

Radiological Imaging of Unicameral Bone Cysts

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Letter to Editor

The monoanterior chamber bone cyst (UBC) or simple / isolated bone cyst was first described by Virchow in 1891 as the “cystic structure”. This was due to anomalies in local circulation at the time [1]. These cysts can also be multiple. These cavities, filled with benign liquid, expand over time and thin the bone. These cysts are usually reported in the metaphyseal region of a long bone with an open body. Efforts to classify these lesions in a way that predicts their natural history have not been successful. Eighty-five percent of UBC occurs almost exclusively in children and adolescents. The reported peak is between 3 and 14 years, with a median age of about 9 years at diagnosis [2]. UBC accounts for about 3% of all biopsied bone tumors and is twice as common in boys as in girls [3]. Many hypotheses have been proposed for the formation of UBC. These include local impairment of bone growth, the role of existing lesions, intramedullary hemorrhage for some post-traumatic cysts to share the same histological features as UBC, and synovial cells trapped in intraosseous locations includes small nests. Blockage in the venous drainage is the most favored mechanism which occurs in a rapidly growing and remodeling portion of cancellous bone. Chiriga et al. [4] found slightly increased internal pressure of involved bone as compared to normal pressure of bone marrow lower partial pressure of oxygen of cyst fluid than arterial or venous blood suggesting a venous obstruction. Factors contributing to bone resorption are high internal pressure and fluid accumulation, venous stasis and developmental anomaly occurring in the veins [5]. The cyst fluid has been shown to contain increased levels of lysosomal enzymes than serum. Based on this observation, an enzymatic role in the growth of simple bone cysts is hypothesized. Bone resorption factors in cyst fluid (prostaglandins, interleukin 1 β , nitrate and nitrite levels, and proteolytic enzymes) were measured in a study by Komiya [5]. Tumor necrosis factor α and interleukin 1 β and 6 because UBC is more aggressive in the first 10 years of life, the recurrence rate in these patients are four times higher than in adolescents [6]. Because UBC is painless, 80% of patients are asymptomatic unless they have a pathological gross fracture or an unresolved stress fracture. Symptoms of patients with no history of trauma include mild pain, local tenderness, and in some cases swelling. In some patients who have never developed symptoms, the lesion may be an accidental finding on radiographs. UBC has been diagnosed in almost every bone. However, in more than 95% of cases, long bones are affected [6]. Almost 90% of these cases are associated with the proximal humerus and femur. UBC in the proximal humerus more commonly occurs where 80% of growth occurs and tends to disappear after puberty. Conversely, 50% of patients with proximal femoral UBC in 17 years or older and have an age range of up to 54 years. UBC is classified as active if it is within 1 cm of the epiphysis and as latent if it advances to the epiphysis.

UBC is classified as active when it is within 1 cm of the epiphysis and potential when it progresses to the diaphyseal site. UBC usually begins at the metaphysis near the body and at the metaphysis of the greater trochanter of the long bone. Over time, as the humerus grows, UBC moves distal to the diaphysis and is found in the center of the humerus. On the other hand, in the proximal femur, UBC rarely descends below the proximal diaphysis. About 6-10% of UBCs have been reported in adult flat bones. It has been hypothesized that this

slow symptom may be due to the location that protects the flat bone from trauma. Simple X-rays are the best method and have high diagnostic accuracy. The cyst is not eccentric and develops in the center of the medullary cavity whose major axis is parallel to the length of the bone. Due to its central location, cortical destruction and soft tissue components are rare [7]. These are the metaphysis and flanks with a thin scleral margin in location and geographic appearance. Cortical destruction and periosteal reactions are usually absent, but are present in associated fractures. Rarely, a simple bone cyst is found in the diaphysis, which looks like a large, slightly dilated anterior chamber. If there is a fracture, there are signs of “falling debris”. Similarly, bubbles that have moved upwards (“signs of rising bubbles”) are also described for single-chamber cysts. This sign is considered pathological and does not require any other modality to confirm this diagnosis [8].

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Conflict of Interest

None

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