ABSTRACT

We report a case of traumatic anterior dislocation of the left knee with an ipsilateral tibial shaft fracture in association with popliteal artery and common peroneal nerve injuries. To our knowledge, such a combination of injuries has not been reported before. All components of this injury were recognised and treated promptly with rehabilitation commencing early, resulting in a good functional outcome. We discuss the possible injury mechanism and management of this unusual case.

Key words: knee dislocation; peroneal nerve; popliteal artery; tibial fractures

INTRODUCTION

Acute dislocation of the knee is a limb threatening injury that often results in extensive soft-tissue damage and disruption of the popliteal blood vessels. We report a case of a closed fracture of the left tibial diaphysis and an anterior dislocation of the knee in association with disruption of the soft tissues including knee ligaments, popliteal vessels, and the common peroneal nerve. We are not aware of any other reports of such a combination of injuries.

CASE REPORT

In January 2004, a 36-year-old woman suffered a high-energy hyperextension injury when her left leg was hit by the rear bumper of a reversing car and trapped between the car and a wall. On admission, obvious deformity and swelling of the leg were noted; the ankle pulses were not palpable and there was foot drop with sensory loss in the distribution of the common peroneal nerve. The injury was closed, with no other systems involved. Anteroposterior and lateral radiographs confirmed a transverse fracture through the mid-shaft of the tibia and fibula and an anteriorly dislocated knee (Fig.1). Despite prompt reduction of the knee, the ankle pulses failed to return on Doppler examination. An urgent
arteriogram revealed a short segmental occlusion of the popliteal artery (Fig. 2). Vascular surgeons carried out an urgent femoropopliteal bypass using the long saphenous vein from the contralateral leg. Internal fixation of the tibial shaft was performed to facilitate a later, second stage knee ligament reconstruction (Fig. 3). The leg was placed in an above-knee back slab. The second stage was carried out 5 days later through an anterior midline incision. The anterior and posterior cruciate ligaments had mid-substance tears with stretching of the fibres, making repair impossible. These were thus reconstructed with a fresh frozen Achilles tendon allograft and the medial collateral ligament directly repaired. The common peroneal nerve and the posterolateral corner were explored through a separate lateral incision, ensuring an adequate skin bridge between the 2 incisions. The common peroneal nerve was intact but stretched. The lateral collateral ligament, popliteal tendon, and popliteal fibular ligaments were ruptured at their femoral attachment and were reattached with suture anchors (Mitec Anchor, Ethicon, Johnson & Johnson, Raynham, US). The biceps tendon was ruptured at its distal end and was directly repaired using the Kessler suture technique.

All the wounds healed well and the patient was discharged, non-weight bearing, in an above-knee cast to protect the vascular repair, and given a quadriceps-strengthening programme. Six weeks post surgery, the cast was converted to a Sarmiento cast and knee mobilisation commenced. At 3 months post surgery, she had a 10° to 90° active range of movement and was able to bear weight with the help of crutches. A foot drop splint was worn for 6 months until common peroneal nerve function returned. By this time she had started walking independently and had returned to work. At the 18 months’ follow-up, she had a grade-1 anterior laxity but no posterior sag or varus/valgus instability. The range of movement was 0° to 110° and she had started brisk walking, jogging, and swimming.

DISCUSSION

The exact mechanism responsible for the tibial shaft fracture and knee dislocation with disruption of all knee ligaments, popliteal vessels, and the common peroneal nerve was not clear. It was a high-energy injury; the left leg was hit by the rear bumper of a reversing car fracturing the tibial shaft. The proximal tibia was then trapped between the car and a wall. The momentum caused the knee to hyperextend thus dislocating and disrupting all ligaments and injuring the popliteal and common peroneal nerves.

Traumatic dislocation is the most severe
ligamentous injury of the knee. Immediate surgical repair and reconstruction of the torn ligaments is the internationally accepted treatment of choice.\textsuperscript{3} People who are young and those with sports-related injuries usually have a better prognosis.

A retrospective study on a series of 29 acute knee dislocations over a period of 6 years concluded that operative treatment of all the torn structures ensured the best overall knee function with better knee stability and patient satisfaction.\textsuperscript{4} Prompt recognition of any associated popliteal artery disruption and early revascularisation is vital for successful functional results.\textsuperscript{1,2} Arteriography is recommended in all cases of knee dislocation.\textsuperscript{5}

Those who underwent immediate knee reconstruction had higher subjective scores and better objective restoration of knee stability than patients treated 3 weeks after the injury or later.\textsuperscript{6} Although the differences between early and delayed repair were small, the outcomes in terms of overall knee function, activity levels and anterior tibial translation were better in the knees reconstructed within 2 weeks of injury.

In our patient, the injury was severe and surgical reconstruction was performed in 2 stages. A fresh frozen Achilles tendon allograft was used for the anterior and posterior cruciate ligament reconstructions. The use of Achilles tendon allografts achieved good results in the objective parameters of knee function in a series of 41 patients followed up over a period of 2 to 10 years.\textsuperscript{7}

It is important to be aware that a component of such a combination of injuries can be easily missed, leading to a devastating outcome. This case presented the entire spectrum of knee ligament disruption, along with tibial shaft fracture, popliteal artery and common peroneal nerve injuries. These were all recognised and treated promptly thus achieving an eventual good functional result. Such serious injuries require awareness and a team approach to achieve a favourable outcome.

**REFERENCES**