

Rare Combination of Ipsilateral Acetabular Fracture-Dislocation and Pertrochanteric Fracture

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Abstract

Acetabular fracture-dislocations are severe injuries that require urgent closed reduction of the hip and often require surgery to restore hip stability. Other authors have described acetabular fracture-dislocations associated with femoral neck fractures, but to our knowledge, this case report is the first to describe an acetabular fracture-dislocation in association with an ipsilateral pertrochanteric fracture and subtrochanteric extension.

The polytraumatized patient initially was not stable enough for prolonged surgery. Through a 3-cm anterolateral hip incision, a 5-mm Schanz screw was introduced percutaneously into the femoral head through the primary fracture site under fluoroscopic guidance. With inline traction on the leg, the Schanz screw was used to manipulate the femoral head back into the acetabular fossa. The Schanz screw was removed, the head remained reduced, and a skeletal traction pin was placed to maintain length and alignment of the pertrochanteric fracture until definitive stabilization was possible.

We propose a staged treatment strategy consisting of early closed reduction of the hip, and after the patient has been stabilized, reduction and fixation of the fractures. This strategy may be useful in managing an unstable polytraumatized patient or a patient who requires prolonged transfer to receive definitive care.

Acetabular fracture-dislocations are severe injuries that require urgent closed reduction of the hip and often surgery to restore hip stability. These injuries are seldom seen in conjunction with ipsilateral proximal fem-

oral fractures. Other case reports have described acetabular fracture-dislocations associated with femoral neck fractures.¹⁻³

This case report describes an acetabular fracture-dislocation associated with an ipsilateral pertrochanteric fracture and subtrochanteric extension.

We propose a staged treatment strategy consisting of early minimally invasive reduction of the hip and delayed reduction and fixation of the fractures. This strategy may be useful in managing a polytraumatized patient who may not be stable enough to undergo early definitive management, or a patient who requires prolonged transfer to receive definitive care.

The patient provided written informed consent for print and electronic publication of this case report.

Case Report

A 44-year-old man was involved in a head-on motor vehicle collision at highway speed. He was taken to a local hospital, stabilized, and transferred to our facility for definitive management. He had a history of diabetes mellitus and hypertension, both managed with oral medications. He denied any significant surgical history. On arrival, he was graded 15 on the Glasgow Coma Scale and reported chest and left hip pain. Trauma workup revealed multiple rib fractures bilaterally and associated pulmonary contusions, left-sided pneumothorax, and elevated serum creatinine consistent with acute renal failure. Radiographs showed a left posterior hip dislocation with associated posterior wall acetabular fracture and an ipsilateral pertrochanteric fracture with subtrochanteric extension (Figure 1). In addition, he had a traumatic arthrotomy of the left wrist, a triquetral fracture, and a right-hand phalanx fracture.

After initial resuscitation and stabilization, the patient was urgently taken to the operating room for reduction of the left hip dislocation 4 hours after arrival at our facility and 8 hours after the initial injury. Considering his physiologic condition, he was only stable enough to attempt reduction. Through a 3-cm anterolateral hip incision, a 5-mm Schanz screw was introduced percutaneously into the femoral head through the primary fracture site under fluoroscopic guidance. With inline traction on the leg, the Schanz screw was used to manipulate

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the femoral head back into the acetabular fossa (Figure 2). The reduction was confirmed by fluoroscopy. We then removed the Schanz pin, and the head remained reduced. The incision was lavaged and closed, and a distal femoral skeletal traction pin was placed to maintain length and alignment of the pertrochanteric fracture until definitive stabilization. The traumatic wrist arthrotomy was debrided, irrigated, and closed. The patient was taken to the intensive care unit (ICU) and underwent continued resuscitation. Computed tomography of the pelvis and the proximal femur, obtained in the interim for surgical planning, showed a posterior column with associated posterior wall fracture and marginal impaction (Figure 3).

By hospital day 4, the patient's physiologic condition had stabilized enough for him to return to the operating room for definitive fracture treatment. An extended Kocher-Langenbeck incision was used to address his injuries. Of note, the hip-reduction incision was 4 cm anterior to the Kocher-Langenbeck incision.

We addressed the proximal femur first. There was extensive soft-tissue stripping, including stripping of the entire anterior capsule, which was detached from the proximal femur. There was a comminuted fracture of the greater trochanter with fracture lines extending down below the lesser trochanter. The fracture was reduced and stabilized with lag screws and a locking proximal femoral plate construct. After reduction and fixation, there was a large void resulting from intertrochanteric bone loss, which we filled with a moldable composite allograft bone void substitute.

Our attention then turned to the acetabular fracture. The fracture was exposed and examined through the same extended incision. There was a large posterior wall fracture, which was divided into superior and inferior fragments. The inferior fracture line extended into the posterior column and into the ischium. There was marginal impaction superiorly and posteriorly. The impaction was elevated, backfilled with allograft, and stabilized with 1.5-mm bioabsorbable pins. The wall piece was then reduced and stabilized with 3 lag screws, a spring plate, and a buttress plate. Another plate was used to stabilize the posterior column (Figure 4). The avulsed anterior capsule was repaired back to bone through drill holes, as were the external rotators. The wound was closed over drains.

Postoperatively, the patient remained intubated and returned to the ICU. He was extubated on postoperative day 3. On postoperative day 7, duplex scan showed a popliteal deep vein thrombosis, and he was started on an anticoagulant. He was mobilized with physical therapy using a walker and on hospital day 18 was discharged to an acute rehabilitation center



Figure 1. Injury radiograph shows left posterior hip dislocation with associated posterior wall acetabular fracture and ipsilateral pertrochanteric fracture with subtrochanteric extension.



Figure 2. Intraoperative fluoroscopy shows Schanz pin in reduced femoral head with posterior wall acetabular fracture.



Figure 3. Postreduction axial computed tomography of left hip shows posterior wall fracture with marginal impaction.

in good condition and non-weight-bearing on the left lower extremity (Figure 5).

Discussion

Multiple cases of concomitant acetabular fracture-dislocations and femoral neck fractures have been reported in the literature,¹⁻³ but to our knowledge this case report is the first to describe a posterior acetabular fracture-dislocation with an associated pertrochanteric fracture. Posterior hip dislocations are severe injuries that require urgent reduction to minimize the chances of long-term sequelae, including posttraumatic osteoarthritis and osteonecrosis. Sequelae are related to injury or tensioning of the medial femoral circumflex artery, which is the primary blood supply to the femoral head.⁴ Several authors have shown the rate of osteonecrosis of the femoral head to be related to duration of dislocation, though whether the critical period is 6, 12, or 24 hours is controversial.^{5,6}

In the presence of a proximal femoral fracture, closed reduction may be impossible as traction cannot be applied through the injured extremity. In this situation, urgent open reduction is usually required. However, reduction cannot always be done in a timely manner. This is due to multiple factors, including polytrauma that prevents the patient from undergoing potentially prolonged definitive surgery, and initial presentation to an orthopedic surgeon who is not comfortable offering definitive treatment for this complex injury.

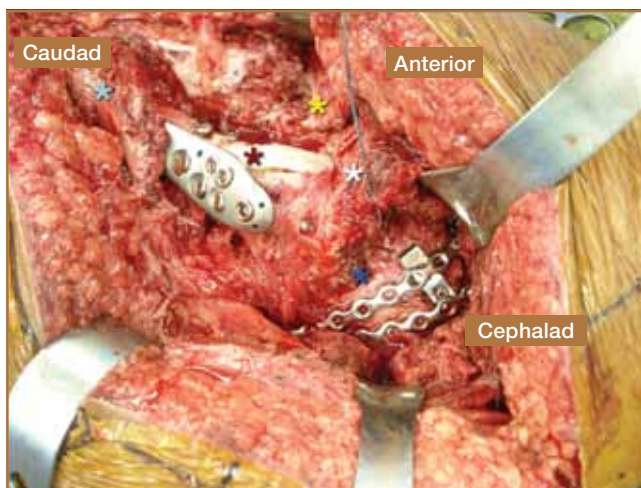


Figure 4. Intraoperative photograph shows final fixation of proximal femoral and acetabular fractures. Light blue indicates proximal femur; brown, moldable bone-graft substitute filling proximal femoral bone void; yellow, avulsed anterior capsule before repair; white, gluteus medius; dark blue, posterior acetabular wall.



Figure 5. Postoperative radiograph shows final reduction and fixation construct.

Whereas the acetabular fracture and the proximal femoral fracture can be delayed until the patient stabilizes or can be transferred to a higher level of care, the unreduced hip should be urgently addressed. Reduction of the dislocation within 6 hours has been shown to enhance recovery of the femoral head blood supply and reduce the risk for femoral head osteonecrosis.^{6,7}

For cases like our patient's, we propose performing staged percutaneous reduction using a Schanz screw. Care should be taken to keep the initial incision out of the area of the planned incision for the definitive fixation. In our patient's case, a large posterior wall fragment mandated use of at least a posterior approach, so the incision was made anterolaterally. Fluoroscopically guided placement of a Schanz screw into the femoral neck is a technique that is familiar to most orthopedic surgeons and achieves control of the femoral head and neck fragment without performing a large exposure. This facilitates closed reduction of the femoral head. In

patients with multiple trauma, skeletal traction may assist in maintaining reduction. This can be done quickly, allowing for the polytrauma patient's further resuscitation or for the patient's transfer to a higher level of care for definitive management, thereby shortening the time the hip is dislocated and potentially minimizing the risk for femoral head osteonecrosis.

Multiple studies have shown that overall outcomes after hip dislocations are contingent on development of arthritis and/or avascular necrosis and are time-dependent.^{5,6} Other

but direction of dislocation and overall severity of all injuries and, more specifically, associated hip pathology.^{5,6}

Less studies have been done on acetabular fractures with associated dislocations. Although these injuries involve higher energy, the defect in the posterior wall may allow the femoral head to lie in a position with less tension on the medial femoral circumflex artery. On the other hand, pure dislocations may put the vessels on greater stretch while the femoral head is displaced over the intact posterior wall.⁸ Multiple authors have shown that the most critical prognostic factor for determining outcome after acetabular fracture is the quality of the articular reduction.^{8,9}

We think our patient likely sustained this rare constellation of injuries about the hip as a result of the ultra-high-energy mechanism of injury in conjunction with the flexed position of the hip and knee typical of automobile drivers at time of impact. This case demonstrates a reasonable protocol for patients who have ipsilateral hip fracture-dislocations but cannot undergo early definitive fixation, either because of their condition or because of the capabilities of the initial treatment facility. Percutaneous reduction of the hip includes techniques familiar to most orthopedic surgeons. Expedient reduction minimizes the risk for developing long-term sequelae. We emphasize keeping incisions out of areas planned for definitive fixation, and we strongly recommend communicating with an accepting physician before performing this technique if the patient is to be transferred to another facility.

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