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# Unusual Simple Bone Cyst of the Distal Radius in a Toddler

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Simple bone cysts are benign fluid-containing lesions that occur mainly in children and adolescents – before skeletal maturity. Usually asymptomatic, they are found incidentally or following a pathologic fracture caused by minimal trauma. Simple bone cysts have been reported in almost every bone. More than 95% of the cysts involve tubular bones, with the proximal humerus and femur comprising 90% of cases. The mean age of presentation is 9 years. Solitary bone

cyst of the distal radius is very rare, occurring mainly in adolescents and young adults [1].

We report a case of a simple bone cyst in the distal radius of an 18 month old child. Since the age presentation and location of the lesion were atypical for a simple bone cyst, we considered metabolic or neoplastic factors, or infection as etiologic. The clinical course was uncomplicated and ended with complete spontaneous healing and disappearance of the cyst.

## Patient Description

An 18 month old child was referred to the outpatient clinic after being treated in the emergency room for a pathologic fracture in the left distal radius that occurred after a fall on an outstretched hand. The X-ray revealed a Buckle-type fracture through an osteolytic cystic lesion in the metaphyseal region of the distal radius [Figure A]. A thorough physical examination revealed no pathology except for the fractured left



Pathologic fracture of the distal radius through a simple bone cyst.

radius. Laboratory and imaging investigation was normal but a bone scan showed high uptake in the left distal radius. The child was treated conservatively with a long-arm plaster cast for 3 weeks until fracture callus was noted on radiographic follow-up. Clinical and X-ray follow-up demonstrated complete resolution of the lesion at the 25 month post-fracture visit [Figure B].

## Comment

The differential diagnoses of a cystic lesion in the distal radius of an infant must include: osteomyelitis, monostotic fibrous dysplasia, chondromyxoid fibroma, non-ossifying fibroma, aneurysmal bone cyst, osteochondroma, and calcium metabolism imbalance.

In the case presented here, the diagnostic options considered were:

- Fibrous dysplasia – a disorder where normal bone is replaced by fibrous tissue stroma. This non-hereditary disturbance of bone development is usually discovered in childhood and adolescence. It occurs in monostotic and polyostotic forms. In the monostotic form, the femur, tibia and ribs are the most commonly affected sites. The polyostotic form appears in 20–30% of cases and is more frequent in girls. Some cases present an association of fibrous dysplasia,

precocious puberty, endocrine disturbances and cafe-au-lait spots and is referred to as McCune-Albright syndrome. The radiologic appearance is typically a well-circumscribed, expanded, central lytic lesion that occupies the medullary canal and thins the cortex. The lesion is usually diaphyseal, sometimes extending to the metaphysis. Its appearance may resemble a simple bone cyst but the density is greater than the fluid of a cyst resembling ground glass.

- Aneurysmal bone cysts – which occur chiefly in the metaphysis of long bones and spine. These usually affect young adults but are very rare in infants. The main radiographic presentation is of an expanding lesion, multi-trabeculated with a bubbling appearance, thin cortical bone, eccentrically located, and sometimes destroying the adjacent cortex. The lesion is often confined to the metaphyseal side of the growth plate.

- Non-ossifying fibroma – a fibrous cortical defect that is not a real cystic lesion, although it may have the appearance of a bone cyst on X-ray. The lesion is eccentric and affects the cortical area of long bones, appearing as an oval shaped lytic area surrounded by a typical sclerotic margin, usually at the metaphyseal area. This lesion is benign, and treatment is unnecessary since it disappears spontaneously. The lesion is

almost always discovered incidentally. Sometimes a non-ossifying fibroma may cause a pathologic fracture.

It is noteworthy that these lesions are extremely rare in children under the age of 2 years [1]. The radiographic features of simple bone cysts are characteristic of a benign lesion located in the metaphyseal region of long bones. Regular sclerotic margins outlining the bone cortex are centrally located and abut the open growth plate. The cyst might also be separated from the growth plate and is found in the diaphysis.

The exact etiology of simple bone cysts remains obscure. They usually appear as solitary bony lesions. Simple bone cysts that appear in the vicinity of the growth plate are referred to as active; they usually cause growth disturbances and are more resistant to treatment [2,3]. Inactive simple bone cysts that move distally through the diaphysis of the bone during skeletal growth have a benign behavior and threaten the patient only because bone fragility as a consequence of the bone cavity may result in a pathologic fracture.

Porat [4] reported a simple bone cyst of the distal radius in an infant. Although the lesion was biopsied and surgically treated, its biologic behavior was very active and aggressive, resulting in recurrent pathologic fractures and a long treatment course. In our case the clinical course was simple and uncomplicated despite its appearance at a very young age (18 months), which is characterized by high activity typical of this age group.

During childhood, about 15% of simple bone cysts heal without treatment, but most persist or increase in size [1]. Treatment decision is based on radiographic and clinical follow-up. The treatment armamentarium is extremely diverse, ranging from observation, prolonged bracing, steroid injections, multiple perforations of the cyst's cortex, curettage and bone grafting, to percutaneous autologous marrow injections [1].

The rapid growth rate at the distal radius in the very young child may give the false impression that the cyst is expanding, and this may call for a more

aggressive approach by the surgeon facing a growing lesion. This enlargement seems to be temporary and the cystic cavity begins to decrease in size after the third month post-fracture. Conservative treatment should always be the initial mode of treatment. Biopsy, curettage, bone grafting, steroids or bone marrow injection should be delayed for at least 3 months. Early aggressive treatment may sometimes result in unnecessary complications and a more contemplative attitude is recommended. Enlargement of the cyst cavity beyond the period of 3 months, or the need for a brace beyond 6 months due to a cyst cavity threatening bone

integrity should be considered an indication for a different treatment approach such as curettage and bone marrow injection [5].

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