



# Aneurysmal Bone Cyst Causing a Femoral Neck Fracture: A Pediatric Case

## Anevrizmal Kemik Kistine Bağlı Femur Boyun Kırığı: Pediatrik Olgu Sunumu

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### ABSTRACT

Aneurysmal bone cysts are benign active or aggressive bone lesions that commonly arise in the long bones, especially the femur, tibia and humerus and in the posterior elements of the spine. They are extremely rare, occurring in 1.5 per one million people per year. They most commonly occur in the metaphysis of long bones during the first two decades of life and usually present with pain, swelling or fracture. The etiology of aneurysmal bone cysts is unknown, but numerous authors have proposed that they form in response to vascular disruption in the bone due to a pre-existing primary tumor or a traumatic insult. The early rate of growth of aneurysmal bone cysts is also unknown. We wanted to share this case to show the destructive effects of aneurysmal bone cysts.

**Keywords:** Bone cyst, femoral neck fracture, curettage

**Received:** 17.12.2011 **Accepted:** 22.02.2012

### ÖZET

Anevrizmal kemik kisti, iyi huylu, genişleme özelliği olan, daha çok çocukluk ve adolesan çağlarda görülen kemik lezyonlarıdır. Özellikle femur, tibia, humerus gibi uzun kemikler ve vertebra posterior elemanlarına yerleşir. Yaklaşık yılda 1.5 milyon insan bu hastalığa maruz kalmaktadır. Herhangi bir kemik segmentini tutabilmekle birlikte en sık tutulum alanları uzun kemikler ve vertebraların metadiyafizleridir. Etiyolojide hala fikir birliği sağlanamamıştır. En güçlü kabul edilen görüş kemiğe gelen mikrotravmaların kemiğin dolaşımını bozduğu kabul edilmektedir. Tedavi seçeneğine hastanın şikayeti, lezyonun lokalizasyonu ve büyüme hızına göre karar verilir. Kliniğimizde teşhis ve tedavisini yaptığımız bu vakayı hastalığın insi ve yıkıcı etkilere yol açabileceğini vurgulamak amacı ile meslektaşlarımızla paylaşmayı amaçladık.

**Anahtar Kelimeler:** Kemik kisti, femur boyun kırığı, küretaj

**Geliş Tarihi:** 17.12.2011 **Kabul Tarihi:** 22.02.2012

### Introduction

Aneurysmal bone cysts (ABC) are benign active or aggressive bone lesions that commonly arise in the long bones, especially the femur, tibia, and humerus and in the posterior elements of the spine (1, 2). They are extremely rare, occurring in 1.5 per one million people per year. They most commonly occur in the metaphysis of long bones during the first two decades of life and usually present with pain, swelling or fracture. The etiology of ABC is unknown, but numerous authors have proposed that they form in response to vascular disruption in the bone due to a pre-existing primary tumor or a traumatic insult (3). The early rate of growth of ABC is also unknown.

### Case Report

A 14-year-old boy suffered from a left femoral neck fracture in July 2010 while playing football. He was previously healthy, and presented to the outpatient clinic with a complaint of hip pain of four weeks in duration (Figure 1). He also complained of pain over his left hip region, which was dull, aching, non-radiating, continuous, and which increased with walking and was associated with a limp. The patient walked with an antalgic gait and pointed out numbness over his left thigh which radiated along the lateral aspect of the thigh. The movement and power of the left hip were normal except for pain during wide abduction. There was no history of fever, chronic illness or swelling in other body regions. The blood analysis, including a complete blood count, erythrocyte sedimentation rate, liver and renal function tests, fasting blood sugar levels and coagulation profile were normal. There

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was no clear initiating factor, such as trauma. There were no other symptoms or complaints. Intraoperative evaluation showed an approximately 8 × 4 cm mass over his left hip region. It was a highly vascular lesion with multiple blood-filled cavities. The liquid-liquid level (shown by black arrows) was significant within the medullary canal. He was treated with open reduction, wide margin curettage (debulking) for preserving hip stability and preventing recurrence. The defect was replaced with an allograft stabilized by means of a DHS plate (Figure 2). The fracture healed uneventfully and by 2010 December, the fracture had healed radiographically and he had returned to all activities without any pain or limitations within 12 weeks of surgery.

## Discussion

Jaffe and Lichtenstein first described ABC as a distinct pathologic lesion in 1942 (1, 3). Biesecker et al. observed that 32% of their cases were associated with other benign lesions of the bone (1, 3, 4). The precise pathogenesis of ABC is unclear, although theories ranging from post-traumatic bone alteration, reactive vascular malformation and genetic predisposition have been described (5). The most widely accepted pathogenic mechanism for the development of ABC involves a hypothetical local circulatory disturbance that leads to markedly increased venous pressure and the development of dilated and enlarged vascular elements within the affected bone (6). A few case reports in the last decade have lent further support to Biesecker's theory (3). They have confirmed the presence of a post-traumatic ABC following an injury in which initial x-rays showed no suggestion of a bone lesion. In one case, an ABC developed at the fracture site in the proximal tibia within six months of the injury. In all of these cases, the tumor appeared at the local site of injury, suggesting that the injury led to the formation of the lesion. In some cases, it has been reported that radical wide resection of primary tumors and reconstruction with appropriately rigid prosthetic material are necessary to avoid instability and to minimize local recurrence (7-9). In this case, we show that the most common and effective procedure is curettage with/without grafting. However, high recurrence rates have been reported, from 10 to 59%. Ozaki et al. reported 17% recurrence rates with curettage and cement application (8, 10, 12, 13). In the same study, the results were compared with cryotherapy and lower complication rates were found in the cement group. The advantages of this technique are that it is easy to perform and the cement provides structural support in the cavity. However, it has limitations, as neurovascular structures and the growth plate should be protected from the heat generated with this technique. Good results (between 82-96% success) have been reported with cryotherapy (11, 12).

However, progression of fractures, local infection, fusion or nerve damage with associated fractures and growth plate destruction are potential complications (11, 12). Corticosteroid injections are ineffective in the treatment of aneurysmal bone cysts (11). Although radiotherapy has been used in the treatment of ABC in doses between 30-40 Gy to ossify cysts, it is not usually preferred due to various complications such as osteonecrosis, shortening, gonad damage and sarcoma (9-11). Some case reports have employed intralesional injection of calcitonin and methylprednisolone for the treatment of ABC. This method is safe and effective, and is an important alternative to surgery, especially when a surgical procedure is technically difficult or unsafe in high-risk patients (11).



Figure 1. AP x-rays after injury



Figure 2. AP x-ray after 8 week demonstrating an eccentric, geographic lytic lesion in the proximal femoral metaphysis

## Conclusion

ABC is a rare benign bone tumor that presents primarily in the first two decades of life and exhibits a slight female predominance. Rapid and silent progression is the most important quality of ABC. The ideal treatment plan includes effective curettage through broad exposure in addition to grafting and rigid internal fixation.

### Conflict of interest

No conflict of interest was declared by the authors.

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