Case report

Posterior dislocation of a constrained total knee arthroplasty: A case report

Raheef Alatassi, Mohammed H. Alattas, Saeed Koaban, Seba Abdullah, Bandar Ahmed

A Security Forces Hospital, Department of Orthopedic Surgery, Riyadh, Saudi Arabia
b Jordan University of Science and Technology, College of Medicine, Irbid, Jordan
a King Saud Bin Abdulaziz University for Health Sciences, College of Medicine, Riyadh, Saudi Arabia

Article info

Keywords:
Dislocation
Total knee arthroplasty
Constrained
Posterior stabilized
Spontaneous
Case report

Abstract

Introduction: Dislocation of the knee after primary total knee arthroplasty is rare in a posterior stabilized knee and extremely rare in a constrained total knee arthroplasty. Constrained total knee prostheses are used for severe knee deformities and to provide stable and mobile knees.

Presentation of case: In this case, we describe a dislocation of a primary constrained total knee arthroplasty using the Genesis II (Smith & Nephew, Memphis Tennessee, USA) prosthesis. Without any significant trauma, the constrained insert dislocated fifteen months after surgery and revision surgery with a bigger insert was needed. Surgical error may have been the cause of dislocation, but we were unable to establish a clear reason behind this dislocation.

Discussion: Knee dislocation after TKA is rare but easily overlooked and can lead to serious complications and permanent disability. This system should provide stable and mobile knees to correct collateral ligament laxity.

Conclusion: Here, we report the first case, to our knowledge, of dislocation with a constrained prosthesis without any history of trauma.

1. Introduction

Dislocation of the knee after primary total knee arthroplasty (TKA) is usually related to the following factors: flexion-extension mismatch with greater laxity during flexion than extension, malposition of a component, extensor mechanism dysfunction, remnant of the cement, and valgus deformity of the knee [1]. Although rare, several case reports on this condition have been published in the literature [2] [3], [5]. The cases that are described in these reports differ in several ways. Most cases do not involve a high-energy trauma and some cases occurred during simple flexion motion of the replacement knee. Constrained total knee prostheses are used for severe knee deformities and insufficiency of collaterals to provide stable and mobile knees with steady rotation centred along the range of motion (ROM) [5]. Dislocation after the use of constrained knee prostheses is extremely rare and causes severe complications [5]. The Genesis II prosthesis (Smith & Nephew, Memphis Tennessee, USA) is a fourth-generation implant for total knee arthroplasty. It has a different type of polyethylene insert with different degrees that can be used in the same prosthesis. The company recommends that a constrained insert can be added without using a stem on the femur in cases that need constrained total knee arthroplasty [6].

Here, we present a rare case of atraumatic posterior dislocation of primary TKA using the Genesis II constrained posterior stabilized prosthesis. There are no reported cases such as this published in the English literature [3]. The current case report was written according to the recently published SCARE criteria as it used for supporting transparency and accuracy in publication of case-reports [11].

2. Presentation of case

A 67-year-old woman, with a known diagnosis of hypertension and bronchial asthma, presented to our outpatient clinic with bilateral knee pain that was more severe on the right side. She was diagnosed with severe bilateral knee osteoarthritis. We decide to perform a right TKA to address the severe osteoarthritis. The patient had a ROM of 0–110° with a positive varus stress test. Her body mass index (BMI) was 42.8 (Fig. 1).

A cemented constrained posterior stabilized TKA prosthesis with a constrained 11 mm polyethylene articular insert was used with a tibial stem (Genesis II, Smith & Nephew), as shown in Fig. 2.

The patient had an uneventful surgery, hospital stay, and post-operative rehabilitation. Fifteen months after surgery and at the time of admission for the other knee, the patient felt pain on the operated side that occurred 1 day prior to admission. She presented to the emergency room with knee
pain after getting up from the chair whilst her knee was in flexion. The patient was still able to walk without any assistance. She did not feel that her knee was going to give way, but she noticed that the ROM was less than before. The physical examination showed swelling and no coronal deformity of the right knee with normal distal neurovascular examination and the ROM was 20–90°. Radiographs of the right knee showed no sign of loosening of the femoral or tibial component but demonstrated posterior dislocation of the knee with the femoral cam anterior to the tibial post (Fig. 3). The decision was made to perform open reduction surgery.

Under spinal anaesthesia, with manipulation under fluoroscopy during high flexion we were able to reduce the knee. We proceeded to revision and the polyethylene was removed. The polyethylene was stable on the tibial component with no sign of wear. There was no sign of infection. The tibia and femur components showed no sign of loosening. No osteophytes or soft tissue impinging structures were observed. Therefore, we chose not to change the cemented, well-fixed tibial component, but the insert was removed and replaced by a constrained size 13 mm polyethylene insert on the original tibial base plate. The same procedure was performed on the other side. The new insert was suitable and stable in the varus/valgus stress test and full extension with flexion up to 120° was observed. Her recovery was uneventful and she was discharged on the third day post-surgery and continued her physical therapy as an outpatient. Nine months post-surgery, the patient reported no pain. There was no recurrence of dislocation. Her extension-flexion ROM was 0–110°.

Standing radiographs showed no abnormalities or any sign of loosening with a normal positioning of the insert (Fig. 4).

3. Discussion

Knee dislocation after TKA is rare but easily overlooked and can lead to serious complications and permanent disability; hence, it must be addressed early and managed appropriately [2] [3] [4], [7] [8], [9]. There are some symptoms that could alert the surgeon of the possibility of knee dislocation or a problem with the insert, such as pain, clicking, locking sensations, or sudden instability [3]. Dislocation of the knee after TKA was first reported by Insall et al., in 1979 after total condylar knee arthroplasty in 4 patients in a series of 220 patients [10].

Reports of dislocation of the knee after TKA are increasing. These reports attribute the dislocations to inadequate stability during flexion, which is addressed with revision surgery with a thicker tibial insert. Since this first report by Insall et al., cases of dislocation in knee arthroplasties have suggested different causes. Although tibiofemoral instability has typically been reported with cruciate-retaining prostheses, it is well-known that dislocation of TKA can occur with both cruciate retaining and cruciate substituting TKAs [8]. For severe knee deformities and collateral insufficiency, constrained polyethylene inserts can be used to provide stable, mobile knees and overcome the deformities that can occur with CR and PS prostheses.

Rutten et al. [3] suggested that polyethylene insert dislocation/spin-out has a higher incidence in mobile-bearing systems compared to fixed-bearing systems, and this is extremely rare with fixed polyethylene inserts. Three main causes for fixed insert dislocation/spinout have been hypothesized. These are inadequate ligament balancing, misplacement of the insert and impingement of the insert on soft tissue or osseous structures during flexion [1].

After the primary surgery, our patient’s ligament balance was stable and adequate and after the second operation when the polyethylene insert was changed to one size larger (13 mm). Furthermore, there were no osseous or soft tissue structures impinging on the insert during flexion when we performed the second operation.

In a series of 3000 patients who underwent primary TKA, only 15 cases of posterior dislocation were reported by Lombardi et al. [7]. Prosthesis function was excellent and yet dislocations still occurred. Dislocations occurred when the knee was in the flexion position, and within 6 months, repositions were performed under general anaesthesia, and a reposition with thicker polyethylene inserts was performed in 3 cases. In our patient, different scenario happened. The patient dislocated her knee during mid-flexion. It occurred 15 months
after surgery and the prosthesis was repositioned with a 2 mm thicker insert (one size larger) while fixing the tibial base plate in place. Fifteen months after the revision, the prosthesis was functioning well and the patient had an uneventful rehabilitation.

The aetiology of dislocation remains an enigma, but we conclude that when there is severe tissue deformity and concomitant ligamentous instability, despite the use of a constrained design at the first operation, dislocation can still occur. The exact cause of dislocation in our patient is still unclear. It could be due to misplacement of the insert or the size of the post being too short, resulting in easier dislocation during flexion. Other possible causes include surgical errors or the insert itself not being fixed securely enough to hold the prosthesis in place even when the ligament laxity was adequate after placement of the prosthesis. We routinely use the constrained prosthesis in the first operation as it is known to correct the ligament laxity and is safe with no history of dislocations.

4. Conclusion

We have presented a rare case of dislocation of a posterior stabilized TKA with a constrained prosthesis, which was atraumatic and needed revision surgery. No specific reason for the dislocation could be found. This case raises a significant question about the efficacy and safety of a constrained prosthesis stability and further investigation is needed so that we can prevent similar complications from occurring later and to find a clinical path to treat this kind of problem in the future.

Ethical approval

We have reported a single case and ethical approval have been taken from our institution with valid reference number and without any conditions.

Funding

No specific grant from funding agencies in the public, commercial, or not-for-profit sectors was received for this work.

Author contribution

-Raheef Alatassi, surgeon: performed the literature review and data collection, designed the manuscript, and wrote the manuscript.
-Mohammed H. Alattas, surgeon: reviewed the final version of the manuscript.
-Saeed Koaban, surgeon: contributed to the manuscript writing.
-Seba Abdullah: contributed to the manuscript writing and data collection.
-Bandar Ahmed, surgeon: contributed to the manuscript writing.

Conflict of interest

The authors have no conflicts of interest to declare.

Registration of research studies

We have reported a single case with no requirement for registry. This manuscript does not describe a clinical study.

Guarantor

Raheef Alatassi.

Consent

Written informed consent was obtained from the patient for publication of this case report and the accompanying images. A copy of the written consent is available for review upon request to the editor-in-chief of this journal.

Declarations of interest

None.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.amsu.2018.07.010.

References

[1] H. Kobayashi, Y. Akamatsu, N. Taki, H. Ota, N. Mitsugi, T. Saito, Spontaneous dislocation of a mobile-bearing polyethylene insert after posterior-stabilized
rotating platform total knee arthroplasty: a case report, Knee 18 (2011) 496–498.

[2] S.C. Lee, K.A. Jung, C.H. Nam, S.H. Hwang, W.J. Lee, I.S. Park, Anterior dislocation after a posterior stabilized total knee arthroplasty, J. Arthroplasty 27 (2012) 324 e17-20.

[3] S.G. Rutten, R.P. Janssen, Spontaneous late dislocation of the high flexion tibial insert after Genesis II total knee arthroplasty. A case report, Knee 16 (2009) 409–411.

[4] A. Conti, L. Camarda, S. Mannino, L. Milici, M. Darienzo, Anterior dislocation in a total knee arthroplasty: a case report and literature review, J. Orthop. 12 (2015) S130–S132.

[5] R. Vaishya, V. Vijay, A. Vaish, Dislocation of a constrained total knee arthroplasty with patellar tendon rupture after trivial trauma, Chin. J. Traumatol. 18 (2015) 241–244.

[6] LEGION™, Total Knee System, Smith & Nephew Internal Document #40420508 7128-1283 02/05.

[7] A.V. Lombardi, T.H. Mallory, B.K. Vaughn, R. Krugel, T.K. Honkala, M. Sorcher, et al., Dislocation following primary posterior-stabilized total knee arthroplasty, J. Arthroplasty 8 (1998) 633–639.

[8] R. Vaishya, V. Langde, S. Ahmad, G. Neupane, Dislocation following total knee arthroplasty, Indian J. Orthop. 45 (2011) 283–284.

[9] S. Laskin, J. Davis, Total knee replacement using the Genesis II prosthesis: a 5 year follow up study of the first 100 consecutive cases, Knee 12 (2005) 163–167.

[10] J.N. Insall, W.N. Scott, C.S. Ranawat, The total condylar knee prosthesis: a report of two hundred and twenty cases, J Bone Joint Surg Am 61 (1979) 173–180.

[11] R.A. Agha, A.J. Fowler, A. Saetta, I. Barai, S. Rajmohan, D.P. Orgill for the SCARE Group, The SCARE Statement: consensus-based surgical case report guidelines, Int. J. Surg. 34 (2016) 180–186.