

# Traumatic Bilateral Central Hip Dislocation: A Case Report

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## ABSTRACT

Dislocations of the hip represent uncommon clinical entities, occurring mostly after high energy trauma such as car accidents. A handful of asymmetrical bilateral hip dislocations following trauma have already been reported. Nevertheless, bilateral central dislocation of the hips has only been described in cases of convulsions or cerebrovascular events.

A young male, due to traumatic bilateral central hip dislocation resulting in inner pelvic rings, as well as left iliac wing fractures, underwent a two-stage surgery. Initially, open reduction and internal fixation through ilioinguinal approach was performed, using a compression plate for the inner pelvic ring, as well as an inter-fragmentary lag screw and a contoured reconstruction plate for stabilization of the iliac wing fracture on the left side. A week later, the patient underwent open reduction and internal fixation with a compression plate on the right side.

Unstable pelvic injuries pose a surgical challenge, while their treatment requires meticulous preoperative planning. Such cases should be managed in trauma centers with adequate experience and the necessary resources. Only few reports of such injuries exist in patients suffering seizures or undergoing electroconvulsive therapy, while the case described here represents the first report of a traumatic bilateral central hip dislocation.

**Keywords:** pelvic injury, hip dislocation, central hip dislocation, symmetrical bilateral central hip dislocations.

## INTRODUCTION

Dislocations of the hip represent uncommon clinical entities, occurring mostly after high energy trauma such as car accidents (1). Most of them are posterior (approximately 90%), while femur and acetabular frac-

tures are considered common concomitant injuries (1). Bilateral hip dislocation is relatively rare and represents approximately 1.2% of all hip dislocations. A handful of asymmetrical bilateral hip dislocations following trauma have already been reported (2). However, bilateral central dislocation of the hips has only been described as result of convulsions or cerebrovascular events (3).

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A bilateral central dislocation of the hips in a young male, following a car accident is presented, being the first such report in the literature. □

### CASE PRESENTATION

A 32-year-old male without previous history of pelvic injuries, abnormal hip development or ligamentous laxity was referred to the Department of Orthopaedics and Traumatology of the “251” Hellenic Air Force General Hospital of Athens, Greece, due to traumatic bilateral central hip dislocation. One and a half months prior to referral, the patient had been involved in a traffic accident while riding his motorcycle in a neighboring country. He was directly hit on the right side by a car, which resulted in a fall from a height of two meters. The patient finally landed on the left side of his body.

He was transported to a regional hospital. There, after initial assessment and stabilization according to Advanced Trauma Life Support guidelines, he was initially treated with skeletal traction from the great trochanter as well as from the tibia in both sides. One and a half months later, he was transported to the department of Orthopaedics and Traumatology of the “251” Hellenic Air Force General Hospital of Athens, Greece, according to an interstate agreement for such cases, due to lack of means and surgical experience of the neighboring country’s regional institution.

Upon presentation, the patient was alert (Glasgow Coma Scale 15), hemodynamically stable (blood pressure 135/78 mm Hg, SpO<sub>2</sub> 100%, heart rate 73 beats per min) and afebrile (36.8 °C). Active and passives movement of both hips could not be performed due to pain, while peroneal nerve palsy was present in both extremities. Both lower extremities were found to be vascularly intact. Signs of pin tract infection were observed from all four Steinmann pin entry points, accompanied with pressure ulcers of both heels. The patient presented with marked undernourishment.

Laboratory investigation revealed C-reactive protein (CRP) 180 mg/dL and albumin 2 g/dL, while all the remaining routine laboratory values were within normal limits. Cultures were obtained from all four pin entry points, while the patient started receiving high calorie enriched nutrition. Additionally, his pressure ulcers were



**FIGURE 1.** Anterior-posterior x-ray view of the pelvis showing the bilateral central hip dislocation through Y-shaped acetabular fractures and a left iliac wing fracture



**FIGURE 2.** Computed tomography 3-dimensional reconstruction. A: anterior-posterior view; B: posterior view from the left side; C: posterior view from the right side

cared with proper surgical debridement and dressing.

The anterior-posterior x-ray views (Figure 1) reconfirmed the bilateral central hip dislocations through Y-shaped acetabular fractures and the iliac wing fracture on the left side. Computer tomography confirmed these findings (Figure 2). According to Judet and Letournel classification, the right side fracture was a transverse acetabular fracture characterized as transtectal, since it divided the acetabulum roof. The left side fracture was an anterior column with posterior hemitransverse one, associated with left iliac wing fracture.

Hence, a two-stage surgery was planned. However, due to the pin tract infections as well as the overall status of the patient (undernourishment, ulcers), surgery was delayed. The cultures revealed a methicillin resistant *S. aureus* and the patient was commenced on I.V. vancomycin. Two weeks after being on the I.V. antimicrobial treatment, CPR and albumin reached normal limits, while no signs of infection were present.

At that point, he had been evaluated as eligible for laboring surgery.

Initially, under general anesthesia, the patient was placed in a supine position. Open reduction and internal fixation was performed on the left side through an ilioinguinal approach, which offered direct access to the anterior ilium. Three operating windows were developed. The first window embraced the internal iliac fossa from the sacroiliac joint, posteriorly, to the iliopectineal eminence, anteriorly. The second window provided access to the pelvic brim and quadrilateral surface from the sacroiliac joint to the lateral third of the superior pubic ramus, while the third window allowed direct intra-pelvic access to the entire quadrilateral surface and the posterior column. Mobilization of the femoral vessels and nerve as well as the spermatic cord was necessary for the development of these three intervals. The dislocation was anatomically reduced with the use of pointed reduction forceps and then, consequently, a compression plate (12 holes) was used for the inner pelvic ring as well as a 6 mm inter-fragmentary lag screw and a contoured reconstruction plate (five holes) for the stabilization of the iliac wing fracture.

A week later, the second stage of the planned operation was performed on the right side through ilioinguinal approach, open reduction, with the same methods, and internal fixation [right inner pelvic ring compression plate (10 holes)] was achieved (Figure 3).



**FIGURE 1.** Postoperative anterior-posterior x-ray view of the pelvis

Postoperatively, respiratory physiotherapy was immediately initiated to avoid pulmonary complications. Mobilization of the patient began the day after surgery with passive and active assisted exercises. For the first few weeks, wheelchair ambulation was necessary. He started walking with two crutches and with less weight bearing on the left side, ten weeks later. To assist ambulation, static drop-foot splints on both sides were used. Full weight bearing began four months postoperatively, while at that point the peroneal nerve palsy of both extremities had recovered. Otherwise, the patient had an uneventful recovery. The sutures were removed on the 15<sup>th</sup> postoperative day, and finally he was discharged free of pain six months after surgery. Additionally, during a 10-month follow-up, no complications were observed. The patient returned to his home country and did not appear for further close follow-up. However, two years after surgery, *via* a telephone interview he gave the information that he was feeling fine, walking unassisted and capable to drive a car. □

## DISCUSSION

Central dislocations of the hip represent the rarest type of such hip injuries (1). The mechanism consists of direct impact to the lateral aspect of the hip forcing it centrally through the acetabulum into the pelvis (1). Therefore, this injury is characterized as fracture-dislocation and is usually observed in high-impact traumas such as car accidents or fall from height (1, 4, 5). In the present case, both hips were directly impacted. The patient was hit by a car on his right side, resulting in an approximately 2 m height fall. Finally, he landed on his left side. Both injuries were high energy traumas.

The bilateral central hip dislocations resulted in unstable pelvic fractures, representing the leading cause of morbidity and mortality in musculoskeletal trauma due to severe hemorrhage and visceral injuries (5). The rarity of this injury's mechanism along with the reported high rates of concomitant mortality represent a case worth reporting; moreover, such injuries pose a real surgical challenge.

According to Judet and Letournel classification, the right side fracture represents a transverse acetabular one. Transverse acetabular fractures involve a single fracture line which crosses

the acetabulum through both posterior and anterior columns. Such fractures divide the acetabulum into an upper portion (ilium with the roof) and a lower portion (ischium and pubis). These injuries are subdivided into three categories: transtectal (dividing the roof of the acetabulum), juxtatectal (dividing the fossa acetabuli and the roof) and infratectal (cutting the fossa acetabuli in the middle) (6). The present fracture was transtectal. The left side fracture was an anterior column with posterior hemitransverse one, associated with left iliac wing fracture. Variations in this fracture pattern are based on whether the anterior column fracture exits at the iliac crest or inferior to the anterior inferior iliac spine. The posterior column component varies on the basis of level of involvement in the greater sciatic notch. The posterior column fracture morphology usually follows an oblique sagittal orientation unlike the posterior column involvement in a T-type fracture (6).

The management of such injuries has to be decided after thorough clinical and radiological preoperative planning and assessment of the specific fracture characteristics, along with the general status of the patient's health (5, 7). Ideally, displaced fractures should be treated with anatomic reduction, stable internal fixation and early non-weight bearing exercises (8). However, different techniques of open reduction and internal fixation have also been introduced. The choice of the particular technique of internal fixation is dictated by several factors, including the patient's concomitant injuries and last, but most important, the surgeon's experience (5). The present patient was initially treated with skeletal tractions due to the limited resources of the first health care institution in his home country. Indications of traction in such cases include unstable pelvic injury without availability of pelvic fixation or surgical inexperience, proximal displacement of the hemi-pelvis and need to delay surgery due to patient's condition (9).

After presentation to the department of Orthopaedics and Traumatology of the "251" Hellenic Air Force General Hospital of Athens, Greece, the patient whose case was reported here underwent open reduction through an ilio-inguinal approach allowing exposure of the entire internal iliac fossa and pelvic brim from the sacroiliac joint to the pubic symphysis (10-12). Reduction was performed with the use of poin-

ted reduction forceps and Farabeuf clamps, while a variety of reduction tools offering the ability to manipulate the fracture fragments, such as Jungbluth clamps or large symmetric ("King Tong") reduction forceps, is available. Reduction should be assessed by intra-operative x-rays as well as palpation. In the present patient, mobilization of the fractured pelvic wing as well as anatomical reduction were extremely challenging due to callus formation (time from injury to surgery approximately two months). The selected approach involves potential dangers regarding injury of nerves and vessels that should be avoided. Injury of the femoral nerve, femoral and external iliac arteries, lateral cutaneous thigh nerve, inferior epigastric artery and obturator nerve has been described in such cases. Additionally, it is of paramount importance to protect the spermatic cord because its damage may lead to testicular ischemia and infertility (10-12).

From the fracture pattern, no disruption of anterior and posterior sacro-iliac ligaments was evident. Following reduction of the left and right side fractures, the pelvis was stable. Therefore, it was decided that a pubic symphysis plate was not required, although it could improve the overall stability of the pelvic ring.

Such complex injuries should be operated during the first two weeks (13). It is extremely challenging to obtain satisfactory reduction two months after the initial injury. The reported patient was not fit for surgery upon presentation, which led to the decision to postpone surgery. Due to intra-operative challenges and difficulties posed by callus formation in two months as well as patient's overall health status, surgery was planned in two stages. Callus should be removed and fracture fragments carefully mobilized in order to obtain reduction.

Acetabular fracture surgery represents a major orthopaedic trauma operation, encompassing serious and possible life-threatening early and late complications (13). These complications include infection, nerve injury, heterotopic ossification, thromboembolic issues, malunion, non-union, avascular necrosis (AVN) of the femoral head and post-traumatic arthritis. Our patient was at high risk for AVN, since his hips were dislocated for a long period of time, while the incidence of post-traumatic arthritis in such cases varies from 19 to 45% (13).

Taking into account the existing literature, the present case appears to be the first report of traumatic bilateral central hip dislocation. There have been reports of such an injury in patients undergoing grand mal seizures and electroconvulsive therapy, while asymmetrical traumatic bilateral hip dislocations have also been described (14-22). The rarity of this injury as well as the difficulty of handling unstable pelvic fractures, such as those of our patient, make this case unique. □

### CONCLUSION

Unstable pelvic injuries pose a real surgical challenge. Their treatment requires meticulous preoperative clinical, as well as radiological planning. Such cases should be treated in trauma

centers with adequate experience and the necessary resources. Also, it is of utmost importance to take into account individual needs and adapt physiotherapy accordingly. The surgeon should closely monitor the rehabilitation of such patients and be able to decide how much mechanical loading is appropriate for each patient's pelvic ring fixation, which should be communicated to the physical therapy staff. □

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