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Case report

Dislocation of a constrained total knee arthroplasty with patellar tendon rupture after trivial trauma

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ABSTRACT

Constrained total knee prostheses are used in knees with severe deformities and insufficiency of collaterals to provide stable and mobile knees. Dislocation after constrained knee prosthesis is an extremely rare and dreaded complication. When dislocation is associated with patellar tendon rupture, the management includes restoration of the extensor apparatus along with a stable knee. Repair of the patellar tendon is challenging due to poor soft tissue coverage in the area and a bulky repair can put tension on the wound closure. Ideal method of restoration of the extensor apparatus is a matter of debate. There are various modalities used ranging from primary end-to-end repair, augmentation by medial gastrocnemius flap, semitendinosus and synthetic implants and allograft tendoachilles. We report a rare case of a posterior dislocation of a constrained total knee arthroplasty in association with patellar tendon rupture due to a minor fall after a few weeks of surgery. The first episode was managed by reposition of the dislocation and V–Y plasty of the quadriceps and primary repair. The second episode of dislocation with re-rupture needed augmentation by semitendinosus along with the insertion of the thicker insert. The management of this complex problem along with the review of literature is discussed in this case report.

1. Introduction

Posterior dislocation of the prosthesis after total knee arthroplasty (TKA) is an infrequent but serious complication.[1–3] Knee dislocation after revised TKA can be dangerous and can lead to neurovascular compromise and permanent disability.[4] Dislocation of a constrained TKA is even rarer and, to the best of our knowledge, its association with patellar tendon rupture has not been reported in the literature. Rupture of the patellar tendon after TKA is itself a catastrophic and debilitating complication, and its association with dislocation of prosthesis makes it even more challenging. Proper surgical management of this condition is often very difficult and remains controversial.

2. Case report

A 70-year-old female, with chronic seropositive rheumatoid polyarthritis with 40° of valgus deformity of the right knee (Fig. 1) had total knee replacement using Scorpio (TS type) constrained prosthesis (Figs. 2 and 3), and extensive lateral release. Due to the correction of severe deformity, she developed common peroneal nerve palsy which was noticed immediately in the postoperative period and it recovered spontaneously at 3 months. One month following surgery, patient presented with right knee pain and deformity, following a fall on a wet floor. Clinical examination revealed a defect in the infrapatellar region with inability to perform active knee extension. This raised the suspicion of an infrapatellar rupture of the quadriceps. Radiographs revealed posterior dislocation of the knee prosthesis (Fig. 4).

Intraoperative findings included dislocated TKA with patellar tendon rupture from patellar insertion and complete rupture of the medial and lateral retinaculae with friable soft tissues. This case was managed by reposition of dislocated TKA with primary repair of the patellar tendon. Since the patellar tendon was shortened following debridement, V–Y plasty of the quadriceps tendon was performed to gain length of the quadriceps by raising an inverted V proximally in the quadriceps tendon with the free limb in the vastus lateralis with care to preserve the lateral genicular artery. After deciding the amount of lengthening necessary for closing the patellar tendon defect, the lateral limb of the inverted V was advanced distally and laterally, detaching the vastus lateralis

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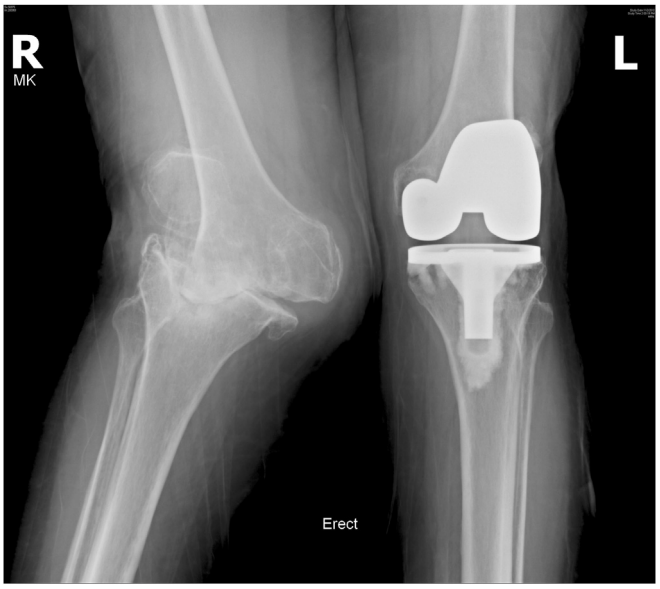

Fig. 1. Preoperative X-rays showing severe arthritis of the right knee with valgus deformity and previously done TKA.

muscle. The V–Y advancement thus gave approximately 2 cm of further length to repair the patellar tendon defect. Postoperatively, the patient was immobilized in knee extension following surgery and discharged with brace and static quadriceps exercises.

The patient came back 10 days after surgery with recurrent pain and deformity of the right knee. She denied any further injury. X-rays revealed posterior dislocation of the prosthesis and superior

Fig. 2. Postoperative X-ray (AP view) of left TKA using Scorpio TS prosthesis.

Fig. 3. Postoperative X-ray (lateral view) of left TKA using Scorpio TS prosthesis.

migration of the patella. On exploration of the knee, re-rupture of the infrapatellar tendon was found with dislocation of the prosthesis. The polyethylene insert was exchanged using one size thicker polyethylene. The patellar tendon reconstruction was done using ipsilateral hamstring (semitendinosus) tendon (Fig. 5). A drill hole of 4.5 mm was made through the tibia at tibial tuberosity level and another hole was made through the patella in a medio-lateral direction. The harvested tendon was passed through these drill holes, sutured back to it, and further anchored to the surrounding soft tissues. An above knee cast was applied for immobilization for 1 month followed by physiotherapy exercises. At 2 years follow-up there was no recurrence of dislocation or any signs of loosening (Fig. 6). There was an extensor lag of 45° (Fig. 7), however, the range of motion was up to 100° flexion (Fig. 8).

3. Discussion

Although tibiofemoral instability has classically been reported with cruciate-retaining prostheses, it is known that the dislocation of TKA can happen in both cruciate-retaining and cruciate-substituting TKAs.[1] Wrong surgical technique and wrong choice of constraint for the prostheses are the main causes of instability. Malalignment, malrotation, and intraoperatively uncorrected instability (especially in flexion) may lead to unstable TKA.[2]

Constrained prosthesis like Scorpio TS (Stryker) is designed to maintain a constant center of rotation throughout the range of motion. This provides uniform ligament tension during the transition from full extension to deep flexion by preserving ligament isometry. This eliminates mid-flexion instability, which is a common concern especially in revision and complex knee surgery. The Scorpio TS eminence is designed to provide ±2° of varus/valgus constraint and allows up to 10° of internal/external rotation. Hence, dislocation of such a constrained prosthesis per se is extremely