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Case Report

Superior bearing dislocation in a unicompartamental total knee prosthesis

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ABSTRACT

The mobile bearing Oxford Unicompartamental Knee Prosthesis (OUKP) is the most commonly used treatment of osteoarthritis confined to 1 compartment of the knee. Dislocation of the mobile bearing is an uncommon but recognized complication of the OUKP. Patients typically present with severe pain and reduced range of motion of the affected knee. Radiological evaluation of OUKP can be challenging and requires knowledge of the prosthesis components and common complication patterns. Dislocation of the bearing can easily be overlooked on plain radiographs as the bearing is radiolucent, distinguished only by radiopaque markers. Further imaging in particular with CT may be required to adequately evaluate for prosthesis complications. Advances in prosthesis design and surgical technique may reduce the rate of bearing dislocation.

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Introduction

The mobile bearing Oxford Unicompartamental Knee Prosthesis (OUKP) (Biomet UK Ltd, Swindon, United Kingdom) is most commonly used for the treatment of osteoarthritis confined to 1 compartment of the knee in patients with a moderate level of physical activity and intact stabilizing ligaments (medical collateral and anterior cruciate ligaments) [1]. While less commonly used than total knee replacements (TKR), a unicompartamental prosthesis is a less invasive procedure [2] with favorable long-term outcomes [3,4]. The replacement consists of metallic tibial and femoral components separated by a mobile polyethylene meniscal bearing [4]. The function of this mobile bearing is to act as a prosthetic meniscus, thereby reduc-

ing wear and friction, and improving movement between the articulating metallic components [4]. Dislocation of the mobile bearing is an uncommon but recognized complication of the OUKP. This case illustrates the potential to overlook this important complication on plain radiographs, as well as how other complications, such as periprosthetic fractures, may co-exist with dislocation.

Case

This is the case of an 89-year-old gentleman with a history of a left medial OUKP for osteoarthritis performed 5 years previously. The procedure was uncomplicated and the patient re-

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E-mail address: theadegeus@hotmail.com (T. De Geus).<https://doi.org/10.1016/j.radcr.2018.12.005>1930-0433/© 2019 Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license. (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)



Fig. 1 – AP radiograph (nonweight bearing) showing displacement of meniscal spacer device (arrow)



Fig. 2 – Lateral radiograph showing displacement of the meniscal bearing into the suprapatellar recess (nonweight bearing)

covered well with good knee function. There was no other significant medical history.

In October 2017, he presented to the emergency department with a painful and swollen left knee following trauma 2 days previously. He reported falling at home and hitting his leg against a door frame, with difficulty mobilizing, severe pain, and swelling. Examination in the emergency department revealed severe limitation of both active and passive flexion of the knee secondary to pain, and a large knee joint effusion. There was no evidence of ligament or meniscal injury or neurovascular compromise on clinical assessment, with intact distal pulses and sensation. Anteroposterior (AP) and lateral radiographs of the left knee were performed in the emergency department (Figs. 1 and 2).

Imaging Findings

A lateral radiograph of the left knee (Fig. 2) demonstrated a new displacement of the medial femoral condyle spacer component of the unicompartmental replacement. The polyethylene meniscal spacer had dislocated superiorly and was visualized in the suprapatellar recess on the lateral radiograph. These findings are less conspicuous on the AP view (Fig. 1) and could easily be overlooked on this view. Radiographs of the left knee performed 5 months prior to this demonstrated satisfactory appearance of the unicompartmental replacement

without evidence of prosthetic failure or malalignment (Figs. 3 and 4).

A CT of the knee was performed to assess for a concurrent complication with no periprosthetic fracture identified (Figs. 5 and 6).

Surgical Outcome

The patient underwent successful emergent revision of the OUKP with a TKR performed. Conversion to TKR was chosen over simple revision of OUKP due to the traumatic nature of the injury and in order to prevent recurrence of this complication. Postoperative radiographs showed satisfactory alignment of the new prosthesis (Figs. 7 and 8). The patient had an uncomplicated postoperative course regaining excellent overall function in the knee.

Discussion

Meniscal bearing dislocation occurs in 0.6-4.0% of UOKP [1,3,4] and is one of the most common complications associated with this type of prosthesis. Bearing dislocation can be traumatic, typically following a twisting injury or atraumatic, and has been associated with proximal tibial varus

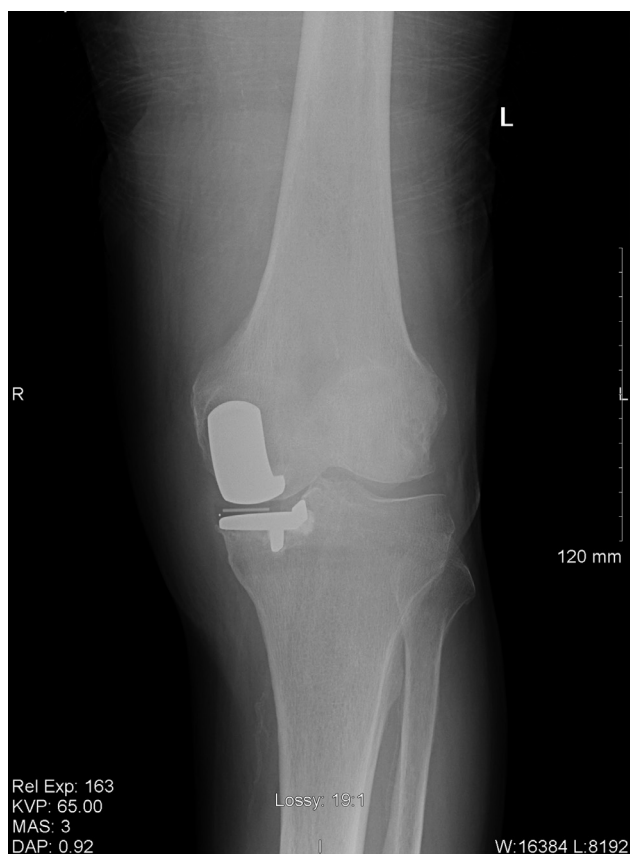


Fig. 3 – Postoperative AP radiograph of OUKR (pretrauma) showing correct location of meniscal spacer device (nonweight bearing)



Fig. 4 – Postoperative lateral radiograph (nonweight bearing) of OUKR (pretrauma)

>5%, excessive femoral component varus or valgus and excessive postoperative tibial slope [5]. In the acute setting, bearing dislocation can cause severe pain and reduced range of motion of the affected knee, as occurred in this patient. If not identified on initial plain radiographs, chronic dislocation can result in ongoing pain and loosening of the metallic components within the knee joint [2], ultimately leading to failure of the prosthesis and the need for revision, further surgical intervention and increased patient morbidity.

Radiological evaluation of OUKP can be challenging and requires knowledge of the prosthesis components and common complication patterns. Dislocation of the bearing can easily be overlooked on plain radiographs as the bearing is radiolucent, distinguished only by radiopaque markers [6,7]. The lateral radiograph in this case clearly demonstrated the dislocation as the bearing was positioned at a 90-degree angle to the radiograph (Fig. 2), illustrating its migration into the suprapatellar recess. It could easily be overlooked on the AP radiograph alone, as it overlaps with the lateral margin of the femur (Fig. 1). Dislocation of the bearing most commonly occurs anteriorly, medially, or laterally within the intracapsular space. It is unusual, however, for the bearing to migrate so far superiorly into the suprapatellar recess. Further imaging in particular with CT may be required to adequately evaluate for prosthesis complications.



Fig. 5 – Coronal CT demonstrating migration of the polyethylene meniscal spacer device into the suprapatellar recess



Fig. 6 – Sagittal CT demonstrating migration of the polyethylene meniscal spacer device into the suprapatellar recess (arrow)

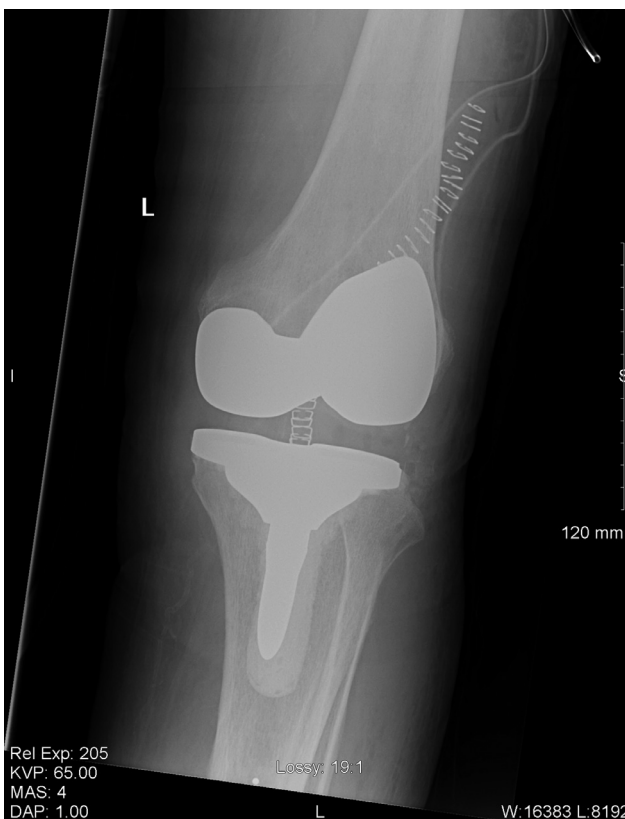


Fig. 7 – Postoperative AP radiograph showing satisfactory alignment post total knee replacement (nonweight bearing)

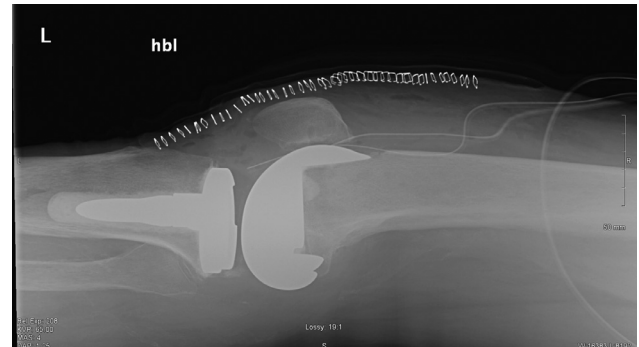


Fig. 8 – Postoperative lateral radiograph post total knee replacement (nonweight bearing)

The management options for a meniscal bearing dislocation depend on the mechanism of dislocation. Bearing replacement with an upsized bearing is typically performed for simple bearing dislocations with an otherwise intact prosthesis. In cases with component loosening revision with a replacement OUKP or total knee arthroplasty is typically performed [8,9].

Advances in prosthesis design and surgical technique are under development which may reduce the rate of bearing dislocation when compared to current widely used methods [10].

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