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Chondroblastoma of lower end of radius: A case report

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Abstract

Chondroblastoma is a tumor occurring in the epiphyses of long bones on immature skeletons commonly. Chondroblastomas of metaphysis leading to loss of Physcal activity is very rare finding leading shortening. We present a rare case of Chondroblastoma of the lower end radius metaphysis treated by curettage and bone grafting followed by ulnar shortening done after 2 years of follow up. It was concluded at early detection and prompt treatment lead of reduced need for repeated surgeries.

Keywords: Chondroblastoma lower end radius, metaphysis chondroblastoma, ulnar shortening

Introduction

Chondroblastoma is defined by the WHO as “A benign, chondroid-producing neoplasm composed of chondroblasts [1].” It is a rare tumour occurring commonly in the skeletally immature population. Accounting for less than 1% of all primary bone tumours, it is commonly found at the epiphyses of long tubular bones, predominantly in the male population by a ratio on 2:1 [3]. It most commonly affects people in the second and third decades of life. It was originally described by Ewing in 1928 as a “calcifying giant cell tumor [2].” The most common anatomical site involved by this tumour is the proximal humerus followed by the distal femur, proximal femur, proximal tibia, talus and innominate bone, in descending order [5]. While the occurrences in flat bone in not uncommon, they usually tend to be in the ileum and acetabulum. Other bones where it is usually located are the bones of hand and feet including talus, calcaneum, metatarsals, phalanges. Least commonly it occurs in the skull and temporal bones where the age of presentation is characteristically higher (40-50 years) [4].

Chondroblastoma almost always occurs as a solitary lesion in a single bone with most of them being situated in the medullary cavity of the long bones at the epiphyses.

The patient usually presents with the complaints of bone pain and swelling which may be longstanding, but other more site-specific complaints can also arise. For example, when the epiphysis of a long bone is involved, the symptoms may include local swelling, joint stiffness and/or effusion, and the development of a limp. In tumors arising from the skull bones, symptoms such as seizures and progressive hearing loss can also occur [5].

Grossly, Chondroblastoma is sharply separated from the adjacent bone and contains a mixture of soft, friable, grey-yellow material and hemorrhage. Small calcifications provide a gritty and chalky cut surface. Occasionally, areas of rubbery blue-grey Chondroid matrix are seen. Necrosis and hemorrhagic cystic cavities (secondary aneurysmal bone cyst formation), may also be present, but usually only comprise a small portion of the tumor.

Histologically, the characteristic cells are uniform, round to polygonal with well-defined cytoplasmic borders, clear to slightly basophilic cytoplasm, and a round to ovoid nucleus (Chondroblasts), often growing in cellular sheets. The nucleus is usually central having longitudinal grooves with a small nucleoli. In addition to the above, variable numbers of multinucleated giant cells are often present, as are foci of hemosiderin deposition. The latter occurs more commonly in the tumors located in the skull and facial bones [6].



Fig 1: MRI of the wrist showing an expansile lesion with surrounding edema in the lower end of radius



Fig 2: Plain Radiograph of the wrist with hand showing the solitary lytic lesion with thin sclerotic rim



Fig 3: Excision of the Tumour from the lower end of radius (L) and Artificial bone grafting(R)

Radiologically, Chondroblastoma is seen as a solitary clear lytic lesion with a thin sclerotic rim on an X-ray film. It is usually eccentric and well demarcated. Although it is usually small to intermediate in size, averaging between 3-6cm, instances have been recorded with the size exceeding more than 10 cm^[7]. There might be thinning of the adjacent cortex but the complete breach of the cortex is rarely seen as are the pathological fractures. Magnetic resonance imaging (MRI) studies of chondroblastomas have shown evidences of extensive edema surrounding the lesion.⁸ Most cases show variable intensity on T2-weighted images because of the fact that the signal intensity on T1- and T2-weighted MRI images in these lesions is dependent on the amounts of various components within the lesion, such as Chondroid matrix, cellularity, calcification, hemosiderin, and aneurysmal bone cyst like areas^[9].

In this report the authors attempts to throw some light on a rare occurrence of a Chondroblastoma in the lower end of Radius of a child.

Case report

A 5 year old male child present to the out patient department of our institution with complaints of a painful swelling over the left distal forearm since 9 months. Patient had an unremarkable past medical history. On clinical examination a tender swelling was found on the lower end of the forearm over the volar aspect which was firm to hard in consistency and not freely mobile. There were no visible signs of inflammation or an underlying infection observed on the swelling. The laboratory data was within the normal limits. An x ray of the forearm was done which revealed an ovoid lytic lesion on the distal metaphysis of the radius of the left forearm with a sclerotic rim. A concurrent FNAC was done which revealed good cellularity smears with fragments of Chondroid matrix admixed with multinucleated osteoclast-like giant cells and mononuclear cells with distinct cell borders, round-to-oval nuclei and dense eosinophilic cytoplasm. Based on these data a provisional diagnosis of Chondroblastoma was established and an MRI was done. A highly intense lesion on T2 weighted MRI was seen on the metaphysis of the radius with surrounding edema suggestive of Chondroblastoma. After anaesthetic fitness, the patient was taken for excision and curettage. Artificial bone grafting was performed and closure done in layers. Histopathology biopsy showed sheets of mature chondrocytes with benign nuclei and no signs of inflammatory changes. Uni-nucleated and bi-nucleated chondrocytes were seen. The patient survived the operation, and recovered uneventfully, was discharged after 12 days after suture removal. The patient had no evidence of recurrence or metastasis 12 months after the operation.

However, on serial follow up of the patient over a period of 18 months, it was concluded that there was a positive ulnar variance (the length of the ulna being longer than that of the radius), implying that the distal physis of the radius had been destroyed by the tumor. The same was confirmed with a serial radiographs of the affected forearms. Subsequently, the patient was taken up for ulnar shortening in order to correct the deformity. The patient is doing well with a functional upper limb over a follow up of 3 months post operatively.



Fig 4: Clinical photograph in the post operative follow up showing a positive ulnar variance



Fig 5: x-rays at 6 months follow up showing a positive ulnar variance and the uptake of the artificial bone graft

Discussion

One of the most characteristic features of chondroblastomas is its epiphyseal location. The incidence of metaphyseal or diaphyseal location in long bones accounts for only 2% of all Chondroblastoma cases. Chondroblastoma in growing children is most frequently located in proximal part of tibia and proximal femoral epiphysis. Epiphyseal chondroblastomas were associated with a higher risk of recurrence when compared with metaphyseal, Apophyseal, and epiphyseal-metaphyseal lesions^[10].

It was concluded that there was a positive ulnar variance, implying that the distal physis of the radius had been destroyed by the tumor. The same was confirmed with a serial radiographs of the affected forearms. Subsequently, the patient was taken up for ulnar shortening in order to correct the deformity. The patient is doing well with a functional upper limb over a follow up of 3 months post operatively which was similar to the study done by Abhinandan Punit^[11], Sambaprasad Nadkarni^[11], and Tanvir Doomra on Chondroblastoma of Diaphysis of Radius in a Seven Year Old Child which said that Most of the reported cases of this uncommon tumor were between 10 to 17 years of age. Cases in which patient is less than 10 or more than 25 are uncommon (Jaffe, 1957); our patient is a seven year old child^[11]. The four major series of Chondroblastoma include 258 cases of which only five were in metaphysis of long bones. Two other metaphyseal lesions were recorded in smaller group of chondroblastomas reported by Sherman and Uzel; and by Salzer and associates. The bones often involved by epiphyseal chondroblastomas are femur, tibia and humerus. Therefore, except for humerus, the distribution of metaphyseal tumors roughly parallels commonest location of epiphyseal Chondroblastomas^[12].

Chondroblastoma in growing children is most frequently located in proximal part of tibia and proximal femoral epiphysis. The radiographic appearance is usually suggestive of the diagnosis. The lesion is usually seen as an oval intramedullary tumour with distinct margins. A key diagnostic feature is its almost invariable location within an epiphysis or an apophysis. Other common features are expansion, sclerotic rim, and matrix calcification. Penetration through the cortex into the soft tissues is seen only in a small percentage of cases. Chondroblastoma is generally benign, shows slow pattern of growth with well-defined margins, but its clinical outcomes are unpredictable as aggressive behavior with local recurrence and lung metastasis have been reported. Functional outcomes of surgical treatment of Chondroblastoma are generally good, provided the tumor is not discovered very late and that the tumor does not recur. The risk of recurrence

appears to be highest for lesions located only in the epiphysis, as opposed to lesions in the apophysis or those that extend into the metaphysis or diaphysis. The recurrence rate ranges from 10% to 35% after curettage and reconstruction with bone graft or Polymethylmethacrylate cement. Factors contributing to recurrence are debatable among studies; more recent reports include: young age, aneurysmal bone cyst components, aggressiveness, anatomic site and inadequate surgery^[13].

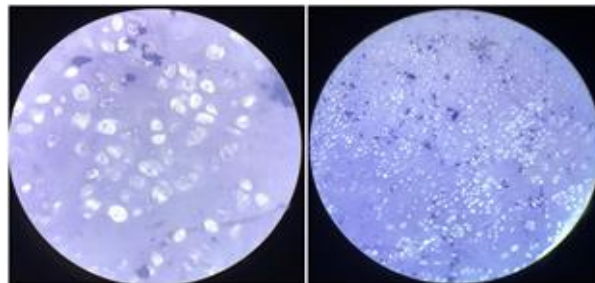


Fig 6: Histopathologic evaluation of the mass under High Power (L) & Low Power (R) fields showing UNI and binucleated chondrocytes.

Conclusion

Although most chondroblastomas are benign, rarely they may spread locally or metastasise. Recurrence is also common with these lesions. Early diagnosis and prompt adequate therapy can help to reduce events of recurrence and repeated surgeries.

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