Available online at www.elixirpublishers.com (Elixir International Journal)

Orthopedics

Elixir Orthopedics 87 (2015) 35565-35569

ISSN: 2229-712X

Surgical management of traumatic posterolateral knee dislocation in emergency

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ARTICLE INFO

Article history:

Received: 30 August 2015;

Received in revised form:

25 September 2015;

Accepted: 01 October 2015;

Keywords

Knee dislocation,

Gracilis and semitendinosus grafts,

Quadriceps tendon graft,

Posterior cruciate ligament,

Medial collateral ligament.

ABSTRACT

Dislocation of the knee represents a severe injury as a result of high velocity traumatism, multi-ligamentous injuries are usual. Clinical exam must be attentive in searching any vascular or nervous disruption. Closed reduction must be performed promptly. Primary reconstruction of the ligamentous lesions is controversial in literature. Stabilizing the knee limits neurovascular and cartilaginous damages. We report a case report of a patient who has sustained a posterolateral left knee dislocation after a road-traffic accident. Reduction was realized in care unit, followed by early reconstruction of both posterior cruciate and medial collateral ligaments using gracilis, semitendinosus and quadriceps tendon grafts. After six month, the Lysholm score was at 81 points.

Introduction

Traumatic knee dislocations are uncommon, they represent less than 0.2% of all orthopedic injuries [1]. It may occur after frontal anteroposterior high velocity injuries. The dislocation is typically posterolateral. After orthopedic reduction, knee instability and cartilaginous lesions are inherent to anterior cruciate ligament (ACL) and posterior cruciate ligament (PCL) damages, associated with lateral ligament complex or medial collateral ligament (MCL) tears. Neurovascular injuries must be analyzed clinically and requiring imaging exploration. Effective treatment of multi-ligamentous injuries remains controversial between non-operative and operative procedures. Partisans of operative reconstruction describe simultaneous and staged techniques. We report the case of a patient who had sustained a posterolateral left knee dislocation, resulting from a road-traffic accident. Surgical management has consisted on closed reduction followed by early reconstruction of PCL using gracilis and semitendinosus auto-graft associated with reconstruction of the medial collateral ligament using quadriceps tendon graft. Rotatory stability was controlled successfully in post-operative. We have obtained satisfied results after six months; with total pain and edema relief and return to daily activities without great difficulties, the Lysholm score was at 81 points.

Patient and Observation

A 70 years-old-man, was admitted to the emergency department at Chambery hospital, France, two hours after a road-traffic accident. Clinically, he had sustained a closed traumatism with deformed and swelling left knee (figure 1). Neuro-vascular status and cutaneous exam were normal to the left lower limb. Anteroposterior and lateral radiographs showed posterolateral knee dislocation without fractures (figure 2). CT angiography did not show any vascular lesion (figures 3 and 4). In the care unit, reduction of the dislocated knee was performed with difficulty because of an exceptional rotatory mechanism (lateral condyle blocked in medial plateau). Because of high instability after reduction (figure 5), the patient was operated 24h later. Under general anesthesia and after median anterior approach, we showed complete rupture of both the anterior and posterior cruciate ligaments, the medial collateral ligament was damaged, and trapped between medial femoral condyle and tibial plateau (figure 6). Firstly, the gracilis and semitendinosus graft were taking (figure 7), followed by realizing tibial and femoral tunnels (figures 8 and 9) and reconstruction of the posterior cruciate ligament using *Toggle loc and ziploop system*; the medial collateral ligament was reinforced using quadriceps tendon graft (figure 10). Fluoroscopic final control of the left knee showed good articular congruence (figure 11). Postoperatively, stability was acquired and the knee was immobilized in a hinged knee brace. Anteroposterior and lateral radiographs of the operated knee showed good reduction and correct fixations (figure 12). We have authorized a touch weight-bearing during six weeks to protect the repaired ligaments, followed by full weight-bearing during three months. After a progressive active and passive rehabilitation program, for six months; flexion and extension of the knee were estimated at 100°/0°, the patient was able to walk, squat and accomplish daily activities without great difficulties. The knee was painless, and the Tegner Lysholm Knee Score was at 81 points.

Discussion

Traumatic knee dislocations are uncommon, they represent less than 0.2% of all orthopedic injuries [1]. This injury is defined as a traumatic lesion resulting in the rupture of at least three of the four major ligaments of the knee and leading to a substantial degree of functional instability [2]. Tibial displacement with respect to the femur defined five types: anterior, posterior, medial, lateral, and rotary (anteromedial, anterolateral, posteromedial, and posterolateral) injuries [3]. Posterolateral dislocations are very difficult to reduce by closed methods [4]. Rotatory posterolateral mechanism was expected in our patient radiologically by showing lateral tibial displacement with the lateral condyle blocked in medial plateau. All the structures contributing to the knee stability can be injured. Traumatic dislocation is a serious injury when associated with neurovascular damage, its evaluation should be performed

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immediately after reduction. The optimum therapeutic method of traumatic knee dislocation has not been established. Closed reduction should be tried in all situations. Post reduction, the preferred treatment can vary. Stable post reduction knee, older or sedentary patient with intact collateral ligaments are the indications of the conservative treatment [5]. It consists of closed manipulation and immobilization in a plaster cast ranging from 3 to 10 weeks [1]. Some authors reported a poor outcome of conservative treatment and have recommended early surgery of all damaged ligaments [6]. Other authors recommend reconstruction of the posterior cruciate ligament (PCL) and collateral ligament injuries alone, and defer anterior cruciate ligament reconstruction until the patient develops rotatory stability [7]. Importance was accorded to rotatory instability in our patient by reconstructing both PCL and medial collateral ligament. Early, rather than delayed reconstruction produced better results in terms of function and stability; it allows easier identification of anatomic landmarks and planes. Joint stiffness, failure of some component of the reconstruction and post-traumatic osteoarthritis are the common complications after surgery repair [8]. Accelerated post-operative rehabilitation with bracing and early movement reduces the risk of arthrofibrosis [9]. Early surgery followed by progressive rehabilitation program were the key of avoiding such complications in our case report. A variety of surgical procedures both open [10] and arthroscopy-assisted [11] have been reported. Mariani et al. reported less favorable results in terms of laxity and range of motion in patients treated by direct repair than reconstructed patients [12]. Gracilis, semitendinosus and quadriceps tendon grafts were preferred, in our situation, for reconstructing PCL and medial collateral ligament.

Conclusion

Knee dislocation is an uncommon lesion. Reduction must be performed at the admission in emergency department to prevent neurovascular damage, potential compartment syndrome and limb amputation. Operative management depends on both the pattern and severity of injury, as well as the surgeon's individual skill base. In our sense, early reconstruction method associated with a progressive good rehabilitation program guarantee best outcomes.

Competing Interests

The authors declare no competing interest.

Author's Contribution

All the authors have read and approved the final version of the manuscript to be published.

Figures

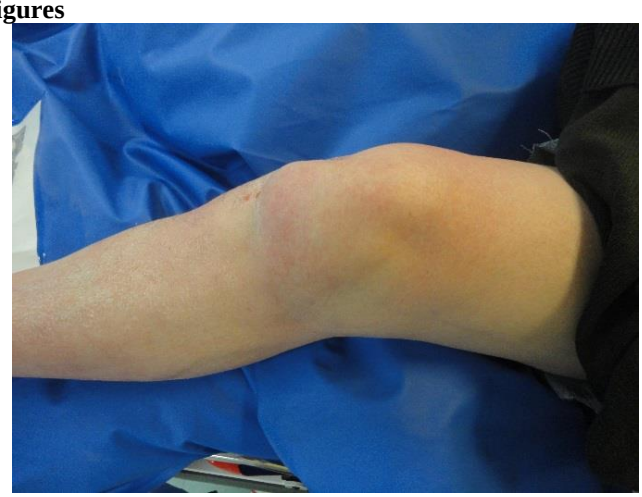

Figure 1. clinical exam showing deformed and swelling left knee after dislocation

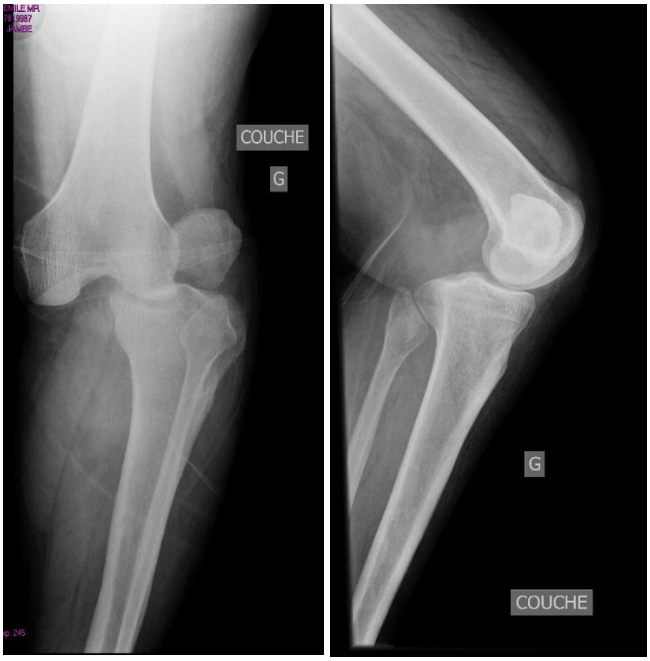

Figure 2. Anteroposterior and lateral radiographs of the left knee showing posterolateral knee dislocation without fractures

Figure 3. CT angiography in sagittal reconstruction showing a good flow in the femoral artery

Figure 4. CT angiography in 3D reconstructions confirming knee dislocation without vascular injuries

Figure 5. post-reduction anteroposterior radiograph of the knee showing persistent knee subluxation

Figure 6. surgical view showing complete rupture of the medial collateral ligament

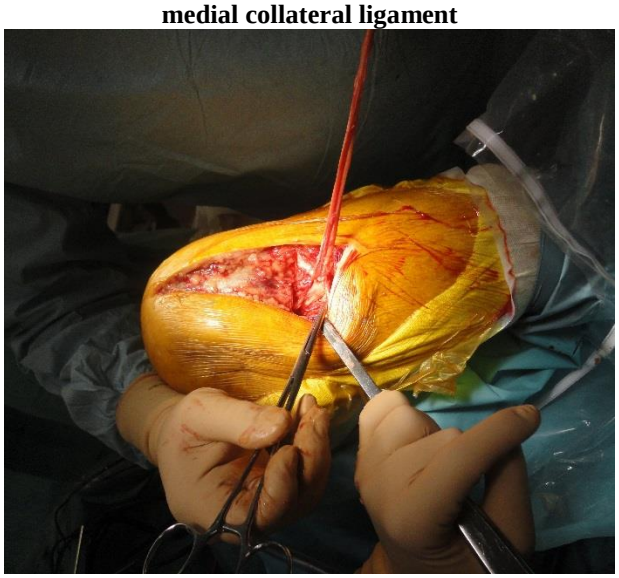

Figure 7. surgical view showing gracilis and semitendinosus grafts

Figure 8. fluoroscopic image showing the position of the tibial tunnel

Figure 9. fluoroscopic image showing the position of the femoral tunnel

Figure 10. reconstruction of the medial collateral ligament using quadriceps tendon graft

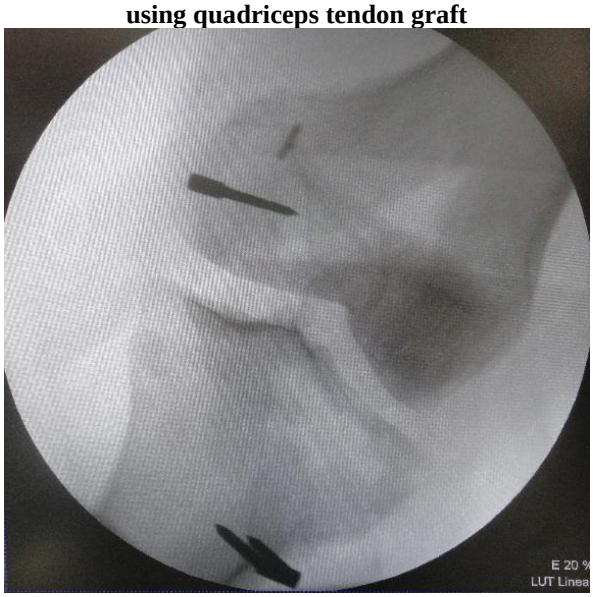

Figure 11. Fluoroscopic final control of the left knee showing good articular congruence and the *Toggle loc Ziploop fixation system*

Figure 12. Postoperative anteroposterior and lateral radiographs of the left knee showing good reduction and correct fixations

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