Posterior Wall Fracture-Dislocation With Traumatic Abductor Avulsion

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abstract

The typical injury pattern of a posterior hip dislocation includes posterior wall fracture, capsular injury, and muscular strain. This report presents an example of a posterior wall acetabulum fracture-dislocation associated with complete hip abductor tendon and capsular avulsion from the femur. The patient was found to have an unstable hip despite a small posterior wall fragment due to the extensive soft tissue injury. This was repaired. The patient had improvement in function initially, but ultimately required repair of the hip abductor tendons. To the best of the authors’ knowledge, this is the first case report of this specific injury in the literature. [Orthopedics. 2017; 40(1):e179-e181.]

Posterior dislocation accounts for 85% to 90% of all traumatic hip dislocations.1,2 Seventy percent of hip dislocations have associated acetabular fractures and 23% are associated with other lower extremity fractures.3,4 Associated injuries portend a worse prognosis, with 88% of hip dislocations associated with acetabular fracture resulting in hip arthritis compared with 24% of simple dislocations.5,6 The typical injury pattern of a posterior hip dislocation includes posterior wall fracture, capsular injury, and muscular strain.7,8 Abductor tendon avulsion with closed hip dislocation has not been described as a common finding.

CASE REPORT

A 25-year-old intoxicated woman presented to the emergency department by emergency medical services after being involved in a motor vehicle collision. On presentation to the authors’ trauma center, Advanced Trauma Life Support guidelines were used in the initial assessment.9 Her orthopedic injuries included a grade IIIA open pelvic ring disruption, grade II open left tibial shaft fracture, and left posterior hip fracture-dislocation (Figure 1). Computed tomography scans following closed reduction of the left hip revealed a small posterior wall fracture along with intra-articular loose bodies (Figures 2-3). The patient underwent open reduction and...
internal fixation of her pelvic ring disruption 2 days after presentation. Following stabilization of her pelvis, manual stress examination of the hip showed gross instability.\textsuperscript{10}

The patient was then placed in a lateral position and a Kocher-Langenbeck approach was performed.\textsuperscript{11} Once deep to the iliotibial band, the gluteus medius and minimus tendons were found to be traumatically avulsed from their insertions on the greater trochanter (Figure 4A). There was also circumferential capsular avulsion from the femur. The posterior wall fragment was small and comminuted and, therefore, simply debrided with loose bodies removed at this time. Additionally, the hip was concentrically reduced.

A combination of FiberWire (Arthrex, Naples, Florida) and a G2 suture anchor (Mitek, Westwood, Massachusetts) were used for capsular repair. A second suture anchor was placed into the gluteus minimus tubercle to repair the gluteus minimus tendon to the proximal femur. The gluteus medius tendon was repaired using Ethibond nonabsorbable polyester suture (Ethicon, Cincinnati, Ohio) through bony tunnels (Figure 4B). The wound was irrigated and layered closure was performed in routine fashion.

Postoperatively, active abduction was restricted. Toe-touch weight bearing was allowed for 6 weeks, at which time restrictions were discontinued and weight bearing was increased. Fourteen months following injury, the patient had returned to ambulation with intermittent cane use for persistent abductor weakness. Radiographs at that time revealed maintained pelvic alignment, a concentric hip joint, and no evidence of avascular necrosis within the femoral head (Figure 5).

At 18 months after injury, she presented with increased pain and limited abduction. Magnetic resonance imaging (MRI) revealed a failed repair of the abductors. She was referred to a fellowship-trained hip arthroscopist and underwent an arthroscopic repair of her gluteus medius and minimus tendons. Three months after hip arthroscopy, her abduction strength had improved from 3 of 5 preoperatively to 5 of 5 in the right lateral decubitus position.

**DISCUSSION**

Parke\textsuperscript{7} previously described the anatomy of the hip, including the capsule and ligaments, which make it stable and difficult to dislocate. Four extracapsular ligaments and one intracapsular ligament reinforce the hip joint. The extracapsular ligaments include the ischiofemoral, iliofemoral, and pubofemoral ligaments, which attach to the ischium, ilium, and pubis, respectively.\textsuperscript{7} The fourth ligament is the zona orbicularis, which is formed by the circular fibers of the anterior capsule. The Y-shaped iliofemoral ligament (of Bigelow) is one of the strongest ligaments in the human body. On standing, it prevents hyperextension of the hip and splints the anterior capsule. The pubofemoral ligament acts to restrict hip abduction, while the ischiofemoral liga-
ment prevents internal rotation. Attached to a depression in the acetabulum lies the ligamentum teres, which projects into a depression in the femoral head. It acts to prevent displacement of the femoral head. The gluteus medius and minimus muscles originate on the outer ilium, inferior to the iliac crest, and insert onto the greater trochanter. Their primary function is to abduct the hip.

Although traumatic hip dislocation has been well described in the orthopedic literature, associated abductor tendon avulsion has not been reported to the authors’ knowledge. Tannast et al. reviewed MRI findings to predict the integrity of the obturator externus and vascular integrity to the femoral head. They evaluated the soft tissues, including the capsule and muscles, surrounding the hip. Operative findings were used to confirm MRI findings. The most common injury pattern included strains of the external rotator muscles, the quadratus femoris muscle, and the gluteus medius and minimus muscles. Twenty-two percent of injuries that required operative intervention were documented to have obturator internus and superior and inferior gemelli tendon avulsion. The abductors were also evaluated, which revealed no documented cases of gluteus medius avulsion and 2 cases of gluteus minimus tendon avulsion.

Laorr et al. also reviewed MRI findings of patients with traumatic hip dislocations treated nonoperatively. They found moderate to severe muscle injury to the posterior hip musculature, including the gluteal muscles, in all of the patients with posterior dislocation. They did not, however, document tendinous avulsions of the gluteus medius or minimus. One limitation of this study was the focus on only nonoperatively treated injuries.

Several sports medicine–related articles have described traumatic hip instability, including common associated findings, none of which included abductor avulsion off of the femur. Moorman et al. described the mechanism and clinical and radiographic findings of 8 American football players who sustained a traumatic posterior hip subluxation. In the 7 patients who had MRI performed, a triad of hemorrhage, iliofemoral ligament disruption, and posterior acetabular hip fracture was found. However, there were no documented cases of abductor tendon avulsion. These authors advocated for obtaining an MRI acutely, in the absence of an unstable posterior wall fracture, to evaluate the possible pathology described above.

The preoperative computed tomography scans were reviewed with a musculoskeletal radiologist and no injury to the abductor tendon was apparent (Figures 2-3). Recognizing an abductor avulsion injury proves difficult because initial imaging and physical examination in the trauma setting may not be specific. In certain settings, despite a small posterior wall fracture, an examination under anesthesia may be warranted. For the current patient, the hip examination under anesthesia showed instability, necessitating operative treatment. Because of this, the abductor injury was recognized and repaired. However, had the hip examination yielded stable results, the abductor avulsion would have likely gone unrecognized, at least acutely. Based on this case example, in the setting of a traumatic hip dislocation with a negative result on dynamic stress examination, the authors think consideration should be given for MRI.

**Conclusion**

A case of a complex hip injury with posterior wall fracture-dislocation and complete distal capsular and abductor avulsion has been presented. This is a unique injury and, to the authors’ knowledge, has not been previously described in the literature. Patients showing hip instability following traumatic hip dislocations despite a small posterior wall fragment warrant careful consideration to the possibility of significant soft tissue injuries to the hip girdle.

**References**