Case Report

Subchondral chondroblastoma of the distal femur - A case report

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Abstract

A rare primary benign tumor of the bone, referred to as chondroblastoma, is found mostly in older children. Impediment in function and growth happen owing to the occurrence of the tumor near a joint or growth plate. Our patient, aged 16 years, presented with a right-sided knee joint pain and swelling for the last 4 months. An X-ray and MRI were done, and the patient was treated with intralesional curettage and saucerization with an open medial knee approach. The bone defect was filled with 2.5 cc bioactive synthetic bone graft. Patient recovered completely by 1 year, postsurgically. Diagnostic feature of chondroblastoma is its invariable location within an epiphysis or apophysis. The lesion is typically diagnosed by X-ray and MRI. Intralesional curettage and reconstruction with autogenous or allogeneic bone graft gives the best results. A separate needling may not be a necessary step to diagnose first and, then, actively manage chondroblastoma. With a typical clinicoradiological correlation, a one-stage definitive curettage and bone supplementation suffices. A secondary chondral defect filling technique is not required.

KEY WORDS: Chondroblastoma, intralesional, bone graft

Introduction

A rare primary benign tumor of bone, referred to as chondroblastoma, is found mostly in older children.[1] The most affected regions are the knee, hip, and shoulder.[2] Generally, the tumor occurs in the epiphysis before the closure of physeal plate.[3] The age of the majority of the patients ranges from 5 to 25 years. The predominance of male patients is seen, with a ratio of 3 to 2. Because the tumor is usually localized near a joint or growth plate, an impediment in functions and growth may be expected.

From a simple curettage to structural reconstruction after resecting a margin of nearby normal tissue are the proposed treatment options for aggressive chondroblastoma.[1]

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In this report, our aim was to present a case of distal femoral chondroblastoma and some implications that we can draw from it.

Case Report

Our patient, a 16-year-old boy, presented to us with a right-sided knee joint pain and swelling for the last 4 months. The pain was spontaneous in onset and gradually increased to the extent such that the patient was walking with a limp. There were episodes of night pain. The patient also presented with swelling in the right knee. There was no h/o fever or other joint symptoms. There was no h/o twisting injury or related trauma. There were no constitutional symptoms of loss of weight and appetite.

On examination, there was medial joint line tenderness with Patellar tap test positive, and the range of movement restricted with flexion = 100° with terminal pain.

We followed-up the patient with an X-ray (right knee AP and lateral).

The X-ray showed a well-defined radiolucent the histopathological findings of the lesion on the lateral part of the medial femoral condylar epiphysis. The lesion had sclerotic edges with the inferior margin abutting the subchondral region [Figure 1].

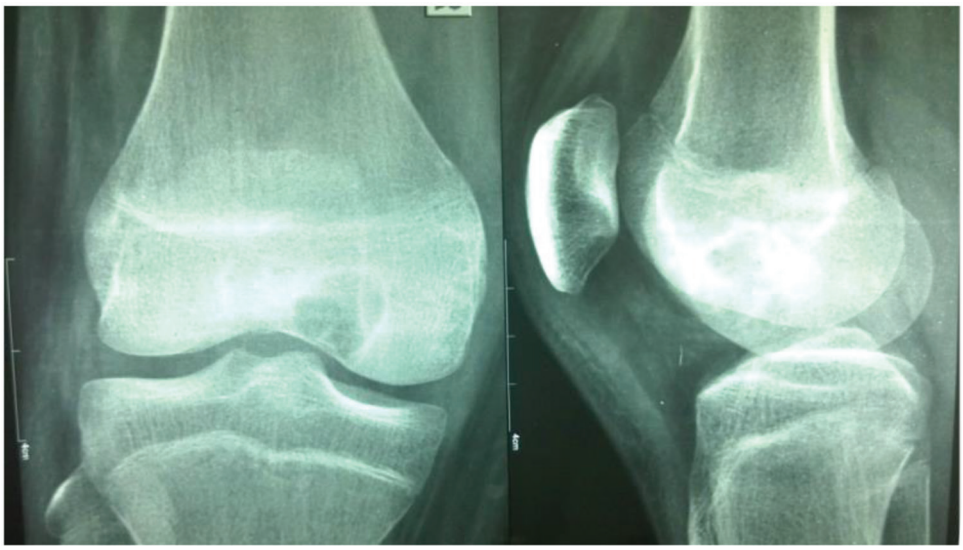

Figure 1: X-ray of the right knee showing a radiolucent expansile subchondral lytic lesion situated near the intercondylar region of the medial femoral condyle.

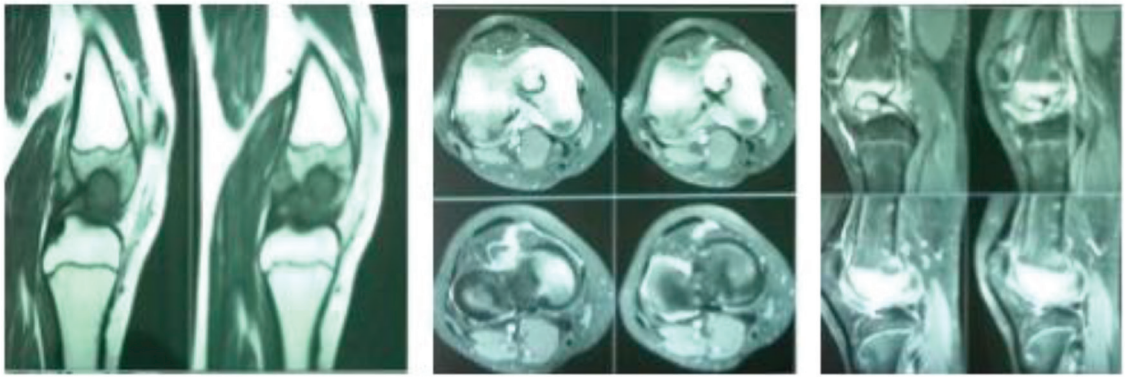

Figure 2: MRI images of the right knee joint with the sagittal and the axial T1 and T2-W images showing the cartilaginous flap and the intercondylar extension of the lesion.

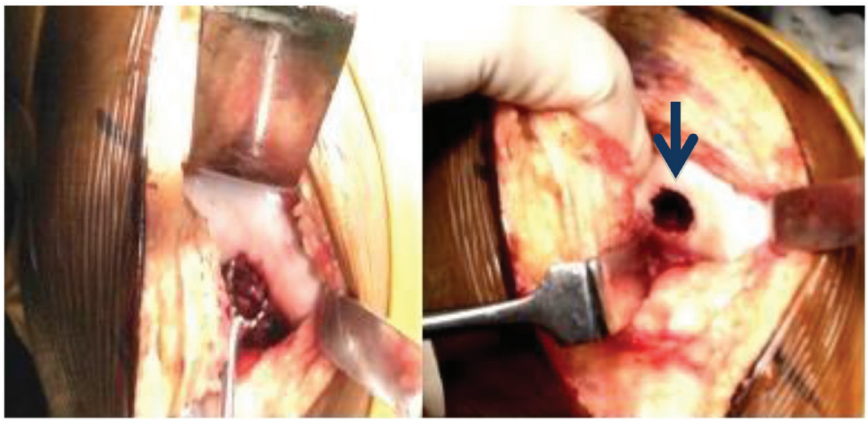

Figure 3: Clinical photograph (intraoperative) showing intralesional scooping and curettage with the resultant cartilaginous defect.

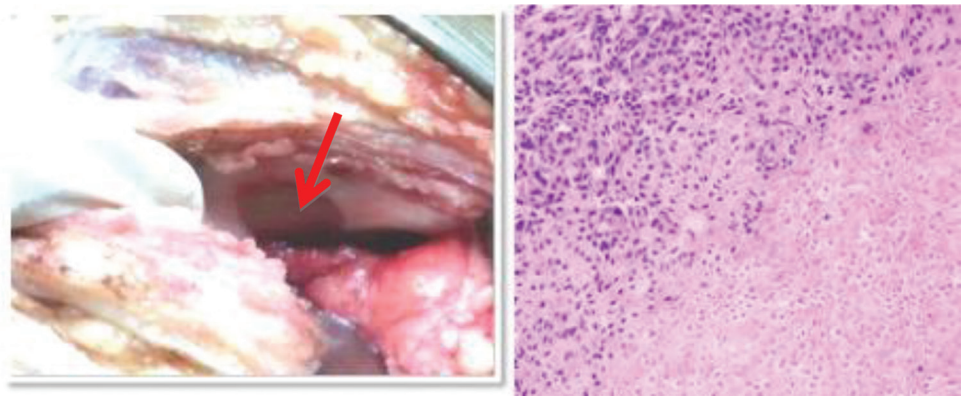

Figure 4: The left figure showing the bone defect filled with 2.5 cc Novabone Putty (Bioactive synthetic bone graft). The right figure shows the histopathogy of the lesion typically reconfirming the diagnosis of Chondroblastoma.

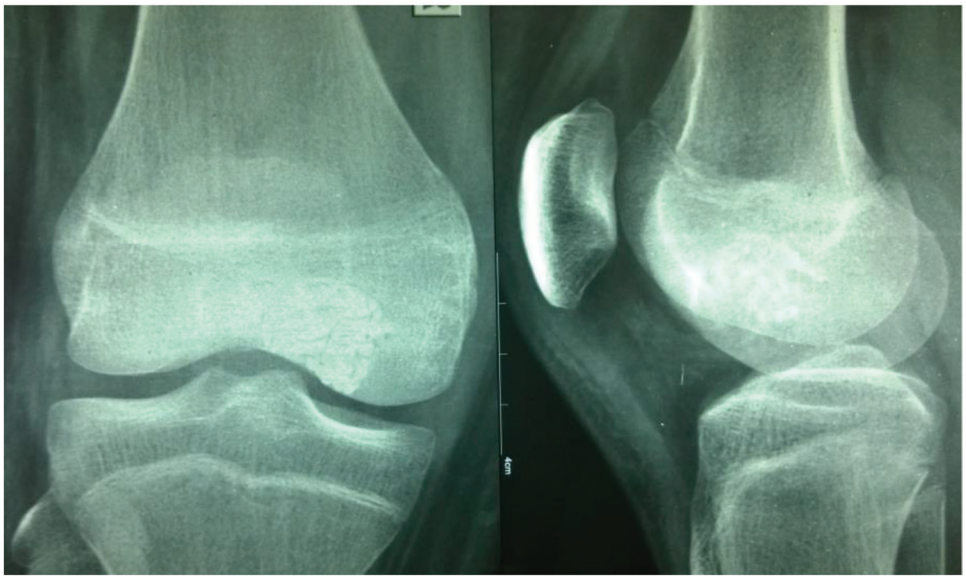

Figure 5: Follow-up X-ray at 1 year showing complete consolidation of the lesion with no evidence of recurrence.

Our first D/D was a chondroblastoma; the second was aneurysmal bone cyst.

Thus, the MRI results showed a focal lytic well-defined soft-tissue lesion that was seen in the lower femoral epiphysis with thin sclerotic margins and perifocal edema, most likely being a chondroblastoma [Figure 2].

We did an electively planned intralesional curettage and saucerization of the lesion. The shell was scooped and curetted with the material being sent for histopathological examination. We took a medial arthrotomy approach, and we were conservative in the extent of curettage [Figure 3].

The bone defect was filled with 2.5 cc NovaBone Putty (bioactive synthetic bone graft). The histopathologic findings of the lesions typically reconfirmed the diagnosis of chondroblastoma [Figure 4].

The patient was followed-up postoperatively at 2 weeks, 6 weeks, 3 months, 6 months, and 1 year.

The patient attained full range of motion at about 6 weeks and became painless postoperatively.

The postoperative X-ray was found with healed lesion and no recurrence [Figure 5].

Discussion

Chondroblastoma refers to a very uncommon rare bone cancer entity.[1,2]

It represents the most frequent primary epiphyseal tumor in children aged between 10 and 30 years. These lesions are mostly dispersed in the skeleton; however, they

generally occur in the regions of epiphysis or apophysis. Majority are located in the tibial proximal part (17%) and the humeral proximal part (15%). The distal femur and pelvis represent the alternate regions that are affected generally.

Chondroblastomas are, generally, well-circumscribed lesions involving the medullary cavity. The radiographic appearance is usually suggestive of the diagnosis. The lesion is characterized as an oval intramedullary tumor with distinct margins. Its invariable location within an epiphysis or an apophysis is the main characteristic feature for diagnosis. Other common features are expansion, sclerotic rim, and matrix calcification. In our case, the lesion was typically a chondroblastoma on both X-ray and MRI. We, thus, did not do a separate needle biopsy for confirmation and headed towards an elective definitive procedure directly. Penetration through the cortex into the soft tissues is seen only in a small percentage of cases.[3] The adjacent cortex is normal in only 15% of tumors (advanced and stage III lesions).[3] Three-fourths of the tumors lead to the erosion and thinning of the involved cortical bone. Cortical destruction is rare and found to prevail only in 10% of cases.[1] Penetration of soft tissues and cortical destruction was not a feature of our case. But, there was thinning of the subchondral bone and cartilage flaking in the knee joint adjacent to the lesion. This was the cause of joint fluid accumulation in this patient.

More than 50% cases of chondroblastoma have reported thinning of the subchondral. In somewhat more than half of the cases have reported the thinning of the subchondral articular cortex less than 5 mm. The expansion of local epiphyseal plate has also been reported. Aneurysmal cyst-like modifications have been observed in upto 15% of chondroblastoma cases. The presence of these modifications lead to recurrences most commonly, as proposed. The presence of aneurysmal bone cyst modifications are present leads to recurrences most commonly, as propsosed by few authors.[1]

Chondroblastoma can be treated by simple curettage, bone grafting, and potential cementation involving similar surgical techniques as for giant cell cancer.[1,4] The reconstruction following intralesional curettage can also be filled with autogenous bone graft, allogeneic bone graft, or both.

A greater recurrence rate is observed when curettage is the only mode of therapy.[5] According to Unni, wide cortical saucerization and curettage should be applied for the treatment of aggressive lesions (lesions with cortical erosion or cortical breakthrough). Adjuvants such as cryotherapy or phenol can be employed.[1] Although greater bone induction is achieved using vascularized or cancellous autogenous grafts, their usage is confined because of donor site morbidity. In our case, we did a conservative intralesional curettage without damaging the normal cartilage. At 1-year follow-up, there have been no signs of recurrence with full clinical–radiological healing. Although this is just a single case experience, there has been literature quoting easy success with this technique with no recurrences.

Curettage of physeal chondroblastomas in children have resulted in limb length inconsistency and malformation.[3] There were no such complications noted in our patients. The term chondroblastoma is suggestive of a benign cartilage-forming tumor. However, the histologic manifestation of this epiphyseal lesion of childhood resembles mostly the benign metaphyseal–epiphyseal giant cell tumor that occurs in young adults.[1] Exceptional occasions have shown metastasizing of chondroblastoma, being generally observed as benign, to the lung.[5] The range of local recurrences following curettage is from 10% to 38%. In our case, there was an excellent graft incorporation, remodeling, and excellent function of the knee after a 35-month follow-up period with no recurrence.

Conclusion

Thus, there are certain vivid interpretations we could try to materialize from this case report. As suggested by literature, curettage and grafting are efficient treatment modalities and a regular follow-up for early diagnosis of recurrence in these patients is a must. A separate needling procedure may not be a necessary step to diagnose first and, then, actively manage chondroblastoma. With a typical clinical–radiological correlation that comprises a detailed clinical examination, X-ray, and MRI, a one-stage definitive curettage and bone supplementation usually suffices. A separate chondral defect-filling technique may not be required as a secondary procedure at this age even at a later date. Although we have not done a diagnostic arthroscopy to confirm this, presently, we can derive a conjectural conclusion with symptomatic recovery of the patient. However, it is agreeable that it would require a large population-based study to conclusively prove these interpretations.

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