Case report: Pure obturator dislocation of the hip, a rare variety of regular dislocations, and long-term clinical outcomes

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Abstract
Post-traumatic dislocation of the hip is a surgical emergency that is usually caused by a high-energy trauma in a context of polytrauma. The pure obturator hip dislocation variant is very rare. It is considered an emergency, and its management must be done within 6 h by a qualified surgeon in order to reduce the risk of osteonecrosis of the femoral head and iatrogenic fractures. Herein, we report the case of a pure obturator dislocation of the hip, following a high-energy trauma. The patient was treated urgently by closed reduction under general anesthesia. The functional and radiological results after 2 years were satisfactory, without signs of avascular necrosis.

Keywords
Hip dislocation, obturator dislocation, pure dislocation, anterior inferior hip dislocation, avascular necrosis

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Introduction
Hip obturator dislocation is one of the rarest dislocation in traumatology,¹ with only a few cases reported in literature.² This rarity can be explained by the very particular anatomy of the hip joint which is one of the most congruent joint in the human body. It is surrounded by multiple stabilizers such as muscles, capsulo-labral, and ligamentous structures. This congruency provides high stability to this joint and makes it necessary to have high-energy trauma to dislocate the hip.³ Hip dislocation is rarely encountered in sports practice.⁴,⁵ Posterior dislocation is the most common, while the obturator type is exceptional, and represents only 6%–10% of all cases of hip dislocations.⁶ Reduction must be done within 6 h due to the high risk of avascular necrosis which can affect the long-term functional outcomes and prognosis.⁶ Herein, we report the outcomes of a case of an isolated obturator dislocation, modality of treatment with a 2 years follow-up.

Case report
We report the case of a 23-year-old patient, smoker, with no past medical history who presented after a motor vehicle accident while being in the passenger seat. On inspection, his left hip was in flexion abduction external rotation (Figure 1), without associated cutaneous opening. A dermabrasion on the inner side of the homolateral leg was noted, and the neurovascular examinations were normal. A standard radiograph of the frontal pelvis showed a pure obturator dislocation of the right hip with no associated fracture (Figure 1), no associated femoral neck fracture, or other bone lesion noted. The diagnosis of a pure obturator dislocation of the hip was made, and the patient was rushed to the operating room at H3 of the accident. Under general anesthesia, a reduction by external manoeuvering was performed. The reduction was made by a pull in the axis of the limb followed by a bending of the hip in internal rotation and abduction and was obtained from the first attempt. The reduction was confirmed by fluoroscopy and post-operative radiographs (Figure 1). Post-reduction hip

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stability and neurovascular status were assessed, and the hip was found to be stable and in a concentric position. Computed tomography (CT) scan of the pelvis was done to rule out intra-articular osteochondral fragment and to further assess the femoral head (Figure 2). Traction of the limb was maintained for 2 weeks to promote capsulo-labral healing and decrease intra-articular pressure. A non-weight bearing post-operative protocol was conducted. After 2 weeks, traction was removed, and partial weight bearing was allowed. Full weight bearing was achieved at 6 weeks. Sport activities were authorized at 3 months post-reduction. The patient was followed up with serial radiographs on a monthly basis for the first 3 months, then every 3 months for 2 years. After 2 years of follow-up, the hip was stable and radiographs showed no signs of osteonecrosis (Figure 3).

Discussion

Obturator dislocation of the hip occur after a movement of flexion, abduction, and forced external rotation. In 2015,
Dellanh et al.\textsuperscript{6} reported a similar case, noting that the most reported mechanism is the propagation of the shock wave from the medial side of a bent knee to the hip in flexed abducted and externally rotated position. Toms et al.\textsuperscript{7} insisted on the cam effect of the great trochanter on the ilium in maximum abduction. The orthopedic reduction is urgently required; and it is the key element in the therapeutic management. We insist, like all authors, on a reduction under general anesthesia with complete muscle relaxation made by a qualified surgeon. The methods of reduction remain controversial; Epstein and Wiss\textsuperscript{3} and Brav\textsuperscript{8} recommend traction in the axis of the femur followed by progressive flexion of the hip in internal rotation and abduction, while Toms et al.\textsuperscript{7} recommend using the orthopedic table and combining axial traction with lateral thigh traction and then gradually releasing the traction while impregnating an adduction movement and internal rotation. Irreducible cases require open reduction through the ilioinguinal approach. Toms et al.\textsuperscript{7} reported a case of open reduction with release of the rectus femoris muscle. In our case, the maneuver consisted of a first traction in the axis of the limb allowing decoaptation followed by flexion internal rotation, which brought the limb back into extension adduction and internal rotation. We consider this technique more appropriate given the displacement of the femoral head in case of obturator dislocation. Some authors criticized abduction, which may cause a femoral neck fractures.\textsuperscript{7,9} These discussions draw attention to the reduction difficulties, and the significant risk of complications that can lead to a surgical approach for an open technique.

Fractures of the anterior wall of the acetabulum should be ruled out after reduction, a CT scan of the pelvis is very useful. It will also allow the detection of any osteochondrial

\textbf{Figure 2.} A post-reduction scanner confirms the dislocation’s "pure" nature and the absence of foreign bodies in the intra-articular space.
lesion of the femoral head or an infra-radiological fracture frequently associated with this type of dislocation. These two elements will determine the functional prognosis of the hip joint, and the patient must be informed of all kind of complications. Theoretically, post-reduction traction for 3–6 weeks may promote capsulo-labral healing. However, there is no evidence in current literature that supports a clinical benefit of its use on the long-term risk of avascular necrosis of the femoral head. Catonné et al. recommend early non-weight bearing and then total weight bearing on the 15th day with eviction of the external rotation for 3 weeks in the context of anterior dislocations. The evolution of isolated hip dislocation is often favorable in 85%–100% of cases. Two essential complications exist: necrosis of the femoral head and coxarthrosis. The risk of avascular necrosis of the femoral head increases with the delay in reduction. Hougaard observed 47% necrosis when the reduction time exceeded 6 h. But these figures mostly concern lesions associated with fractures of the acetabulum or femoral head. This rate is certainly lower in isolated dislocations.

**Conclusion**

Obturator dislocation of the hip is rare, and its rarity is due to the stability of the hip joint. Early diagnosis and management within 6 h are critical for preventing avascular necrosis of the hip. A clear and instructed post-reduction protocol is needed and the patient must be informed of all complications that can follow his dislocation.

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**Author contributions**

All authors contributed to the conduct of this research and read and approved the final version of the manuscript. Written informed consent was obtained from the patient to publish this report in accordance with the journal’s “patient consent policy” on the title page of the manuscript.

**Availability of data and materials**

The data that support the findings of this study are openly available in Department of Orthopedic Surgery and Traumatology, University Hospital Oujda, Morocco.

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**Ethical statement**

I agree with the above statements and declare that this submission follows the policies of Solid State Ionics as outlined in the Guide.
for Authors and in the Ethical Statement. The paper is not currently being considered for publication elsewhere. The paper reflects the authors’ own research and analysis in a truthful and complete manner. The paper properly credits the meaningful contributions of co-authors and co-researchers. The results are appropriately placed in the context of prior and existing research. All sources used are properly disclosed (correct citation). Literally copying of text must be indicated as such by using quotation marks and giving proper reference and all authors have been personally and actively involved in substantial work leading to the paper, and will take public responsibility for its content.

**Informed 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.

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