Trauma of the External Popliteal Sciatic Nerve (SPE) Following a Dislocation of the Knee: About a Case

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ABSTRACT

Knee dislocation is a translocation of the tibia with respect to the femur following a violent trauma. It can be complicated by serious vasculo-nervous lesions, of which the paralysis of the sciatic nerve popliteal external remains infrequent. This is the case of our patient who presented six months ago a traumatic dislocation of the left knee reduced in urgency. And which was complicated by a complete neurological deficit of the SPE nerve, confirmed by electromyogram (EMG). Palliative surgery was indicated and was aimed at improving functional prognosis, using tendon transfer to resuscitate the dorsal flexion of the foot.

Keywords: paralysis, external popliteal sciatic nerve, knee dislocation

1. INTRODUCTION

Knee dislocation is defined by the translocation of the tibia with respect to the femur, often secondary to high energy trauma, or it may cause vascular lesions that are a real surgical emergency, and rarely severe nervous lesions. The paralysis of the nerve SPE remains an infrequent pathology usually leading to a motor deficit translating a foot-drop of Anglo-Saxons and its steppage characteristic to walking. The sensory deficit is very limited and discrete, localized at the lower part of the antero-external face of the leg and the back of the foot. And the treatment in the delayed emergency rests on a restoration of the nerve continuity either by sutures or by a graft. And in the late stage, palliative surgery is only discussed in the absence of clinical and electrical recovery beyond two to three months. Further functional rehabilitation is always indicated. The spontaneous evolution is unpredictable. It depends on the degree of damage to the nerve. We report a case of isolated paralysis of the left EPS nerve following a traumatic dislocation of the left knee without any associated vascular lesion seen late.

2. OBSERVATION

This is a paralysis of the left SPE nerve following a knee dislocation in a 52-year-old patient, victim six months ago of a violent road accident, pedestrian hit by a car. The standard radiology of face and left knee profile showed an anterior dislocation of the knee (Figure 1). That was reduced in emergency (Figure 2) and immobilized for 8 weeks by a cruro pedic plaster, followed by functional rehabilitation.
At six months of evolution, the patient always keeps lameness with walking with steppage, and frequent falls. The clinical examination includes a balance of motor skills and sensitivity of the leg and foot. Who noticed a motor deficit affecting the muscles of the external anterior lobe of the left leg (peroneal muscles and anterior tibialis) leading to a limitation of dorsiflexion and abduction of the left foot, as well as a limitation of the Flexion and extension of the toes on the same side, associated with a sensory deficit. The achillian reflex was abolished on the left side. The diagnosis of paralysis of the nerve SPE was evoked and confirmed by the electromyogram which has objectified an absence of the motor potential of the left SPE, signifying a complete attack. A palliative surgical management by a transfer of posterior tibialis associated with a typical arthrodesis was made, followed by a functional motor rehabilitation, made it possible to obtain a satisfactory functional result.

3. DISCUSSION

The frequency of SPE paralysis secondary to knee dislocation varies in the literature depending on the lesional circumstances and recruitment of the surgical team handling this trauma, usually between 10% and 40% \(^{(1)}\). The mechanism of paralysis is often related to a compression of the SPE nerve when it passes around the neck of the fibula, or is subjected to a very large traction, causing a rupture at the level of the block formed by the lateral condyle of the femur on a knee In extension. In the popliteal fossa, the distal tip of the nerve is found in the joint space of the knee, while the proximal tip rises more or less upwards in the popliteal fossa \(^{(1,2,3)}\).

The neurological deficit in our clinical case was complete on both the motor and sensory levels, without the participation of the popliteal sciatica contingent (SPI).

The isolated paralysis of the SPE has a caricature and pathognomonic sensitivomotor semiology allowing easy diagnosis. Indeed, except in case of ischemia by rupture of the popliteal artery, the clinical symptoms include after a few hours of evolution, a neurological component leading to a complete sensory-motor paralysis. It is no longer possible to discern the vascular symptomatology of a possible paralysis of the SPE nerve \(^{(4,5,6)}\). Similarly, the occurrence of a lodge syndrome necessitating the making of fasciotomy incisions, or the muscular sequelae of ischemia, are all circumstances that make initial neurological evaluation difficult.

Only an early clinical examination, from the first hours, allows to solve this diagnostic problem. The EMG confirms the SPE nerve injury by the appearance of either the conduction block in the fibula neck or focal slowdown or both, and shows the site of compression, with assessment of the size and Type of attack. It allows monitoring of evolution and provides an indication of surgical exploration at a later stage. Magnetic resonance imaging (MRI) is not contributory to the diagnosis of the neurological lesion, although it provides valuable information on the anatomical state of capsuloligamentar structures \(^{(7,8)}\). And at a late stage it allows to obtain an order of magnitude, the extent of the loss of nerve substance and is part of the preoperative assessment.

The attitude towards paralysis of the SPE nerve is not consensual in the literature, which poses a problem of
indication of nerve surgery and tendinous transfer. In recent series with operative management of knee dislocations, few authors report this functional repercussion. Some patients immediately eliminate patients with SPE nerve palsy from their ligament repair collective. Others emphasize the spontaneous and rapid recovery of paralysis\(^{(6,9,10)}\). Despite a significant rate of rupture or non-recovery, several authors do not report the impact of neurological sequelae on the final result\(^{(11,12,13)}\). In urgent cases, the risk of an irreversible lesion of the SPE nerve is not clearly known. Goitz and Tomaino\(^{(1)}\) recommend in the context of knee dislocations complicated by complete paralysis of the SPE nerve an early interventional attitude to avoid secondary nerve retraction and agree with the conclusions of Niall et al.\(^{(14)}\). This neurolysis is approached early and systematically by some\(^{(4,14)}\), or only during lateral ligament repair\(^{(14)}\).

The attitude of systematic exploration before the absence of electrical and / or clinical recovery after the first three months could be called into question in the face of the simplicity and the reliability of the ultrasound in the evaluation of the state of anatomical continuity Of the SPE nerve, and in monitoring evolution; Brewer and Sans\(^{(15)}\), Gruber et al.\(^{(16)}\), Rossett\(^{(17)}\) distinguishes two cases where the release of the SPE nerve from cicatricial fibrosis (neurolysis) is recommended either in the presence of incomplete paralysis without clinical and electromyographic early recovery or in any lateral plane ligament repair in case Of initial complete paralysis.

In case of complete nervous breakdown, the indication of the nerve graft with the contralateral sural nerve is necessary if there is a significant loss of neurological substance and after sedation of the inflammatory phenomena. Experience has shown that the long grafts were not followed by any recovery: for Bleton et al.\(^{(18)}\), 20 cm is the threshold beyond which there can be no functional axonal regrowth; Kim et al.\(^{(19)}\) set this limit at 6 cm and Piton et al.\(^{(20)}\) to 15 cm. The surgical prognosis of these lesions is linked for Bleton and Piton\(^{(18,20)}\) to the size of the nerve graft. A nerve transplant less than 5 cm has a high potential for clinical recovery that can take from eighteen months to two years. For others, the poor prognosis of spontaneous nervous recovery after nerve transplantation justifies the association of a palliative tendinous transfer to resuscitate the tibiotal dorsal flexion\(^{(21,22,23)}\). This prognosis is not always specified in the literature, often due to a lack of operative exploration or imaging of the nerve SPE\(^{(4,14,24,25)}\). Knee dislocations, possible neurological involvement.

In practice, the management of the lesion of the nerve SPE is most often delayed, due to the primary treatment of ligamentous lesions and sometimes wait-and-see. This makes assessment of nerve substance loss difficult. In the absence of clinical improvement, this is the case of our patient, a palliative treatment in progress by a transfer of posterior tibial tendon passed through the interosseous membrane (Figure 3, 4) is then indicated. This corrects the falling foot but sometimes poses a problem of cerebral integration and does not correct lateral instability of the ankle due to peroneal muscle paralysis. This tendon transfer has been associated with an arthrodesis arthrodesis type Lambrinudi (Figure 5). This surgery is followed by immobilization for two months followed by rehabilitation with re-learning of the walk. The results were satisfactory (Figure 6).

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**Figure 3:** technique for the transfer of the posterior tibial tendon

**Figure 4:** Procedure for the transfer of the posterior tibial tendon
4. CONCLUSION

In the case of dislocations of the knee, the paralysis of the nerve SPE is infrequent, the diagnosis often late. The lesion of the nerve trunk is irreversible in more than a third of cases, without any hope of spontaneous recovery. Total ruptures and bruises have a poor prognosis even after a transplant as soon as they exceed several centimeters. The induced neurological sequelae alter considerably the overall functional result. This unpredictable and sombre prognosis must be clearly announced to the patient and a palliative gesture can be proposed.

The main goal of this work was to show the good prognosis of palliative surgery in the event of complete nerve injury in the knee dislocation

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest in the drafting of this article.

REFERENCES