Complete Anterior Knee Dislocation 16 Years After Cruciate-retaining Total Knee Arthroplasty

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Abstract

Anterior dislocation after total knee arthroplasty (TKA) is rare; 9 cases have been reported in the English literature. Five patients sustained subluxation, with recurvatum as the clinical manifestation, and 4 patients sustained complete dislocation, usually accompanying other serious complications.

This article describes a case of complete dislocation that developed atraumatically 16 years after TKA and was characterized by dislocation in extension and spontaneous reduction in flexion. Revision TKA was planned, with several alternative procedures under consideration, ranging in degree of invasiveness from simple polyethylene exchange to conversion to a hinge-typed prosthesis. Intraoperatively, extensive areas of blackened synovium and posterior-dominant polyethylene wear existed medially and laterally. Considering the patient’s age of 82 years, low activity level in activities of daily living, edematous skin, and number of stable components, we performed simple polyethylene exchange to a cruciate-retaining component that left the partial metal defect in the tibial plate untouched. Successful outcome was achieved for >2 years. The dislocation mechanism was polyethylene thinning, leading to relative valgus and anteroposterior instability that aggravated the anterior cruciate ligament dysfunction, which is speculated as the inherent key causative factor in every TKA.

Complete dislocation, usually accompanying other complications, requires prompt treatment because the possibility of serious consequences exists. Due to the absence of a gold standard, the treatment of choice needs to be made on a case-by-case basis.

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terior dislocation after total knee arthroplasty (TKA) is rare; 9 cases have been reported in the English literature. Subluxation occurred in 5 cases, with recurvatum as the clinical manifestation, and complete dislocation occurred in 4 cases, usually accompanying other serious complications. This article describes a case of complete dislocation, which developed atraumatically 16 years postoperatively and was characterized by dislocation in extension and spontaneous reduction in flexion.

CASE REPORT
An 82-year-old woman presented with a 3-month history of a catching sensation in her left knee, which progressed to knee pain and difficulties in walking 1 month previously with no traumatic episode. Prior to this episode, she could walk with no support and ascend and descend stairs with the use of a handrail. She had undergone sequential bilateral TKA at our institute 16 years previously, with the left and right knee procedures separated by 4 months due to osteoarthritis. An Advantim cruciate-retaining prosthesis (Wright Medical Technology, Arlington, Tennessee) was used for each knee. She was lost to follow-up approximately 6 years postoperatively, and her knees had not been examined since.

Physical examination revealed anterior left knee dislocation in extension and reduction at normal position at approximately 45° of flexion with audible crepitus. Radiographs revealed complete anterior left knee dislocation in extension and reduction in flexion and a cystic mass containing granular particles in the posterior soft tissue (Figure 1). Posterior portion polyethylene shadow loss indicated polyethylene wear (Figure 1). Radiographs also showed that the metal-backed polyethylene had been used for the patella and that the patellofemoral joint space was preserved, with no obvious femoral or tibial component malpositioning. Fluoroscopy showed the knee dislocating anteriorly (ie, forward movement of the tibia with no resistance when the knee reached 0° of flexion). Stress radiographs revealed 5° of valgus instability.

Revision TKA was performed, with several alternative procedures under consideration, ranging in degree of invasiveness from simple polyethylene exchange to conversion to a hinged prosthesis. The skin was incised along the previous surgical scar, and a medial parapatellar approach was taken, which revealed that the knee joint was filled extensively with blackened synovium (Figure 2). Synovectomy was performed, and patellar evasion was achieved by a rectus snip.

Polyethylene removal revealed that the posterior portion of the tibial plate had eroded by as much as 7 mm posteromedially and 3 mm posterolaterally (Figure 2), which appeared to be the source of the metallosis. Although small scratches existed, the femoral component surface was smooth on palpation. The patellar polyethylene remained intact and stable. The femoral and tibial components were also stable, and the hook structure for inserting the polyethylene was intact. Macroscopic inspection of the retrieved polyethylene showed joint-side wear, primarily posterior, and no backside wear (Figure 3). The posterior capsule had loosened, but the posterior cruciate ligament (PCL) was functional. Insertion of a 21-mm-thick trial insert recovered varus, valgus, and posterior stability. Because of the patient’s age of 82 years, low activity level in activities of daily living, edematous skin, and number of stable components, we performed simple polyethylene exchange to a cruciate-retaining component that left the metal defect in the tibial plate untouched.
The patient regained the ability to ascend and descend stairs 4 weeks postoperatively. Her knee remained stable 2 years postoperatively. A cystic mass containing granular particles in the posterior soft tissue reduced its size 2 years postoperatively (Figure 4).

**DISCUSSION**

Anterior dislocation after TKA is rare, with 9 cases reported in the English literature.\(^1\)\(^2\)\(^3\)\(^4\)\(^5\)\(^6\)\(^7\) Cruciate-retaining prostheses were used in all but 1 case. Two types of anterior dislocations exist: subluxation, with recurvatum as the clinical manifestation of anterior instability, and complete dislocation, usually accompanying other complications.

Wang and Wang\(^1\) reported 3 cases of anterior subluxation, 2 of which developed with no episodes of trauma 3 and 6 years postoperatively, respectively. They attributed anterior instability to posterior capsular stretch and a nonfunctional PCL and described obvious recurvatum as the typical clinical manifestation.\(^1\) In our patient, posterior capsular stretch existed, as indicated by the cystic soft tissue mass detected on radiographs (Figure 1), but the PCL was functional, and no recurvatum existed. Tuoheti et al\(^2\) also reported anterior subluxation occurring 11 years postoperatively due to gradual progression of the posterior tilt of the tibial component leading to knee recurvatum. Yan et al\(^3\) reported anterior dislocation in a posterior-stabilized prosthesis due to polyethylene post fracture following malpositioning of the femoral and tibial components and 20° of recurvatum. No severe complications occurred in subluxation cases.\(^3\)

Complete dislocation has been reported in 4 cases, 3 of which had neurovascular complications.\(^4\)\(^5\)\(^6\) Besides neurovascular complications, cases of complete dislocation also tend to have concurrent structural knee joint damage, including PCL rupture or combined medial, lateral, and PCL rupture.\(^4\)\(^5\) Pao and Jiang\(^5\) reported a case of complete dislocation with vascular occlusion that required above-knee amputation. Aderinto et al\(^3\) reported a case of complete dislocation with motor and sensory function loss that had not recovered well, implying that below-knee amputation might be necessary. Villanueva et al\(^4\) reported a case of complete dislocation with occlusion of the ascending genicular artery and a peroneal palsy, from which the patient recovered. These cases show that complete anterior dislocation can be one of the most serious postsurgical complications of TKA. Our patient had no serious neurovascular complications, which might be attributable to her ability to reduce her knee spontaneously by flexing it and usually keeping it in a reduced position.

Regarding the cause of dislocations, insufficient posterior structures or component malpositioning have been reported, neither of which appeared to be a factor in our case. Rather, the identification of polyethylene thinning leading to relative valgus and anteroposterior instability suggests that aggravated ACL dysfunction, which every TKA inherently has, was the key causative factor cause in our case. Posterior capsular stretch might have been a secondary event.

In the absence of a gold standard, the treatment of choice needs to be made on a case-by-case basis. We performed simple polyethylene exchange.

**CONCLUSION**

Anterior dislocation after cruciate-retaining TKA is rare relative to posterior dislocation after posterior-stabilized TKA, which has reported incidences of 0.2% to 0.5%.\(^8\)\(^9\) Anterior dislocations have occurred as early as 6 months postoperatively in traumatic cases and from 3 to 16 years in atraumatic cases.\(^5\)\(^7\) Despite their rarity, anterior dislocations require prompt treatment because they can cause serious complications.

**REFERENCES**

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