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Infrequent Case of Aneurysmal Bone Cyst in First Decade with Femur Neck Fracture and its Management Strategy

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Abstract: ***Tumor and tumor like lesions are relatively common in the growing skeleton, with proximal femur being the most common site. Bony lesions in children occur generally in the 2nd decade of life. Majority of these lesions are asymptomatic and may present with impending fractures making the diagnosis difficult and potentially challenging. Pathologic fractures due to benign bone lesions in children and adolescents should be approached in a systematic fashion in order to ensure appropriate management. Natural history, cause and treatment should be taken into account while managing these fractures. Surgical treatment in these cases are aimed at eradicating the lesion while simultaneously providing good stabilisation.***

Keywords: Aneurysmal bone cyst, Pathological fracture, Proximal femur, K wiring, hip spica application

1. Introduction

The aneurysmal bone cyst (ABC) is an expansile cystic lesion that may involve any bone in the body, most commonly long bones such as femur, tibia and humerus. It usually affects individuals in the second decade of life. Although benign it can be locally aggressive, and impinge on the surrounding tissues causing pathological fractures. (1,2,3). Pathological fractures of proximal femur secondary to benign bone tumours often are difficult to treat because of extensive bone destruction, periarticular location and high risk of local relapse (4). A procedure that saves the joint and ensures low risk of recurrence is desirable. Thus, the treatment of such tumours is a challenge for orthopaedic surgeons. We report a case of aneurysmal bone cyst of proximal femur complicated by fracture neck of femur, treated with curettage, K wiring, Bone Marrow Aspirate Concentrate (BMAC) injection and hip spica cast application.

2. Case Report

A 9 year old boy presented with complaints of inability to bear weight on his left lower limb after history of slip and fall. Clinical examination revealed externally rotated left lower limb with painful movements at the hip joint. Local tenderness on palpation was noted with no distal neurovascular deficit. X ray revealed well defined expansile lesion involving proximal femur with destruction associated with pathological fracture of neck of femur. Patient also had a history of enucleation surgery for dentigerous cyst one and a half years ago.

Figure 1: Preoperative X ray (AP view) of pelvis with both hips showing lytic lesion in left proximal femur with femur neck fracture

The patient was subsequently taken up for surgery and lateral approach was utilised. Intralesional extended curettage, K wire fixation and bone marrow aspiration concentrate injection and hip spica cast application was done. Histopathological examination revealed cystic lesion lined by fibroblasts, histiocytes and occasional osteocytic giant cells, consistent with aneurysmal bone cyst.

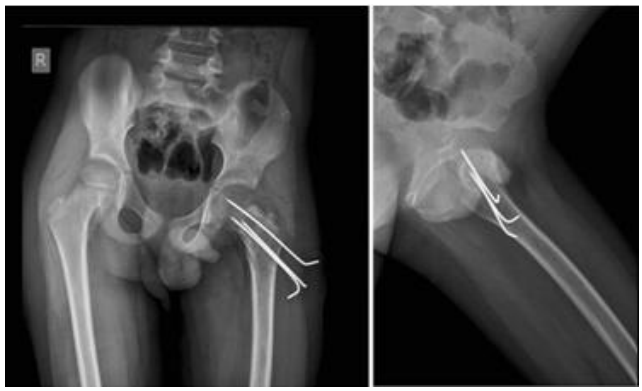

Figure 2: Post operative X ray (AP and Lateral view) showing fixation of fracture with K wires

3. Discussion

Aneurysmal bone cysts are locally destructive, blood-filled cystic lesions of bone. Approximately 85% of patients present before age 20 (5,6). Any bone may be involved, but the most common location include proximal humerus, distal femur, proximal tibia, and spine. Majority of the patients present with complains of mild to moderate pain with swelling that has been present for weeks to several months. Pathologic fracture occurs in about 8% of the cases (6). Most lesions arises de novo and are termed as primary ABCs. True etiology of these tumours is unknown. Although the pathogenesis is uncertain, it is likely that ABCs result from local circulatory disturbance causing increased venous pressure and production of local haemorrhage. Secondary ABC arises in association with other lesions like fibrous dysplasia, osteoblastoma, chondromyxoid fibroma, nonossifying fibroma, chondroblastoma, osteosarcoma, chondrosarcoma, and metastatic carcinoma. The features of the present case were consistent with primary ABC.

Radiographs typically show an eccentric, lytic lesion with an expanded, remodelled blown out or ballooned bony contour of the host bone (7,8). The natural history of ABCs was described by Dabska and Buraczewski (9)based on radiology. They divided the lesions into four phases: 1) the initial phase, described as osteolysis of the marginal part of the bone; 2) the growth phase, characterised by the progressive destruction of bone; 3) the stabilisation phase, defined by the classic ABC appearance: an expansile lesion with a distinct bony shell and osseous septations; and 4) the healing phase, where progressive ossification of the lesion is obvious and results in a bony mass with a somewhat irregular structure (9).

Microscopy consists of blood-filled septate cavities lined by fibroblast and histiocytes. Hemosiderin-laden macrophages, chronic inflammatory cells, and multinucleated giant cells also are present (1,2,3,4,10).

The treatment includes curettage with bone grafting and bone graft substitute which remains the gold standard for aneurysmal bone cysts. Recurrence rate is seen as 10-44 % of cases. Jaffe and Dunham reported on one patient with a pathological femoral neck fracture through an aneurysmal bone cyst (11). It was treated with curettage, cortical fibular autograft and dynamic hip screw.

The current case illustrates a successful treatment for extensive benign bone tumour of the proximal femur with pathological fracture. Using the principles of extensive curettage, internal fixation with K wires and bone marrow aspiration concentrate injection, the femoral head can be preserved with good functional and oncological outcome.

4. Conclusion

There is always a dilemma regarding the treatment of such a destructive and aggressive lesion by an orthopaedic surgeon. Replacement in such young patients must be limited to situations. The ideal treatment plan includes effective curettage through wide exposure in addition to grafting with cancellous bone graft and bone substitutes and a rigid fixation.

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