

## Knee Dislocation Complicated by A Vascular-Nervous Injury: Case Report and Review of the Literature

Mohamed Rida El Galiou\*, M. Boufettal, R. A. Bassir, M. Kharmaz, M. O. Lamrani, M. S. Berrada

Department of Orthopedics and Traumatology, University Hospital Center of Rabat, Faculty of Medicine and Pharmacy of Rabat, University Mohamed 5 Souissi, Université Mohammed V de rabat siège, Rabat, 10000, Morocco

DOI: [10.36347/sjams.2020.v08i11.010](https://doi.org/10.36347/sjams.2020.v08i11.010)

| Received: 29.10.2020 | Accepted: 07.11.2020 | Published: 11.11.2020

\*Corresponding author: Mohamed Rida El Galiou

### Abstract

### Case Report

Pure knee dislocations are rare injuries. Vascular-nervous complications must be explored systematically. The authors report the case of a 58 years old patient, who presented to the ER with a traumatic knee dislocation associated to a paralysis of the external popliteal sciatic nerve and an occlusion of the popliteal artery. The patient benefited from a reduction, a femoro-tibial stabilization by an external fixator bridging the knee and a bypass of the popliteal artery using a graft from the saphenous vein intern.

**Keywords:** Knee dislocation, popliteal artery, external popliteal sciatic nerve.

**Copyright © 2020 The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

## INTRODUCTION

Complete knee dislocations are severe and rare injuries resulting from high energy trauma, and associated with a multi-ligamentous rupture, that of the central pivot in particular. Any anatomical interruption of the popliteal artery may cause distal ischemia of the member that needs to be urgently reversed simultaneously to the treatment of the dislocation. The frequency of the paralysis of the external popliteal sciatic nerve associated to the ligamentous trauma varies between 10 and 40 %, following high traction forces exhibited on the nerve and explained by the adherence of its trajectory around the head of the fibula [1-3].

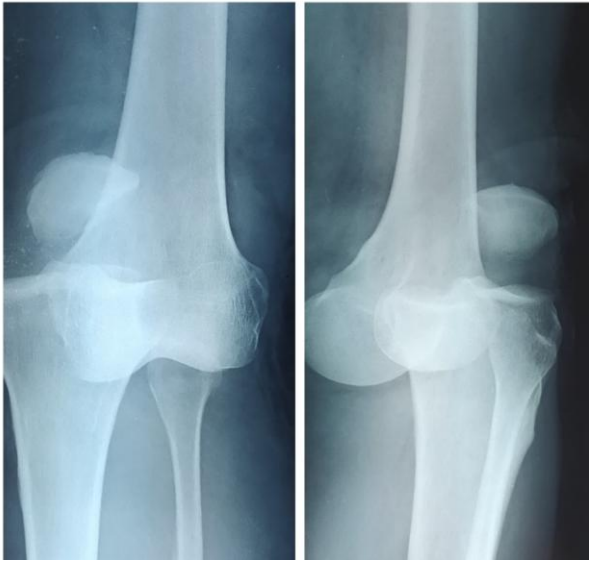
## CLINICAL OBSERVATION

It's the case of a 58 years old patient with no particular medical background, who suffered from a domestic trauma of the knee in hyperextension and forced varus. At the clinical exam, the knee was swollen and deformed with an abolition of the foot and posterior tibial pulses, the sensitivity of the anterolateral face of the leg as well as the back of the foot was troubled, and a paralysis of the foot and toe lifters was also observed. The diagnosis of the antero intern knee dislocation was

confirmed by an X-rays of the knee, face and profile (Fig-1). The patient was admitted to the emergencies at H3 and benefitted from a reduction under sedation, and the absence of pulse was explored by a CT angiography that objectified an occlusion of the popliteal artery with a recovery of the continuity at the level of the tibio-peroneal trunk (Fig-2).

At first hand, the orthopedic team stabilized the dislocation using an external fixator Hoffman type bridging the knee. Then, at second hand the vascular surgery team intervened and performed a bypass of the popliteal artery using a graft from the saphenous vein intern reversed with a proximal and a distal end-to-end anastomosis at H6.

Postoperatively, the member was immediately warm and the foot as well as the posterior tibial pulses were recovered. Five weeks later, the external fixator was removed and the reeducation began. By lack of means, the patient couldn't afford an IRM. Concerning the paralysis of the external popliteal sciatic nerve, a conservative approach was agreed upon with a progressive recovery of the extension of the forefoot six months after the trauma. The results were assessed with a minimum follow-up of two years.



**Fig-1: Knee x-ray (face and profile) showing the antero-internal dislocation of the knee**



**Fig-2: CT angiography of the knee showing occlusion of the popliteal artery**

## DISCUSSION

Pure knee dislocations are rare injuries that account for under 0,02% of all trauma emergencies [4]. Anterior, posterior, external, internal dislocation represent respectively 40%, 33%, 18% et 4% of dislocations [4, 5]. Rihn *et al.*, [4] classifies dislocation into two categories: acute (under 3 weeks) and chronic (over 3 weeks). Clinically a physical examination evaluating pain, deformity, mobilization of the extremities, edema, pallor, coldness of the extremities, reflexes and neurological function is performed urgently. The vascular checkup must be prioritized, given the severity and frequency of the popliteal artery injuries. The presence of paresthesia should also signal the differential diagnosis with

compartment syndrome [6]. The ligamentous lesion assessment must be meticulous, based on clinical exam, the radiographic exam that confirms the diagnosis and the IRM if possible. A good assessment will allow us to classify the lesions in terms of peripheral ligament damage. In case of ischemia, arteriography should be considered on the operating table in order to reduce loss of time [7]. The prevalence of a rupture of the popliteal arterial axis during a dislocation of the knee sits between 4 and 20%, the popliteal artery is particularly subjected to this sudden elongation because it is relatively attached to the femur as it passes through the adductor ring and to the tibia by the arch of the soleus [8]. The frequency of interruptions to the popliteal axis is closely related to that of neurological damage and soft tissue damage [9, 10]. The traumatologist and the vascular surgeon must be present from the start of the operation to establish the operating strategy based on the first reduction of the dislocation, the surgical exploration of vascular and ligament injuries, followed by repair of the vascular continuity [10]. In front of any major instability and immediate recurrence of the displacement, strict femoro-tibial immobilization is necessary with an external fixator bridging the knee. The repair of the arterial vascular axis consists of a bypass between the high popliteal artery and the subarticular popliteal artery or the tibio fibular trunk: this technique is made necessary by lesions of the arterial walls which are contused and torn over several centimeters [11, 12].

The frequency of external popliteal sciatic nerve during a knee dislocation is between 25 and 40% [9, 10]. All the authors agree in emphasizing the parallelism between neurological damage and ligament damage: the more extensive and severe the ligament ruptures, the more frequent and deep is the concomitant paralysis of the external popliteal sciatic nerve [13]. The etiology of paralytic syndrome remains difficult to determine in such a context. It is probable that ischemia more than direct nerve damage was responsible for total sciatic paralysis, only an early clinical examination, from the first hours, can resolve this diagnostic problem [13]. The attitude towards paralysis is not consensual in the literature. Rosset *et al.*, [10], in case of an incomplete paralysis, recommends the release of the external popliteal sciatic nerve if early clinical and electromyographic recovery does not progress and / or during any ligament repair to the lateral plane. In the event of initial complete paralysis, exploration and release are systematic in the event of ligament surgery on the lateral plane, with identification of the extremities and subsequent inter-fascicular graft.

## CONCLUSION

Knee dislocation associated with the anatomical rupture of the popliteal artery is a rare occurring trauma that demands immediate and multidisciplinary medical care from a specific surgical team reuniting trauma and vascular surgeons. As it is

the case for vascular lesions, it is urgent to reduce the displacement giving the external popliteal sciatic nerve an anatomical path.

## REFERENCES

1. Reebye O. Anatomical and clinical study of the common fibular nerve. *Surg Radiol Anat.* 2004; 26:365-70.
2. Ryan W, Mahony H, Delaney M, O'Brien M, Murray P. Relationship of the common peroneal nerve and its branches the head and neck of the fibula. *Clin Anat.* 2003; 16:501-5.
3. Tomaino M, Day C, Pagageorgiou C, Harner C, Fu FH. Peroneal nerve palsy following knee dislocation: patho anatomy and implications for treatment. *Knee Surg Sports Traumatol Arthrosc.* 2000; 8:163-5.
4. Rihn JA, Cha PS, Groff YJ, Harner CD. The Acutely Dislocated Knee: Evaluation and Management. *J Am Acad Orthop Surg.* 2004; 12(5):334-46.
5. Reckling FW, Peltier LF. Acute Knee Dislocations and Their Complications. *Clin Orthop Relat Res.* 2004; 422:135-41.
6. Kupczik F, GuniaSchiavon EM, de Almeida Vieira L, Tenius PD, Fávoro CR. Knee dislocation: descriptive study of injuries. *Rev Bras Ortop.* 2013; 48(2):145-151.
7. Green NE, Allen BI. Vascular injuries associated with dislocation of the knee. *J Bone Joint Surg Am.* 1977 Mar; 59(2):236-9.
8. Bonneville P, Chaufour X, Lousteau O, Mansat P, Pidhorz L, Mansat M. Luxation traumatique du genou associée à une interruption de l'artère poplitée. Étude rétrospective critique d'une série de 14 cas. *Rev Chir Orthop.* 2006; 92:768-77.
9. Twaddle BS, Bidwell TA, Chapman JR. Knee dislocations: where are the lesions? A prospective evaluation of surgical findings in 63 cases. *J Orthop Trauma,* 2003; 17:198-202.
10. Rosset PH. Luxation traumatique du genou de l'adulte. Table ronde de la SOO. *Ann Orthop Ouest,* 2003; 35:303-36.
11. Crolais JM, Chevallier JM, Enon B, Moreau P, Pillet J. Traumatismes vasculaires poplités: classification pronostique. *Rev Chir Orthop,* 1983; 69:475-480.
12. Rozycki GS, Tremblay LN, Feliciano DV, Mac Clelland WB. Blunt vascular injury in the extremity: diagnosis, management and outcome. *J Trauma,* 2003; 55:814-824.
13. Bonneville P, Dubrana F, Galau B, Lustig S, Barbier O, Neyret P, Rosset P, Saragaglia D. Lésions traumatiques du nerf fibulaire commun dans les lésions bicroisées ou luxations du genou. *Revue de Chirurgie Orthopédique et Traumatologique.* 2010 Feb 1;96(1):64-70.