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Case Report

Homolateral Hip Dislocation, Floating Hip Injury, and Floating Knee Injury: A Unique Presentation of a Rare Injury

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Introduction: Floating joint injury is an unusual injury pattern that is hard to deal with and often caused by high-energy trauma. In this report, a patient had a homolateral floating hip injury (FHI), floating knee injury (FKI), and hip dislocation at our hospital, and there was no case reported before.

Case Presentation: A 48-year-old driver who encountered a traffic accident was seen. Radiologic examination revealed acetabulum comminuted fractures and hip joint posterior dislocation with some fracture pieces in the joint space on the left side. The femur, tibia, and fibula were simultaneously disrupted with open trauma of the left calf. Open reduction and screw-plate fixation of the acetabulum fracture, intramedullary nail fixation of the femoral fracture, and external fixator for his tibia and fibula fracture were carried out.

Conclusion: The treatment of multiple fractures should focus on life-threatening injuries above all, and then deal with the fractures according to the situation of the patient. Open reduction and internal fixation are priority choices except in some special cases like where soft tissue is in poor condition. Individual therapy and early rehabilitation are effective for homolateral FHI and FKI.

Key words: Floating injuries – Hip – Dislocation – Fracture

A floating joint injury is the skeletal disruption above and below a joint simultaneously. It is an unusual injury pattern that is hard to deal with and often caused by high-energy trauma, the operation for the injury is complicated, and it usually causes great trauma and results in a poor prognosis. There are few cases reported in literature describing treatment of this injury. In this report, a

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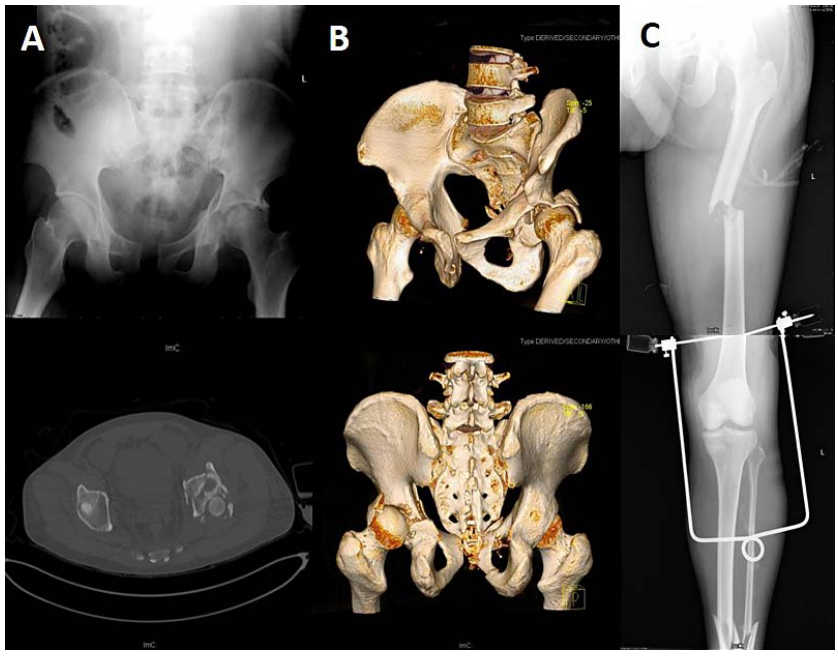

Fig. 1 (a–c) A 48-year-old driver encountered a traffic accident. X-ray film, computed tomography, and 3-dimensional graphics revealed a sacrum wing fracture and pubic branches disruption on the right side and acetabulum comminuted fractures and hip joint posterior dislocation with some fracture pieces in the joint space on the left side.

patient had homolateral hip dislocation, floating hip injury (FHI), and floating knee injury (FKI) and had undergone surgery at our hospital.

Case Presentation

This patient is a 48-year-old driver who encountered a traffic accident. He was alert but could not move his left leg when the paramedics arrived. We then prepared an initial evaluation and treatment for him at the time of admission to the emergency department.

His Glasgow Coma Scale was 13/15. He could breathe spontaneously; hence, his oxygenation was 95%–100% as delivered by nasal cannula. Two intravenous lines were placed to keep the blood circulatory system stable with a blood pressure of 149/95 mmHg and a heart rate of 128 beats/min. There were visible deformities in his left lower extremity with open fractures. Meanwhile, pulsation of the dorsalis pedis artery was touched on both sides. Plaster splint fixation and skeletal traction were used for his left leg later. X-ray films of cervical spine, chest, pelvis, and lower extremities were then applied in an emergency. Subsequently, further examinations, such as computed tomography and 3-dimensional graphics, were taken, which revealed that the first to third rib fracture and pulmonary contusion were suspected on the right side, as well as a sacrum wing fracture and pubic branches disruption on the right side. There were acetabulum comminuted fractures and hip joint posterior dislocation with some fracture pieces in the joint space on the left side. The femur, tibia, and fibula were simultaneously disrupted on the left side (Fig. 1a–1c).

The patient was then transferred to the operating theatre for 6 hours to have a debridement and external fixator of his left calf, and prophylactic antibiotics therapy was performed before the operation. After 3 days, he received a comprehensive assessment, with the conclusion that he could tolerate a second operation. Therefore, open reduction and screw-plate fixation of the acetabulum fracture with a Kocher-Langenbeck approach and intramedullary nail fixation of the femur fracture were carried out (Fig. 2). After another comprehensive assessment, the disruptions of the rib, sacrum, and pubis branches were treated in a conservative way without surgery. Six weeks later, he was transferred to the rehabilitation center for physiotherapy.

At the 3-month follow-up, he could walk with a crutch independently but not fully weight bearing, and the imaging examination showed that there was some callus formation at the fracture site.

Discussion

The concept of FKI was first proposed by Blake and McBryde[1] in 1975, and Fraser *et al*[2] analyzed the clinical characteristics retrospectively and described patterns of FKI. Early publications concluded that there were some poor outcomes after conservative

Fig. 2 Open reduction and screw-plate fixation of the acetabulum fracture and intramedullary nail fixation of the femoral fracture were carried out during the second surgery.

treatments,[3,4] and severe functional outcomes may occur after articular fracture that are associated with ligament injuries. According to Feron *et al*,[5] femoral fixation is recommended as a priority in most cases except in cases of tibial fracture with soft tissue problems requiring the tibial fixation first; dual nailing remains the best treatment for FKI.

Lyddon and Hartmann[6] first reported FHI in 1971, and then Burd *et al*[7] summarized the complications and outcomes of 57 cases. After the reduction of femoral fractures, most acetabulum fractures were treated by open reduction and internal fixation with a Kocher-Langenbeck approach. Because of systemic trauma, delays in surgery were common, and they concluded that surgeons should pay attention to the high incidence of sciatic nerve palsy. Ng *et al*[8] suggested restoration of femoral fractures primarily to prepare for the stability of the pelvic ring; moreover, fractures involving the acetabulum should be operated on by surgeons with rich experience under suitable conditions.

Injury mechanisms of homolateral FHI and FKI may be different in some patients. In our case, we estimated that he had hip flexion at 100°, and the knee extended at 120° while driving in the car. At the moment of the accident, due to inertial motion, the leg moved forward rapidly, and the fractures of the tibia and fibula were caused by direct high-energy violence; likewise, the external force on the front of the knee caused fractures of the acetabulum and the posterior dislocation of the hip joint. Due to blockage caused by the driver's seat, the femoral head, after dislocation, could not continue to move backwards therefore causing femoral fracture. These factors finally resulted in the occurrence of homolateral FHI and FKI.

Considering the actual situation, we did not fix the femur first, as is usual, but chose to restore the dislocated femoral head instead to maximize the recovery of blood supply of the femoral head and avoid articular cartilage ischemic necrosis due to a long period of compression and completed the debridement and external fixation of left calf in 6 hours. Then the second operation of the acetabulum and femur was conducted at a suitable time.

Conclusion

The treatment of multiple fractures should focus on life-threatening injuries above all and then deal with the fractures according to the situation of the patient. Open reduction and internal fixation are priority choices except in some special cases such as soft tissue being in poor condition. The individual therapy and early rehabilitation are effective in treating homolateral FHI and FKI.

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