Introduction

A complete anterior knee dislocation after total knee arthroplasty is an extremely rare event, with less than 5 cases reported in the English literature [1]. This report describes a traumatic complete anterior knee dislocation of a previously well-functioning total knee arthroplasty in a 65 year old woman.

Case history

A 65-year-old female who underwent an uncomplicated left cruciate-retaining total knee replacement 8 years prior presented to the emergency department with left knee pain and deformity after slipping over ice and twisting her knee. Postoperatively, she achieved an excellent knee range of motion from 0 to 125°. There was not any instability or gap imbalance demonstrated in her follow-up examinations.

She sustained a left knee injury when she slipped on ice and hyperextended her left knee while in external rotation. She immediately experienced a painful pop and was not able to move her knee afterward. She was unable to ambulate secondary to pain and was brought to the emergency department via ambulance. The injury occurred around 9:30 AM, and the patient arrived in the emergency room at 10:06 AM. Plain radiographs of the left knee demonstrated a complete anterior dislocation of the prosthesis Fig. 1a and b.

An orthopaedic surgery consult was requested for this injury at 11:30 AM. On physical examination, there was a gross deformity with varus and moderate effusion in her left knee. She was unable to flex or extend the knee secondary to pain, but she demonstrated intact function in extensor hallucis longus, extensor digitorum longus, flexor hallucis longus, tibialis anterior, gastrocnemius, and soleus muscle groups. She reported intact sensation over superficial and deep peroneal nerve distributions without numbness or tingling. Her left lower extremity was warm and well perfused, and there were palpable dorsalis pedis and posterior tibial pulses.

The patient's knee dislocation was reduced under conscious sedation via axial traction combined with anteriorly directed force applied onto the anterior femur and posteriorly directed force applied onto the anterior tibia Fig. 2a and b. Postreduction examination revealed full range of passive flexion and extension in the knee, and intact neurovascular examination unchanged from pre-reduction. However, there was global instability with varus and valgus stresses on the knee at 0° and 30° of flexion and with anterior and posterior drawer testing. The patient’s left lower extremity was subsequently placed in a knee immobilizer.

Initially, we considered an arthrogram study secondary to a high likelihood of concurrent vascular injuries, which are often associated with a knee dislocation. However, the patient’s clinical examination revealed a well-perfused left lower extremity, with strong and palpable dorsalis pedis and posterior tibial pulses. After a discussion with the vascular surgery service regarding an appropriate diagnostic modality, we proceeded with a noninvasive
popliteal Doppler study with ankle brachial index (ABI) instead of arthrogram to rule out possible vascular injury. The Doppler study did not reveal any vascular compromise, and her ABI was 1.13. The patient was admitted to the observation unit for serial neurovascular examinations of her left lower extremity every 2 hours. The patient’s remaining hospital course was uneventful, with a warm and well-perfused left lower extremity with strong palpable dorsalis pedis and posterior tibial pulses. She remained neurovascularity intact with maintenance of muscle group strengths and sensation. She was subsequently discharged home on post-admission day 2.

Two weeks after her discharge, she was reexamined in the office. Swelling and ecchymosis in her left knee had subsided substantially, and she was able to demonstrate an intact extensor
mechanism. However, we appreciated a global instability in her left knee that persisted beyond 6 weeks after the injury despite of complete immobilization of the left knee. At that time, it was decided that there was a low likelihood of nonoperative stabilization of her left knee, and we proceeded with a revision of the left total knee arthroplasty using hinged knee components. The patient underwent an uneventful revision left total knee arthroplasty 3 months after the injury. The patient has done well postoperatively, and most recently, she was able to demonstrate a range of motion from 0° to 110°, without any residual instability.

**Discussion**

A complete anterior dislocation of the knee after total knee arthroplasty is an extremely rare event, with less than 5 cases reported in the English literature [1]. Theoretically, risk factors associated with this rare complication include flexion-extension mismatch with greater laxity in flexion than extension, malposition of a component, extensor mechanism dysfunction, valgus deformity of the knee [2], and fracture of polyethylene tibial post [3]. Tuoheti et al. [4] reported an atraumatic anterior dislocation occurring 11 years postoperatively due to massive wear of ultrahigh-molecular-weight polyethylene, avulsion injury of the medial collateral ligament and patella tendon, and a stress fracture of the fibular secondary to the increased posterior tilt angle.

The case discussed in this article describes a complete anterior dislocation of the prosthetic knee by extreme hyperextension and external rotation during a fall. This diagnosis should be considered when presented with a grossly deformed knee with severely limited range of motion in a patient who previously underwent total knee arthroplasty. Recognition of this injury and urgent reduction followed by a careful and thorough physical examination will delineate the injured structures during the event and allow for prevention of subsequent dislocation. The majority of patients with prosthetic knee dislocations were successfully reduced under conscious sedation. However, there had been several cases in which there were concurrent neurovascular injuries, necessitating vascular intervention to restore blood perfusion [5,6]. Aderinto et al. [5] reported a case of complete dislocation with concurrent neurologic injury from which the patient had not recovered. On the other hand, Villanueva et al. [6] reported a case of a complete dislocation with ascending genicular artery injury and peroneal nerve palsy, from which the patient fully recovered. In addition to neurovascular complication, these injuries also tend to inflict damages to structural stabilizers of the knee joint, including the posterior cruciate ligament, medial, and lateral collateral ligaments [1,5]. Most patients demonstrated global instability of the prosthetic knee after the reduction and, eventually, underwent revision arthroplasty with more constrained implants [1].

The causes of the dislocation vary from acute traumatic dislocation to chronic atraumatic dislocation secondary to ligamentous deficiency, component malalignment, polyethylene wear, suboptimal soft tissue balancing, and neurologic disorder including multiple sclerosis [1–7]. It is important to identify these risk factors in patients that are undergoing total knee arthroplasty and to counsel them about the risk of this rare but devastating complication.

The treatment recommendation is immediate immobilization of the knee joint after reduction and a careful physical examination to assess neurovascular status often required advanced imaging such as computed tomography angiogram or noninvasive Doppler study with ABI if there is concern for vascular injury [7]. With concurrent neurologic injury, most of the recovery occurs within 6 months after the injury. With suboptimal clinical improvement 6 months after the injury, the prognosis for return of useful motor function below knee level is poor [5].

Based on our experience with this patient, we recommend immediate immobilization and protection of the injured knee for at least 6 weeks to allow soft tissue healing, reassessed via serial examinations at 2-week intervals. If the patient continues to demonstrate global knee instability at the 6-week mark, consider proceeding with a revision knee arthroplasty with more constrained implants around 3 months after the injury.

**Summary**

An anterior knee dislocation after a total knee arthroplasty is a very rare injury. Our case report describes a patient who sustained this injury from extreme hyperextension and external rotation of the knee during a fall. This injury can be associated with neurovascular compromise, in addition to damage to the ligamentous and soft tissue stabilizers in the knee, resulting in subsequent global instability. Therefore, it is important to perform a thorough neurovascular examination before and after the reduction to assess neurovascular status of the limb and knee stability testing after reduction to assess residual ligamentous laxity.

**References**

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