Concomitant ipsilateral traumatic dislocation of the hip and knee following high-energy trauma: a case report

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ABSTRACT

Traumatic dislocation of the hip or knee can occur after high-energy trauma and is often associated with concomitant injuries and secondary complications. Concomitant traumatic dislocation of both hip and knee is rare. We describe a case of combined ipsilateral posterior hip dislocation with a posterior acetabular fracture and a complete open knee dislocation with disruption of the popliteal artery that resulted in amputation.

Key words: amputation; hip dislocation; knee dislocation; wounds and injuries

INTRODUCTION

Traumatic dislocation of the hip or knee is a common injury after high-energy trauma, and is associated with increased morbidity because of the substantial risk of concomitant injuries and development of early or late complications. Acetabular wall fractures, femoral head fractures, post-traumatic arthritis, and avascular necrosis of the femoral head are common concomitant injuries and complications with hip dislocation\(^1\)--\(^4\); traumatic open knee dislocation is associated with extensive ligamentous, vascular, and neurological damage.\(^5\),\(^6\) We describe a case of combined ipsilateral posterior hip dislocation with a posterior acetabular fracture and a complete open knee dislocation with disruption of the popliteal artery that resulted in amputation.

CASE REPORT

In December 2004, an 18-year-old man was admitted to the University Hospital of Ioannina, Greece following a motor vehicle accident 8 hours earlier. On admission, the patient remained conscious with normal respiration, a heart rate of 120 per minute, and a systolic blood pressure of 90 mm Hg. His right leg was covered with bandages and was shorter than the
left. The right hip was slightly flexed, adducted, and internally rotated. He had a deep open wound at the right popliteal fossa with minor haemorrhage. The skin below the knee appeared pale, waxy-white and was cooler than the left. No popliteal or ankle pulses were detected on the right foot. Clinical examination of the left leg, the upper extremities, and the rest of the trunk showed no injuries. Plain radiographs revealed a posterior dislocation of the right hip associated with a posterior fracture of the acetabular rim and an ipsilateral complete dislocation of the knee (Fig. 1). Radiographic evaluation of other body parts did not reveal any fractures.

The patient was taken directly to the operating room without undergoing arteriography because of the obvious vascular injury around the knee and the delayed admission. Under general anaesthesia, closed reduction of the right hip was successfully performed; a longitudinal incision was then made to explore the popliteal artery. Both the proximal and distal fragments of the artery had been destroyed by an obvious stretching mechanism for a length of approximately 10 cm. The contused segment of the popliteal artery was removed and revascularisation was performed using a reversed saphenous vein interpositional graft from the contralateral leg. Unfortunately, the blood flow was poor and only mild clinical symptoms of revascularisation of the distal leg were observed. A second revascularisation failed to achieve any change in the blood flow. Intra-venous heparin and oral anti-coagulants were used postoperatively, but no sign of re-establishment of the circulation in the ischaemic extremity was observed. On the third postoperative day, a through-knee amputation was performed. Computed tomography (CT) of both hips was performed postoperatively to confirm the reduction of the hip and the full extent of the acetabular fracture. It showed a shattered acetabular rim with an ipsilateral fracture of the sciatic and pubic rami, along with intra-articular osteochondral fragments that were incongruous with the femoral head (Fig. 2). At 2 months’ follow-up, the patient was in a stable condition and started walking with 2 crutches. At 14 months’ follow-up, he had returned to daily activity and was considering using a prosthesis.

DISCUSSION

Traumatic posterior dislocations of the hip are common following high-velocity trauma. They occur more often than anterior dislocations and account for approximately 90% of hip dislocations. An axial force acting on the flexed hip in a road accident or a fall from a height is a typical cause. Such dislocations are usually associated with acetabular fractures, particularly in the posterior wall. The extent of the posterior acetabular fracture determines management. When the fracture involves more than 65% of the posterior acetabular wall, open reduction along with surgical repair of the acetabular fracture is the treatment of choice in order to avoid residual posterior hip instability.

In addition to plain radiography, CT may be required to confirm the diagnosis, to show the direction if the signs are subtle, and to reveal associated acetabular wall fractures. CT is the most sensitive diagnostic tool for detecting reduction, intra-articular osteochondral fragments, and residual subluxation of the joint. Although most patients with posterior hip
dislocation remain asymptomatic in the long term, they carry a substantial risk of developing late complications such as post-traumatic arthritis and osteonecrosis of the femoral head.\textsuperscript{2,4}

Complete open dislocations of the knee are also caused by high-energy trauma; multiple dense ligaments and a sturdy capsule protect the knee. Such dislocations are associated with extensive soft-tissue and ligamentous rupture and vascular or nerve injuries. Damage to the popliteal artery is common because of the stretching mechanism secondary to tethering of the vessel at the adductor hiatus or by direct contusion by the posterior tibial plateau; so, too, are fractures of the distal femur or the tibial plateau. Immediate surgery is the only treatment option in open knee dislocation with an associated popliteal artery injury because a popliteal artery injury is limb threatening. The effectiveness of revascularisation depends on the timing of surgery. Inadequate initial assessment and delayed vascular repair increase the amputation rate.\textsuperscript{12-14} Delayed vascular repair often results in loss of revascularisation and consequent amputation. The amputation rate has been reported to range from 60\% to 80\%.\textsuperscript{12,14,15}

Concomitant ipsilateral traumatic dislocation of both hip and knee following high-energy trauma is extremely rare. Only one case of ipsilateral hip and knee dislocation involving a 31-year-old driver in an accident has been reported.\textsuperscript{5} That patient was admitted to hospital with absent peripheral pulses and closed reduction of the dislocation achieved revascularisation; there was no evidence of vascular injury on arteriography. The absence of vascular injury, along with the aggressive early surgical treatment and extensive postoperative physiotherapy resulted in a functional extremity.

The present case is unique because no injuries apart from ipsilateral dislocation of the hip and knee and posterior fracture of the acetabulum were observed. Immediate surgery is crucial for successful revascularisation; whether delayed repair of the popliteal artery is the main factor leading to amputation is unknown. Although surgery was performed approximately 8 hours after the accident, the severity of the arterial injury appears to be the main factor leading to amputation.

REFERENCES