

Initial Treatment of Knee Dislocation at Yopougon Teaching Hospital/Abidjan, Ivory Coast

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Abstract

Knee dislocation is a serious and rare injury. Its rarity and the variety of injuries that result from it mean that there is no adequate management that is universally accepted. The aim of this study was to evaluate our emergency care strategy for these injuries. Materials and methodology: This was a retrospective study conducted from January 1992 to December 2004 on nine cases of knee dislocation. It consisted of six men and three women. The average age of these subjects was 35, ranging from 15 to 50 years. The causes for these injuries included: public road accidents (n = 4), household accidents (n = 3), a sporting accident and a dislocation that occurred following a fight. The dislocations were anteromedial (n = 4), posterolateral (n = 2), posterior (n = 2) and anterior (n = 1). Associated injuries were sore joint (n = 2), contusion of the common peroneal nerve (n = 1) and vascular injury (n = 1). An angiography was performed on one patient for a vascular injury and an Elecmyography (EMG) for a common peroneal nerve injury. Closed reduction was used for eight patients and open reduction for one patient. Results: Five knees were stable with normal range of motion and some residual pain. Four patients had knee instability; two anterior, one anteroposterior and one lateral. In three of these patients, the CT arthrography/arthro-scan confirmed central pivot damage, with meniscal damage in two of them. The four patients were referred to a knee surgeon in a private practice. The post-operational effects were minimal in vascular injury. The EMG performed for the common peroneal nerve detected a nerve contusion. Conclusion: Our emergency care strategy remains closed reduction. This therapeutic management is consistent, at least in the first 15 days, with the literature.

Keywords

Knee, Dislocation, Initial Management, Instability

1. Introduction

Dislocation of the knee is uncommon, representing less than 0.2% of all orthopaedic injuries. It occurs mainly as a result of high energy trauma, usually in young men. Motor-vehicle accidents account for over half of the cases and sports injuries for slightly less than one-third [1] [2]. In Kennedy's system, five types of dislocation are described: anterior, posterior, lateral, medial and rotatory. These may be subdivided into anteromedial, posteromedial, anterolateral and posterolateral types [3]. Its rarity and the variety of injuries that result from it mean that there is no adequate management that is universally accepted; non-operative or surgical repair in emergency [4]-[10]. Despite the boom in arthroscopy for knee surgeries, there is still controversy regarding the surgical schedule, graft selection, reconstruction of medial and lateral structures and post-operative rehabilitation [7] [8] [9] [10]. The aim of this study was to evaluate our emergency care strategy for these injuries.

2. Materials and Methodology

This was a retrospective study conducted from January 1992 to December 2004 on nine cases of knee dislocation. Knee dislocation was defined as a dislocated tibio-femoral joint seen clinically or radiographically by an orthopaedist. Spontaneously reduced dislocation, instability caused by fracture without ligament disruption and severe knee sprains were excluded from this study.

It consisted of six men and three women. The average age of these subjects was 35, ranging from 15 to 50 years. The causes for these injuries included: public road accidents (n = 4), household accidents (n = 3), a sporting accident and a dislocation that occurred following a fight. A standard X-ray was requested for all patients. The classification was made based on the relative movement of the tibia with respect to the femur (**Table 1**). The dislocations were anteromedial (n = 4) (**Figure 1**), posterolateral (n = 2), posterior (n = 2) and anterior (n = 1). Associated injuries were sore joint (n = 2), contusion of the common peroneal nerve (n = 1) and vascular injury (n = 1). An angiography was performed on one patient for a vascular injury (**Figure 2**) and an EMG for a common peroneal nerve injury.

Closed reduction was used for eight patients. For six patients, the reduction was under general or locoregional anesthesia followed by immobilization (**Figure 1**) and for the other two patients, immobilization was preceded by debridement. Surgical reduction was used for one patient and consisted of stabilization using Kirschner wire followed by vascular repair and immobilization with a posterior splint.

The average immobilization period was five weeks. Medical treatment involved systematically, namely, an anticoagulant, an analgesic and an anti-inflammatory. All patients were hospitalized at least twice for the monitoring of vascular complications. They were seen at the end of plaster immobilization and clinically evaluated. All patients were reviewed following immobilization. The parameters that were investigated include mobility, knee stability and the presence of pain. The average follow-up was 9 weeks, ranging from 6 to 12 weeks.

Table 1. Summary of the 9 patients.

Patient	Age	Sex	Activities of daily live	Mechanism of injury	Dislocation type	Associated injuries	Treatment	Follow-up (weeks)	Results
1	31	M	driver	Assault	Anteromedial	None	Closed reduction and immobilisation	8	Stable
2	26	M	Office staff	Road traffic accident	Posterolateral	common peroneal nerve injury	Closed reduction and immobilisation	6	Posterolateral instability (referred to a private practice)
3	43	M	unemployed	Road traffic accident	Anteromedial	None	Closed reduction and immobilisation	12	Stable
4	38	F		Domestic accident	Anteromedial	None	Closed reduction and immobilisation	12	Stable
5	26	M	sparty	Road traffic accident	Anterior	Skin injury	Debridement, reduction and immobilisation	6	Anterior instability (referred to a private practice)
6	47	F	driver	Domestic accident	Anteromedial	Vascular injury	Open surgery, cross pins and vascular exploration	8	Anterior instability (referred to a private practice)
7	42	F	Office staff	Domestic accident	Posterior	None	Closed reduction and immobilisation	11	Stable
8	43	M	Manual workers	Road traffic accident	Posterolateral	None	Closed reduction and immobilisation	8	Lateral instability (referred to a private practice)
9	27	M	Office staff	Sporting injury	Posterior	Skin injury	Debridement reduction and immobilisation	10	Stable

**Figure 1.** Anteroposterior and lateral plain X-ray of anteromedial dislocation of the knee and antero posterior and 3/4 plain X-ray after closed reduction.

3. Results

Five knees were stable with normal range of motion and some residual pain. Four patients had knee instability; two anterior, one anteroposterior and one lateral. In three of these patients, the CT arthrography/arthro-scan confirmed central pivot damage, with meniscal damage in two of them. The four patients were referred to a knee surgeon in a private practice. The post-operational effects were minimal in vascular injury. The



Figure 2. Angiography showing knee dislocation with vascular injury.

EMG performed for the common peroneal nerve detected a nerve contusion.

4. Commentary

Knee dislocation is a rare and serious injury. Our management consisted of closed reduction in the majority of cases. The reduction was done under general anesthesia followed by immobilization. The immobilization period is between three to four weeks depending on the authors, if a ligamentoplasty is not prescribed [7] [8] [9] [10]. There were no cases of irreducibility as reported by some authors [11].

Historically, knee dislocation has been a matter of great controversy. The literature on knee dislocation is marked by numerous studies with a workforce in short supply, often insufficient perspectives and a varying numbers of therapeutic procedures. This is largely due to its relative rarity. The great controversy revolves around whether to treat these dislocations using closed or open reduction. Studies show better results for closed reduction treatment [7]. In all cases, recovery of range of motion and stability remain the major concern for orthopedic surgeons [1] [7] [8] [9] [10] [12].

The emergency repair of the cruciate ligaments and the collateral ligaments is controversial despite the boom in arthroscopy and innovation in repair techniques of these injuries. Immediate reconstruction of all injured ligaments is a major surgical challenge

requiring expertise in reconstructive surgery and access to essential resources including allograft tendons [9] [10] [12] [13] [14].

Most of the authors supporting surgery agree on closed reduction in emergency followed by reconstructive surgery between the 8th and 15th day [9] [10] [12] [13] [14]. Our therapeutic management in emergency remains in line with that of the majority of authors, this, regardless of the rest of the treatment.

The goals of initial management of knee dislocations are to recognize and treat limb-threatening injuries and subsequently maximize long-term joint function, particularly related to motion, stability, and strength. Specific treatment depends on the exact nature of the injury, systemic status of the patient, and presence of concomitant injuries [15]. Associated vascular injury, open injury, compartment syndrome, irreducible dislocation, or grossly unstable dislocation requires emergent surgical management.

Skin and vascular injuries are indications for open surgery [9] [16]. But skin injury is believed to be associated with a worst outcome. The main complication is the evolution towards knee osteoarthritis [1] [5] [9] [16]. Our approach involved debridement, reduction and immobilization. We do not have sepsis cases probably due to antibiotic administration until healing of the wound.

Despite major advances in vascular trauma surgery, evaluation and diagnosis of popliteal artery damage in knee dislocations are a challenge for orthopedic surgeons. It is associated with dislocation in 16% - 60% of cases [5] [16]. The clinical problem in knee dislocations combined with arterial vascular injury is that ischemia can settle progressively [5] [16] [17].

Inadequate initial assessment and delay in vascular repair may lead to an amputation rate of 60% - 80%. Therefore, one of the most important steps in assessing these dislocations is an arteriography or, failing that, an angiography as in our study. The indications of the arteriography are the clinical signs of severe ischemia or weak distal pulses. The popliteal artery can be repaired by stitching or saphenous vein graft or external femoro-popliteal bypass. Fasciotomy is usually performed when there is significant soft tissue damage. External fixation appears to be the best method to stabilize the knee, although we used Kirschner wire in our study. Excessive handling must be avoided in order not to prevent compromising vascular permeability [1] [5] [16] [17] [18] [19].

It is difficult to draw definitive conclusions in regards to outcomes following knee dislocations because of the relative rarity of the injury and the variability of the specific injury pattern, operative technique, graft selection, and rehabilitation protocol [20]. Patients who sustain a knee dislocation have decreased range of motion, increased instability, greater pain, and lower functional outcome scores compared with uninjured age-matched controls. Risk factors for poor outcome include: open injury, delayed definitive reconstruction, vascular injury, and nerve injury. In addition, higher-energy injuries portend a poorer prognosis when compared with lower-energy injuries [21] [22].

The main limitations of this study are its retrospective design. The use of recall to obtain pre-injury functional scores is not ideal for analysis of improvement of function due to recall bias, but actual pre-injury function is difficult to determine by other

means in the trauma setting.

5. Conclusion

Complete dislocation of the knee, which is evident clinically as well as radiographically, is quite a rare injury. His optimum method of treatment has not been established. Our emergency care strategy usually consists of closed reduction and immobilisation in a plaster cast for 3 - 5 weeks. This therapeutic management is consistent, at least in the first 15 days, with the literature.

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Conflict of Interest

The authors report no conflict of interest concerning the findings specified in this paper.

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