Non-traumatic anterior dislocation of a total knee replacement associated with neurovascular injury

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ABSTRACT

Prosthetic total knee replacements rarely dislocate. When dislocation does occur, it is usually in a posterior direction in association with a posterior stabilised, cruciate-sacrificing prosthesis. Neurovascular injury is unusual. In this report, we describe a case of anterior dislocation of a cruciate-retaining total knee replacement in a 67-year-old woman. The dislocation occurred in the absence of overt trauma and resulted in severe neurovascular injury.

KEYWORDS

Knee replacement – Anterior dislocation – Neurovascular injury

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Case report

A 67-year-old woman developed pain and deformity of her right knee whilst bending forwards to open an oven at home. Radiographs confirmed anterior dislocation of the right knee replacement (Fig. 1).

Right knee replacement had been performed 6 years previously. A cruciate-retaining Nexgen prosthesis was implanted (Zimmer, Inc., Warsaw, IN, USA). Postoperative recovery was uneventful and during the ensuing 6 years she did not report any problems with the knee. Specifically, there was no history of instability. Of note, she was obese, weighting 109 kg.

Closed reduction of the knee was performed successfully under sedation, following which the knee was immobilized in an extension splint. It was established at this stage that there was loss of motor and sensory function below the level of the knee, but there was no clinical evidence of vascular compromise.

On the third day of admission, the right leg became acutely ischaemic with absent dorsalis pedis and posterior tibial pulses. An angiogram showed complete thrombosis of the popliteal artery from its origin extending to the proximal aspect of the trifurcation in the calf with reconstitution of the distal vessels in the leg. Femoropopliteal bypass grafting was performed immediately to re-establish vascular perfusion of the right leg. During the same anaesthetic, fasciotomies were performed through medial and lateral incisions to decompress the four compartments of the leg. At

the time of surgery, the knee was found to be unstable with clinically apparent disruption of the medial and lateral collateral ligaments and the posterior cruciate ligament. To address this degree of instability, an external fixator that spanned the knee was applied to provide stability and protect the vascular reconstruction.

When assessed 6 months following dislocation of the knee, the external fixator had been removed but the leg remained insensate with complete loss of motor power below the knee level. As a result, she was unable to mobilise independently.

Discussion

Dislocation of fixed-bearing total knee replacements is relatively uncommon and is usually associated with cruciate-sacrificing posterior stabilised knee replacements, where the posterior post of the polyethylene insert subluxes behind the cam of the femoral component. Lombardi *et al.*¹ reported 15 posterior dislocations of posterior stabilised condylar prosthesis over a 10-year period during which more than 3000 primary total knee arthroplasties had been performed. Reported risk factors include ligamentous deficiency, polyethylene wear, tibial component malalignment, suboptimal soft tissue balance and neurological disorder.^{2–4}

The knee dislocation we have described differs from previous literature reports of prosthetic knee dislocation. The prosthesis used was cruciate-retaining and the dislocation was anterior, rather than the more common posterior,

Figure 1 Anterior dislocation of total knee replacement.

pattern associated with posterior stabilised knee prostheses.^{1,5} In addition, the dislocation was a limb-threatening event associated with severe neurovascular compromise. The patient was markedly overweight which we believe was a contributing factor for the atraumatic dislocation. It is likely

that the mechanism of dislocation is similar to that associated with anterior dislocation of the native knee, with hyperextension resulting in anterior subluxation of the tibia until complete dissociation of the articulating surfaces of the knee prosthesis occurred.

With limited clinical improvement 6 months after injury, prognosis for return of useful motor function below knee level is poor; therefore, the option of below-knee amputation was discussed with the patient.

Conclusions

This case report demonstrates that anterior dislocation of a total knee replacement, in the absence of overt trauma, can result in severe neurovascular injury. A thorough assessment of the vascular status of the lower limb followed by appropriate investigation is, therefore, mandatory in patients who present with this pattern of injury.

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