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CHONDROBLASTOMA OF LATERAL MALLEOLUS : A RARE CASE REPORT

Orthopaedics

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ABSTRACT

Introduction: A chondroblastoma is a benign and rare tumor, usually found in the epiphyseal region of the long bones. It is found less frequently in membranous bones. Chondroblastoma was first described as calcified giant cell tumour by Ewing. Most commonly it found in the epiphyses of long bones; particularly from the epiphyses of the proximal and distal parts of the femur, the proximal part of the humerus, and the proximal part of the tibia. Other reported sites are talus, scapula , patella, pelvis, distal radius, distal tibia , ribs, proximal fibula, calcaneum. We here report a rare case of a chondroblastoma of lateral malleolus.

Conclusion: It appears that till date no case has been reported of chondroblastoma occuring in lateral malleolus world wide in the literature. Based on unique presentation of this case we reported this rare case of chondroblastoma of lateral malleolus.

KEYWORDS

INTRODUCTION

Every individual has chondroblasts (specialized cartilage producing cells) present at the end of long bones, close to joints. Sometimes these cells divides abnormally out of control and cause a benign tumor known as chondroblastoma.[1] It is a very rare benign tumor constitutes 1% of all tumors.[2] It is also known by name of Codman's tumor. Codman classified it as a chondromatous variant of giant cell tumor.[3] Jaffe and Lichtenstein renamed it as benign chondroblastoma of bone.[4] It almost always involves the epiphysis of long bones particularly lower end of femur, upper end of tibia, upper end of humerus. Other sites for chondroblastoma are pelvis, hip, heel (flat bones) though less commonly found. It is mostly found in children in the second decade of their life when growth plates start to close and is having male to female ratio of 2:1.[1][5][6]

Till date to our knowledge no case of chondroblastoma of lateral malleolus has been reported. So here we present a rare case of chondroblastoma of left lateral malleolus.

CASE STUDY:

A 14 year female presented in our OPD in September 2016 with pain and swelling over left lateral malleolus since 8 months. Pain was gradual in onset, progressive in nature, intermittent and relieved by analgesics in from of oral tablets. Patient was able to walk without limp. Patient had no history of fever, significant weight loss or any other significant medical history. She was admitted for evaluation and further management.

On physical examination, temperature of the overlying skin was normal. Tenderness was present on left lateral malleolus with a 3x2 cm localized swelling (Fig. 1). Skin over the swelling was non adherent. Swelling was hard in consistency. Range of movements at left ankle joint was normal. There was no lymphadenopathy and systemic examination was normal. The routine investigations were within normal range.

Radiographs of the left ankle with anteroposterior and lateral views were taken (Fig.2). A well circumscribed expansile, eccentric, lytic lesion, oval in shape was seen in the left lateral malleolus without any periosteal reaction and cortical breech .Chest X-ray was normal. MRI (Magnetic resonance imaging) of the left ankle was done (Fig 3). It reported altered signal intensity lesion measuring approximately 18 x 20mm in distal fibular epiphysis showing internal cystic changes. No extension across the growth plate was seen. Erosion of posterior cortex was seen. Increased signal intenstity showing marrow edema in superior aspect of talus and superior aspect of calcaneum with minimal ankle joint effusion with bony contusion in distal tibial metaphysis.

Core biopsy was done by Jamshidi needle which showed numerous polygonal cells arranged in sheets with rounded nuclei and clear to pink cytoplasm. Large number of osteoclastic giant cell were scattered throughout the lesion. Chondroid tissue was seen in many areas with areas of haemorrhage and calcified deposits.

A provisional diagnosis of Chondroblastoma was made. Patient was then taken up for surgery under spinal anaesthesia and extended curettage and filling of cavity with bone graft taken from ipsilateral iliac crest was done (Fig 5, Fig 6). Curette material was sent for biopsy and confirmation of the diagnosis. Biopsy report confirmed diagnosis of chondroblastoma with mixture of mononuclear cells and giant cells. The mononuclear cells had oval to round nuclei with longitudinal grooves with clear to pink cytoplasm matrix showing chondroid differentiation with calcified deposits. Follow-up of patient was done at 2 weeks, 6 weeks, 3 months after the operation. The lesion resolved with resolution of pain and swelling. Ankle movements were normal. Radiologically no sign of recurrence was found at 3 month follow-up.

DISCUSSION

Chondroblastoma is a rare benign tumor of cartilaginous origin, almost always involves the epiphysis of long bones particularly lower end of femur, upper end of tibia, upper end of humerus. Pelvis, hip, heel are lesser common sites of its presentation.[2][6]

Chondroblastoma most commonly affects children in the second decade of life in 95% of cases when growth plates start to close and with male to female ratio of 2:1.[2][7] Although this entity is a benign in nature , but it has the potential to metastasize to the lungs.[8]

Various theories have been given for the pathogenesis of chondroblastoma. Romeo et al has noted that chondroblastoma arising in long bones mainly affects the epiphyses, while in other locations it is close to ossification centers. In chondroblastoma, growth signaling molecules may be present due to the pre-pubertal signaling network as well as cartilage growth. Sex hormones are thought to be linked to this process because of relationship of chondroblastoma with the growth plate and its typical occurrence before growth plate fusion. Both Parathyroid Hormone-related Protein (IHh/PtHrP) and fibroblast growth factor (FGF) signaling pathways, are considered responsible for development of the epiphyseal growth plate, are active in chondroblastoma which leads to greater proliferation among the cells in proliferating/pre-hypertrophic zone (cellular-rich area) versus hypertrophic/calcifying zone (matrix-rich area). These findings suggest that chondroblastoma is derived from a mesenchymal cell undergoing chondrogenesis via active growth-plate signaling pathways.[1]

Edel et al found that collagen II, a marker for mature chondrocytes,

was expressed in chondroblastoma, supporting the chondroid nature of the neoplasm. The results of Romeo and colleagues favored view of Edel et al of chondroblastoma being cartilaginous in nature. Romeo et al have observed chondroblastoma neoplasms to be composed of mesenchymal cells that have completed normal chondrogenesis along with production of osteoid and collagen I that could be result of transdifferentiation of chondrocytes towards osteoblasts.[1]

Common clinical features: Pain followed by swelling is the most common presenting symptom[9] as seen in this patient also. Pain is mild and gradually progressive and initially may be coincidental finding with injury. Other features may include tenderness, decreased range of movements of the involved joint, joint stiffness, pathological fracture. If it involves the temporal bone , tinnitus, dizziness and hearing loss may occur.[6]

The radiographically chondroblastoma is well circumscribed oval/round, eccentric, osteolytic lesion with thin sclerotic rim in epiphyseal region of long bones. Expansion of cortex and periosteal reaction may also be seen. The mottled appearance may indicate the areas of calcification. MRI features of chondroblastoma include increased signal intensity suggestive of marrow edema, internal cystic changes in epiphyseal region of long bones. It may also reveal erosion/breech of the cortex, joint effusion, extension into soft tissue, focal lobules of altered intensity likely to be calcified chondroid matrix.[10]

The histopathological features of chondroblastoma are as sheets of chondroblasts in chondroid matrix, cartilage with occasional giant multinucleated cells. Because of dystrophic calcification Calcium may deposit around the chondroblasts, results in typical "chicken-wire" appearance which is pathognomonic of chondroblastoma.[11][12]

Chondroblastoma should be differentiated from various conditions which can mimic it. These include giant cell tumor, bone cyst, clear cell chondrosarcoma, brodie abscess, chondromyxoid fibroma, osteoblastoma, enchondroma .[13] Presence of chondroid matrix and open physis differentiate it from giant cell tumor. Clear cell chondrosarcoma mostly occurs in the middle age. Osteoblastoma and enchondroma usually not involve the epiphysis. Presence of bone marrow odema is not a usual feature of chondromyxoid fibroma, enchondroma.

If not treated , chondroblastoma will continue to grow and destroy the surrounding bone. The aim of treatment is to remove the tumour and prevent damage to the surrounding bone. The recommended treatment of chondroblastoma includes extended curettage, packing of final cavity with bone graft or bone cement (polymethylmethacrylate). Other modalities like radiofrequency ablation and cryotherapy can be used when surgery might lead to unacceptable complications. Due to their proximity to the articular surface and growth plate, complete eradication of the tumor is very difficult; consequently recurrence rates are relatively high and injury to the growth plate may result in limb-length discrepancies.[12]

This case seems to be the first reported case of chondroblastoma occurring at the left lateral malleolus. This case report mainly stresses on increasing awareness of this rare tumor occurring at very unusual site and hence avoiding any misdiagnosis. Extended curettage with bone grafting or bone cement are recommended methods of treatment. In above discussed case, treatment consisted of an open biopsy followed by extended curettage and bone grafting without any recurrence at 3 months follow-up.

CONCLUSION

Though lateral malleolus is an extremely rare site for Chondr oblastoma, however the swellings over the lateral malleolus in young patients should include it in the differential diagnosis, hence avoiding any misdiagnosis and should be treated promptly.

FIGURES

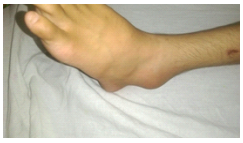

Fig1: Swelling over the left lateral malleolus

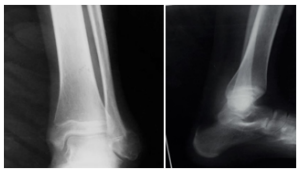

Fig2: Anteroposterior and lateral radiograph of left ankle joint showing well circumscribed, lytic lesion involving epiphyses of left lateral malleolus

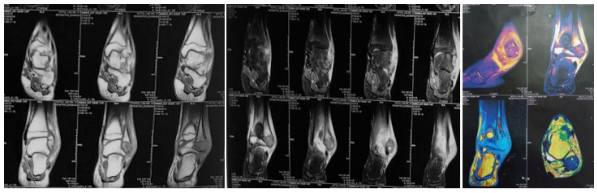

Fig3: MRI of left ankle joint showing cystic changes in distal fibular epiphyses, erosion of posterior cortex, marrow edema in superior aspect of talus and superior aspect of calcaneum with minimal ankle joint effusion.

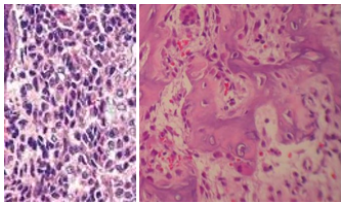

Fig4: Microscopic picture of the lesion showing mixture of mononuclear cells having oval to round nuclei with longitudinal grooves with clear to pink cytoplasm, scattered giant cells, Matrix showing chondroid differentiation with calcified deposits.

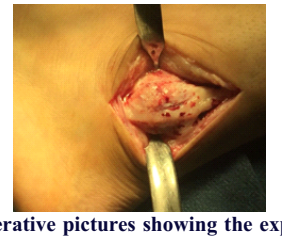

Fig5: Intra-operative pictures showing the expanded left lateral malleolus.

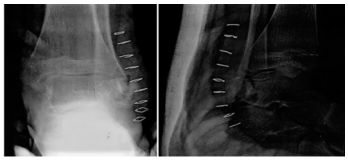

Fig6: Post operative xrays showing the cavity after extended curettage filled with bone graft taken from ipsilateral iliac crest

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