

KNEE DISLOCATION

Introduction

- **Dislocation of the knee is a severe injury associated with major soft tissue injury and a high incidence of damage to the popliteal artery.**
- There is displacement of the tibia with respect to the femur with, according to some definitions, disruption of 3 or more of the stabilizing ligaments.
- Note that it is not the same thing as dislocated patella, which is often labelled as a “dislocated knee” by the lay public. This injury is usually relatively minor and without major complications.
- Overall this injury is uncommon.

Mechanism

- Knee dislocation usually requires great direct force, so the history is significant, especially when examination findings are unclear.
- The most common injury will be an anterior dislocation, and this usually results from a hyperextension mechanism.

Classification

Dislocations at the knee are usually classified according to the position of the tibia with respect to the femur.

The 5 main types therefore will include:

- **Anterior, (the most common)**
- Posterior
- Medial
- Lateral
- Rotational

Complications

1. Vascular, (popliteal artery and / or vein)

- **Popliteal artery injury is by far the most important complication. The incidence of popliteal artery injury in knee dislocations is high, (up to 40% according to some literature)**

The popliteal artery is far more essential to the viability of the lower leg than the brachial artery is to the forearm. Part of its vulnerability lies in the fact that the vessel is relatively fixed at the knee, (at the adductor hiatus and the soleal line).

Note that a number of injuries are possible and that manifestation of arterial compromise may be delayed

Injury patterns to the artery may include:

- Complete or partial transection.
- Vasospasm
- Intimal tears and dissection, (which can predispose to delayed thrombosis)
- Pseudo-aneurysm formation.
- A-V fistula formation.

2. Nerve injury:

- Tibial nerve
- Common peroneal nerve

The tibial and common peroneal nerves may be injured but these structures are not as fixed as the popliteal artery and therefore not as commonly injured.

3. Ligamentous and cartilaginous:

- Ligamentous injury, (cruciates and collaterals)
- Meniscal injury

4. Associated bony injuries:

- In particular tibial plateau fractures are associated.

5. Compartment syndrome.
6. Long term
 - A significant proportion will have chronic pain/ joint instability/ secondary degenerative changes.

Clinical Assessment

Important points of history

1. There will be a history of a significant mechanism of injury.
2. Because of this there should be a high index of suspicion for associated injuries.

Important points of examination

1. Again because of the mechanism there should be a careful search for any associated injuries. In particular note that dislocated knee represents a significant “distracting” injury with respect to cervical spine assessment.
2. The most immediately critical part of assessment with respect to the knee injury will be an assessment of the popliteal artery for evidence of vascular compromise
 - **Note that the presence of distal dorsalis pedis and posterior tibial pulses will not necessarily rule out an arterial injury.**
3. There will be significant soft tissue swelling, pain and deformity.
 - Some dislocations will be obvious from clinical examination, however there is a high incidence of spontaneous reduction and so dislocation may need to be inferred from the history and degree of soft tissue injury, rather than the observed deformity.

Significant valgus/varus deformity will increase suspicion for dislocation.

Investigations

Plain radiology

- Standard A-P and lateral views will be needed to confirm the diagnosis, and to rule out other possible associated bony injuries.
- The injury may not be obvious on single views.

All knee dislocations should then have arterial imaging done routinely because of the high risk of damage to the popliteal artery and the severe consequences that this carries.



Severe anterior (the tibia lies in front of the femur) dislocation of the knee.

Doppler ultrasound

- This is the best initial screening investigation to check for arterial flow. The test must establish the patency of the popliteal artery, exclude a dissection and record velocities in the anterior, posterior tibial and peroneal arteries. If these features cannot be reliably determined, angiography will be required.

Angiography

CT angiogram

- This should be done in cases where the doppler ultrasound study is inconclusive, (or not available), or when there is some concern about the circulation.
- The CT angiogram will also give valuable additional information about the extent of associated bony injury.

Catheter Angiogram

- It should be noted that whilst CT angiogram will be adequate in most cases, the “gold standard” remains formal catheter angiography.

Intra-operative angiogram

- In cases of extensive injury or where the leg is **clearly** compromised from a vascular viewpoint, patients will usually be taken immediately to theatre. An intraoperative angiogram may then be done by the vascular/orthopaedic surgeon.

MRI

- This is usually done later to assess the degree of associated soft tissue injury around the knee.

Management

1. Immediate attention to any associated ABC issues.
2. IV access, narcotic analgesia will usually be required.
3. **All patients with actual (or suspected of having had) a knee dislocation must be referred to the orthopaedic unit urgently.**
4. If there is significant vascular compromise, then reduction will need to be urgent.
 - This can be done with traction under sedation.
 - Immobilize in a backslab and elevate the limb
5. Vascular injuries must be repaired within 6-8 hours, but the earlier the better.
 - Vascular surgery referral will be necessary.
6. Ligamentous/ meniscal injuries may be repaired at a later date.
7. Extensive postoperative physiotherapy and rehabilitation will be necessary.

References

1. Wheelless' Orthopaedic Textbook on Line, May 2006

Dr J. Hayes

Dr. Dinesh Varma, (Director Trauma Radiology, Alfred Hospital)

7 June 2006