Management of traumatic knee dislocation

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Abstract:

A knee dislocation is defined as a complete displacement of the Tibia with respect to the femur, with disruption of 3 or more of the stabilizing ligaments. Traumatic knee dislocation is considered as an emergency condition as a result of the high incidence of vascular injuries 5-79% and nerve injuries 16-40%. As a result of low numbers of cases recorded in the published studies and the numbers of studies itself, there are many controversies about the evaluation and management of traumatic knee dislocation. Therefore, this essay aims to show new and recent trends for the management of traumatic knee dislocation.

Keywords: dislocation= traumatic knee dislocation , joint= knee joint

Appreviation

ABI	Ankle-brachial index
ACL	Anterior cruciat ligament
ATLS	Advanced trauma live support
ESSKA	The European society for sports traumatology , knee surgery and arthroscopy
IT	Iliotibial band
LCL	Lateral collateral ligament
LM	Lateral meniscus
MC	Medial condyle
MCL	Medial collateral ligament
MM	Medial meniscus
MRI	Magnetic resonance image
PCL	Posterior cruciate ligament
PLT	Popliteus tendon
ROM	Range of motion
SM	Semimembranosus muscle
SML	Superfaicial medial ligament
SOFCOT	The French society of orthopedic surgery and traumatology

Introduction

A knee dislocation is defined as a complete displacement of the Tibia with respect to the femur, with disruption of 3 or more of the stabilizing ligaments.[1] [2]

Traumatic knee dislocation is considered as an emergency condition as a result of the high incidence of vascular injuries 5-79% and nerve injuries 16-40%. The overall incidence of arterial injury is about 33%.[3]

The Mayo clinic recorded 14 knee dislocations during an interval of 2 millions admissions.[4]

The largest reported series of knee dislocation is from Los Angeles Country Hospital, where 53 knee dislocations were reported over a 10-year period. However, the true incidence of knee dislocation is higher than reported because as many as 50% of knee dislocation reduce spontaneously.[5]

Knee anatomy relevant to dislocation is related to the main four ligaments and neurovascular structures, the anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), medial collateral ligament (MCL) and posterolateral corner (lateral collateral ligament (LCL), arcuate complex , popliteus and biceps femoris), together with joint capsule are responsible for knee stability.[1]

Knee dislocation requires injury to at least 3 of the 4 main ligaments.[6]

Most knee dislocations are the result of high energy trauma such as motor vehicle accident or industrial accidents.[4]

In the literature, three systems are used regularly to classify knee dislocation:

1) Joint position (tibial displacement) classification.
2) Velocity or energy of the injury.
3) Anatomic factors, which are based on the ligaments torn which was initially described by Kennedy from KD1 to KD5.[4] [5] [6]

Since many of these injuries are high-energy motor vehicle collision, evaluation for life-threatening injuries is the first priority.

In the secondary survey, evaluation of the limb usually reveals an obvious deformity of the knee.[7]

Non-invasive Doppler studies and arteriogram in post-reduction assessment is controversial.[8]

MRI: Can be used for determine the extend and location of ligament disruption, meniscal tears and subtle injuries to the bone, as well as which tears are repairable.[9]

The treatment is either conservatively or surgically, the latter being by open or arthroscopic means.[10]

Best results are obtained if vascular repair is performed within 6-8 hours of the time of injury.

Knee artheroscopy is contraindicated within 2 weeks of knee dislocation because capsular tears cause fluid extravasation into the leg that may result in compartement syndrome.[11]

Aim of work

As a result of low numbers of cases recorded in the published studies and the numbers of studies itself, there are many controversies about the evaluation and management of traumatic knee dislocation. Therefore, this essay aims to show new and recent trends for the management of traumatic knee dislocation.

Relevant anatomy and biomechanics of the knee

Relevant anatomy and biomechanics of the knee

A thorough knowledge of the complex anatomy and biomechanical function of the structures of the knee is essential to make accurate clinical diagnoses and decisions regarding the treatment of the multiple-ligament-injured knee.[12]According to Larson and James the knee joint structures can be classified into three categories:

a. **Osseous structures**: the distal femoral condyles, the proximal tibial plateau and patella (fig.1).
b. **Intra-articular structures**: the medial and lateral menisci and the anterior and posterior cruciate ligaments and the synovium.
c. **Extra-articular structures**: the capsule, collateral ligaments and musculotendinous units.[13]

A. The Bone Anatomy

The knee joint is the largest synovial joint in the body. The knee is a modified hinge joint that must allow flexion and rotation, yet provide complete stability and control under a great range of loading conditions.

The knee consists of two joints: The femorotibial joint, a compound joint that includes two condylar joints between the femur and the tibia and the patellofemoral joint, a sellar (saddle) joint between the patella and the femur. The bony architecture of the femur, tibia, and patella contribute to the stability of the knee joint, along with static and dynamic restraints of the ligaments, capsule, and musculature crossing the joint. [14]