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The Knee



Case report

Polyethylene liner dislocation of fixed-bearing medial oxinium unicompartmental arthroplasty with severe metallosis

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ABSTRACT

The case of an atraumatic dislocation of a fixed bearing in a medial unicompartmental arthroplasty with an oxinium femoral component is presented. A review of the literature pertaining to knee arthroplasty locking mechanisms is discussed. Potential modes of locking mechanisms failure are reviewed including the recognition of such failures in the clinical setting. This is the first report of a dislocated fixed-bearing medial oxinium unicompartmental arthroplasty and consequent metal arthrogram.

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1. Case presentation

This case describes a retired 72yo Male with a longstanding history of bilateral anteromedial osteoarthritis of the knee. Of note in his past medical history, the patient reported an allergy to nickel. On examination, he demonstrated correctable varus deformity bilaterally and no instability with Lachman maneuver. Radiographs of the knees were nearly symmetrical displaying isolated medial compartment joint space narrowing with an anterior wear pattern. Valgus stress radiographs revealed correction of the deformity without collapse of the lateral compartment.

After exhausting non-operative treatments, the patient elected staged bilateral unicompartmental arthroplasty. Taking into consideration his reported nickel allergy, a Smith & Nephew JOURNEY UNI implant was selected for the patient. This implant system is comprised of an OXINIUM oxidized zirconium femoral component containing <0.0035% nickel content, and is paired with a titanium tibial baseplate containing <0.1% nickel content as compared to the 0.5% typically contained in a cobalt chromium knee implant.

The patient underwent successful left knee unicompartmental arthroplasty in December of 2011 without complication (Femur size 5, tibia size 4, insert size 8 mm). The patient was progressing appropriately at the 4-week post-operative follow-up, and subsequently underwent right knee unicompartmental arthroplasty in January of 2012, 6 weeks after the surgery on the right side, without intra-operative complication (femur size 6, tibia size 4, insert size 8). Likewise, at 6-week follow-up after the right knee surgery he was progressing as expected. Post-operative radiographs are shown in [Figures 1 and 2](#).

At one year post-operatively, the patient was experiencing persistent left lower extremity swelling and was diagnosed with a lower extremity DVT for which coumadin therapy was started. His knee exam and imaging appeared unchanged at this time.

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Figure 1. Post-operative radiographs following primary left unicompartmental arthroplasty.

However, within a few weeks of this diagnosis, he experienced acute onset of right knee pain and swelling after his knee buckled while going down the stairs at home. On exam, the patient had a small effusion, but otherwise his exam and radiographs appeared unchanged from his prior visit. Two separate joint aspirations were performed both yielding blood-tinged fluid with a cell count less than 2500, less than 10% PMNs, and multiple cultures yielding no growth.

Symptoms persisted for the following three months and he was having significant difficulty ambulating prompting a return for evaluation. His physical exam displayed a drastic change with discoloration of the medial aspect of the knee and a large effusion. Knee radiographs demonstrated a large metal arthrogram pictured in [Figure 3](#), and there was direct contact between the femoral and tibial components on orthogonal views. The patient was diagnosed with polyethylene liner failure and resultant metallosis from articulation between the femoral and tibial components.

He underwent revision total knee arthroplasty nearly a year and a half removed from the index unicompartmental arthroplasty procedure. Upon exposure of the knee joint during the procedure a large amount of metallic debris was encountered as shown in [Figure 4](#). Components were removed, and total knee arthroplasty revision was performed utilizing a titanium Biomet Vanguard cruciate-retaining implant. Pathology was consistent with metal foreign body infiltrate consisting of pigmented macrophages and giant cell reaction. The patient has been seen for follow-up at 6 weeks and 6 months post-operatively and is progressing well.

2. Discussion

Polyethylene locking mechanism failure is an unfortunate, reported consequence of modular total hip and knee arthroplasty. Modularity provides distinct benefits including the ability to appropriately tension soft tissue and achieve stability after implanting final components, in addition to providing the option for isolated bearing exchange in the setting of revision arthroplasty with well-fixed components [1,4]. From a biomechanical perspective, it has also been shown that a metallic baseplate reduces tensile stresses in the polyethylene compared to all-polyethylene designs, and it decreases maximum compressive stress on the bone under loading [2].

Despite these attributes, dysfunction of the liner locking mechanism is a potential failure mode that bears with it the possibility of backside wear and liner dissociation permitting unintended articulation of metal components. Backside wear is a commonly

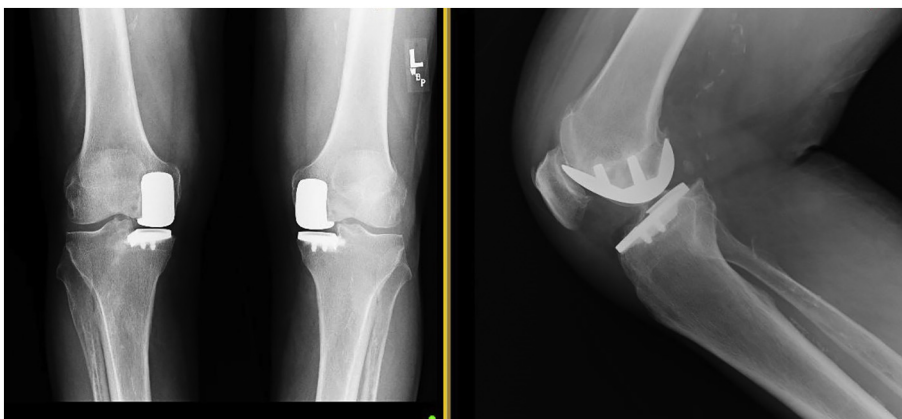


Figure 2. Post-operative radiographs following primary right unicompartmental arthroplasty.

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