characteristically revealed chondroblasts and osteoclast-like giant cells. The cytologic diagnosis of chondroblastoma was confirmed on both cases by histopathology. The radiologic appearance and differential diagnosis in both cases are discussed.

Key words: Chondroblastoma, chondroblasts, osteoclast-like giant cells, temporomandibular

INTRODUCTION

Chondroblastoma is a benign cartilage producing tumor typically affecting the epiphysis of long bones in skeletally immature individuals.[1] It can occur in unusual locations like the bones of the skull.[2] Tumors in unusual locations, atypical clinical presentations, or complicated by aneurysmal bone cyst may pose diagnostic difficulty.[3] We describe two cases of chondroblastoma, one located in the epi-metaphyseal region of the humerus, and the other located in the temporomandibular region. Both cases were practically challenging, presented clinically and radiologically simulating other pathologic processes and the diagnosis was suggested by cytology and confirmed by histopathology.

CASE REPORTS

Case 1

A 15-year-old male presented with pain in the right shoulder joint of 1-year duration and pathological fracture. Local examination revealed diffuse swelling in right shoulder with painful movements. Clinical impression in this case was osteosarcoma. Routine laboratory investigations of this patient were within normal limits. Radiology showed irregular lytic lesion in the epi-metaphyseal region of the right humerus with pathological fracture and linear periosteal reaction [Figure 1a]. Bone scan revealed increased uptake over the primary site. Fine-needle aspiration biopsy (FNAB) was performed. Moderately cellular smears showed atypical cells with a moderate amount of cytoplasm and round to oval shaped nucleus with fine chromatin, nuclear grooves and small nucleoli, dispersed singly and in small clusters with scattered multinucleated osteoclast-like giant cells [Figure 1b and c]. A diagnosis of chondroblastoma was suggested on FNAB and advised histopathology confirmation. Surgical curettage was done, and histopathology sections showed neoplasm composed of sheets of round to oval cells having well-defined borders and embedded within lobules of myxoid matrix. Nuclei were vesicular with few cells showing nuclear grooving [Figure 1d]. Chicken wire calcifications and scattered osteoclast-like giant cells were present. Thus, diagnosis of chondroblastoma was confirmed. The patient is on follow-up with disease free interval of more than 5 years.

Case 2

A 27-year-old male patient presented with hearing loss of 2 weeks duration. Local examination showed firm swelling in the preauricular region measuring 4 cm × 3 cm. FNAB was done in a local hospital and reported as Langerhans

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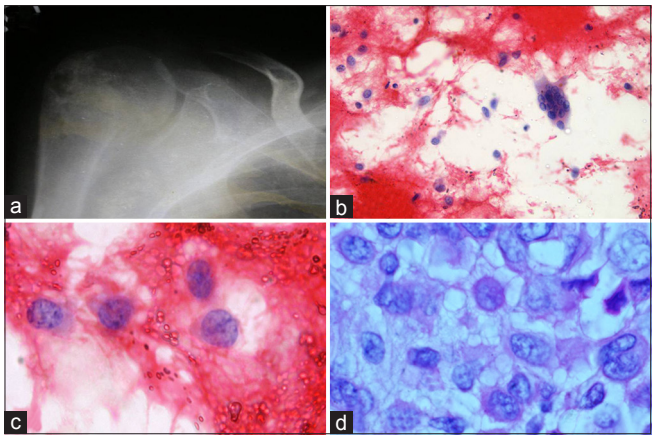

Figure 1: (a) Irregular lytic lesion in the epi-metaphyseal region of the right humerus with pathological fracture and linear periosteal reaction. (b) Moderately, cellular smears showing atypical cells with moderate cytoplasm and round to oval nucleus admixed with scattered osteoclast-like giant cells (Pap, ×400). (c) Cells showing nuclear grooves (Pap, ×1000). (d) Sheets of neoplastic cells with nuclear grooves (H and E, ×1000)

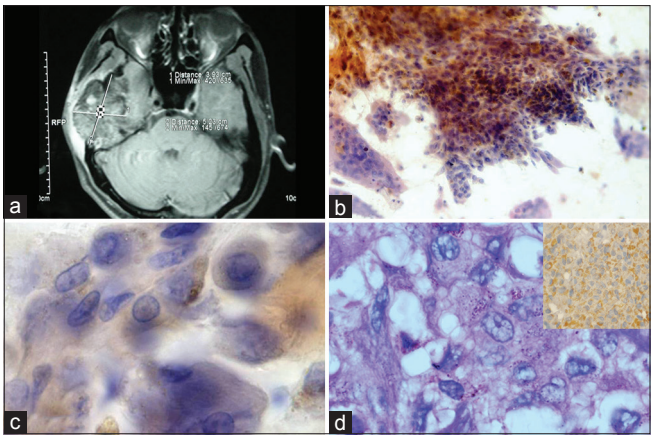

Figure 2: (a) Computed tomography scan of the skull showing destructive lytic lesion involving the squamo-petromastoid region of right temporal bone. (b) Cellular smears showing oval to spindly cells admixed with several osteoclastic giant cells (Pap, ×100). (c) Cells with nuclear grooves (Pap, ×1000). (d) Neoplastic cells with nuclear grooves (H and E, ×1000). Inset showing discovered on gastrointestinal stromal tumor 1 positive chondroblasts (IHC, ×400)

cell histiocytosis and thus referred to our institution for further evaluation. Routine laboratory investigations were within normal limits. Computed tomography scan of the skull showed a destructive bone lesion involving the squamo-petromastoid region of right temporal bone with destruction of temporo articular portion of temporomandibular joint [Figure 2a]. The lesion was extending to middle cranial fossa and infra-temporal fossa. Bone scan revealed abnormal bone reactivity in the right temporal bone. FNAB was repeated in our institution which showed plump oval to spindly cells with vesicular grooved nuclei seen intermixed with numerous osteoclast-like giant cells [Figure 2b and c] and reported as giant cell lesion possibly chondroblastoma. Surgical decompression was done. Sections showed a neoplasm composed of cells having eosinophilic cytoplasm and vesicular grooved nuclei admixed with many osteoclastic giant cells [Figure 2d]. Cystic spaces filled with blood, hemosiderin laden macrophages, stellate cells in chondromyxoidstroma were also seen. Neoplasm was seen infiltrating the adjacent brain tissue. Tumor cells were positive for discovered on gastrointestinal stromal tumor 1 (DOG1) by immunohistochemistry [Figure 2d]. Thus, diagnosis of chondroblastoma of the temporal bone with secondary aneurysmal bone cyst and infiltrating the adjacent brain parenchyma was given. Patient while on follow-up developed three recurrences and is now on radiotherapy.

DISCUSSION

The term chondroblastoma of bone was introduced by Jaffe and Lichtenstein to provide a clear distinction from giant cell tumor of bone.[4] Chondroblastoms in the skull and temporal bones are a rare event. There are case reports of chondroblastoma involving the mandibular condyle.[5] They tend to occur in older patients, to have unusual histologic features and higher rates of local recurrence.[2] Location of the lesion in our second patient was in the temporomandibular region and was associated with aneurysmal bone cyst formation and had three recurrences. Closest differential diagnosis in the first case includes giant cell tumor and chondroblastoma like osteosarcoma, and in the second case includes Langerhans cell histiocytosis and giant cell tumor.

Chondroblastoma-like osteosarcoma is an extremely rare entity which may or may not be epiphyseal.[6] This type of osteosarcoma is specifically distinguished from chondroblastoma by its osteoid or bone formation, atypical mitotic activity, and infiltration of adjacent intertrabecular spaces. Thus, aspiration biopsy of chondroblastoma can precede but should not replace close scrutiny of the subsequent surgical curettage specimen, especially when clinical and/or radiologic features are atypical.

Osteoclast-like giant cells are universally present in cases of chondroblastoma of bone. But they may be numerous in a variety of benign and malignant lesions including chondroblastoma, giant cell tumor, osteosarcoma and metaphyseal fibrous defect, etc.[7] Apart from classical clinical and radiologic correlations, the diagnostic features of giant cell tumor are the background oval to spindled uniform cells.[7]

One of the more difficult entities to distinguish form chondroblastoma of bone is Langerhans cell histiocytosis. Cytologically, chondroblasts with nuclei displaying prominent longitudinal grooves and inconspicuous nucleoli are similar to those seen in Langerhans cell histiocytosis.[8] Accompanying inflammatory cells mainly eosinophils in cases of Langerhans cell histiocytosis are absent in this

lesion. Langerhans cell histiocytosis is also not associated with matrix production. Radiologically, when Langerhans cell histiocytosis involves the long bones of the extremities, diaphyseal involvement is more common.[9]

Chondroblastomas associated with aneurysmal bone cyst component may cause further difficulties in diagnosis as the diagnosis may be missed on fine-needle aspiration biopsies due to sampling error.[3] DOG1 is a useful marker to support the diagnosis of chondroblastoma by immunohistochemistry. Nasts of DOG1 positive chondroblasts are present in the cellular areas of chondroblastoma which are not detected in chondromyxoid fibroma or giant cell tumor of bone.[9] There are case reports of chondroid metaplasia in pigmented villonodular synovitis mimicking chondroblastoma. Histopathology features are similar to chondroblastoma except for the presence of the villous pattern. The histiocyte-like cells of pigmented villonodular synovitis are positive for CD68 and negative for S100 protein by immunohistochemistry.[10]

CONCLUSION

Fine-needle aspiration biopsy can be used as a reliable tool in the diagnosis of chondroblastoma in conjunction with radiology and clinical features.

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