

Total Hip Replacement in Fracture of Hip with Unicameral Bone Cyst – A Rare Case Report

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Learning Point of the Article:

Cemented THR is an appropriate approach for a pathological fracture neck of the femur with a unicameral bone cyst in an elderly patient.

Abstract

Introduction: Unicameral (simple) bone cysts (UBCs) are fluid-filled intramedullary cavities commonly seen in the metaphysis of long bones in young patients under the age of 20 years. Pathological hip fractures associated with UBCs in the proximal femur are rare, especially in non-osteoporotic elderly patients. The management of such tumors, such as benign lesions of bone causing pathological fractures at the biomechanically critical load-bearing zone of the neck of the femur, remains a clinical challenge due to limited literature on optimal treatment strategies.

Case Report: A 60-year-old non-osteoporotic male presented with right hip pain and inability to walk for 10 days, without any history of recent trauma. X-ray pictures revealed a pathological hip fracture of the right hip in the neck of the femur with an associated lytic lesion with benign radiological appearance. Computed tomography scan confirmed a bony cystic lesion, whereas a DEXA scan ruled out osteoporosis. Oncological workup excluded any metastatic pathology, and the patient was managed surgically with cemented total hip replacement (THR). Intraoperatively, a cystic lesion in the femoral neck was excised and sent for histopathological analysis, which confirmed it to be a unicameral (simple) bone cyst. The patient was mobilized on the first post-operative day and achieved excellent functional recovery, with a Harris Hip Score of 90 at 12 months follow-up.

Conclusion: Pathological fractures of the femoral neck due to UBCs are exceptionally rare in elderly patients. This case highlights the successful management of a unicameral bone cyst with cemented THR, demonstrating that THR can be a viable treatment option for pathological hip fractures due to benign bone lesions in older adults.

Keywords: Bone cysts, pathological fracture, femoral neck fracture, total- hip replacement.

Introduction

Unicameral bone cyst (UBC), also known as a simple bone cyst (SBC) is an intramedullary fluid-filled cavity containing serous or serosanguinous fluid in the metaphysis of long bones, commonly seen in patients under 20 years of age [1].

The proximal femur is the 2nd most common site of unicameral

bone cyst following the proximal humerus [1, 2,3]. It is usually an incidental finding or they present with pain due to pathological fractures [3]. The management of pathological hip fractures due to metastatic carcinomatous lesions is well-studied as compared to benign lesions of the hip with pathological fractures.

Author's Photo Gallery



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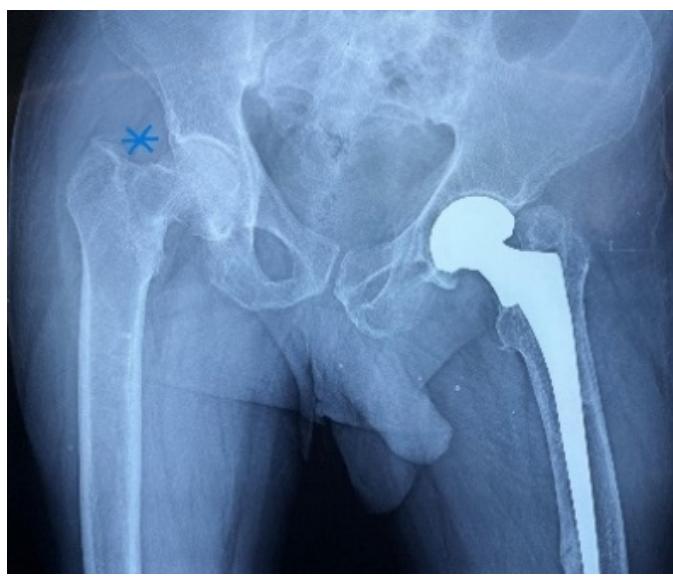


Figure 1: Pre-operative radiograph revealing an osteolytic lesion in the right neck of the femur (blue asterisk) and left hip bipolar implant in situ.

Young adults with pathological hip fractures of benign conditions can be treated with cementless fixations but geriatric populations need immediate implant stability & early full weight mobilizations & won't afford on growth or ingrowth waiting times seen in uncemented implants, such conditions are best treated with cemented arthroplasty & avoid implant

failure risks in preexisting osteoporotic bones, or complications like periprosthetic fractures. As literature on cemented THR specifically for pathological fractures secondary to unicameral bone cyst in this age group is almost nonexistent & most of the case reports mention other cystic lesions of younger populations [4], we present rare case report for successful management of such fracture in an elderly patient with follow-up of one year duration.

Case Report

A 60-year-old male patient presented with complaints of right hip pain and inability to bear weight on his right lower limb for 10 days, with no history of recent trauma. The patient also had a history of neck of femur fracture in his left hip due to a traumatic cause, which was treated with uncemented hemiarthroplasty (elsewhere) four years ago. Clinical examination revealed shortening of the right lower limb, groin tenderness, and absent active SLR with no distal neurovascular deficits. x-ray of the Pelvis with both hips revealed a pathological fracture in the right neck of the femur with a lytic lesion at the basicervical region of the neck of the femur (Fig. 1). Computed tomography (CT) of the pelvis with both hips was performed, which confirmed the x-ray findings (Fig. 2). DEXA Scan revealed no evidence of osteoporosis, and the patient underwent an oncological workup to rule out any metastatic cause for the pathological fracture.

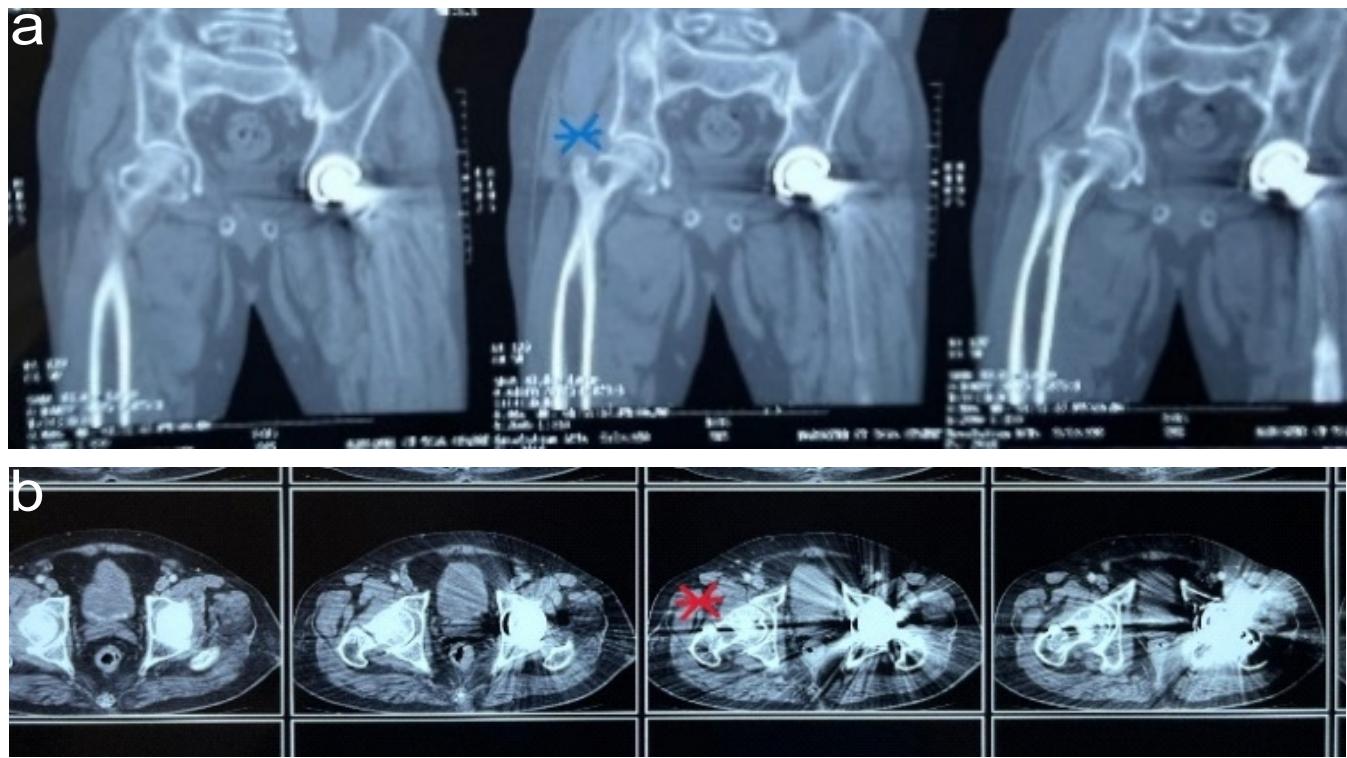


Figure 2: (a) Computed tomography (CT) scan coronal view (blue asterisk) confirms radiographic findings. (b) CT scan axial view with a red asterisk suggests the extent of the lytic bony lesion.



Figure 3: Post-operative radiograph showing cemented total hip replacement (right hip).

The patient subsequently underwent right cemented Total Hip Replacement using the lateral approach. A cyst-like lesion was identified in the right femoral neck, which was excised and sent for histopathological examination. The patient's postoperative radiograph was satisfactory (Fig. 3 & 5), and the patient was ambulated on the first postoperative day with support. The staples were removed after 2 weeks & followed for a year. Histopathological examination revealed Gray-brown soft tissue pieces with three blackish soft tissue pieces from the neck of the femur containing brownish gelatinous fluid. On microscopic examination, the sections from the neck of the femur showed necrotic bone, granulation tissue, haemorrhage, and hemosiderin-laden macrophages. Sections from the cyst

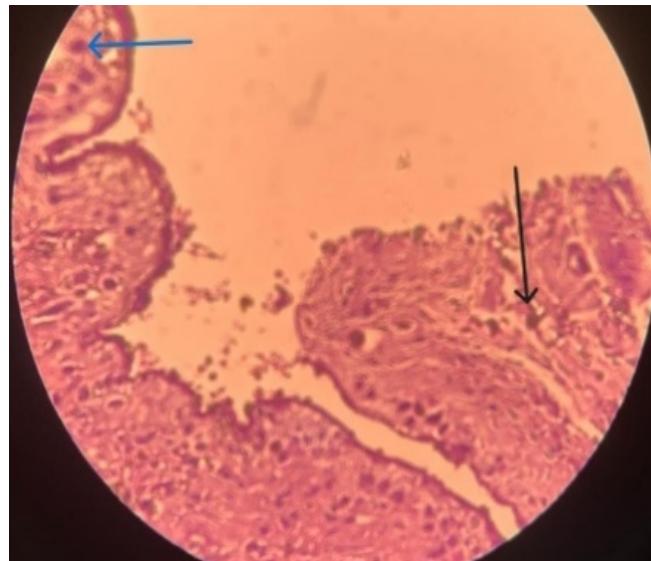


Figure 4: Histopathological image of a biopsy specimen's Unicameral bone cyst confirms the diagnosis, with the black arrow suggesting hemosiderin-laden macrophages and fibroblasts, whereas the blue arrow suggests osteoblasts and osteoclasts.

showed connective tissue, histiocytes, and hemosiderin pigment, suggestive of a unicameral bone cyst (Fig. 4).

Discussion

A unicameral (simple) bone cyst is a uniloculated fluid-filled cavity usually seen in the metaphysis of long bones. More than 85% of bone cysts occur in patients under 20 years of age, with males being twice as commonly affected as females [1,2,3]. The proximal humerus and proximal femur are the most commonly involved bones, although it can occur in any bone. However, above the age of 20 years, simple bone cysts are found to occur in the ilium and calcaneus [2]. These lesions are most active during skeletal growth, and most of them heal spontaneously. It is hypothesized that cysts are formed due to intramedullary venous occlusions [1]. SBCs are classified as active if the cyst is within 1 cm of the growth plate and latent if the lesion is beyond 1 cm from the growth plate, making it closer to the diaphysis [2]. These are mostly asymptomatic unless there is pain due to a pathological fracture. In the case of a pathological fracture, the cyst heals spontaneously in 2/3rd of such cases. However, this has not been reported for UBCs, causing pathological fractures of the hip in the current literature. Moreover, the biomechanical forces acting on the hip are too high to anticipate spontaneous healing at the fracture site of the femoral neck [1,5].

Radiologically, a unicameral bone cyst appears as a well-circumscribed osteolytic lesion located centrally. A periosteal reaction is observed in pathological fractures. The pathognomonic sign of a pathological fracture due to SBC is the 'Fallen fragment sign', which was not observed in our case [2].



Figure 5: Radiographs of One year follow up with stable Cemented THR of right hip.



Figure 6a: One year Follow up clinical picture Right Hip with healed surgical scar & Active hip flexion.



Figure 6b: One year Follow up clinical picture S/o balanced External rotations of both Lowerlimbs in extension & without LLD.

Usually, MRI is essential to assess other extra-articular or non-bony cystic lesions of the hip [6,7]. We avoided an MRI owing to the preexisting bipolar SS implant in the contralateral hip and performed a CT scan. This patient had a contralateral hip fracture 4 years earlier owing to a trivial fall, which raised the possibility of a benign cystic lesion in the left hip. As biopsy was not performed previously, it emphasizes the importance of biopsies if retrospectively analyzed for the possibility of bilateral UBCs in such cases of non-traumatic etiology.

Unicameral bone cysts contain yellowish colored serous material & a fibrous membrane lines the cavity wall. Deep to this lining, it contains fragments of immature bone, osteoclast giant cells, mesenchymal cells, and occasionally lymphocytes [2,8]. In case of a pathological fracture, the cystic fluid is discolored due to occult bleeding as seen in the HPE report.

Treatment for small lesions if asymptomatic is regular follow-ups and radiographs. Large-sized lesions that are at risk of pathological fracture are treated surgically. These include curettage & bone graft or internal fixation, or less invasive options like aspiration & injection of corticosteroid/bone marrow aspirate [2].

In young patients, non-arthroplasty surgeries can be considered [4,9]. However, in older patients with SBC in the neck of the femur leading to a pathological fracture, total hip arthroplasty is a better-suited treatment option. Cemented THR may have a better outcome as compared to uncemented total hip replacement [10]. As our patient was a 60-year-old with preexisting contralateral uncemented bipolar hemiarthroplasty, Cemented THR was done successfully. A post op Harris Hip

Score of 90 was achieved at 3 months & one year follow-up with x-rays s/o stable hip components & clinically painless mobile hip without LLD. (Fig. 3, Fig. 5, Fig. 6a, 6b).

There is limited literature regarding the treatment of pathological fractures due to UBC. The current case report throws light on success in the management of a UBC causing a pathological fracture in the neck of the femur of an elderly male with curettage of the cyst and cemented total hip replacement.

Interestingly, UBCs are among the uniquely placed benign bone tumours that can be reflected in all three stages of Enneking's classification for benign tumour-like lesions [11,12], hence, orthopaedic surgeons must be familiar with the spectrum of benign bone tumours and the approach to their surgical management.

Conclusion

The choice of treatment of benign lesions of bone may present as a clinical challenge for many surgeons. Cemented Total Hip replacement should be considered as a successful treatment option for pathological hip fractures due to UBC with pre-operative planning. Outcome following this surgery is akin to the surgeries performed for pathological fractures of neck of femur due to senile osteoporosis encountered at this age.

Clinical Message

Elderly patients with hip fractures of nontraumatic etiology require biopsy and have excellent clinical outcomes if treated with cemented THR in cases of unicameral bone cysts.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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