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Aneurysmal bone cyst of proximal femur with pathological fracture managed with proximal femoral locking compression plate (PFLCP) with curettage and bone grafting- A case report

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Abstract
Aneurysmal bone cyst being locally destructive tumour, any bone can be involved. Due to its aggressiveness and cortical thinning can lead to pathological fracture. We reported a case of 20-year-old female patient with proximal femur aneurysmal bone cyst leading to pathological fracture which required surgical intervention. Patient was admitted and evaluated with radiographs and MRI, fracture was fixed with proximal femur locking compression plate (PFLCP) and curettage of the lesion was done followed by cancellous bone grafting. On follow up patient had excellent outcome with near normal range of movements.

Keywords: PFLCP, bone grafting, pathological fracture

Introduction

Aneurysmal bone cysts are locally destructive, blood-filled reactive lesions and are not considered to be true neoplasms. Any bone can be involved but most common locations include the proximal humerus, distal femur, proximal tibia and spine. Most of these tumours occur in younger than 20 years old, and there is slight female predominace [1].

Treatment options mentioned in literature includes, extended curettage and bone grafting, marginal resection sometimes indicated for lesions in expendable bones. Arterial embolization has been used as definitive treatment of ABC in locations where curettage would be extremely difficult. Low-dose radiation has been reported to be an effective method in treatment, often associated with rapid ossification but with risk for malignant transformation. Few studies describe use of Denosumab in treatment of ABC when surgery is associated with unacceptable morbidity. The recurrence rate after curettage being 10% - 20% and has been correlated with younger than 15 years, centrally located and with incomplete removal of cyst content [1].

We reported a case of Aneurysmal bone cyst with pathological fracture treated using curettage and PFLCP with bone graft.

Case presentation

A twenty-year-old female presented with history of constant dull aching pain around her right groin / hip for 2 months. For same complaints radiograph of pelvis and bilateral hip was done at nearby medical facility and referred to Mysore Medical College and Research Institute for further management.

Fig 1: pre-op x-ray, before trivial trauma

Before patient presented to us, she gave history of trivial trauma, following which her symptoms exaggerated and she was not able to bear weight. Radiograph was taken and we noticed pathological fracture secondary to osteolytic lesion in the proximal femur.

Fig 2: Pre-op x-ray, after trivial trauma

Patient was admitted and evaluated. On examination, there was tenderness on deep palpation and restricted movements around right hip. Plain radiographs revealed a well-defined, expansile, lytic lesion involving the proximal part of right femur in trochanteric region.

An MRI was done, which reported hyperintense lesion in the proximal part of femur with internal septations on T2 – weighted image. And suggested Aneurysmal bone cysts.

Informed consent for surgery was taken. Patient was operated under spinal anesthesia, prophylactic antibiotics given 30mins before incision. Patient positioned on traction table and fracture reduced under c-arm guidance.

Reduced fracture fragments were first fixed with PFLCP. After confirming good reduction and fixation, intra-lesion curettage was done following which cavity was filled with cancellous iliac bone graft. Curettage material was sent for histopathological examination.

Fig 3: Post-operative x-ray

Post-operatively quadriceps exercises and knee ROM was started from post-op day 1, weight bearing was delayed for 6 weeks. Partial assisted weight bearing was started after 6 weeks followed by full weight bearing 2 weeks later once the x-ray showed healing of the lesion. Histopathological examination show confirmed the lesion as aneurysmal bone cyst.

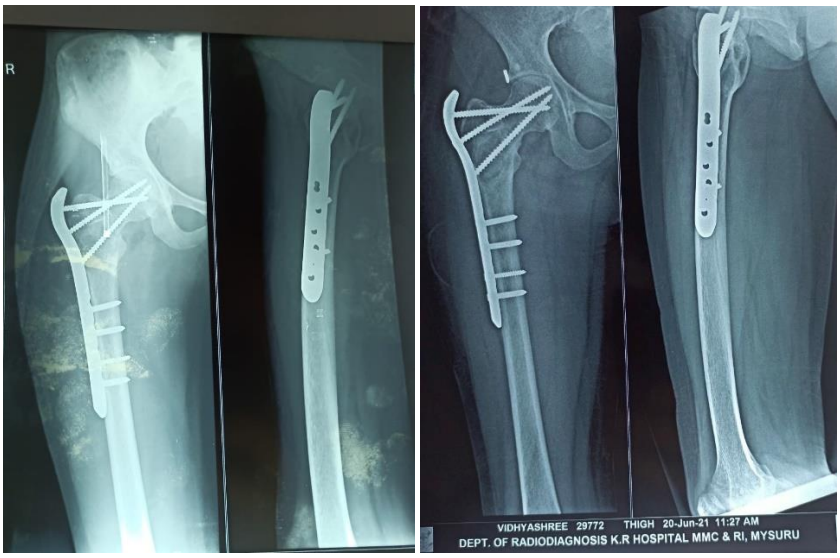

Fig 4-5: Follow-up x-rays

Patient showed improvement with near normal range of movements and also has excellent radiological outcome.

Fig 6-8: Clinical pictures

Discussion

Aneurysmal bone cysts can occur in any bone, but it is more commonly located in the metaphysis of long bones, especially weight-bearing ones. It can present as a primary or secondary lesion (e.g., associated with chondroblastoma or osteoblastoma). Primary ABC's arise de novo. Although ABCs are typically located in the metaphysis, because of the aggressive nature of this tumour, physeal involvement or extension may occur,

resulting in growth plate disturbances and subsequent development of deformities. Radiographically, an ABC is a lytic and expansile lesion that presents with cortical thinning and septations and shows fluid-fluid levels on MRI. Same findings were noted in our study [2].

Aneurysmal bone cyst (ABC) is an aggressive benign lesion that may sometimes be difficult to treat. Lesions that occur in the proximal femur require to be addressed aggressively because of the high rate of local recurrence and the risk of fracture. This location presents a surgical challenge due to its anatomical and biomechanical peculiarity. Extended curettage and cryotherapy represent a recommended approach for management of ABC in the proximal femur with favourable results [3].

Majority of benign osteolytic lesions in the femoral head and neck can be treated with intralesional curettage with acceptable local tumor control and satisfactory function. The incidence of local recurrence might be decreased dramatically for lesion access under direct visualization. The native joint maintenance could be achieved even in patients with aggressive lesions presenting pathological fracture [4].

While both surgery and sclerotherapy are widely implemented for treatment of ABCs, there is currently no good quality evidence to support the use of one option over the other [5].

Management with only sclerotherapy holds good when patient presents early without any pathological fracture, whereas with fracture requires surgical fixation.

The classic aneurysmal bone cyst (ABC) is an expansive and haemorrhagic tumour, usually showing characteristic translocation. About 30% of ABCs are secondary, without translocation; they occur in reaction to another, usually benign, bone lesion. ABCs are metaphyseal, eccentric, bulging, fluid-filled and multi-cameral, and may develop in all bones of the skeleton. On MRI, the fluid level is evocative. It is mandatory to distinguish ABC from UBC, as prognosis and treatment are different. Treatment in non-threatening forms consists in intra-cystic injection of methylprednisolone. When there is a risk of fracture, especially of the femoral neck, surgery with curettage, filling with bone substitute or graft and osteosynthesis may be required [6].

The treatment in ABC should be individualized for each patient. The dilemma of the optimal treatment in pathologic fractures in cases associated with the destructive and aggressive lesion exists in ABC. Large defects associated with en-bloc resection of the tumour can be successfully managed with non-vascularized fibular autograft and cancellous graft with DCS [7]. At present, curettage and filling the cavity with bone graft or polymethylmethacrylate is the principal modality used [8].

In terms of filling the cavity after curettage, smaller areas can be filled with cancellous grafts whereas managing large cavities is difficult, might require autograft or allograft. Some authors also suggest use of vascularised autograft for filling large cavities. In our case we preferred to use non-vascularised autogenous cancellous bone graft with excellent result.

Conclusion

Aneurysmal bone cyst being a locally aggressive bone tumor even though non-neoplastic, leads to marked expansion of involved bone with cortical thinning leading to pathological fracture. Various modalities of fixation have been reported for pathological fracture of proximal femur and also in managing aneurysmal bone cyst. In our case we used PFLCP and cancellous bone graft with good reduction and excellent result with near normal range of movements, hence PFLCP can be considered as a method of fixation in these scenarios augmented with curettage and bone grafting.

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