Case Report

Anterior hip dislocation with simultaneous anterior column and anterior wall acetabular fracture: A case report

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ABSTRACT

Introduction: Isolated anterior column and anterior wall fractures are a relatively rare subgroup of acetabular fractures. They represent 6.3% of all acetabular fractures. Surgical treatment is indicated for fractures with displacement more than 5 mm and when incongruence of the articular surface and/or instability of the joint is evident, in order to allow early mobilization and prevent further complications, such as posttraumatic hip arthritis. Open reduction and internal fixation is the usual standard of care. Closed reduction and percutaneous fixation can be performed in minimally displaced fractures. In the herein article, we describe the unique combination of anterior hip dislocation along with anterior column and anterior wall fractures in a middle-aged patient, after a fall from small height.

Case report: A 56-year-old female patient was brought to the emergency department after an accidental fall from height less than 2 m. Upon arrival her right hip was abducted, shortened and externally rotated. CT scan of the pelvis revealed anterior dislocation of the right hip, an impaction injury of the femoral head, and fractures of anterior column and anterior wall of the acetabulum. Closed reduction of the hip was performed. Open reduction and internal fixation of the fractures was carried out utilizing the extended Smith-Petersen approach in a scheduled manner 5 days after admission. At one-year follow-up after the injury the patient had returned to all of her pre-injury activities and she was able to walk exercising full weight bearing without residual pain.

Conclusion: Anterior hip dislocation with simultaneous isolated anterior column and anterior wall fracture is an injury of rare incidence. Orthopaedic surgeons treating fractures should be aware of this entity and the herein article can serve as a reference regarding the management of such an uncommon injury.

Introduction

Isolated anterior column and anterior wall fractures are a rare subgroup of acetabular fractures [1]. Anterior column fractures occur as a result of high energy injuries such as road traffic accidents, even though they can occur after low energy falls in the elderly [2]. Existing literature evidence regarding their outcomes is scarce, as they are usually analyzed along with other associated fracture patterns, such as anterior column posterior hemitransverse or bicolumnar fractures [3]. Isolated anterior wall represent only 2% of all acetabular fractures, according to Judet and Letournel [4] They occur when the greater trochanter is impacted with the hip in lateral
rotation of at least 40 to 50 degrees [4]. Treatment strategies and their outcomes have been analyzed mainly in case reports and small case series [4,5].

Surgical treatment for anterior column fractures is indicated for fractures with displacement more than 5 mm, and when incongruence of the articular surface and/or instability of the joint is evident, in order to allow early mobilization and prevent further complication, such as posttraumatic hip arthritis [3]. Open reduction and internal fixation is the usual standard of care. Closed reduction and percutaneous fixation can be performed in minimally displaced fractures [3]. Anterior wall fractures require surgical fixation in order to restore the congruency of the acetabular margin and prevent instability of the hip joint. Surgical treatment includes open reduction and plate/screw fixation. In this article we present a rare case of an adult woman suffering an anterior hip dislocation with simultaneous ipsilateral fractures of anterior column and anterior wall of the acetabulum, after an accidental fall from small height.

Case report

A 56-year-old female patient was brought to the emergency department after an accidental fall from height less than 2 m. Her right hip was abducted, shortened and externally rotated. No other injuries were observed. CT scan of the pelvis revealed anterior superior dislocation of the right hip, an impaction injury of the femoral head, and fractures of the anterior column and anterior acetabular wall (Fig. 1). Closed reduction of the hip under general anaesthesia was performed. The reduction maneuver included traction along the long axis of the hip, internal rotation and adduction. The patient was neurovascularily intact before and after the reduction. A second post-reduction CT scan was performed for further investigation of the fracture morphology and confirmation of concentric reduction of the hip (Fig. 2). Surgical treatment was carried out in a scheduled manner 5 days after admission. Both fractures were exposed utilizing the Smith-Petersen approach. Reduction using pushers and provisional fixation with k-wires was performed. Fluoroscopy as per usual was utilized. Provisional fixation of the fragments was performed using k-wires. Definitive fixation followed, using long fully-threaded 3.5 mm cortical lag screws. (Figs. 3 and 4). On the 1st postoperative day the patient was mobilized with toe-touch weight bearing of the right lower extremity and following an uneventful postoperative course she was discharged on the 5th postoperative day. Toe-touch weight bearing was instructed for 10 weeks and extension of the hip was restricted for six weeks. At one-year follow-up after the injury the patient had returned to all of her pre-injury activities and she was able to walk exercising full weight bearing without residual pain.

Discussion

Isolated anterior column and anterior wall fractures are uncommon injuries that constitute 6.3% of all acetabular fractures [1]. They are usually occur in elderly patients and patients with osteopenic bone [1]. Osteopenic bone stock might explain the fact that these types of fractures demonstrate the least satisfying results among the simple fracture patterns [2]. Matta also demonstrated a 20-year survivorship of operatively-treated anterior wall fractures that is significantly lower in comparison to other fracture patterns (34% vs 76% in posterior wall fractures and 100% in posterior column fractures) [6].

Fracture displacement more than 5 mm is considered an indication for surgical fixation [3]. Surgical treatment consists of anatomical reduction and stable internal fixation of the fractures. Open reduction and internal fixation is the mainstay of treatment. An anatomical reduction with a gap of less than 2 mm, is a predictor of good joint function and reduced risk of post-traumatic osteoarthritis. As a result, the surgeon should try to obtain reductions with zero displacement or displacement up to 1 mm [7]. The ilioinguinal approach is most commonly utilized in order to achieve anterior column/wall reduction and fixation [7]. Other approaches that can be used is the Stoppa or Anterior Intra-pelvic approach, and the Smith-Petersen approach [7]. Due to the higher complication rate of open techniques in obese patients (BMI > 40) or patients with severe comorbidities, percutaneous fixation of anterior column fractures is an alternative in non-displaced or minimally displaced fractures (<2 mm) [8].

Complications of treatment include infection, iatrogenic nerve injury, heterotopic ossification, thromboembolic issues, malunion, nonunion and post-traumatic arthritis [2]. The initial 30% rate of infection of the ilioinguinal approach, which is the most commonly used approach to treat anterior column or anterior wall fractures, has been significantly lowered by prophylactic antibiotic treatment, the use of drains in the retropubic space and bringing the medial portion of the incision slightly proximal [9]. Postoperative infection
Fig. 2. Axial and three dimensional post-reduction CT scan views, showing the concentric hip position and the fractures of the anterior column and anterior wall.

Fig. 3. Intraoperative fluoroscopic images of the anterior column and anterior wall fixation and intraoperative picture depicting the Smith-Petersen approach and the provisional stabilization of the fractures with k-wires.

Fig. 4. Postoperative anteroposterior radiograph of the pelvis demonstrating the hip in reduced position and the fixation of the anterior column and anterior wall.
occurred only in 3 of 119 patients treated with the ilioinguinal approach in the series of Matta [9]. Injury of the lateral cutaneous nerve with the ilioinguinal approach is a relatively common complication of anterior column/wall fracture fixation [7]. Rare injuries of the femoral or obturator nerves can also occur [7]. The ilioinguinal approach has been associated with a 1.5% incidence of heterotopic ossification [7]. Post-traumatic arthritis is a well-recognized complication of acetabular fractures, with an overall rate of 26.6% [7]. The most significant factor that has been associated with hip osteoarthritis is the quality of the reduction (< 2 mm of displacement), and few studies have attempted to correlate the type of fracture with the prevalence of osteoarthritis. However, looking separately at each type, poorer results are found in anterior column fractures [10]. The prevalence of osteoarthritis is difficult to determine in isolated anterior wall fractures, due to their rarity. In the series of Giannoudis et al. [3], the overall rate of complications was 20%(6 of 30), with most of them occurring in patients that were operated on more than ten days post-injury.

Piriou et al. reported two similar cases of anterior hip dislocation with simultaneous anterior wall fracture [4]. In the first case, closed reduction could not be achieved due to entrapment of an anterior wall fragment. Urgent surgery was performed, which included reduction of the hip with anatomic reduction and screw fixation of the anterior wall fragments, utilizing the Smith Peterson approach. In the second case, urgent closed reduction of the hip was performed. Fixation of the fragments was performed in a scheduled manner, with separate screws and an anterior pelvic plate, utilizing the Smith-Peterson approach. Sherlock et al. [5] also reported a case of anterior hip dislocation with simultaneous anterior wall fracture in a 20-year-old motorcyclist. Emergent closed reduction of the hip was performed. Due to post-reduction instability, immediate fracture fixation with malleolar screws through the Smith-Petersen approach was performed.

Conclusion

The unique combination of anterior column and anterior wall fracture along with an anterior hip dislocation is an injury of rare incidence. Consequently we believe that orthopaedic surgeons treating fractures should be aware of this entity and the herein article can serve as a reference regarding the management of such an uncommon injury. Early reduction of the hip is of paramount importance, as it reduces the possibility of avascular necrosis of the femoral head. In selected cases operative treatment through the Smith-Petersen approach allows anatomic reduction and stable fixation of the fragments, with subsequent early mobilization of the patient.

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Ethical approval

Due to the retrospective nature of this study, ethical approval was not required.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Declaration of competing interest

None.

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