

## Simple bone cyst (unicameral bone cyst)<sup>1</sup>

### Definition

This is typically a unilocular cystic lesion filled with serous fluid found in a major long bone in skeletally immature patients.

### History

First recognised by Virchow.

### Epidemiology

Male>female 2:1

80% of cases between 3 and 14, and uncommon after 20

### Aetiology

Virchow felt that SBC were formed by central cystic softening of an enchondroma.

OKU 7 describes these cysts as developmental anomalies of the physis where there is a transient failure of ossification of physeal cartilage and cyst formation.

Another theory is that of a localised bleed results in an intramedullary haematoma and localised venous stasis with development of a cyst.

### Localization

Proximal humerus	60-70%
Femur	15%

Pelvic cysts are seen in older adult patients.

Calcaneal cysts are also seen in adults rather than adolescents

### Clinical

Pain

Pathological fracture

Swelling or deformity on occasion.

Most are asymptomatic and go unrecognised.

### Radiology

Central lucency within the medullary cavity of the shaft of major long bone.

Narrow zone of transition with well defined sclerotic margins.

Cortex is not disrupted unless there is a pathological fracture and the lesion doesn't extend into the soft tissues.

In a pathological fracture a segment of cortex may break off and drop into the distal part of the lesion, constituting the fallen fragment sign (Reynolds 1969).

Extension into the epiphysis can occur in skeletally mature patients.

CT and MRI will confirm the extent of the lesion and its cystic nature, with a very bright signal on T2 weighted images and low intensity on T1 weighted images.

After resolution of a cyst there may be a residual disorganised pattern to the trabeculae.

### Gross pathology

The fluid is yellowish/serous, similar to serous effusions in other cavities.

Usually consists of a single cyst but may be multilocular.

Wall consists of paper thin, brownish yellow fibrous tissue.

The pressure within the cyst is high.

### Microscopy

The walls consist of fibrous tissue without a lining.

The fibrous tissue may contain giant cells, dilated vessels and scattered inflammatory cells.

### Classification

A simple classification (Neer's) is into:

A. Active -usually juxta-epiphyseal

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<sup>1</sup> Dorfman's book considers uncameral bone cyst to be a misleading term because some of these lesions may consist of several multilocular cavities

B. Inactive -the cyst lies nearer the diaphysis (is more than 2cm removed from the physis)

Inactive cysts are less aggressive and more amenable to treatment

### **Treatment**

Pathological fractures should be allowed to heal prior to any regime of injections. They can be treated closed or with flexible intramedullary nails, which may allow earlier movement and make casting unnecessary.

Injection of methylprednisolone is successful in 90% of cases and can be repeated if required. This was described by Campanacci and Scaglietti. Typically 2 to 6 injections are required.

Injection of iliac crest bone marrow was reported by Lokiec and Wientraub, who reported on an 84% rate of healing with repeated punctures and iliac crest bone marrow.

Chang's series of steroid and bone marrow injections showed no benefit of bone marrow injections over steroid injections.

Rougraff reported on injection with demineralised bone matrix and bone marrow. They felt that patients were able to return to activities very quickly after this treatment, usually within 6 weeks. They also felt that fewer injections were required, with more than half of their 23 patients requiring only 1 injection and the rest only one more. They emphasised that the slurry be injected from the very top and bottom of the cysts, where they feel that the cyst may be more active.

One other approach is to allow continuous drainage of the cyst by

leaving a cannulated screw protruding from the lesion.

Expanding lesions in weight bearing bones can be curetted and packed with bone graft, with a recurrence rate of 18-36%.

### **Prognosis**

Spontaneous healing may occur after pathological fracture, but is often incomplete and is also often complicated by repeated fracture.

Growth arrest and coxa vara may result from the cyst or after curettage and grafting.

Very rare malignant change noted, including to a chondrosarcoma.

Simple cysts tend to spontaneously resolve in the late teens and rarely persist into adulthood.