Case Report

Post-traumatic osseous cyst of the distal radius in a child

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ABSTRACT

Post-traumatic osseous cysts are an uncommon complication of pediatric appendicular trauma which develop in the first few weeks following the injury. Due to their infrequent occurrence, their appearance may be mistaken for other, more sinister entities. We present a case of a post-traumatic osseous cyst in a 6-year-old child with radiographic and magnetic resonance imaging findings which we hope will reassure clinicians as to their benign nature and prevent over-investigation.

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Introduction

Post-traumatic osseous cysts are an infrequently seen complication of pediatric appendicular trauma, with approximately 30 cases reported in the literature [1,2]. Commonly occurring secondary to greenstick or buckle fractures of the wrist and developing several weeks following the injury, their appearance may be mistaken for more emergent pathology such as a Brodie’s abscess or other primary bone cyst such as eosinophilic granuloma.

We present the case of a post-traumatic osseous cyst in the radius of a 6-year-old child with accompanying radiographic and magnetic resonance images. Appreciation of their etiology, coupled with recognition of the imaging appearances may reassure clinicians as to their benign nature and promote conservative management.

Clinical presentation and imaging findings

A 6-year-old child presented to the emergency department with left wrist pain following a fall onto an outstretched hand that occurred 3 weeks prior. There were no concerns regarding the delayed presentation. Examination revealed a tender, slightly swollen wrist with mild restriction of movement, but no visible deformity. Clinical observations were normal; in particular there was no pyrexia. Subsequent imaging was undertaken.

Initial radiographs of the wrist show a greenstick fracture of the distal radial metaphysis with slight dorsal angulation (Figs. 1a and b). There is evidence of early healing with dense sclerosis at the metaphysis in keeping with the delayed presentation. In addition to the fracture there is a well-defined

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Fig. 1 – AP (a) and lateral (b) radiographs of the left wrist display an ovoid lucency at the distal radial metaphysis with adjacent sclerosis. There is cortical irregularity of the lateral radial metaphysis in keeping with a greenstick fracture. Two faint discrete areas of sclerosis at the metadiaphysis of the distal ulna are in keeping undisplaced fractures which are better characterised on the subsequent MRI. A well-defined ovoid lucency proximal and continuous with the fracture line is in keeping with a post-traumatic osseous cyst. Sclerosis adjacent to the fracture in keeping with early healing.

Fig. 2 – (a) Coronal T1 and (b) fat-suppressed proton density images of the left wrist. At the lateral aspect of the metaphysis of the distal radius there is a healing greenstick fracture. Within the new subperiosteal bone, an ovoid lucency is present which returns homogenous high T1 signal with complete signal loss on the fat-suppressed sequence confirming intralesional fat. High signal surrounding the cyst in (b) in keeping with bone marrow oedema.
Fig. 3 – Short axis proton density fat suppressed images of the left wrist demonstrate the subperiosteal location of the cyst with homogenous absence of signal in keeping with its fatty composition. Bone marrow oedema is noted at the radius.

The nature of the cystic lesion was unclear, and the possibility of a fracture complicated by a Brodie’s abscess was raised, as well as an underlying primary osseous cyst with pathological fracture. Given the diagnostic uncertainty, further investigation with MRI was undertaken 2 days later.

On MRI, the cyst is readily visible and returns homogenous high T1 signal (Fig. 2a) with absence of signal on fat-suppressed sequences confirming its fatty composition (Fig. 2b). Short-axis fat-suppressed proton density images (Fig. 3) more readily demonstrate the cyst’s subperiosteal location. The cyst did not display contrast enhancement with gadolinium.

Given the reassuring imaging findings, the child was treated conservatively in a wrist brace with no requirement for tertiary opinion, further cross-sectional imaging or biopsy. The child was followed up in the orthopedic clinic over the following 8 months with interval radiographs displaying ongoing healing and gradual decrease in size of the cyst (Fig. 4) with improvement in function.

Discussion

Post-traumatic osseous cysts are rarely seen and as such clinicians may not be familiar with their imaging appearances, of-
ten mistaking them for a Brodie’s abscess or other concerning primary osseous cyst. Post-traumatic osseous cysts tend to affect children [3]. They occur following non- or minimally displaced fractures and particularly those at the radius [4] as in our case although they may occur at other locations. Their development is perceived to relate to disruption of the cortex following minor trauma such as a buckle or greenstick fracture. Following such cortical damage, the overlying periosteum remains intact which creates a potential space in which medullary fat may seep out and become sequestered; this is demonstrated well through axial imaging with MRI (Fig. 3). In addition to accurately locating the position of the lesion, MRI demonstrates the internal composition of the cyst. High T1 signal and complete fat suppression confirms a fatty lesion. The location of the cyst tends to be proximal to the fracture line [5].

The cyst does not impede fracture healing [6] and over time will decrease in size without risk of further pathological fracture. In the presence of diagnostic uncertainty, an MRI scan is sufficient to make the distinction.

The primary differential diagnosis is that of a Brodie’s abscess, however, one might expect a greater degree of pain, a leucocytosis or pyrexia to support such a case. Alternatively, a post-traumatic aneurysmal bone cyst may be considered however the proximity to the fracture line and internal fatty components with no fluid levels or hemorrhage are more suggestive of a post-traumatic osseous cyst. In our case, with concurrent injury to the ulna as demonstrated on the radiograph and the classic mechanism of injury with delayed presentation, the presence of the cyst is felt to be secondary to trauma, particularly as the was no prior history of wrist pain or dysfunction.

Post-traumatic osseous cysts do not require any further investigation or treatment and are a benign entity which will resolve over time and therefore clinicians, parents and most importantly the child may be reassured as to their presence.

Patient consent

Written informed consent was obtained from the patient(s) for publication of this case report, including accompanying images.

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