Case Report
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A SAFE SURGICAL HIP DISLOCATION FOR TREATING PIPKIN FRACTURE: A CASE REPORT

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ABSTRACT

Pipkin fractures are devastating injuries that usually occur consequently for high-energy trauma. Optimum anatomical reduction and fixation is the primary target of treatment for most of these injuries. We reported a case where we treated a pipkin fracture using safe surgical hip dislocation approach. Case presentation a 18-year-old male, which sustained a type I Pipkin fracture following a motorcycle accident. In the emergency department, an emergency closed reduction was performed, followed by surgery two weeks later. Using a surgical hip dislocation, a successful anatomical reduction and fixation was performed. The discussion is safe surgical hip dislocation allows full access to the femoral head and acetabulum, without increasing the risk for a femoral head avascular necrosis or posttraumatic arthritis and minimizing trauma to the abductor musculature. Simultaneously, this surgical approach gives the opportunity to repair associated acetabular or labral lesions, which explains the growing popularity with this technique.
Conclusion: Although technically demanding, safe surgical hip dislocation represents an excellent option in the reduction and fixation for Pipkin fractures.

Keywords: Pipkin fracture, surgical hip dislocation, high energy trauma.

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INTRODUCTION

Femoral head fracture is one of devastating injuries that is often associated with poor functional outcomes and complications (1,2). The most common classifications were proposed by pipkin and remain the most known classification amongst orthopedic surgeons. Although commonly known and various approaches have been reported, the best one is not yet decided.

Amongst reported approaches, limited femoral head exposure remains one of the challenges in treating this type of fracture. To overcome this problem, an approach whereas hip joint is surgically dislocated as firstly described by Grantz in 2001 as Safe Dislocation of the Hip, manage to grant an adequate exposure towards femoral head and acetabulum without further damage to the joint vasculature. In this paper, we report a clinical case where this approach is used to treat Pipkin type-I fracture.

PRESENTATION OF CASE

An 18-year-old man came to the emergency department with decreased consciousness and deformity of his left leg following a motorbike accident with a car. Physical examination revealed posterior fracture dislocation of the right hip with fracture of head femur (type I Pipkin fracture), comminution fractures of right shaft femur, a simple fracture of the right tibia, laceration of the spleen and multiple maxillofacial trauma. At that time, we performed closed reduction of the hip joint, external fixation of femur and tibia. We performed definitive surgical treatment 2 weeks after the initial injury because of his condition.

Regarding the Pipkin fracture, we chose to perform an anatomical reduction and internal fixation using a surgical hip dislocation as described by Ganz et al. We performed in supine position; we did a step trochanteric osteotomy of greater trochanter. In step trochanteric osteotomy, we performed “Z” cutting bone which is give more stable in reattachment of GT. Osteosynthesis was achieved using three subchondral headless cannulated screws, the capsule was closed with Vicryl 2-0 sutures, and the greater trochanter stabilized using two 4.5mm cortical screws.

Patients are non-weight bearing for 6-8 weeks on operated limbs while femoral head viability is evaluated. Ambulation might be done as soon as union is achieved.

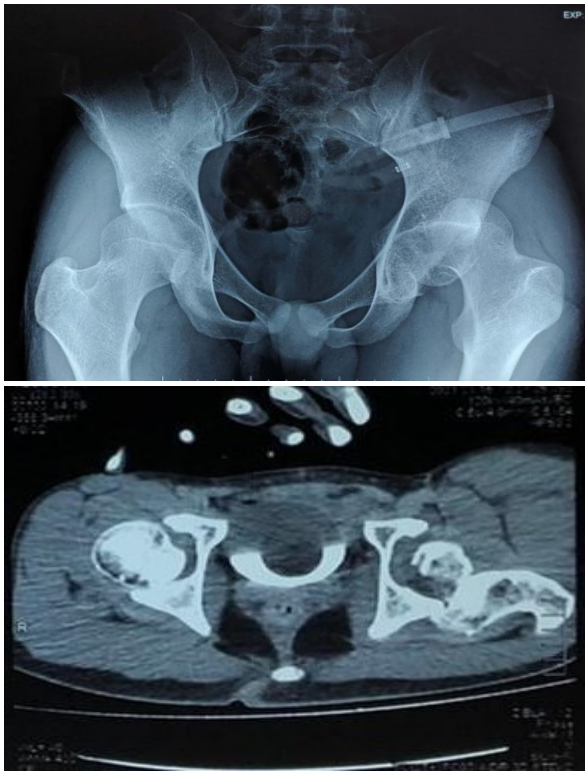

Figure 1. x ray and CT scan of the pelvis showing a femoral head fracture associated with a posterior hip dislocation.

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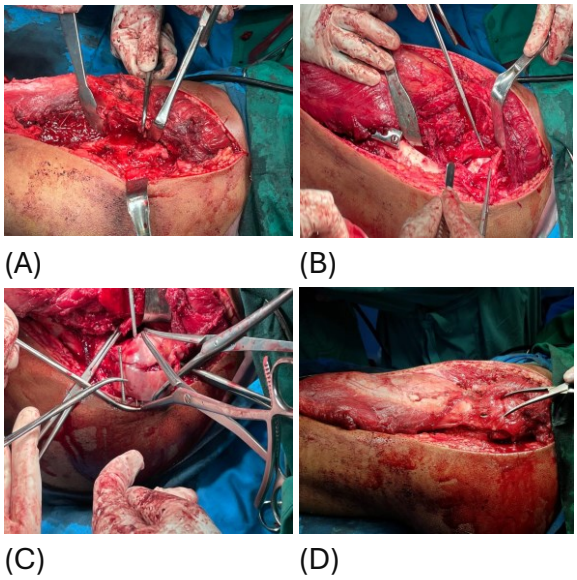

(A) (B)

(C) (D)

Figure 2. A) A step trochanteric osteotomy was performed in supine position. A Step osteotomy results in more stable reattachment of GT which is recommended in adult/obese patients. B) Joint capsulotomy. C) A big fragment fracture was reduced and fixed by three headless cancellous screw. D) GT fragment is returned and fixed by two 4.5 cortex screws

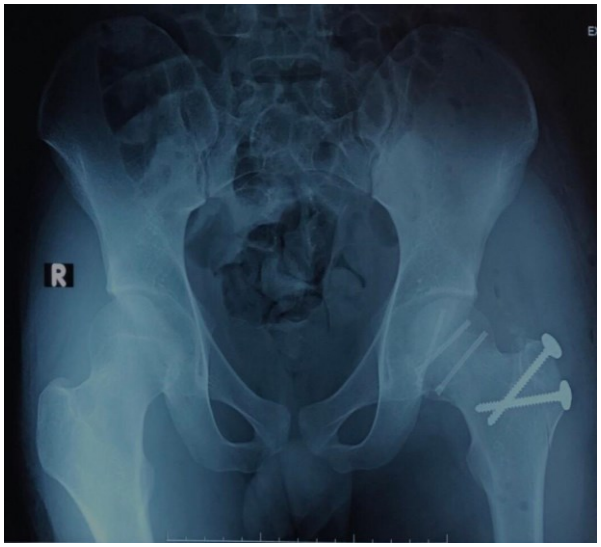

Figure 3. Post operative pelvis x ray

DISCUSSION

Femoral head fractures are often associated with hip dislocations thus immediate reductions is necessary to decrease the risk of complications such as AVN. With incidence of 8-26%, reduction within 6 hours is required to decrease the risk of AVN (1,2). To gain a better functional outcome, optimum anatomical reduction needs to be achieved (2,5). Furthermore, Pipkin type I fracture required a stabilization of free head fragment whenever possible to further decrease risk of progression toward post-traumatic generative hip.1 However, not all femoral head fractures are prone to osteosynthesis. Literature shows consistently better results with fixation in comparison to fragment excision (9).

Commonly known approaches such as posterior (Kocher-langenbeck), Anterior (Smith-Peterson), all of them have limited exposure of the femoral head and acetabulum, which makes an anatomical reduction and identification of associated injuries inside the acetabulum or in the labrum difficult (1). According to previous studies, Fixation of femoral head fractures through posterior approach is recommended. Anterior approaches were considered related higher risk of AVN as disruption of ascending lateral circumflex artery, although nowadays it is known that mentioned artery is not only supply towards femoral head.

The medial femoral circumflex artery (MFCA) is the main source for femoral head vascularization, contributing for the main intra- and extracapsular anastomotic rings, it enters the capsule superolaterally has been proved by cadaveric study which might be disrupted through posterior approach (10,11).

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In this case, Surgical Hip Dislocation (SHD) is performed through a trochanteric-flip osteotomy, leaving external hip rotators intact, that furthermore protect MFCA. A retinacular flap that contributes in preservation of local blood supply is obtained through Z-shaped capsulotomy. Intraoperative checking of vascularization status of femoral head can be done through small head perforations, A bleeding sign indicates a good sign towards femoral head viability (10). Another advantage is that SHD allows full access to the entire femoral head and acetabulum, which make an anatomical reduction of the capital fragments, and the identification of chondral, subchondral, or labral injuries that could go unnoticed using other approaches possible (1).

Subchondral headless screws, countersinking lag screws, bioabsorbable pins, or screws/suture can be used for optimal fixations (1). Complications as heterotopic ossification, AVN, and posttraumatic arthritis can strongly affect long term results for the patients.9 However, study by Stannard et al. showed that the posterior approach was associated with a 3.2 times higher incidence of AVN compared with the anterior approach (4). This trend was also confirmed by Giannoudis et al. systematic review (13). Recent evidence shows that AVN rate in Pipkin fractures treated by SHD rounds 7.7 to 11.8%. To keep in mind, that all evidence has short term follow-up duration which is not proper to determine complication incidence (14). One of evidence by Gavaskar and Tummala stated that in a series of 26 patients with Pipkin fractures submitted to SHD, they found no cases of AVN with a mean follow-up of 36 months but 11.5% post traumatic arthritis.1 In other hand, Trochanteric-flip osteotomy has a lower rate towards posttraumatic arthritis comparatively to anterior or posterior approaches (12,13). By that, Nonunion of the trochanteric osteotomy is a potential complication for the SHD approach only (3).

Recent literature shows consistently good functional results in patients submitted to femoral head fixation through a trochanteric-flip approach, thus it is a safe and optimal choice for the operative treatment of femoral head fractures (1,12,13). Last but not least, please keep in mind that the outcomes are also depend on a wide variety of factors such as the severity of the initial injury and other concomitant injuries, patient health status, timing until initial reduction and surgery, and postoperative complications (3,5).

CONCLUSIONS

Although technically challenging, Safe SHD might appear as an alternative approach in treating Pipkin femoral head fracture. Remembering Pipkin fractures are rare devastating injuries that tend to progress to numerous complications. Whenever possible, these fractures should be stabilized to reduce the risk of early articular degenerative changes. The SHD technique has proven to be an effective and safe methodology compared to classical approaches, having the additional advantage of allowing a full visualization towards the femoral head and acetabulum.

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