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A rare case of bilateral medial femoral condylar cyst in OA knee managed with cruciate retaining TKA

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Abstract

Introduction: We report an osteoarthritic patient with huge sub-chondral cyst-like lesions in the medial femoral condyle of distal femur. This large bone defects due to advanced osteoarthritis was successfully treated with Cruciate retaining implant in total knee replacement.

Case Report: A 60yrs old obese Female presented in our institution diagnosed with bilateral tricompartmental Osteoarthritis. The x-rays showed bone on bone Tricompartment OA Knee with Varus Malalignment. The left knee was operated first. After exposure, Distal Femoral Cuts were taken wherein a huge bony defect of about 2cm*1 cm was found in medial femoral condyle, but as lateral border of medial femoral condyle was intact the contained defect was managed with bone grafting and Hebert's screw and a Cruciate retaining implant was done in femur. The right knee was the mirror image of left and managed similarly with bone grafting and Hebert's screw and implanted a CR femur.

Conclusion: Any cystic /defect management in knee replacement traditionally always require extra armamentarium in form of augments, rods, wedges, but sometimes reverse thinking can also work if we understand the intraoperative scenario objectively and CR femur, the least constraint implant also, if used judiciously can bail us out from such a difficult situation. Usually one should keep rods, augments, wedges and constrain implants ready for difficult cases. Read your x ray carefully, if suspected a Preoperative MRI /CT scan should be done to exclude any sub-chondral cysts osteochondral defects and good planning of the cases, which will avoid any surprise during surgery. No benefits or funds were received in the support of this study. The authors reports no conflict of interest.

Keywords: Sub-chondral cyst, total knee replacement, cruciate retaining implant, osteoarthritis

Introduction

Osteoarthritis of the knee presents as destruction and degeneration of articular cartilage that results in pathological changes to the subchondral bone [1]. Although the pathogenesis of bone changes is poorly understood, it appears to be influenced by alterations in abnormal mechanical forces around the affected joint. In addition to the degeneration of cartilage, characteristic radiological findings include narrowing of the joint space, subchondral sclerosis, and the appearance of osteophytes; intra-articular osteochondral bodies and subchondral cysts are all associated with OA. Among these findings, subchondral cyst formation is often found mainly in OA and rheumatoid arthritis (RA) Patients. Whereas RA is reported to cause huge synovial cysts [2-6], well known as geodes [7], huge subchondral cysts associated with OA are extremely rare. Total knee arthroplasty is one of the most successful operations in orthopaedic surgery. However, this procedure might become demanding at the site of bone defects. Depending on the size and location of the particular osseous defect(s), various treatment modalities are available, including the use of bone cement, autologous bone grafts, structural allografts, or metallic augments [1] with or without implantation of a long-stemmed prosthesis [2]. We report an osteoarthritic patient with huge subchondral cyst-like lesions in the medial femoral condyle of femur. Deep and large bone defects due to advanced osteoarthritis was managed with cruciate retaining primary total knee replacement.

Case report

A 60 years old obese female with bilateral knee pain presented to our hospital. After clinical examination and other investigation she was diagnosed with bilateral advanced osteoarthritis of knee.

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Upon visiting our hospital she had worsened left knee pain and because of it restriction to walking and range of motion, with medial joint line tenderness, pain at extension and high flexion and starting pain. There was slight swelling but no palpable joint effusion, redness or local heat. The patients gait was slow and had 5 degree FFD with pre op flexion of 120 in both knees. Neurovascular examinations had normal findings. Patient was hypertensive and nondiabetic and all blood investigations were under normal limits. The x-rays showed bone on bone Tricompartment OA Knee with Varus Malalignment. She was posted for left Total Knee Replacement first.

After exposure, first, we took distal femur cut, wherein we found a cystic bone defect in posteromedial part of medial femoral condyle. After that we followed measured resection technique i.e all femur cuts were taken first anterior, posterior and both chamfer cuts. After the cuts, the lateral portion of medial femoral condyle was found intact and so the defect remained contained defect of 2cm*1cm. The defect was managed with bone grafting and a heberts screw, then we took proximal tibia cut with 5 degree slope and TKR was done with implantation of CR implants.

The right TKR was done 6 months later with a preceding CT scan, similar cyst was present in medial femoral condyle, and it was the mirror image of left knee. We managed right knee with same technique and was managed with bone grafting and heberts screw and the implantation of CR knee implants.



Fig 3: Intra op (a) after chamfer cuts, (b) bony defect, (c) bony defect managed with bone grafting, (d) fixation with heberts screw

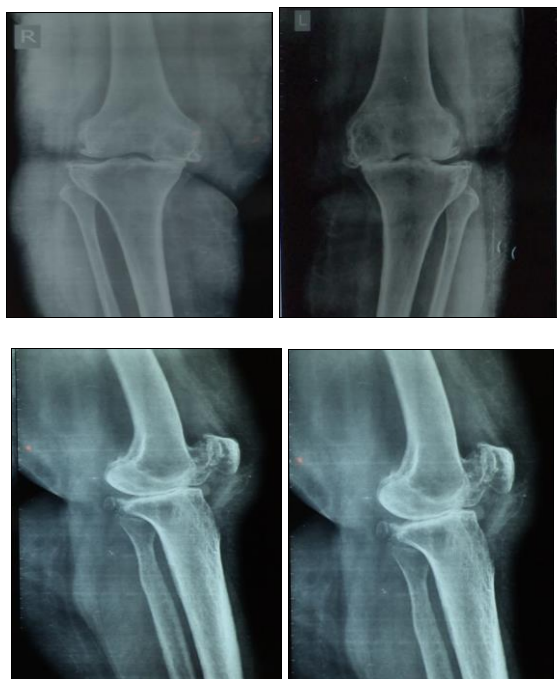


Fig 1: Pre op x rays of both knee



Fig 4: 5 years post op x rays of both knees

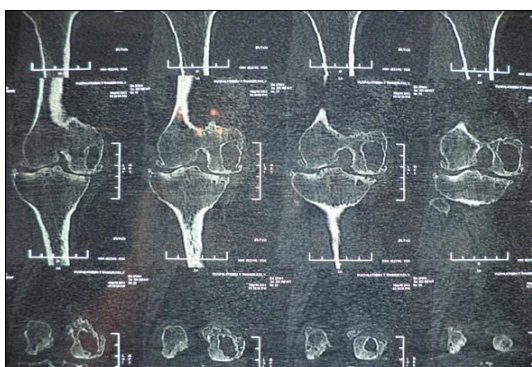


Fig 2: CT scan of right knee showing bony defect

Discussion

Multiple huge subchondral cysts are often found in RA patients, and the sewer first reported as geodes by Jayson *et al.* [7]. Shih *et al.* [8] reported a huge tibial subchondral cyst to successfully treated with standard stem and autologous bone grafting. However, there have been no reported cases of multiple huge subchondral cysts in osteoarthritic patients to our knowledge. In the present osteoarthritic patient, severe bone defects were found but we managed with minimal constrain implant. The treatment provided the patient with relief of pain and good activity of daily living.

Generally, there are two main theories that attempt to explain the development of osteoarthritic cysts. The first is based on

the idea that synovial fluid intrudes through the articular cartilage, resulting in hydraulic destruction of subchondral bone^[9]. This theory is supported by the presence of defects in the articular cartilage resulting from cysts, of fragments of articular cartilage within cysts, and the similarity of cyst fluid to synovial fluid^[10]. The second theory suggests that a localized area of subchondral necrosis of bone results from repetitive micro trauma, which leads to cystic degeneration in the bone while the articular cartilage is left intact^[11, 12]. This is based on evidence of bony contusion, trabecular fracture, and primary subchondral osteolysis, which may subsequently communicate with the joint if the overlying articular cartilage and subchondral bone plate crack^[13]. In our case, the existence of defects in the articular cartilage above the cysts partly indicates the validity of the first theory. Spjut *et al.*^[14] reported a coalescence of smaller degenerative cysts as a mechanism subchondral cysts successfully treated with surgery. Deep and for huge cyst formation. In addition, Wada and Lambert^[15] reported the deposition of intraosseous fat in a degenerating simple bone cyst, indicating that the intraosseous cavity is partly filled with fat after involution of the cyst. Taken together, these previous reports and our findings suggest one degenerative subchondral cyst may fuse with another old intraosseous cavity filled with fat tissue. Accordingly, the coalescence of two different cysts at different stages may result in huge cyst formation.

In our case we started with distal femur cuts wherein we found the cyst but as the lateral border was found intact we used cruciate retaining implant and so the defect remained contained, if we did a box cut for PS knee the defect would have become open non contained which would have demanded posterior augment over medial femoral condyle and an extension rod in femur. But the bone grafting and CR femur saved us from this long process. So we did the surgery using minimal constraints providing pain relief and patient satisfaction at 5 years follow up.

Conclusion

Any cystic/defect management in knee replacement traditionally always require extra armentranor in form of augments, rods, wedges. but sometimes reverse can also work if we understand the intraoperative scenario objectively and CR femur the least constraint implant also if used judiciously can take us out from such a situation. Usually one should keep constrain implants ready for difficult cases.

And read your x ray carefully, if suspected a Preoperative MRI /CT scan should be done to exclude any sub-chondral cysts osteochondral defects and any surprise during surgery.

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