Acta Scientific MEDICAL SCIENCES (ISSN: 2582-0931)

Volume 8 Issue 12 December 2024

Guest Editorial

# Cinch and Snap-Simple Bone Cyst

**Anubha Bajaj***

*Department of Histopathology, Panjab University/A.B. Diagnostics, India*

***Corresponding Author:** Anubha Bajaj, Department of Histopathology, Panjab University/A.B. Diagnostics, India.

**Received:** October 07, 2024

**Published:** November 01, 2024



Simple bone cyst emerges as a benign lesion confined to intramedullary compartment of bone. Additionally designated as solitary bone cyst, the terminology of unicameral bone cyst is not recommended.

Preponderantly unilocular, the cystic lesion is layered by a wall of fibrous tissue wherein the cyst is pervaded with serous or sero-sanguineous fluid. Additionally, cyst appears devoid of an epithelial layer coating the cyst.

Cyst wall depicts fibrin-like deposits which may organize and mineralize, thereby configuring immature and mature bone along with cementum-like articulations. Plain radiographs expound a cystic bone lesion.

Simple bone cyst predominantly (~85%) emerges within first two decades of life. A male preponderance is observed with male to female proportion of 3:1 [1,2].

Simple bone cyst preponderantly involves the appendicular skeleton, metaphysis of proximal humerus or proximal femur. Besides, radius, sacrum, vertebral column or jaw bones may delineate the lesion. Bones as calcaneum, talus or pelvic bones with iliac wings are infrequently implicated, especially within older subjects.

Of obscure aetiology and pathogenesis, simple bone cyst is posited to emerge as a reactive condition or may configure as a lesion with disordered development, possibly due to deranged growth upon the epiphyseal plate [1,2].

Simple bone cyst is predominantly asymptomatic. Alternatively, lesion may be associated with pathological fracture and localized pain or soft tissue and bone swelling due to the fracture [2,3].

Cytological smears expound aspirates of minimal cellularity wherein cellular component is comprised of histiocytes, lymphocytes and osteoclastic giant cells [2,3].

Although exceptionally adopted, frozen section depicts fragments of fibrotic cyst wall and bony fragments along with or devoid of fibrin-like substance confined to the cyst wall [2,3].

Grossly, the intact simple bone cyst is layered with attenuated, smooth cyst membrane and permeated with straw coloured or clear fluid, preponderantly confined to the enlarged intramedullary cavity. Generally unilocular, the cyst may appear as a multilocular lesion.

Curettage of simple bone cyst displays multiple, attenuated, greyish or reddish fragments of membranous tissue intermingled with bony fragments and haemorrhagic soft tissue [3,4].

Upon microscopy, simple bone cyst delineates an attenuated wall of fibrous tissue comprised of spindle shaped fibroblasts. The cyst wall appears devoid of layering epithelium. Cyst cavity is traversed by irregular bands of fibrin-like tissue. The traversing bands are frequently calcified and appear to simulate odontogenic cement. Cyst cavity is impregnated with osteoclast-like giant cells, foamy histiocytes, hemosiderin pigment deposits and cholesterol clefts which may be embedded within the cyst wall [3,4].

Simple bone cyst associated with pathological fracture may demonstrate foci of reactive bone.

Ultrastructural examination depicts collagen fibres and innumerable matrix vesicles entangled within a cementum-like substance.

Neoplasm is composed of dual cellular subtypes simulating morphological features of type A and type B synovial cells layering the cyst [3,4].

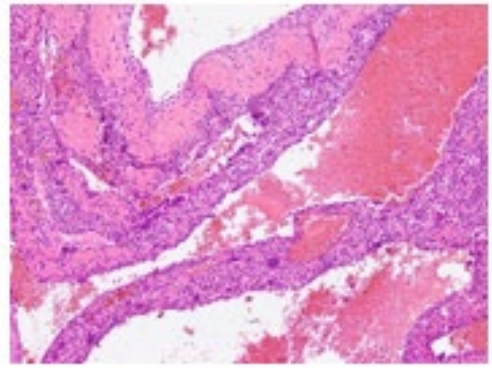

**Figure 1:** Simple bone cyst layered by fibrous tissue composed of spindle shaped fibroblastic cells and an absence of lining epithelium. Cyst cavity is traversed by bands of fibrin-like tissue along with foamy histiocytes and hemosiderin pigment deposits [6].

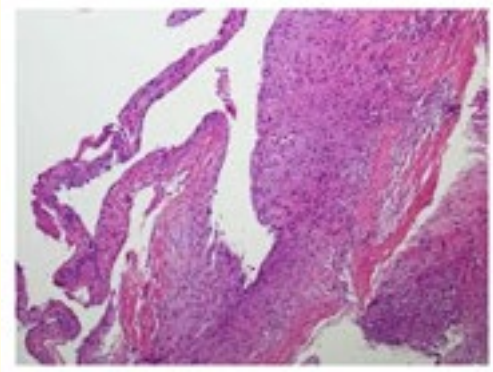

**Figure 2:** Simple bone cyst layered by fibrous tissue composed of spindle shaped fibroblastic cells and an absence of lining epithelium. Cyst cavity is traversed by bands of fibrin-like tissue along with foamy histiocytes and hemosiderin pigment deposits [7].

TNM staging of osteogenic sarcoma is denominated as [3,4].

### Primary tumour

### Limbs, trunk, skull, facial bones

- TX: Primary tumour cannot be assessed
- T0: No evidence of primary tumour
- T1: Tumour is ≤ 8 centimetre magnitude
- T2: Tumour is > 8 centimetre magnitude
- T3: Primary tumour site exhibits multi-centric neoplasms

### Spine

- TX: Primary tumour cannot be assessed
- T0: No evidence of primary tumour
- T1: Tumour is confined to single vertebral segment or singular focus of vertebrae or two adjacent vertebral foci
- T2: Tumour is confined to three adjacent vertebral segments
- T3: Tumour is confined to ≥ 4 adjacent vertebral segments or non adjacent vertebral segments
- T4: Tumour invades spinal canal or great vessels of vertebral column
- T4a: Tumour extends into spinal canal
- T4b:Tumour invades great vessels of vertebral column or impedes vascular outflow

### Pelvis

- TX: Primary tumour cannot be assessed
- T0: No evidence of primary tumour or extra-osseous extension
- T1:Tumour manifests singular focus within pelvis
- T1a: Tumour is ≤8 centimetre magnitude
- T1b: Tumour is > 8 centimetre magnitude
- T2: Tumour is confined to singular pelvic focus with extra-osseous extension or two pelvic foci with absent extra-osseous extension
- T2a: Tumour is ≤8 centimetre magnitude
- T2b: Tumour is >8 centimetre magnitude
- T3: Tumour is confined to two pelvic foci with extra-osseous extension
- T3a: Tumour is ≤8 centimetre magnitude

- T3b: Tumour is > 8 centimetre magnitude
- T4: Tumour is confined to three pelvic foci or extends beyond sacroiliac joint
- T4a: Tumour invades sacroiliac joint and incriminates sacral neuro-foramina
- T4b: Tumour encases regional vasculature or impedes vascular outflow

### Regional lymph nodes

- NX: Regional lymph nodes cannot be assessed
- N0: Regional lymph node metastasis absent
- N1: Regional lymph node metastasis present which is exceptional in a primary bone sarcoma

### Distant metastasis

- M0: Distant metastasis absent
- M1:Distant metastasis present
- M1a: Metastasis into pulmonary parenchyma
- M1b: Metastasis into various bones or viscera

Generally, cogent immunohistochemistry remains superfluous for diagnostic ascertainment. Tumour cells display intense fuscinophilic countenance with elastic van Geison stain and may be highlighted with procollagen I, collagen I, collagen III or bone proteoglycan (decorin). Osteoblasts may be suitably detected with transcription factors RUNX2 and osterix.

Tumour cells appear immune non reactive to fibrin and various non-collagenous proteins [4,5].

Simple bone cyst requires segregation from neoplasms such as aneurysmal bone cyst, intraosseous ganglion cyst, fibrous dysplasia, enchondroma, benign chondroblastoma, giant cell tumour or chondromyxoid fibroma [4,5].

Appropriate discernment of simple bone cyst necessitates concurrence of plain radiographic features with cogent histological features.

Plain radiographs depict a unilocular, radiolucent lesion confined to intramedullary compartment demonstrating symmetrical expansion of bony cortex [4,5].

Pathological fracture delineates fragments of cortical bone floating within cyst fluid, a feature designated as the 'fallen leaf sign'. Aforesaid phenomenon appears pathognomonic of simple or unicameral bone cyst. Occurrence of 'gas bubble' within a significantly non-dependent area of simple bone cyst is designated as 'rising bubble' sign [4,5].

The predominantly multi-locular appearance of the cyst occurs due to healing of repetitive fractures with configuration of multiple septa.

Computerized tomography (CT) displays a cystic lesion delineating well circumscribed perimeter and homogenous fluid attenuation.

Magnetic resonance imaging (MRI) exhibits minimal signal intensity upon T1 weighted imaging. T2 weighted imaging expounds an enhanced signal intensity, thereby confirming elevated fluid content of the cyst [4,5].

Simple bone cyst may be aptly treated with simple curettage with bone graft. Alternatively, cyst fluid may be aspirated followed by injection of steroids within the cyst cavity [4,5].

Simple bone cyst is associated with superior prognostic outcomes. Localized tumour recurrence occurs in up to 20% lesions.

Factors contributing to unfavourable prognostic outcomes emerge as ~age of implicated subjects ≤ 5 years

- Enlarged tumour magnitude
- Occurrence of pathological fracture
- Emergence of cyst adjacent to bony epiphysis [4,5].

## Bibliography

1. Evans J., *et al*. "Unicameral Bone Cyst". Stat Pearls International. Treasure Island. Florida (2023).

2. Lin CS., *et al*. "Simple bone cysts of the proximal humerus presented with limb length discrepancy: A case report". *World Journal of Clinical Cases* 12.6 (2024): 1130-1137.

3. Ong SLM., *et al*. "No NFATC2 fusion in simple bone cyst of the jaw". *Histopathology* 83.2 (2023): 326-329.

4. Kim JS. "Simple bone cyst recurred in adjacent areas: A case report". *Imaging Science in Dentistry* 53.4 (2023): 383-388.

5. Choi SY., *et al*. "Analysis of the fluid contents of simple bone cyst in the mandible". *Scientific Report* 12 (2022): 10083.

6. Image 1 Courtesy: Pathology outlines.

7. Image 2 Courtesy: Science direct.