Bilateral Hip Dislocation: An Indicator for Emergent Full-Body Computed Tomography Scan in Polytraumatized Patients? A Case Report and Review of the Literature

Benjamin Rufer, Marius Johann Baptist Keel, Beat Schnüriger1, Moritz Caspar Deml
Departments of Orthopaedic and Trauma Surgery and Visceral and Transplantation Surgery, University of Bern, Inselspital, Bern, Switzerland

Abstract

We present a rare case of traumatic bilateral asymmetric hip dislocation with pelvic fractures and a traumatic diaphragmatic hernia. A 53-year-old machinist was transferred to our emergency department with the suspicion of a bilateral hip dislocation after he was trapped between an elevator and the roof. Immediate closed reduction of the hips was not performed because of the expected risk of increasing hemodynamic instability with muscular relaxation. An emergent full-body computed tomography (CT) scan was made to assess injuries with need for further operative treatment. Thus, closed reduction of both hips was finally performed in the OR directly before the laparotomy for the diaphragmatic repair and the osteosynthesis of the anterior pelvic ring. A 12-month follow-up showed good general health condition with asymptomatic situation of the hip joints and the abdomen. The diagnostic work-up of patients with severe trauma is still debated, a randomized controlled trial showed no reduction of the in-hospital mortality with immediate full-body CT scan compared to a conventional radiological work-up. Traumatic hip dislocations (THDs) are always due to high-energy trauma and additional injuries are frequent. To attempt a closed reduction of THD, under general anesthesia can be life-threatening with unrecognized associated injuries. Therefore, THD can serve as selection criteria for immediate full-body CT scan to facilitate diagnosis and treatment of associated injuries sustained by the patient.

Keywords: Asymmetric hip dislocation, traumatic diaphragmatic rupture, traumatic hip dislocation

INTRODUCTION

Bilateral traumatic hip dislocation (THD) is a rare injury that usually occurs after high-energy trauma.1 Associated injuries are frequent.2,3 Diagnostic workup of these severely injured patients is challenging, especially if they are hemodynamic unstable. We present a case with traumatic bilateral asymmetric hip dislocation, bilateral superior and inferior pubic rami fractures, abdominal injuries including left diaphragmatic rupture and hemodynamic instability. In recent years, the importance of immediate full-body computed tomography (CT) scans in the emergency room regarding posttraumatic mortality has often been discussed. Huber-Wagner et al. have repeatedly shown from retrospective register data that immediate full-body CT scans can decrease absolute mortality and increase the probability of survival in patients with polytrauma (injury severity score ≥16).4 In contrast, the REACT-2 study, a prospective international multicenter study, showed no advantage in decreasing total mortality in trauma patients whether or not a conventional radiographic workup was performed before the full-body CT scan.5 They discussed the importance of finding selection criteria for full-body CT scans in patients with polytrauma. Referring to bilateral hip dislocations, these injuries often indicate a high-energy impact to the whole body often combined with other injuries.6 Hence, the suspicion of bilateral hip dislocation should lead to an immediate full-body CT scan in the emergency room.

Address for correspondence: Dr. Benjamin Rufer, Department of Orthopaedic and Trauma Surgery, University of Bern, Inselspital, Freiburgstrasse 3, 3010 Bern, Switzerland.
E‑mail: benjamin.rufer@insel.ch

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CASE REPORT

A 53-year-old machinist was transferred to our emergency department with a malposition of the legs after he was trapped between an elevator and the ceiling of the elevator shaft. Primary survey showed a conscious patient with Glasgow Coma Scale of 14. The vital signs were blood pressure 88/46 mm/Hg, heart rate 112/min, oxygen saturation 95% with oxygen mask. The serum lactate level was 7.3 mmol/l with a peak of 8.3 mmol/l; 6 h after trauma, hemoglobin was 121 g/l. On physical examination, the patient complained of pain over the symphysis and the abdomen. Palpation of the abdomen showed tenderness mainly in the upper left quadrant. The chest wall was stable with diminished breath sounds on the left side. The right leg was flexed, abducted, and fixed in external rotation. The left leg was flexed, adducted, and internally rotated [Figure 1]. Peripheral pulses of the lower extremities were only palpable in the popliteal fossa; the pulses of the femoral arteries could not be assessed due to the pelvic binder. Ankle and toes showed active motion with full strength. The right thigh showed slight numbness on the anterior.

Whole-body radiograph with “Lodox” [Figure 2] in the emergency room showed a diaphragmatic rupture with herniation of visceral organs to the left hemithorax, bilateral superior, and inferior pubic rami fractures and bilateral asymmetric hip dislocation. The left hip was dislocated posterior (Type I Thompson–Epstein) and the right hip anterior-inferior (obturator dislocation, Type II A Thompson–Epstein).[7] Sonography of the abdomen was suspicious for a splenic rupture. A full-body CT scan confirmed the pelvic fractures, the bilateral hip dislocation [Figure 3], and the rupture of the left diaphragm with herniation of stomach, spleen, and the colon transversum to the left hemithorax [Figure 4]. The splenic rupture was Grade II according to the American Association for the Surgery of Trauma criteria.[8]

Due to increasing hemodynamic instability, the patient was transferred to the OR for emergent laparotomy. With the initiation of the anesthesia and muscle relaxation, closed reduction of both hips was conducted 1 h and 40 min after the patient’s arrival in the emergency department. Visceral surgeons achieved hemostasis of the spleen, sutured the diaphragm [Figure 5], serosal and mesenteric lesions of the sigma, and the colon transversum through midline laparotomy. Finally, the superior pubic rami fractures were stabilized with a reconstruction plate bridging the symphysis [Figure 6]. Six days later, a hemicolecctomy with creation of a transversotomy was performed due to a secondary peritonitis caused by an ischemic-delayed perforation of the sigmoid colon just at a mesenteric tear.

Postoperative X-rays and CT scan of the pelvis confirmed concentric reduction of both hips and showed no intraarticular fragments. A small posterior fragment of the greater trochanter was treated conservatively. The patient was immediately allowed to ambulate with crutches and full weight-bearing. Hip flexion on the left side was limited to 70° for 6 weeks because of the posterior dislocation. Closure of the transversotomy with reanastomosis was performed 3 months after trauma. At 3 and 12 months, the patient showed a normal gait, full range of motion, and no signs of avascular necrosis (AVN) or degenerative changes on anteroposterior pelvis X-rays.
Discussion

THDs are usually caused by high-energy trauma,[1] and therefore, additional injuries are frequent.[2,3,6] Mortality rate is up to 10%.[8] Most cases in the literature were due to traffic accidents.[6,10-12] Heavy objects hitting the lumbosacral area from behind can cause (bilateral) hip dislocation as well.

A review of the Chinese National Knowledge Infrastructure database found this trauma mechanism in 55% of 51 cases between 1983 and 2009.[13] Buckwalter et al. analyzed 104 cases with asymmetric bilateral hip dislocation and found associated fractures in 44% of patients. In 75% of them, the acetabulum of the posterior dislocated hip is involved. Proximal femoral fractures were reported in 25% of cases but more frequent after anterior dislocation (66%).[16] In general, posterior dislocations are much more common (85% e.g., dashboard injury) than anterior (11%).[3,10] Morphologic abnormalities such as CAM-deformity or acetabular retroversion can predispose for posterior dislocations.[5] Articular complications after THD are osteonecrosis of the femoral head, posttraumatic arthritis (PTA) due to cartilage damage with consequent degenerative joint disease and joint instability or stiffness. Extraarticular complications include nerve injury (sciatic nerve up to 10% with posterior dislocation), heterotopic ossification, or venous thromboembolism.[7]

Several prognostic factors for the development of AVN of the femoral head are known, such as time interval from trauma to closed reduction. Therefore, several authors recommend closed reduction within 6 h.[1,13,15] A systematic review of AVN and PTA found data regarding time to reduction in only two of 17 included studies.[16] The reported incidence of AVN after THD including fracture-dislocations varies between 1.74% and 2.9% with reduction within 12 h and 14.8%–56.9% after 12 h.[17,18] A prospective study with minimum follow-up of 2 years showed good to excellent results (clinical criteria by Matta) with a reduction within 12 h in 88% (33/47 patients).[19] Another risk factor is the severity of injury. PTA is probably the most common complication with 16%–24% in the long-term follow-up,[18,20] and the rate of PTA is increasing with the severity of injury.[9,16,20] Anterior dislocations have a better outcome than posterior dislocations.[9,17,21] Overall, Kellam could show an event rate for AVN of 0.106 for posterior dislocations and 0.087 for anterior dislocation, respectively.[16]

Traumatic diaphragmatic injury (TDI) is a severe injury with mortality rates up to 20%. Penetrating injuries are more frequent than blunt injuries,[22,23] and the latter have a higher mortality rate. Half of the patients do not show herniation of visceral organs; in these cases, TDI is difficult to diagnose on plain chest radiogram.[23]

To the best of our knowledge, we report the first case of traumatic asymmetric bilateral hip dislocation associated with diaphragmatic hernia. Our patient showed hemodynamic instability with decreased blood pressure levels and elevated heart rate; therefore, a hemodynamic relevant hemorrhage was suspected due to associated injuries (pelvic fracture, rupture of the diaphragm, and spleen). With an interdisciplinary approach of visceral and orthopedic trauma surgeons, the patient was transferred to the OR. With initiation of the anesthesia, the hemodynamic stability decreased further due to the muscular relaxation. After closed reduction of both hips within 2 min,
an emergent laparotomy was performed, followed by an osteosynthesis of the superior pubic rami fractures.

Closed reduction after TDH should be achieved as soon as possible. In fact, the threshold (time from injury to reduction of the joint), when complications such as AVN or PTA are increasing, is still controversial. On the other hand, complete diagnosis of all associated injuries during the primary survey must not be disregarded because of inordinate concern about delayed reduction of TDH.

In summary, traumatic bilateral hip dislocations should always prompt suspicion of associated visceral or vascular injuries, and mortality rates of 4%–10% are reported.[9,24] CT scans of thorax, abdomen, and pelvis help identify these injuries and give additional important information about pelvic or femoral fractures that can determine the therapeutic algorithm such as the reduction technique (open versus closed) or the choice of approach for the treatment of acetabular or pelvic ring fractures. We therefore believe that immediate full-body CT scans are justified in THD even though the benefit compared to a conventional radiographic workup is still debated.[14,5]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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