



# Aneurysmal femoral neck cyst: Report of a paediatric case and review of literature

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## ABSTRACT

The aneurysmal bone cyst (ABC) is a benign tumour of children and young adults. It represents approximately 1-2% of all bone tumours. The ABC may develop on all skeletal bones, but the proximal end of the femur is the most common location. The authors report a ABC femoral neck in a child of 13 years. This location is pretty special. Indeed, the fragility of the femoral neck due partly to the pathology itself and secondarily curettage requires a judicious attitude surgical (excisional curettage + bone graft + screw) to prevent the risk of high local recurrence and pathological fracture.

**Key words:** Aneurysmal bone cyst, child, femoral neck, surgery

## INTRODUCTION

Aneurysmal bone cyst (ABC) is defined according to the WHO as 'benign cystic lesion of the bone, consisting of blood-filled cavities and separated from each other by septa of connective tissue containing fibroblasts, giant cells and osteoclast reactive trabecular bone'.<sup>[1]</sup> This is a benign tumour of children and young adults. Its incidence in the general population is 0.14/100,000 inhabitants, the peak incidence is recorded in the second decade of life.<sup>[2]</sup> It is approximately 1-2% of all bone tumours.<sup>[2]</sup> The ABC may develop on all skeletal bones, but the proximal end of the femur is the most common site.<sup>[3]</sup> Its aetiology remains unknown despite many theories.<sup>[4]</sup> Clinical signs of the ABC have no specificity, sometimes making diagnosis difficult. Plain radiography is the examination of choice and allows a probable diagnosis, but only histology can confirm

it.<sup>[1,4]</sup> Several therapeutic methods are proposed today, but some remain controversial.<sup>[4]</sup> Most cases reported in literature have been reported by European or American teams.<sup>[1,3,5]</sup> However, few studies have been conducted in Africa on ABC,<sup>[6,7]</sup> none in Senegal. That is why we report a case of an aneurysmal femoral neck cyst in a child of 13 years to discuss the diagnosis and treatment of the disease in this location.

## CASE REPORT

This is the child 'GL' 13-year-old, male, with no particular medical history, who was consulted with the Emergency Department of Pediatric Surgery at Aristide Le Dantec Hospital in Dakar for pain in the right thigh and lameness in the right lower limb.

The onset of these symptoms began about 1 month ago. During a football match, he had fallen down, causing pain and swelling in the inner side of the right thigh. The evolution was marked by a regression of the swelling and persistent mechanical pain. That motivated the parents to consult with our service for better management.

The admission examination found a good general and haemodynamic status, analgesic attitude (bent trunk on the right side), painful end proximal thigh on palpation, especially in the inner side. The amplitude of the hip motion was normal, except that the internal

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and external rotations, which were painful. The rest of the examination was normal.

To establish the diagnosis, a paraclinical examination was requested. Radiography showed an eccentric cystic lesion, multilocular with cavities that were separated by septa and thin cortical bone. The lesion was invading almost the entire femoral neck. The trochanters were not affected by this lesion and it did not cross the growth plate. The soft parts did not appear to be invaded [Figure 1].

Ultrasound of the hip was normal as well as laboratory tests (complete blood count, C-reactive protein, blood sugar and haemostasis).

Before the patient's radiographic findings, the diagnosis of ABC was discussed, and the surgical indication was asked for and performed. After the anterior Hueter approach of the right hip joint, opening of the capsule and trepanation of the femoral neck, about 10cc were taken from a haematic fluid-filled cyst cavity. The lesion was curetted, cancellous graft from the ipsilateral iliac bone filled the cyst cavity. The gesture was completed by prophylactic screwing with a spongy screw and drainage of the joint before the closure of the surgical wound.

Histological study concluded to an ABC before the presence of fibroblasts associated with osteoclasts and osteoid (giant cells of osteoclast type). Cytologic results showed a haematic material containing RBCs [Figure 2].

After a follow-up of 3 months, the functional outcome was satisfactory with complete indolence, a walk with partial support of the limb and a healed surgical wound. Radiography showed a partial filling of the curetted cavity and a screw in place [Figure 3]. The removal of the screw is recommended after a total filling of the curetted cavity.

## DISCUSSION

ABC accounts for about 1-2% of all primary bone tumours.<sup>[2,8]</sup> Its incidence in the general population is 0.14/100,000.<sup>[5]</sup> The lesion can be observed at any age, it clearly predominates among patients aged 10-20 years.<sup>[3]</sup> The sex ratio is 1 to 1,04 and the average age is 13 years, ranging from 1 to 59 years.<sup>[5]</sup> In our work, we present a 13-year-old boy.

The ABC is a lesion that may sit at all the bones of the skeleton, but in 50-60% of cases, it occurs in the



Figure 1: Anteroposterior pelvic radiograph showing a lesion of the right cystic femoral neck, eccentric, multilocular with septa

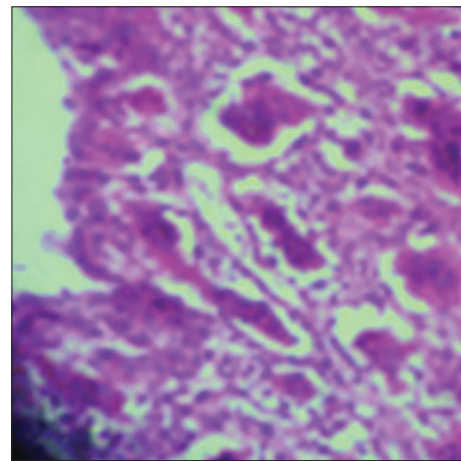


Figure 2: Histology of the surgical specimen of an aneurysmal femoral neck cyst showing giant cells



Figure 3: Radiograph of the pelvis after 3 months postoperatively, showing a partial filling of the cystic cavity

metaphyses of long bones.<sup>[3,5]</sup> The proximal end of the femur is the commonly encountered location.<sup>[3,9]</sup> There are no studies of ABC according to different segments of the proximal femur. However, the aneurysmal

femoral neck cyst is distinguished by its fragility with a pathological fracture risk of about 10-11%.<sup>[10]</sup>

Symptoms of aneurysmal femoral neck cyst are generally poor. Its main interest is to attract attention and then lead to additional paraclinical investigations that enable the diagnosis. Plain radiography is the first examination in the diagnosis of a bone cyst. The usual radiological aspect of ABC corresponds to a lytic metaphyseal lesion, oval or rounded, eccentric, multilocular with cavities separated by often large cortical septa.<sup>[4]</sup> These aspects were found in our patient. The differential radiological diagnosis of aneurysmal femoral neck cyst is essentially the cracked essential bone cyst. Although other lesions (giant cell tumour, fibrous dysplasia and non-ossifying fibroma) which are similar to the ABC were listed, they are quickly eliminated.<sup>[2,11]</sup>

Computed tomography scan and magnetic resonance imaging have not been performed in our patient, but they are used in the diagnosis of ABC. They come in addition to the examination and still used in second intention.

Several authors agree that the biopsy is needed prior to diagnosis.<sup>[1,4]</sup> It lets you know the mitotic index of the lesion and to tailor the treatment. For some authors,<sup>[12]</sup> biopsy would be lonely sufficient to cure an ABC. In our patient, we performed in a single stage operation, biopsy and surgical cure. Our attitude is explained by the fact that the hip joint is deep and doing first biopsy, and secondarily the cure after histological confirmation seems excessive. The pathological findings of the surgical specimen were in favour of an ABC.

Several procedures for taking therapeutic ABC have been described in literature.<sup>[1,4,7,9,12,13]</sup> In the inactive lesions, no treatment is recommended, but the actual incidence of spontaneous recovery is difficult to assess because there are no series reporting a natural history of ABC without treatment. In most cases, when an ABC is diagnosed, a surgical treatment is recommended. Curettage is the standard therapeutic method.<sup>[6,9,13]</sup> Our technical method, i.e. excision of the lesion, a complete curettage of the banks, a bone graft and preventive screwing of the proximal femur may be a good therapeutic alternative because it allowed us to have an improvement of the symptoms as well as a partial filling of the curetted cavity after 3 months of follow-up without risk of pathological fracture. Similarly, Yongu *et al.*<sup>[7]</sup> adopted the same therapeutic approach with satisfactory results. de Mattos *et al.*<sup>[8]</sup> think that lesions that occur in the proximal femur

should be treated more aggressively, in part because of the high rate of local recurrence and the risk of fracture. Even if we adopt a too aggressive surgical attitude, the key is to make no harm.

Resection with wide resection followed by immediate reconstruction is a rather therapeutic used method,<sup>[1,4]</sup> but was not suitable for this location at the femoral neck. Selective arterial embolisation was not our choice of therapy because the lesion in our patient was not very large, so there was no risk of bleeding.

The evolution of ABC after treatment is usually favourable, but is, nevertheless, unpredictable and justifies prolonged monitoring.

## CONCLUSION

The ABC is a benign tumour of the child and adolescent. Its diagnosis is suspected on plain radiographs, but only histology can confirm it. The fragility of the femoral neck due in part to the disease itself, and secondarily to curettage requires a judicious surgical attitude to prevent the risk of high local recurrence and pathologic fracture.

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## Conflicts of interest

There are no conflicts of interest.

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