

Case Report

Simultaneous traumatic dislocation of the hip knee and ankle joints in an ipsilateral limb, does it happen? A case report

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ABSTRACT

Simultaneous dislocation of three joints the hip knee and ankle joint in an ipsilateral limb is a very rare pattern of injury and only a single case has been reported in the literature, but it is associated with acetabulum fracture. A 34-year-old male had met with a road traffic accident involving left lower limb. Radiographic examination revealed (i) Posterior dislocation of the hip joint without any fracture (ii) Posterior dislocation of the knee joint (iii) Open fracture dislocation of the ankle joint with medial malleolus fracture tibial pilon fracture. The patient underwent an immediate closed reduction of the hip joint by Allis method. Simultaneous reduction of the knee and ankle joint was done and appropriate splintage gave. Open wounds were well debrided and trans-articular fixator was placed over knee and ankle joint. At a second stage, the medial malleolus fracture and tibia pilon fracture were fixed. MRI scan was done which revealed an anterior cruciate ligament injury of the knee. At 6-month follow-up, the patient was ambulating with full weight-bearing on both lower extremities without any assistive devices. There always lies a high risk of hemodynamic instability and other serious and life-threatening injuries due to the high velocity of trauma involved in such cases. The outcome of ipsilateral hip knee and ankle dislocation can vary widely depending on the circumstances and other associated injuries.

Keywords: Ankle joint in a single limb retrospective, Dislocation of hip knee, Simultaneous traumatic triple dislocation in an ipsilateral limb, Traumatic triple dislocation, Triple dislocation of lower limb

INTRODUCTION

Posterior hip dislocation frequently occurs due to forces applied over the knee joint and are associated with high incidence of intraarticular knee injury.^{1,2} Simultaneous dislocation of three joints mainly the hip knee and ankle joint in an ipsilateral limb is a very rare pattern of injury and so far only a single case has been reported in the literature so far to the best of our knowledge.³ The rarity of such injuries and the complex bony and soft tissue injuries involved in such cases creates a uniquely challenging situation even to the most experienced surgeons. We are going to present and discuss a similar case with ipsilateral traumatic hip and knee dislocation along with ankle fracture dislocation of the lower limb,

which happens to be the first case with such an injury pattern to be reported in literature as to the best of our knowledge, and its associated management and difficulties encountered along with it.

CASE REPORT

A 34-year-old male had met with a road traffic accident while driving his motorbike. He had a head-on collision with a truck and sustained severe injuries and was referred to our emergency services. The patient was a manual labourer and he sustained a road traffic accident when he was driving back home after work with his helmet on. He was brought to the emergency in our trauma centre and on initial examination his GCS was

found to be 15 and his vitals were stable. On further examination, his left lower limb was in an attitude of flexion, adduction and internal rotation with painful restriction of all active and passive movements of the hip joint. A globular bony mass was palpable in the gluteal area. The left knee joint was also grossly deformed, and tibia was noted to be dislocated posteriorly. Movements around the knee joint were restricted and there was moderate swelling in the knee joint.

There was an open fracture dislocation of the ankle joint with medial malleolus fracture of grade 3a according to Gustilo Anderson classification which was confirmed by radiographic examination. No other significant systemic or associated musculoskeletal injuries were noted.⁴ The limb was splinted appropriately, and the patient was adequately resuscitated. The distal pulses were present on both legs and capillary flow was adequate. Regular monitoring of the capillary blood flow using continuous pulse-oximetry was carried out.

Radiographic examination was carried out and the patient sustained the following injuries to his left Lower limb:

- Posterior dislocation of the hip joint without any fracture of the acetabulum (Figure 1).
- Posterior dislocation of the knee joint (Figure 2).
- Open fracture dislocation of the ankle joint with medial malleolus fracture and a suspected tibial pilon fracture (Figure 3).



Figure 1: Posterior dislocation of hip.

There was no evidence of any neurovascular damage in the limb. No other injury was sustained by the patient. An emergent CT scan of the hip and knee and ankle joints and CT angiography of the affected limb were carried out. CT of the hip joint and knee were normal and revealed no fracture. CT of the ankle revealed a tibial pilon fracture along with the medial malleolus fracture. CT angiogram of the affected limb showed normal patency of the lower limb vessels.

The patient underwent an immediate closed reduction of the dislocated hip joint by Allis method which was done with the help of two assistants, taking care to prevent further injury to the joint.⁵ Simultaneous reduction of the

knee and ankle joint was done and appropriate splintage was given.



Figure 2: Dislocated knee joint.

The open wound was washed, and the dressing was done along with an appropriate antibiotic cover and immobilized with a plaster of Paris slab. After adequate resuscitation, the patient was shifted to the operation theatre. The open wounds were well debrided and trans-articular fixator was placed over the knee joint and ankle joint to stabilize the joints and for soft tissue healing. Skeletal traction was provided to maintain the hip joint in a reduced position and for immobilization.



Figure 3: Fracture dislocation of ankle joint.

At a second stage, after one week, the medial malleolus fracture and tibial pilon fracture were operated upon and open reduction and internal fixation were done with distal tibial plates and screw fixation for medial malleolus. The post-operative period was uneventful. After three weeks the trans-articular fixator was removed, and a knee immobilizer was given. The knee joint was further assessed for ligamentous injuries and an MRI scan was done which revealed an anterior cruciate ligament injury. The need for knee ligament reconstruction was discussed with the patient but the patient refused to have any other surgeries. The patient was placed into a guided physical therapy program consisting of hip and knee range of motion and gradual strengthening starting 6 weeks after injury and non-weight bearing mobilization with the help of axillary crutches.

At one-year follow-up, the patient was ambulating with full weight-bearing on both lower extremities without any

assistive devices. Right knee range of motion was 0° to 105°, and there were no symptoms of instability.



Figure 4: Post reduction of knee joint.



Figure 5: Post orif of ankle joint.

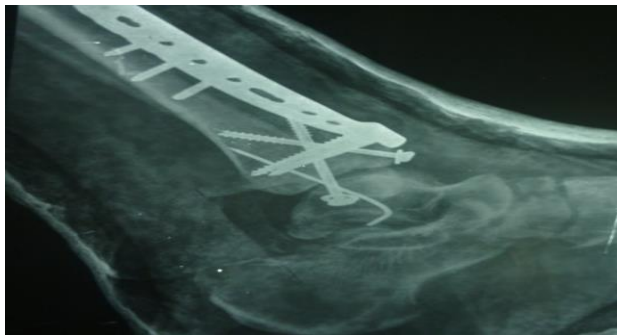


Figure 6: Orif of ankle joint.

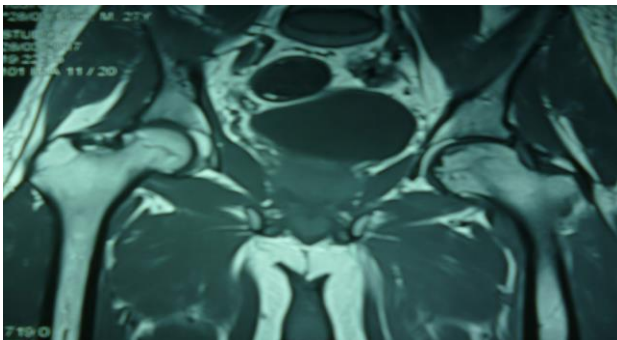


Figure 7: MRI showing AVN changes.

The patient had mild difficulties in squatting and running and sitting cross-legged on the floor involving the left hip. Radiographs of the hip, knee, and ankle showed maintenance of joint reduction, no evidence of avascular necrosis of the hip, and no evidence of arthrosis in any joint., however, MRI scan of the left hip joint showed grade 1 avascular changes of the femoral head according to FicatArlet staging. At 6 months, the patient's Short Musculoskeletal Function Assessment scores were 42 (Dysfunction) and 12 (Bother).⁶

DISCUSSION

To our knowledge, this is the only report of a patient with simultaneous traumatic ipsilateral dislocations of the hip and knee joint with associated ankle joint dislocation with ankle fracture alone. A simultaneous dislocation of all three major joints in the lower limb is of rare occurrence and proves to be a challenging case for the orthopaedic surgeon.

In 1984, Malimson reported a case of ipsilateral fracture-dislocations of the hip and knee and a fracture-dislocation of the tarsometatarsal joints.⁷ In 1991, Millea and colleagues described a case of ipsilateral fracture-dislocations of the hip and knee and an open fracture-dislocation of the ankle.

However, in our case, there was no associated fracture with the hip dislocation but the only fracture involving the ankle joint, making it a unique pattern to be reported.⁸

The three dislocations described in these 2 reports had associated fractures. Pure tibiotalar dislocations, without associated malleolar fractures, are rare, (9-11) and this combination of dislocations without fractures was not previously reported.⁹⁻¹¹ In 2011, Watermann had reported a rare case and the only to be reported in the literature so far, of a case of simultaneous hip knee and ankle dislocation in a single limb.¹²

Any dislocation or subluxation of a joint requires urgent reduction. Posterior hip dislocations are more common, contributing to around 90% of hip dislocations and they are often a result of axial force transmitted through a flexed knee, which is commonly seen in dashboard injuries.¹³ Anatomy of the proximal femur, Position of the hip and direction of the force vector determine whether a pure isolated ligamentous dislocation occurs or an associated fracture with the dislocation.¹⁴

In a study carried out by Gillespie et al it was found that around 11% of knee dislocations were missed on initial evaluation.¹³ A study carried out by Jones et al had concluded that 45% of posterior knee dislocations were associated with a vascular injury which makes it of utmost importance to recognize such dislocations and reduced it immediately.¹⁵

Simultaneous ipsilateral dislocation of three major joints in a single lower limb present a challenging problem even to the most experienced orthopaedic surgeon, where in addition to the potential risk of development of avascular necrosis of femoral head, which warrants urgent reduction, there also lies the increased potential of risk to neurovascular structures due to associated ankle and knee dislocation putting the survival of the limb at a crossroad.

There always lies a high risk of hemodynamic instability and other serious and life-threatening injuries due to the high velocity of trauma involved in such cases. A high index of clinical suspicion is required along with the knowledge of mechanism and pattern of these injuries in order to suspect such injuries which are generally masked by graveness of other injuries.

A thorough and meticulous clinical examination to identify such injuries and rule out any associated neurovascular injury. Ct scan of the hip knee and ankle joints to assess the joint and identify fracture morphologies is also required. CT –angiography of the limb before and after reduction of the joints is also a necessity. MRI scans are increasingly being advised to be done at follow-ups to diagnose avascular necrosis of the femoral head or associated meniscal or cruciate injuries in the knee joint.

The outcome of ipsilateral hip knee and ankle dislocation can vary widely depending on the circumstances and other associated injuries. Since there has been no known case of such an injury pattern reported in the literature, this case turns out to be the first and unique case to be reported. The patient had a congruous reduction in all the three joints.

Factors that were surgeon controlled that could improve outcome include emergent reduction of the dislocated joint and stabilization of the reduced joint preferably in the emergency room, assessment of neurovascular injury and management of the multi-ligament knee injury on an elective basis.

CONCLUSION

Dislocation of any joint is treated as an orthopaedic emergency. Simultaneous dislocation of three joints in an ipsilateral limb is a challenging situation for even the experienced surgeon. The outcome of such patients varies with associated injuries and time took for relocation and risk of avascular necrosis. Meticulous physical examination with a high index of clinical suspicion is needed in diagnosing and management of such cases.

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