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Case Report

Obturator dislocation of the hip associated with ipsilateral quadrilateral plate fracture: A rare case report

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ABSTRACT

Traumatic hip dislocations typically result of high-energy trauma and frequently involve young patients. The obturator dislocation is not a common condition and rarely combined with acetabular fracture. We report a rare case of a 48-year-old male patient with a trauma of the left hip following a car-vs-car frontal accident. He presented with an obturator hip dislocation combined with ipsilateral quadrilateral plate fracture. The patient underwent a clinical and imaging evaluation to identify the acetabular fracture dislocation. The CT scan showed a severe dislocation of the acetabular medial wall. *Closed reduction under* conscious *sedation* was performed in Emergency Department. The patient underwent open reduction and internal fixation. During surgery, obturator nerve was entrapped inside the fracture rim and then it was released. No intraoperative complications were observed. The patient was followed, with accurate clinical and radiological follow up assessments for 24 months reporting excellent clinical outcomes according to Oxford Hip Score (47/48 points), a good hip range of motion and a complete recovery of basic activities of daily living. After two years of follow-up, no evidence of femoral head necrosis was reported and the patient returned to sport activity.

Introduction

Hip dislocation represents an orthopaedic urgency related to several long-term comorbidities. Traumatic hip dislocations are classified according to the direction of femoral head dislocation, and occur as anterior, posterior or central [1]. Anterior dislocations are less frequent than posterior, accounting for only 10% of all hip displacements and are classified either obturator or pubic [2]. They usually occur as result of high-energy trauma. Road traffic accident is the major traumatic mechanism, ranged between 62% and 93% [1]. The purpose of this article is to report the diagnostic and therapeutic management of a rare case of obturator left hip dislocation associated with isolated quadrilateral plate fracture and no femoral head impaction.

Case report

A 48-year-old male was transported to regional Hospital Emergency Department (ED) due to a car-vs-car frontal impact. He was sitting in the posterior passenger seat without wearing safety belt when the accident occurred. On admission, he complained pain and functional impairment of the left hip, without loss of consciousness or focal neurologic deficits. The Injury Severity Score was 9 and the

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hemodynamic status was stable. The Body Mass Index was 19 and no relevant pathologies in his medical history were reported. The left lower limb was shortened, abducted and externally rotated. The clinical exam revealed swollen hip, tenderness to palpation and inability to move the lower left limb. The pelvis with the bilateral hip joint X-ray showed an obturator left hip dislocation with associated acetabular fracture (Fig. 1). In the emergency room, early closed reduction was carried out *under* conscious *sedation*. The post-reduction CT scan confirmed an acetabular quadrilateral plate fracture (Fig. 2). The patient was transferred to our Hospital at the 3th day after the accident to undergo surgery. One day after hospitalization, the absence of surgical contraindications was assessed and the patient underwent surgical procedure under general anesthesia. The antibiotic prophylaxis was administered. The patient was placed supine and the modified Stoppa approach was performed. The hip arthrotomy revealed acetabular quadrilateral plate fracture with the obturator nerve entrapped inside the fracture rim and no femoral head impaction. The distal part of the nerve sheath was faded and was released from surrounding bone fragments. The quadrilateral plate was reduced and fixed with a modelled seven holes reconstruction plate and cortical screws. Final fluoroscopic controls confirmed anatomical fracture reduction (Fig. 3) according to Matta Radiological Score [3]. No intra-operative complications were observed and blood loss was acceptable. The patient was allowed to seat immediately at 90° of hip flexion. For 4 weeks the patient was mobilized non-weight-bearing with two crutches. Additionally, rehabilitation protocol was activated to regain the quadriceps strength. Partial Weight bearing was permitted at 6 weeks, progressing to weight bearing as tolerate at 12. Clinical and radiological evaluations were performed every 30 days for 4 months, then the patient was telephonically interviewed. The hip mobility achieved a normal range of motion 2 months after surgery. X-rays controls reported fracture consolidation at 4th month (Fig. 4). At two years of follow-up, the patient was able to perform his basic activities of daily living, completely asymptomatic, without limitations in recreational activities. The Oxford Hip Score was 47. The radiological and clinical outcomes were excellent and no evidence of femoral head necrosis was observed.

Discussion

Hip dislocation represents an orthopaedic urgency and is associated with long-term comorbidities, such as avascular necrosis of the femoral head (AVNFH) and post-traumatic osteoarthritis (OA) [4]. Comparing to posterior, the anterior dislocation presents a slightly higher rate of complications such as femoral head impaction fractures, with a frequency ranging between 15 and 35% [2,5]. In contrast, the acetabular fractures are rare occurring in only 4% of cases of anterior hip dislocation and commonly involving the acetabular anterior wall [5]. In our case report, the obturator hip dislocation causes a rare quadrilateral plate fracture with no femoral neck and anterior wall impairment. The anterior-inferior dislocation occurs with hip forced in abduction and external rotation. At the time of the accident, the patient was sitting in the posterior seat. The abduction of the legs during the impact may partially explain the traumatic mechanism. Not wearing the seat belt have complicated the clinical outcome. Judet and Letournel described the universally accepted classification of acetabular fractures in 1964 [6], which was later revised by Letournel in 1980 [7]. The purpose of an orthopaedic classification should be to help the surgeons in the decision-making and management of the fracture and to address the surgeons to the proper treatment according to fracture type. However, the isolated fracture of quadrilateral plate seems to be not included in Judet and Letournel classification system. Furthermore, this classification only describes involvement of acetabular columns and/or walls fracture and does not include joint dislocation and fracture displacement. With this regard, the aforementioned classification is not completely suitable for our case report. As recorded in a recent Review, the incidence of post-traumatic OA ranged from 0.155 for type I to 0.633 for type II dislocations. However, the Authors described that there were not enough types III and V dislocations reported to provide meaningful comparisons for these 2 groups. [8]. With this regard, Matta et al. [3] analysed the clinical outcome of acetabular fracture displacement. The authors did not report a statistically significant correlation between fracture gap and

Fig. 1. plain anteroposterior radiograph of the left hip showing anterior hip dislocation with large acetabular fragment.

Fig. 2. Computer Tomography (CT) axial image of the pelvis. The fracture of the ipsilateral quadrilateral plate is clearly visible.

Fig. 3. postoperative anteroposterior x-ray, showing the anatomical reduction of the fracture.

Fig. 4. One year after surgery anteroposterior x-ray.

clinical results. In a series of 118 patients surgically treated for acetabular fracture, Meena et al. [9] reported significant worse outcome in patients with pre-operative gross displacement (>20 mm) than the patients with <20 mm of fracture gap. In our report, the fracture displacement of the quadrilateral plate was more than 20 mm, but it did not correlate with poor result, because the quality of final

reduction was anatomical (0–1 mm of displacement). Many authors have highlighted the importance of anatomical reduction in development of OA in acetabular fracture [9]. Hip dislocation had negative effect on clinical outcome, because it indicated a high intensity trauma with transmission of direct forces through hip joint. This traumatic mechanism determined damage of surrounding soft tissue and compromised vascularity of the femoral head leading to AVNFH. The AVFNH is the second most common long-term complication. Some authors highlighted the importance of timing of reduction of the *hip dislocation*. The risk of AVNFH development was related to the time to reduction of the femoral head, reaching up to 70% in hip reduced more than 12 h after the trauma [10]. Therefore, it was mandatory to promptly reduce all traumatic hip dislocations to decrease the risk of the AVNFH. In our case, the dislocation was reduced once the patient arrived to ED. After two years of follow–up, no evidence of femoral head necrosis has been observed and the patient recovered a complete function of the hip.

Conclusion

Commonly, the hip fracture-dislocation occurs in young patients. Due to the long life expectancy of this population the appropriate treatment is mandatory to guarantee an adequate quality of life and a complete recovery of hip function. We highlight the importance to promptly reduce all traumatic hip dislocations and anatomically reduce the fractures, in order to decrease post-operative complications such as AVNFH and post-traumatic OA. To our knowledge, this is the first case report of obturator hip dislocation associated with isolated quadrilateral plate fracture and no femoral head impaction.

Declaration of competing interest

None.

References

[1] T.E. Clegg, C.S. Roberts, J.W. Greene, B.A. Prather, Hip dislocations–epidemiology, treatment, and outcomes, Injury. 41 (4) (2010 Apr) 329–334.
[2] K. Dawson-Amoah, J. Raszewski, N. Duplantier, B.S. Waddell, Dislocation of the hip: a review of types, causes, and treatment, Ochsner J. 18 (3) (2018 Fall) 242–252, https://doi.org/10.31486/toj.17.0079.
[3] J.M. Matta, Fractures of the acetabulum: accuracy of reduction and clinical results in patients managed operatively within three weeks after injury, J. Bone Joint Surg. Am. 78 (1996) 1632–1645.
[4] R.A. Brooks, W.J. Ribbans, Diagnosis and imaging studies of traumatic hip dislocations in the adult, Clin. Orthop. Relat. Res. 377 (2000) 15–23.
[5] K. Pfeifer, M. Leslie, K. Menn, A. Haims, Imaging findings of anterior hip dislocations, Skelet. Radiol. 46 (6) (2017 Jun) 723–730, https://doi.org/10.1007/s00256-017-2605-x (Epub 2017 Feb 25).
[6] R. Judet, J. Judet, E. Letournel, Fractures of the acetabulum: classification and surgical approaches for open reduction. Preliminary report, J. Bone Joint Surg. Am. 46 (1964 Dec) 1615–1646.
[7] E. Letournel, Acetabulum fractures: classification and management, Clin. Orthop. Relat. Res. 151 (1980 Sep) 81–106.
[8] P. Kellam, R.F. Ostrum, Systematic review and meta-analysis of avascular necrosis and posttraumatic arthritis after traumatic hip dislocation, J. Orthop. Trauma 30 (1) (2016 Jan) 10–16, https://doi.org/10.1097/BOT.0000000000000419.
[9] U.K. Meena, S.K. Tripathy, R.K. Sen, S. Aggarwal, P. Behera, Predictors of postoperative outcome for acetabular fractures, Orthop Traumatol Surg Res. 99 (8) (2013) 929–935.
[10] V. Sahin, E.S. Karakaş, S. Aksu, D. Atlihan, C.Y. Turk, M. Halici, Traumatic dislocation and fracture-dislocation of the hip: a long-term follow-up study, J. Trauma 54 (3) (2003 Mar) 520–529, https://doi.org/10.1097/01.TA.0000020394.32496.52.