Case report

Bilateral sequential knee dislocation in a patient with connective tissue disorder: Report of an unusual case and lessons learnt

Waheeb Al-Azzani*, Konrad Wronka, James Lewis, Adel Ghandour, Angus Robertson

Trauma and Orthopaedics, University Hospital of Wales, Heath Park, Cardiff CF14 4XW, UK

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ABSTRACT

Tibiofemoral knee dislocation is a rare but serious limb-threatening injury. Without prompt recognition and management, amputation or long-term functional impairment may result. The authors present a case of bilateral sequential knee dislocation, secondary to low-energy trauma, in a patient with Systemic Lupus Erythematosus and antiphospholipid syndrome. Adequate stability was achieved on both occasions by reconstruction of the postero-lateral corner and MCL. During the first reconstruction, ipsilateral autograft, as well as hamstring tendons from the contra-lateral side, were used to strengthen the graft. For the second reconstruction, allografts were used. This case highlights that, a patient with soft-tissue disorder presenting with low-energy knee dislocation may be at risk of further dislocations. Treating surgeons should anticipate these issues and consider the role of allograft in ligamentous repair.

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1. Introduction

The knee is a hinge joint consisting of three articulations: the patellofemoral, the tibiofemoral and the proximal tibiofibular joints. Tibiofemoral knee dislocation is a rare but serious limb-threatening injury representing less than 0.2% of orthopaedic injuries with an estimated incidence of between 0.28 and 5.3 per year.¹ Without prompt recognition and management, amputation or long term functional impairment may result due to concomitant neurovascular injuries.² Approximately, 10% of tibiofemoral knee dislocation injuries are due to normal daily activities and simple falls, also known as ultra-low velocity dislocations.³ The incidence is higher in women with high Body Mass Index (BMI) and often associated with neurovascular injuries and postoperative complications.^{4,5} However, authors present an unusual case of a female patient presenting with low energy bilateral sequential knee dislocations that occurred almost 2 years apart.

2. Case history

The case of a female patient with medical history of Systemic Lupus Erythematosus (SLE), anti-phospholipids antibody syndrome (APS) and a BMI of 34 is presented.

The patient was on regular Prednisolone, Azathioprine, Hydroxychloroquine, Aspirin, Calcium and Vitamin D.

The first episode of knee dislocation occurred in 2012 after a fall from standing height whilst getting out of the bathroom. The patient was 38 years old at the time. She presented to emergency department (ED) with right knee deformity, hypoaesthesia along the common peroneal nerve distribution and absent dorsalis pedis and posterior tibial pulses. However, the foot was warm and pink. A diagnosis of anterior dislocation of the right knee was made and prompt reduction under sedation in ED was achieved (Figs. 1 and 2). Initially, her CT angiogram did not visualise anterior tibial or peroneal arteries and a vascular surgeon opinion was sought. The patient was closely monitored and no vascular intervention was necessary.

Pre-operative MRI showed complete rupture of anterior cruciate ligament (ACL), posterior cruciate ligament PCL, medial collateral ligament (MCL) and postero-lateral corner. Within 48 h, the patient underwent right knee postero-lateral corner reconstruction. Intra-operatively, use of tourniquet was avoided given the history of a potential vascular injury. Hamstring tendons autograft harvested from ipsi-lateral side was very thin and weak; therefore, contra-lateral gracilis and semitendinosus tendons were also harvested and used to reconstruct postero-lateral corner and MCL. The patient was kept on IROM brace for a total of 4 weeks postoperatively. She then commenced physiotherapy exercises and weight bearing with crutches for another 2 weeks. Within 6 months from time of surgery, she returned to her normal level of activity with no instability symptoms. There was no need to reconstruct cruciate ligaments as the patient was asymptomatic, due to her low demand.

* Corresponding author.

E-mail address: al-azzaniw@cf.ac.uk (W. Al-Azzani).

Fig. 1. AP right knee.

Fig. 2. Lateral view of right knee.

Fig. 3. AP left knee.

In 2014, at age of 40, the patient presented with an injury to the other knee after falling from standing height again. Despite the history of previous knee dislocation and obvious deformity of the leg at ED, there were significant delays in appropriate assessment and diagnosis was made 5 h after initial injury. The patient had globally reduced sensation and power on the left lower leg. Distal pulses were palpable but diminished.

Left knee X-rays confirmed the diagnosis of acute anterior dislocation of the left knee (Figs. 3 and 4). Under sedation in ED, the dislocation was reduced. Distal pulses remained diminished, and ankle-brachial pressure index was 0.8, therefore vascular imaging was performed. A CT angiogram (Fig. 5) showed good arterial flow. Pre-operative MRI scan showed complete ACL, PCL and MCL rupture, LCL avulsion off the fibular head and injury to biceps femoris, popliteus and gastrocnemius. The patient underwent postero-lateral corner and medial collateral ligament reconstruction by the same surgeon, who used gracilis tendon allografts available commercially, as there were no suitable autograft options. Within 6 months, the patient made a full recovery, with no symptoms of instability and normal function when undertaking activities of daily living. There was no need to perform cruciate ligament reconstruction.

3. Discussion

Tibiofemoral knee joint dislocation is rare, and many of these reduce spontaneously before presentation to ED. Data from large academic institutions estimated the incidence to range from 0.28 to 5.3 per year with a male to female ratio of 4:1.¹

According to the mechanism of injury, nearly 50% of knee dislocations are secondary to road traffic accidents (high velocity dislocations), 30% secondary to sport injuries (low velocity dislocations) and nearly 10% are due to normal daily activities and simple falls (ultra low velocity dislocation).³

Presented patient had several risk factors for ultra-low velocity dislocation including female gender and high BMI.^{4,5} Additionally, she suffered from SLE and APS.

SLE has been reported to associate with multiple tendon ruptures and altered tendon microstructure.⁶ Potasman and Basan⁷ reported histological findings of a perivascular mononuclear infiltrate of tendons leading to structural damage suggested to be attributed to SLE. Furthermore, Delle Sedie et al.⁸ found a high prevalence of tenosynovitis (28%) and structural damage (12%) of hand and wrist tendons when they evaluated 50 patients with SLE.

Although formal histo-pathological evaluation was not performed on this patient, both hamstring tendons from both sides

Fig. 4. Lateral view of left knee.

were very thin and tenuous. One could hypothesise that this patient's sequential ultra-low velocity dislocations were associated with tendon structural abnormalities resulting in poor muscular control of the knee and diminished function of secondary stabilisers as a result of chronic connective tissue disorder.

Fig. 5. CT angiogram.

A further important issue, when dealing with a dislocated knee, is the assessment of a concomitant neurovascular injury. In dislocation injuries associating with limb ischaemia, a delay from injury to reperfusion exceeding 8 h have been reported to have up to 86% amputation rates compared to 10% with early revascularisation.^{9,10} Therefore, knee dislocation should be diagnosed, assessed and managed in a timely fashion.

Although fortunately in this case, there were no long-term vascular complications despite the delay in diagnosis, it is important to recognise that patients with a previous history of ultra-low energy knee dislocation may present with further dislocations.

Treating team should have a high index of clinical suspicion when assessing such patient.

4. Conclusion

A patient with soft tissue disorder presenting with low energy knee dislocation may be at risk of dislocating contra-lateral knee. A high index of suspicion of such injury is vital in allowing prompt diagnosis and management. Treating surgeons should anticipate these events and consider the role of allograft in ligamentous repair and that, in such patients, postero-lateral and medial reconstruction could be adequate to achieve stability.

Author contributions

Authors WA, KW, JL, AG and AR contributed to the concept and literature review. Authors WA and KW contributed to drafting the article. All authors contributed to the final approval of the version to be published.

Conflicts of interest

The authors have none to declare.

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