

Medial Compartment Osteoarthritis with a Large Subchondral Geode of Medial Femoral Condyle Treated with Unicondylar Knee Arthroplasty: A Case Report

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1. Abstract

Osteoarthritis (OA) with a large subchondral geode of medial femoral condylar is not common. The treatment options of this lesion vary according to the location of the cyst and the severity of osteoarthritis, with less invasive procedures such as calcium phosphate cement injection to a joint arthroplasty. In the past decade, unicondylar knee arthroplasty (UKA) has been extremely successful in the treatment of medial compartment OA, with a survival rate of 97% at 10 years. In this paper UKA was applied to an elderly patient with moderate medial compartment OA and a large subchondral geode of medial femoral condyle for the first time. In our patient, both knee function and pain after UKA greatly improved. In those elderly patients with a large geode and articular surface damage UKA should be considered as one of treatment options if conservative management fails to ameliorate symptoms.

2. Introduction

Although subchondral bone cystic lesions are common in patients with advanced knee osteoarthritis, occurrence of a large subchondral bone cyst, known as a geode, in an osteoarthritic knee is rare [1]. By now only a few case reports could be found in the literature [1-6]. These cysts are often benign and incidentally found on radiography, with 80% of patients reporting no symptoms unless a fracture occurs [7]. The treatment options of this lesion vary according to the location of the cyst and the severity of osteoarthritis, with less invasive procedures such as calcium phosphate cement injection to a joint arthroplasty [1,3-5]. This article reports a pa-

tient who had a large geode in medial condyle of an osteoarthritic knee that was treated successfully with unicondylar knee arthroplasty (UKA).

3. Case Report

A 76-year-old man presented to our hospital with a 10-year history of pain in the left knee and a sudden severe pain in the recent two weeks. He had to walk on crutches. Conservative treatment at a nearby clinic had failed. Physical examination of the left knee showed tenderness along the medial joint line with palpable joint effusion. Range of motion was abnormal due to obvious pain during activity. No anteroposterior or lateral instability was observed. Findings of blood and urine studies were normal. The C-reactive protein level was 1.70 mg/L and the erythrocyte sedimentation rate (ESR) was 7mm/h. The findings for rheumatoid factor were negative. Plain radiograph of the left knee showed grade 2 medial compartment osteoarthritis and a vague oval area of radiolucency in the medial femoral condyle (Figure 1A and B). Computed tomography (CT) showed a well-defined giant intraosseous cyst in the femoral medial condyle and measuring 3.0cm×2.5cm×1.5 cm (Figure 2A). A medial femoral cortical bone break was observed (Figure 2B). Magnetic resonance imaging (MRI) showed a cystic lesion with hyperintensity on T2- weighted images. Synovial proliferation into the cyst through the window of the medial cortex was seen as well (Figure 3A and B). A cartilage fragment stripping from the surface of the cyst was seen in the suprapatellar bursa (Figure 4A and B). The patient was diagnosed as a large geode in the osteoarthritic knee. UKA was performed with the patient under

epidural anesthesia. Intraoperatively, the cartilage fragment was found in the suprapatellar bursa. The surface of the medial femoral condyle was damaged, with moderate wear of the articular surface (Figure 5). UKA with cemented Oxford phase III (Biomet Ltd, UK) was performed. After milling of the femoral condyle, the cyst was completely curetted and packed with bone chips obtained from the medial tibial plateau (Figure 6). Microscopic examination showed that the cyst capsule was consistent with bone cyst.

Post-operative rehabilitation was the same as normal UKA surgery involving a standard regime of active range of motion exercises with full weight bearing 2 days after surgery. Follow up X-rays one year after surgery showed that the grafted bone was well incorporated, without loosening of the prosthesis (Figure 7). The patient had no difficulty performing activities of daily living and no limitation of range of motion in the left knee. Compared with preoperative scores, The hospital for special surgery (HSS) score of the knee was improved from 43 to 94 points.

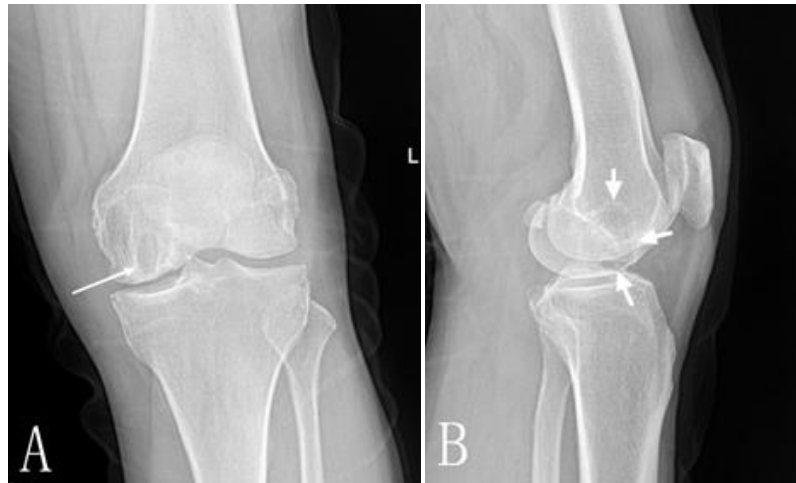


Figure 1: Plain radiograph of the left knee showed grade 2 medial compartment osteoarthritis and a vague oval area of radiolucency in the medial femoral condyle (A. anteroposterior view; B. lateral view).

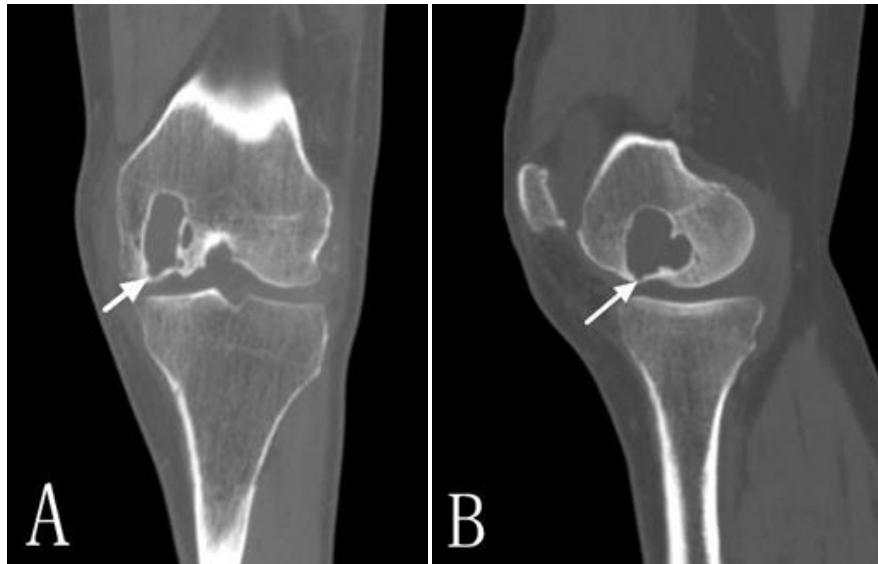


Figure 2: CT showed a well-defined giant intraosseous cyst in the femoral medial condyle. A medial femoral cortical bone break was observed (A. coronal view; B. sagittal view).

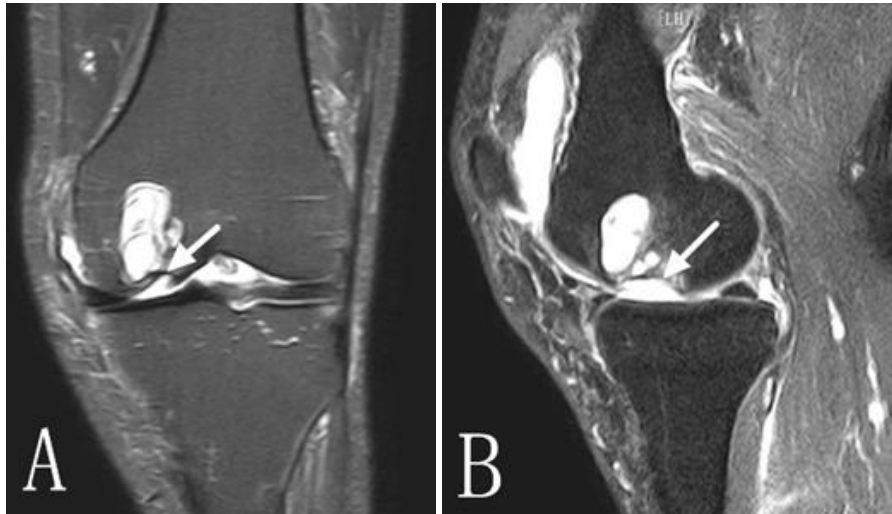


Figure 3. MRI showed a cystic lesion with hyperintensity on T2- weighted images. Synovial proliferation into the cyst through the window of the medial cortex was seen as well (A. coronal view; B. sagittal view).

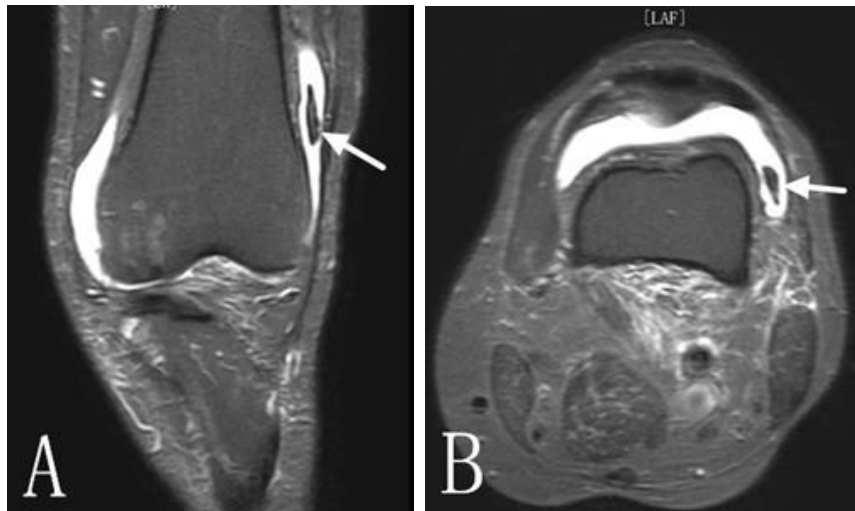


Figure 4: The defective cartilage became a loose body in the suprapatellar bursa. (A. coronal view; B. transverse section).



Figure 5. The surface of the medial femoral condyle was damaged, with moderate wear of the articular surface.



Figure 6: After milling of the femoral condyle, the cyst was completely curetted and packed with bone chips obtained from the medial tibial plateau.

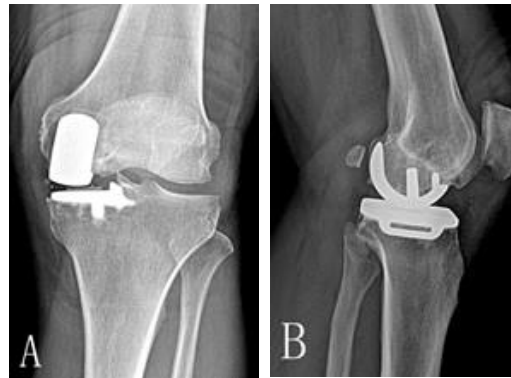


Figure 7: Follow up X-rays one year after surgery showed that the grafted bone was well incorporated, without loosening of the prosthesis (A. anteroposterior view; B. lateral view).

4. Discussion

Large geodes of the knee have been reported by several authors [1-10,13-20]. The treatment options of this lesion vary from less invasive procedures such as calcium phosphate cement injection to a total knee arthroplasty (TKA) according to the location and the severity of the cyst and concomitant disease conditions [1,3-5,8-10,13-20]. Table 1 showed the current treatment options of large geode lesion of the knee reported in the literature. However, a large cyst in an osteoarthritic knee treated with UKA has not been reported in the English literature. In the current patient, the large geode was located in the medial condyle of the knee and preoperative MRI showed that the cyst communicated with the joint cavity through a large defect in the articular surface (Figure 3A and B). The defective cartilage became a loose body in the suprapatellar bursa (Figure 4A and B). Moreover, a moderate cartilage wear could be detected in the preoperative MRI and X-ray. These findings strongly suggested that calcium phosphate cement injection or curettage and grafting could not solve the problem of articular surface defect and wear. Although TKA can also relieve pain and restore knee function, it is more invasive. UKA is a bone and ligament sparing alternative to TKA in the patients with end stage single compartment degeneration of the knee. In the past decade, UKA has been successful in the treatment of medial com-

partment osteoarthritis (OA) and spontaneous osteonecrosis of the knee (SONK), with a survival rate of 97% at 10 years [11,12]. In the current 76-year-old patient, lesions including large geode, cartilage wear, and cartilage defect were in the medial compartment of the knee and the ligaments and lateral compartment of the knee were intact. These findings strongly suggested that UKA maybe the best treatment plan because of its ability to replacing the cartilage wear and defect of medial condyle, requiring no additional bone grafts and less invasive. The patient turned out as expected. He could walk without aid 5 days after surgery and the pain disappeared completely after 3 months. Follow up X-rays one year after surgery showed that the grafted bone was well incorporated, without loosening of the prosthesis (Figure 7).

For a patient with a large geode treated with UKA, several issues must be noted. In addition to following the usual UKA contraindications careful assessment of the location of cyst, cartilage surface and bone mass should be performed both pre- and intra-operatively, as too little bone mass or the cyst being located at the peg position of the implant would lead to the prosthesis being not firmly fixed, and it is a definite contraindication to UKA. In the current patient, the cyst located in the anterior part of the medial condyle and there was enough bone mass for the fixation of the main peg of the femoral prosthesis.

Table 1: The current treatment options of large geode lesion of the knee reported in the literature.

concomitant disease conditions treatment options	Osteoarthritis ; Wilson disease [18]	Rheumatoid arthritis ; pseudogout [14]	With unicondylar prosthesis	Normal articular surface
Intraosseous Bioplasty				Potty et al [5]
Curettage and cement		Suzuki et al [3]		Zeng et al [7]
Curettage and bone grafting		Carter et al [17]	Curran et al [8]	
Unicondylar knee arthroplasty	This study			
Total knee arthroplasty (including extension stem)	Ohishi et al [1]; Rajani et al [4] Elansary et al [13]	Lohse et al [9] Jayson et al [10] Minoda et al [14]	Hart et al [16] Crawford et al [19] Sanchis et al [20]	
Osteochondral multiple autograft transfer +extraarticular curettage and bone grafting	Atik et al [15]			
High tibial osteotomy	Kataoka et al [18]			

5. Conclusions

For old patients with a large subchondral geode of medial femoral condyle complicated with medial compartment osteoarthritis, if the bone mass is enough and an unicondylar prosthesis can be firmly fixed, as seen in the current patient, curettage and grafting followed by UKA maybe a treatment option due to its bone and natural kinematics preservation and less invasive.

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