Chondroblastoma of the Naviculum: A Diagnostic Dilemma

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Abstract

Introduction: Chondroblastoma is a benign tumor characteristically seen in the epiphyseal region of long bones. Its occurrence in the tarsal bones is extremely rare.

Case Report: We report the case of a 17-year-old girl with chondroblastoma mimicking an aneurysmal bone cyst in the naviculum. Along with the primary enbloc excision of the naviculum, a tricortical iliac crest bone graft was placed in the gap to prevent collapse of the medial longitudinal arch.

Conclusion: Chondroblastoma in uncommon sites can present with atypical features and cause dilemma in diagnosis and thereby management.

Keywords: Chondroblastoma, Bone grafting, Aneurysmal bone cyst, Tarsal bones, Naviculum.

Introduction

Chondroblastoma is a cartilage-forming benign bone tumor frequently seen in the epiphyses of long bones[1].Its occurrence in the talus and calcaneum is reported in literature. Naviculum is a rare site for chondroblastoma and presentation as aneurysmal bone cyst is extremely uncommon. Only two cases of navicular chondroblastoma have been reported in literature till date [2,3].We report a case of navicular chondroblastoma managed differently from the reported two cases and further discuss about the atypical features when chondroblastoma occurs at unusual sites.

Case Report

A 17-year-old girl presented with complaints of left foot pain of 2years'duration. There was no visible swelling or deformity in the foot. Tenderness was present over the medial aspect of the foot over the talonavicular joint. The subtalar movements were restricted due to pain. Plain radiographs showed an expansile lytic lesion with septations involving the entire navicular bone(Fig. 1a and b).Chest radiograph and ultrasonography of abdomen were done to rule out metastases. Differential diagnosis of aneurysmal bone cyst, giant cell tumor (GCT), and chondroblastoma was considered. Computed tomography (CT)scan showed a well-defined lytic lesion in the naviculum with sclerotic margin and cortical breach (Fig. 1c and d). Magnetic resonance imaging (MRI) showed a well-defined altered signal intensity lesion (which was heterogeneously hypointense on T1WI and hyperintense on T2WI showing fluid levels) measuring 1.2 cm ×2.5 cm ×2.8 cm and involving the entire navicular bone. The lesion showed heterogeneous post-contrast enhancement. Mild STIR hyperintensities were noted in the articular surface and neck of the talus, lateral, and the middle cuneiform bones suggestive of bone marrow edema (Fig. 1e and f).

Surgical technique

Since the entire naviculum was involved, curettage was not attempted in view of the risk of recurrence. The talonavicular joint was approached medially. After excising the naviculum in toto, the cartilage from the anterior aspect of the talus and posterior aspect of medial and intermediate cuneiforms was removed. The gap was bridged with a tricortical iliac crest graft and transfixed with 2 Kirschner wires(Fig 2a).The ankle was immobilized in a below knee cast for 3 months. After 6 weeks of non-weight-bearing, partial weight-bearing was started. The Kirschner wires were removed at 3 months(Fig. 2a)and unaided full weight-bearing was permitted by 5 months, once bony incorporation was noted on radiograph. The patient came for regular follow-up, and at the end of 3 years, she was asymptomatic. Plain radiographs showed sound incorporation of iliac bone graft with talus but patchy fusion with the cuneiforms. There was no evidence of recurrence (Fig. 2b). Histopathology of the excised specimen showed sheets of uniformly arranged cartilage-forming cells with well-defined cytoplasmic borders and inconspicuous nucleoli, interspersed with giant cells and bony fragments. Blood filled cystic spaces lined with fibrous septae with fibroblasts and reactive bone was also seen along with congested blood vessels without evidence of dystrophic calcification and a diagnosis of chondroblastoma was given by the pathologist (Fig. 2c and d).

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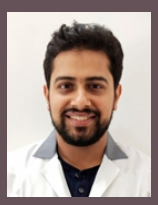
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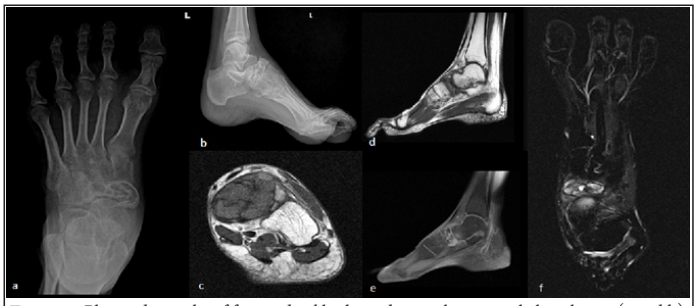

Figure 1: Plain radiographs of foot and ankle showed navicular expansile lytic lesion (a and b), Computed tomography scan showing well-defined lytic lesion with sclerotic margin and narrow zone of transition with cortical breach(c andd),Magnetic resonance imaging shows altered signal intensity lesion (which is heterogeneously hypointense on T1WI and hyperintense on T2WI showing fluid levels (e and f).

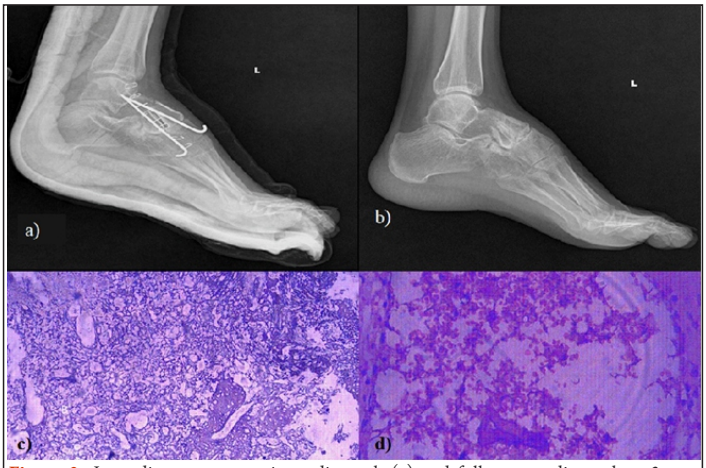

Figure 2: Immediate post-operative radiograph (a) and follow-up radiograph at 3-year (b).Histopathology section H and E stain showing well-formed cartilage-forming cells (c) and s100 stain which are normally positive for chondrocytes confirming the cell of origin without any evidence of dystrophic calcification (d).

Discussion

Chondroblastoma is commonly seen at the age of 10–30 years[1].The aneurysmal bone cyst is common in the age group of<20 years, whereas GCT is common after 30 years. Chondroblastoma and GCT are commonly seen around the knee joints and present as swelling followed by pain. In tarsal bones, it usually presents as painful swelling, but in this case, the patient presented with pain over the medial aspect of foot without palpable swelling. Chondroblastoma, in general, presents as well-defined lucent lesions, with either smooth or lobulated margins and thin sclerotic rim on radiographs. Despite uncommon presentation in foot and ankle, the tumor usually presents as multiple lytic lesions without cortical breach, and it is difficult to differentiate from GCT and aneurysmal bone cyst [4]. In our case, the MRI [5] features were more consistent with aneurysmal bone cyst(Table 1).However, perilesional edema which is a distinctive finding of chondroblastoma was seen in our case. Management usually includes staged biopsy, curettage, and bone grafting with autograft or allograft [3,6]. The diagnosis in our patient was not classical of any of the considered differentials. Hence, we planned for enbloc resection rather than curettage to avoid the risk of recurrence. The surgical management of our case was different from those reported by Li et al. and Fang and Chen (Table 2). The risk of recurrence after curettage is higher as compared to enbloc resection of tumor [1,6]. Curettage has been combined with various surgical techniques including cauterization to minimize the risk of recurrence [6]. We performed enbloc excision of the naviculum and reconstructed the gap using a tricortical iliac crest graft to maintain the medial longitudinal arch. We justify our approach to perform a single-staged resection followed by bone grafting as it avoids two surgical procedures. Additionally, once metastasisis ruled out, the enbloc resection of the primary tumor results in complete eradication of the lesion irrespective of chondroblastoma, GCT, or aneurysmal bone cyst. We preferred autologous iliac crest bone graft to improve the rate of graft incorporation and lack of immunogenic concerns. There was no recurrence at 3-year follow-up. Dystrophic calcification which is one of the classical histopathological features noted in chondroblastoma giving the classic chicken wireappearance was absent in our case. Hemorrhagic cystic areas can hide the classic histological image of chondroblastoma[7]. The final histopathology report of our patient was suggestive of chondroblastoma with areas of hemorrhagic cyst.

Table 1: MRI features of chondroblastoma and aneurysmal bone cyst

Chondroblastoma	Aneurysmal bone cyst
T1-weighted sequences-Homogeneous intramedullary lesion that is isointense with muscle	The cysts are of a variable signal, with a surrounding rim of low T1 and T2 signal. Focal areas of high T1 and T2 signal are also seen presumably representing areas of blood of variable age
T2-weighted sequences-Variable and heterogeneous signal intensity with perilesional edema affecting the bone and/or soft tissues is a distinctive finding for this tumor	
MRI: Magnetic resonance imaging	

Table 2: Reported cases of navicular chondroblastoma and their management

Author	Year	Presentation	Investigations	Procedure	Outcome
Li *et al*.	2013	24 Mfeeling of ankle instability	X-rays-Expansile cystic lesion with sclerotic margins	Curettage+resection+bone grafting+k wire fixation(Single stage)	No evidence of recurrence after a follow-up of 2 years
			CT scan- Scalloped, sclerotic, and well-defined margins		
			MRI- Low signal intensity on T1-weighted image		
Fang and Chen	2013	24 Fleft foot pain for 6 months	X-rays-Expansilelesion of the navicularbone without periosteal reaction	Curettage+phenolization+allograft reconstruction and stabilization with k-wires	No evidence of recurrence after a follow-up of 3 years
			CT scan-Cortical thinning		
			Bone scan-Increased uptake		

MRI: Magnetic resonance imaging, CT: Computed tomography

Conclusions

Chondroblastoma can mimic aneurysmal bone cyst in the naviculum. CT and MRI features may not show classical features of chondroblastoma. Histological features may confuse it with aneurysmal bone cyst if associated with hemorrhagic cystic areas. Enbloc excision of the naviculum with tricortical iliac grafting is an effective option for treating such lesion. The tricortical iliac graft achieves adequate stability and incorporation in the foot for maintaining medial longitudinal arch.

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