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Case Report

Ipsilateral hip and knee dislocation: Case report and review of literature

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ARTICLE INFO

Article history:

Received 26 September 2015

Accepted 16 February 2016

Available online 8 March 2016

Keywords:

Dislocation

Hip

Knee

Ipsilateral

Reconstruction

ABSTRACT

Hip and knee dislocations are not uncommon but simultaneous ipsilateral dislocation of the hip and knee joint is rare; consequently, there is an inadequate amount of literature on the subject. We identified only 11 such cases reported in English literature. In the present report, we describe the case of a 23-year-old male patient who presented with ipsilateral hip and knee dislocation on the right side after being involved in a road traffic accident. The hip dislocation was associated with a posterior wall acetabular fracture. The hip as well as the knee joints was reduced in the emergency bay. The patient underwent an urgent fixation of the posterior wall acetabular fracture with delayed ligament reconstruction for the knee dislocation. At one-year follow-up, he had no pain in the hip or knee. There was grade 1 posterior sag but no symptoms of knee instability. Radiographs revealed no evidence of avascular necrosis or arthritis of the femoral head. The normal treatment protocol for individual injury is affected by the simultaneous occurrence of hip and knee dislocation.

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1. Introduction

Hip or knee dislocations occurring in isolation are not rare injuries, but their simultaneous ipsilateral occurrence is uncommon.^{1–11} A thorough review of literature identified only 11 such cases. The simultaneous occurrence of these two orthopedic emergencies affects the normal treatment protocol for individual injury. The outcome can vary widely from no

significant sequelae^{4,5,7} to knee amputation.⁶ We report a patient with such injury and discuss the literature.

2. Case report

A 23-year-old truck driver was involved in a high velocity road traffic accident. He presented to tertiary care hospital three hours after injury. Examination revealed hip in attitude of

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<http://dx.doi.org/10.1016/j.jcot.2016.02.012>

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Fig. 1 – X-ray pelvis anteroposterior view showing fracture dislocation of hip. Note the large posterior wall fragment.

flexion, adduction, and internal rotation with a posterior dislocation of the right knee. The posterior tibial and the dorsalis pedis artery were palpable. Dorsiflexion of the right ankle was absent along with reduced sensations along the lateral aspect of the leg and the dorsum of the foot, suggesting common peroneal nerve involvement. Radiographic evaluation revealed a posterior dislocation of the right hip with a posterior wall acetabular fracture (Fig. 1) and a posterior knee dislocation (Fig. 2).

The patient underwent immediate closed reduction of the knee in the emergency bay under sedation followed by

application of a posterior splint with the knee in 90° flexion. The hip joint was then reduced by giving traction over the distal part of thigh with the hip and knee in 90/90 flexed position and pelvis stabilized by second assistant. A third person stabilized the leg while traction was applied through the distal part of the thigh, with the hip reducing easily. Postreduction CT scan of the hip showed a concentrically reduced femoral head with a large posterior wall acetabular fracture (Fig. 3), while the postreduction MRI knee revealed disruption of the cruciates, medial collateral ligament (MCL), and the posterolateral corner (PLC) (type IV) (Fig. 4).

Next morning the patient underwent osteosynthesis of the posterior wall acetabular fracture. He was operated in the lateral position using the Kocher Langenbeck approach. The posterior wall fragment was fixed with two lag screws and a buttress plate (Fig. 5). At the time of surgery, the knee was protected using a posterior splint.

In order to reduce the surgical insult to the patient and to reduce the risk of arthrofibrosis, a delayed reconstruction was planned for the knee. It was placed in a hinged PCL brace initially locked in extension. Controlled range of motion exercises were started at three weeks. The patient was mobilized with crutches, nonweight bearing on the right lower extremity for the first eight weeks. At this time, the knee range of motion was 10–120°. Examination under anesthesia revealed a mildly positive Lachman test with a firm end point, a positive posterior drawer test with more than 15 mm translation, and a positive dial sign. Under fluoroscopy, valgus stress testing did not reveal instability, but varus stress testing at 0° and 30° showed more than 10 mm opening of lateral compartment of the knee. Ten weeks post injury, he underwent combined PCL and PLC reconstruction (Fig. 6).

Fig. 2 – X-ray knee anteroposterior and lateral views showing dislocation of knee. Note the fractures of the avulsion fracture of head of fibula and fracture of shaft of fibula.

Fig. 3 – Postreduction CT scan of the hip showed a concentrically reduced femoral head with a large posterior wall acetabular fracture.

Fig. 4 – Postreduction MRI knee revealed disruption of the cruciates, medial collateral ligament (MCL), and the posterolateral corner (PLC) (type IV).

Fig. 5 – Photograph and X-ray pelvis anteroposterior view illustrating the osteosynthesis of posterior acetabular wall fracture.

Fig. 6 – Photograph and line diagram illustrating the reconstruction of the posterolateral ligament complex.

Patient underwent PCL (arthroscopic single bundle with ipsilateral quadrupled hamstrings) and PLC reconstruction with Larson's procedure (contralateral semitendinosus graft).

3. Result

At 18 months follow-up, the patient had no symptoms of knee instability, although he had mild discomfort in the knee. He had no pain in the hip and used no ambulatory aid. The CPN palsy had resolved completely. On examination, the right hip had a full painless range of motion. Knee examination revealed negative posterior drawer test as well as a negative dial test. Valgus and varus stress testing were negative. The ROM at the right knee was 10–120° compared to 0–140° on the left. Radiographs revealed a congruous hip without evidence of AVN or arthritis (Figs. 7 and 8).

Fig. 7 – X-ray pelvis anteroposterior view revealed a congruous hip without evidence of AVN or arthritis.

Fig. 8 – X-ray knee anteroposterior and lateral views revealed a congruous knee without evidence of arthritis.

4. Discussion

Although injury to the ipsilateral knee is common in the setting of traumatic hip dislocation,^{12,13} the simultaneous occurrence of ipsilateral knee and hip dislocation seems to be a rare event.¹⁻¹¹ Table 1 lists the reported cases of ipsilateral hip and knee dislocation (twelve, including the present one).

4.1. Pattern of injury

The right side was involved more often^{1,4-8,11} (eight times) as compared to the left^{3,4,9,10} (four times). All twelve cases of

Table 1 – Reported cases of ipsilateral hip and knee dislocation.

Author name; year	Side	Hip dislocation	Knee dislocation	Associated injuries	Treatment		Result at final follow-up	
					Hip	Knee	Hip	Knee
Malimson; 1984	Right	P + PW	Posterior closed; KD V	Tarsometatarsal fracture dislocation, fracture body of sternum	CR; Acetabular wall # treated conservatively	Fractured LFC treated conservatively	Painless	0–100° ROM, knee stable
Kreibich; 1989	Left	P + FN	Posterior closed; KD III L	None	OR with fixation of femoral neck #	Primary repair of ligaments	Intermittent pain, AVN	Flexion up to 105°; no instability; Arthrosis+
Millea; 1991	Left	P + FH	Rotary closed	Ipsilateral femoral shaft fracture, open bimalleolar fracture	OR with fixation of femoral head #	Primary repair/ fixation of ligaments	Occasional discomfort of the hip	Occasional discomfort of the knee
Freedman; 1994	Right	P	Posterior closed; KD III L	None	CR	Early ligament reconstruction	Painless, no AVN	10–105° ROM, mild Lachman+
Schierz; 2002	Right	P + PW	Posterior closed; KD III L	None	CR acetabular wall # treated conservatively	PCL repaired, ACL planned for delayed reconstruction but patient refused	Painless, no AVN	0–125° ROM, Mild Lachman+ pivot shift–
Motsis; 2006	Right	P + PW	Posterior open; KD IV (C)	None	CR Acetabular wall # treated conservatively	Through knee amputation	Not mentioned	Walking with crutches
Dubois; 2006	Right	P + PW	Posterior closed; KD III L	None	CR using shanks' screw, Posterior wall treated conservatively	Early ligament reconstruction	Painless, no AVN	0–125 ROM, no instability
Ali;2009	Right	A	Anterior KD I	None	CR	Early ligament reconstruction	Painless, no AVN	Up to 120 ROM, mild instability
Vaseenon; 2010	Left	A	Posterior closed; KD I	Ipsilateral olecranon fracture	CR	Ligament reconstruction not discussed	Not mentioned	Not mentioned
Sen; 2011	Left	P + PW + FH	Posterior closed; KD V	Contralateral open leg fracture	OR with fixation of femoral head and acetabular fragments	Open reduction of tibial plateau fracture	Painless, no AVN	0–105 ROM, no instability or arthrosis
Waterman; 2011	Right	P	Posterior closed; KD III M (C)	Ipsilateral tibiotalar dislocation, contralateral tibia fracture	CR	Patient refused ligament reconstruction	Painless, no AVN	0–125, no instability
Present case	Right	P + PW	Posterior closed, KD IV	None	CR fixation of posterior wall fragment	Delayed ligament reconstruction	Painless, no AVN	0–120 ROM, mild Lachman+

P – posterior; PW – posterior wall; FH – femoral head; FN – femoral neck; (C) – vascular injury; CR – closed reduction; OR – open reduction; # – fracture; LFC – lateral femoral condyle.

ipsilateral hip and knee dislocation resulted from road traffic accidents. The hip dislocated posteriorly in ten cases, while two had anterior dislocations.^{8,9} The most common pattern was a posterior hip dislocation hip with a posterior wall acetabular fracture.

The knee dislocated posteriorly in eleven of the twelve cases. Two of them were fracture dislocations, involving the tibial plateau,¹⁰ and lateral femoral condyle.¹ Rest of them involved ligamentous disruptions (substance tears/avulsions). The most common pattern of knee dislocation involved a closed posterior ligamentous dislocation.

4.2. Associated injuries other than hip and knee

Seven^{2,4-8} of the twelve patients, including the present one, had no other injury apart from the ipsilateral hip and knee dislocation. Three patients^{1,3,11} had ipsilateral foot and ankle injuries. This probably reflects the specific mechanism of injury involved, as well as transfer of most of the force to the knee, and through it, to the ipsilateral hip.

4.3. Nerve and vascular injuries

Two of the patients had popliteal artery injury^{6,11}; one had a successful arterial repair¹¹ with grafting, whereas the other required an amputation.⁶ Three^{2,7} patients, including the present one, had common peroneal nerve injury, and all of them ultimately recovered. Cornwall and Radomisli¹⁴ reported a 10% incidence of nerve injury after traumatic hip dislocation. The peroneal component was most commonly involved. In cases of nerve injury associated with hip dislocation, exploration of the nerve is generally not recommended. The incidence of concomitant neurologic injury with knee dislocation is reported to be from 10% to 40%.^{15,16} The indications for peroneal neurolysis and cable grafting in the setting of knee dislocations are controversial. Patients who are undergoing PLC repair or reconstruction and have a peroneal nerve injury should be treated with at least a peroneal neurolysis.¹⁷

4.4. Technique of hip reduction

Previous reports of ipsilateral hip and knee dislocation have described different techniques of reducing the hip. Freedman et al.⁴ reduced the hip with manual traction over the thigh. DuBois et al.⁷ described the use of Schanz pins placed in the femoral condyle as well as lateral aspect of the proximal femur to affect the reduction. Brian et al.¹¹ described a technique where the patient's knee was flexed over the surgeon's shoulder and traction applied through the distal femur; gradual internal and external rotation completed the reduction. Of note in most of the described techniques for reducing isolated hip dislocations, traction is applied through the proximal leg, either directly¹⁸ or using the surgeon's arms¹⁹/knee as fulcrum.²⁰ It makes sense that in case of an ipsilateral knee dislocation, traction be applied through the distal thigh instead of the proximal leg with the knee stabilized either by a third person or by the person attempting the reduction. We agree with Waterman et al.¹¹ that an initial attempt of reducing the hip should be made in the trauma bay under sedation so as to reduce the time the hip remains dislocated.

4.5. Management of the knee dislocation

With respect to the timing of ligament reconstruction in isolated knee dislocations, recommendations have ranged from immobilization followed by delayed surgery^{21,22} to surgical treatment within three weeks after injury.^{23,24} The few published studies offering direct comparison of surgical timing have typically shown greater improvements in functional and clinical outcomes with early treatment.^{25,26} However, a recent systematic review of literature regarding timing of surgery in multiligament injured knees found residual anterior knee instability as well as more flexion deficits in acutely managed knees compared to delayed reconstructions.²⁷ Additional treatment for joint stiffness was also more likely in association with acute treatment. One of the reasons for advocating early surgery in multiligament knee injuries is that the collaterals can be repaired; the repair becomes increasingly difficult two to three weeks after surgery. However, recent literature suggests that reconstruction of the PLC is better than repair,^{28,29} and therefore, if one is contemplating a reconstruction, an early surgery is not a necessity.

Giannoudis et al.³⁰ reported five cases of knee dislocation with ipsilateral femoral shaft fractures. They advocate a delayed knee ligament reconstruction in this setting.

We opted for a delayed reconstruction to reduce the surgical insult to the patient as well as to reduce the chances of postoperative arthrofibrosis. All three^{4,7,8} of the twelve patients with ipsilateral hip and knee dislocation who underwent an acute reconstruction required an additional procedure for arthrofibrosis. Based on these findings, we recommend a delayed reconstruction of the multiligament injured knee in the setting of an ipsilateral hip and knee dislocation.

4.6. Rehabilitation

The simultaneous occurrence of hip and knee dislocation precludes early weight bearing, which may be allowed after an isolated knee dislocation. The rehabilitation protocol however, also depends on the other associated injuries.

4.7. Outcome

The outcome for ipsilateral hip and knee dislocation can vary widely from no significant sequelae^{4,5,7} to through the knee amputation.⁶ Surgeon-related factors that could improve outcome include emergent reduction of the knee joint, assessment of neurovascular injury, reduction of the hip joint as soon as possible, preferably in the emergency room with the knee stabilized, and management of the multiligament knee injury on an elective basis.

5. Conclusion

The ipsilateral occurrence of knee and hip dislocation is a serious injury with important differences related to the technique of hip reduction, the timing of knee ligament reconstruction, and rehabilitation. The outcome is highly variable and remains guarded.

Conflicts of interest

The authors have none to declare.

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