Case Report

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Controlled Hip Dislocation Using the Ganz Technique as a Treatment Option for a Rare Injury Caused by a Firearm Projectile. Case Report

José Félix dos S Neto*

Director of the ANORF Clinic (Neurological Orthopedic Rehabilitation and Physiotherapy Assistance LTDA), Professor at AFYA Faculty of Medical Sciences in Itabuna-BA, Brazil

***Corresponding author:** José Félix dos S Neto, Director of the ANORF Clinic (Neurological Orthopedic Rehabilitation and Physiotherapy Assistance LTDA), Professor at AFYA Faculty of Medical Sciences in Itabuna-BA, Brazil

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ABSTRACT

The use and indication of controlled hip dislocation using the Ganz technique in a patient who presents a rare injury, an impacted femoral head fracture, with accommodation of the intra-articular firearm design, after exceeding the bottom of the acetabulum. The good result reported here with controlled hip dislocation, a growing surgical technique in the last two decades in countries around the world, proves the success described in current literature, when it presents the advantages and limitations of each one of them (in this case, Ganz's), even more so because it is an unusual case like this.

Keywords: Hip Fractures; Femoral Head Fracture; Hip Dislocation

Introduction

The controlled surgical hip dislocation technique, described by Reinhold Ganz in the early 1990s for open treatment of femoroacetabular impingement [1], has been increasingly used for traumatic injuries of femoral head and acetabular fractures. The injury reported here, according to current literature, is uncommon, as it is an impacted femoral head fracture caused by a firearm projectile (which makes it rarer) [1,2]. The projectile remained lodged in the femoral head after passing through the acetabular floor from medial to lateral, also causing an acetabular fracture. The Ganz technique was chosen for surgical treatment of this injury due to its advantages regarding exposure of the hip joint, allowing visualization of the entire circumference of the femoral head. The access facilitates the removal of intra-articular loose bodies, improves the assessment of damage caused to both the femoral head and the acetabulum, and reduces the risk of injury to the main vascular supply to the femoral head [1].

Case Report

A 23-year-old female patient, a victim of a gunshot wound to the left hip, was admitted to the emergency room of a public hospital belonging to the Unified Health System (SUS). The patient complained of pain in the left buttock and inguinal region, associated with a burning sensation radiating to the medial region of the ipsilateral thigh. On physical examination, the bullet entry wound was located in the medial region of the buttock, with slight bleeding, limitation of the range of motion of the left hip joint, and inability to bear weight on the left lower limb. Neurovascular status at both the pelvic and left lower limb levels was preserved. Radiographic and tomographic studies of the region were performed for adequate therapeutic planning (Figures 1 & 2). The patient underwent surgery in the fixed lateral decubitus position, using the Kocher-Langenbec approach with a surgical variation employing the Ganz technique for controlled hip dislocation. After digastric osteotomy of the greater trochanter, a zeta capsulotomy was performed to expose the joint. Sectioning the round

ligament was not necessary as it had already been damaged by the gunshot wound. The projectile lodged in the femoral head and the small fragments of the acetabular floor fracture were removed. After cleaning the joint with saline solution, a defect of approximately 1.5 cm was observed in the acetabular floor and an impacted fracture of the femoral head below the round ligament.

Figure 1: Radiographs of the left hip showing the FAP lodged in the femoral head.

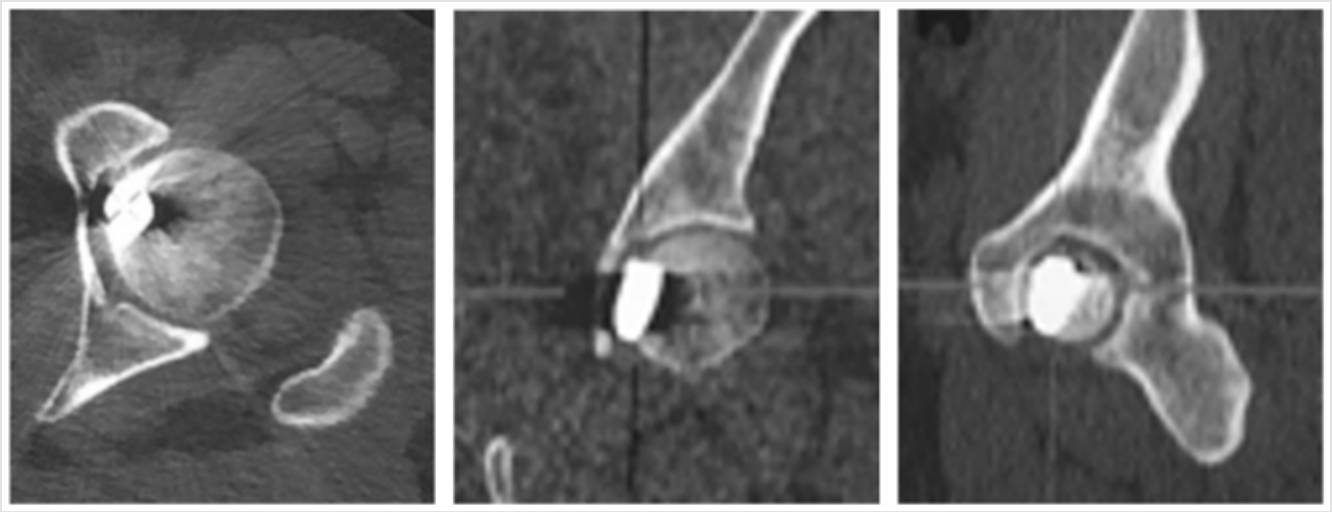

Figure 2: Tomographic slices showing the articular invasion of part of the projectile.

As the lesions were outside the weight-bearing area of the hip, no grafting of the acetabular defect or disimpaction of the femoral head was performed (Figure 3). After hip reduction, the greater trochanter was fixed with two 4.5 mm cortical screws. The patient was discharged the following day with instructions to immediately begin a joint mobility protocol and to use a lower limb abduction cushion when lying down to rest. Weight-bearing on the left lower limb was not permitted for a period of two months, at which point gait training was initiated while maintaining the use of a pair of Canadian crutches. The patient was followed up as an outpatient, with her last follow-up appointment 180 days post-surgery. At this appointment, the patient arrived ambulating without crutches, reporting no pain, only slight

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edema at the end of the day in her left foot and with a full range of motion in her left hip. Radiographically, there were no signs of avascular necrosis of the femoral head (AVN) or post-traumatic osteoarthritis (PTO) of the affected hip (Figure 4). Using the Merle D'Aubgne-Postel score modified by Matta and the Harris Hip Score modified by Byrd, an excellent result was observed with a score of 17 and a good result with a score of 87, respectively. The patient was cleared for physical training at a gym, under the supervision of a physical education professional.

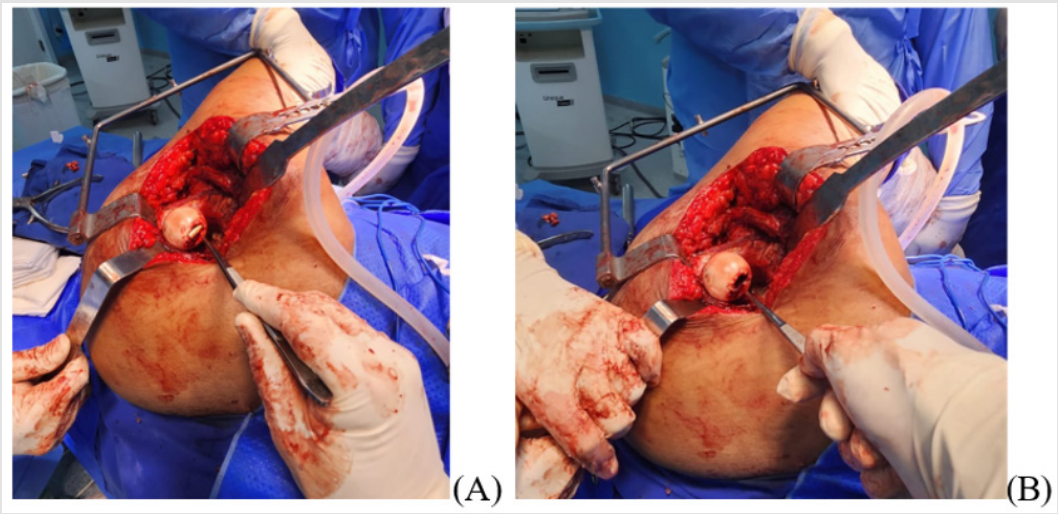

Figure 3: Intraoperative photographs showing the excellent exposure of the left femoral head before
(A) And after
(B) Projectile removal.

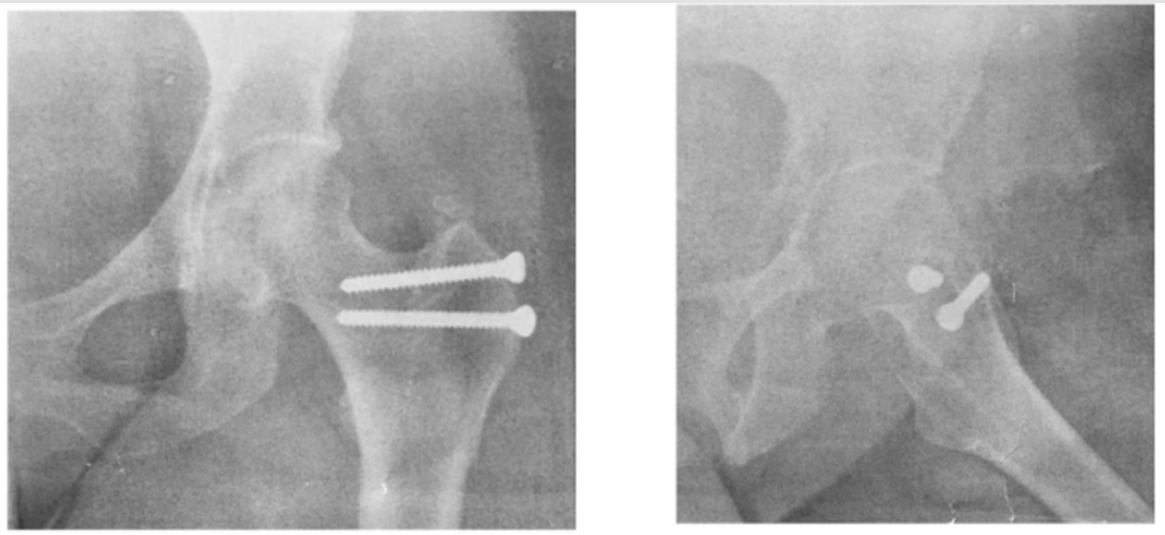

Figure 4: Postoperative radiographs of the left hip showing no signs of AVN or PTO. Note the fixation and proper consolidation of the greater trochanter osteotomy.

Discussion

Femoral head fractures are rare injuries, usually associated with hip dislocations, where the head impacts the acetabular wall, almost always caused by high-energy trauma, such as car accidents. Approximately 95% of patients require hospital treatment, either due to the need to treat the fracture itself or as a result of associated injuries [1,2]. In this clinical case, the mechanism of trauma to the femoral head becomes rarer because it was caused by a firearm projectile, which remained lodged in it after passing through the acetabular floor from medial to lateral. Femoral head fractures are mostly treated surgically, and the literature generally shows good results from the treatment of these injuries with controlled hip dislocation. Massè, et al. [3] analyzed 13 patients, of whom only one had a poor outcome [3]. The Ganz technique, originally described for the open treatment of femoroacetabular impingement, presents some advantages when compared with other techniques, providing better visualization of the entire circumference of the femoral head, minimal risk of vascular supply injury, and a lower percentage of postoperative complications [1,4].

Our choice for controlled hip dislocation with the Ganz technique was due to the aforementioned advantages: access to the gunshot wound in the femoral head (slightly below the round ligament), visualization of the acetabular floor fracture, and access to bone fragments in this area. This facilitates our approach through a more precise assessment of the lesions. Henle, et al. [5] using the Merle d'Aubigne and Postel hip function analysis classification cited by Ugino, et al., published that of the 12 patients treated, ten obtained good or excellent results in the follow-up [5,6]. In this case report, functional assessment using the Merle D'Aubgne- Postel score modified by Matta and the Harris Hip Score modified by Byrd yielded excellent results with a score of 17 and good results with a score of 87, respectively, confirming what is described in the current literature.

Conclusion

The use and indication of controlled hip dislocation have increased in the last two decades, driven by the good results reported with this surgical technique. One of the main advantages of this technique is the excellent exposure of both the femoral head and the acetabular cavity, preserving local vascularization. As a limitation, due to the complex anatomy of the hip and the demanding surgical skill required in this technique, controlled hip dislocation requires specific training and should not be performed in isolation by less experienced surgeons. In the case reported here, the use of the Ganz technique through the Kocher-Langenbeck approach allowed us to treat an unusual case of femoral head fracture due to gunshot wound, with excellent articular exposure. Despite the short follow-up time of the patient (180 days), there are no signs of AVN (avascular necrosis) or ATP (post-traumatic osteoarthritis), which is probably directly related to the vascular preservation to the femoral head and the lesions being in the infra- foveolar region, respectively.

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