Dislocation of the knee with lateral dislocation of the patella

A REPORT OF FOUR CASES

W. J. Mills, R. J. Nowinski

From the Harborview Medical Centre, University of Washington, Seattle, USA

In a group of 25 patients with traumatic dislocation of the knee, four, all of whom had similar ligament and medial soft-tissue injuries, also had associated lateral patellar dislocation. In all four reconstruction was delayed because of their other serious injuries.

Having encountered the combination of knee dislocation and lateral patellar dislocation in 16% of our patients, we believe that it may be less rare than is commonly believed. We think that it is important to maintain a high index of suspicion of possible patellar dislocation when medial structures have been severely damaged. Early recognition and immobilisation in extension can prevent fixed lateral dislocation of the patella.

J Bone Joint Surg [Br] 2001;83-B:530-2.

Received 21 January 2000; Accepted after revision 5 October 2000

In one year, 25 patients with acute dislocation of the knee were admitted to our centre. Although the tibiofemoral joint was reduced, four continued to experience persistent lateral patellar subluxation or dislocation. Dislocation of the knee and lateral patellar subluxation or dislocation are unlikely to occur in combination, unless virtually all the medial structures have been disrupted.

While dislocation of the knee is usually easily recognised, associated patellar subluxation or dislocation can be overlooked (Fig. 1). It may be obscured by swelling or guarding or simply missed in the presence of multiple injuries. When clinical and radiological examination reveals gross disruption of the medial structures, patients should be carefully examined for possible patellar subluxation or dislocation. Furthermore, it can be difficult to maintain patellar reduction when the medial structures are no longer adequate, and slight flexion of the knee may cause the patella to sublux or dislocate again.

Case reports

Table I shows the multiple injuries sustained by the four patients, one in a pedestrian accident and three in motor-vehicle accidents. Because of the severity of their other injuries, surgical treatment of the knee injuries was delayed for ten to 21 days.

All patients had tears of the anterior and posterior cruciate ligaments (ACL and PCL) and severe disruption of the medial structures, including rupture of both the deep and superficial portions of the medial collateral ligament (MCL), the medial capsule and the medial patellofemoral ligament (MPFL). At surgery, bone was visible immediately below the skin, all the overlying soft-tissue structures having been disrupted. In one patient, the MCL was avulsed from the tibia and rotated through 180°; it was unidentifiable in two patients and had been extensively divided transversely in one.

A full lateral release was carried out in all four patients to protect patellar tracking when movement was initiated.

Case 1. The lateral collateral ligament (LCL) and posterolateral corner structures were injured. While life-threatening injuries were being treated, lateral patellar subluxation was not recognised and progressed to fixed lateral patellar dislocation (Fig. 2). At the time of reconstruction the contracted lateral structures, including the iliotibial band and retinaculum, were released and the patella reduced.

Case 2. MRI confirmed the complex of ligamentous injuries and clearly demonstrated the patellar dislocation (Fig. 3). Before operation, the knee was immobilised in extension to maintain patellar reduction. An intraoperative anteroposterior (AP) radiograph of the knee in 15° of flexion (Fig. 4) showed how readily the patella dislocated laterally in the presence of disruption of the medial structures. It was necessary to reconstruct the MCL.

Case 3. The LCL and posterolateral corner structures were damaged. Figure 5 shows the obvious lateral patellar dislocation before reduction. MRI demonstrated both knee instability and patellofemoral instability (Fig. 6). We avoided any preoperative attempt at passive movement. The MCL required reconstruction. Release of the lateral soft tissues and repair of the medial structures failed to produce tension-free reduction of the patella through a full range of

W. J. Mills, MD, Assistant Professor
R. J. Nowinski, DO, Chief Resident
Department of Orthopaedics, Harborview Medical Centre, University of Washington, Box 359798, Seattle, Washington 98104-2499 USA.

Correspondence should be sent to Dr W. J. Mills.

©2001 British Editorial Society of Bone and Joint Surgery
0301-620X/01/411069 \$2.00

Fig. 1a

Fig. 1b

Fig. 2

Case 1. Radiographs showing (a) an AP view of lateral displacement of the patella and (b) a lateral view with no evidence of patellar subluxation or dislocation.

Case 1. Axial MRI shows lateral subluxation of the patella.

Fig. 3

Fig. 4

Case 2. An axial MRI showing lateral dislocation of the patella before immobilisation in extension.

Case 2. An intraoperative AP radiograph shows how, with minimal flexion, the patella may dislocate laterally.

Fig. 5

Fig. 6a

Fig. 6b

Case 3. An AP radiograph before reduction of the dislocated knee and patella. The appearance suggests medial soft-tissue injury and skin compromise.

Case 3. Sagittal (a) and axial (b) MRI showing knee and patellofemoral instability.

Table I. Details of the four patients with both dislocation of the knee and lateral patellar dislocation

Case	Age (yr)	Mechanism of injury	Associated injuries	Knee ligament injuries
1	32	Pedestrian accident	Closed head injury, haemothorax, acetabular and pelvic fractures	ACL, PCL, MCL, LCL, PLC*, MPFL, medial meniscus
2	62	MVA†	Thoracic spinal fractures, shoulder dislocation, pelvic ring fractures	ACL, PCL, MCL, MPFL
3	40	MVA	Humerus, pelvis, acetabular fractures, liver, spleen lacerations, closed head injury	ACL, PCL, MCL, LCL, PLC, MPFL, medial meniscus
4	15	MVA	Closed head injury, anterior prepatellar open wound, pelvic fractures	ACL, PCL, MCL, MPFL

* posterolateral complex

† motor-vehicle accident

Fig. 7

A lateral bolster dressing placed under ace wrap and a knee immobiliser help to maintain patellar reduction in extension.

movement. It was necessary to reconstruct the MPFL with a hamstring autograft in order to maintain intraoperative reduction of the patella in flexion.

Case 4. Immobilisation in extension, supplemented by a lateral bolster dressing, maintained patellar reduction before operation (Fig. 7). After initial reduction, the patella appeared to be reduced with the knee extended. Further examination, however, showed lateral patellar dislocation within 24 hours, prompting the use of the bolster.

Discussion

Four of 25 patients (16%) who presented with acute dislocation of the knee, also had patellar dislocation. All had suffered complete disruption of the medial soft-tissue envelope.

There has been a recent report¹ of nine cases of patellar dislocation in combination with disruption of the ACL, all resulting from relatively low-energy athletic injuries. The importance of the medial patellofemoral ligament in resisting lateral patellar translation has been emphasised² and reconstruction of the MPFL with a hamstring graft has been described.³

Our experience leads us to offer some recommendations. We suggest that preparation for possible reconstruction of the MCL should be made preoperatively. Many surgeons repair the collateral ligament when they reconstruct the PCL and/or ACL,^{4,5} but reconstruction of the MCL is not common and injury to the MCL can occasionally be so severe that primary repair is impossible and augmentation necessary. Early reduction of the patella helps to reduce contracture of the lateral soft-tissue structures. A lateral bolster dressing may provide a passive restraint to patellar translation with the knee in extension, but in some cases knee-spanning external fixation is the only way of maintaining patellar reduction in extension. As flexion of the knee may cause patellar dislocation, preoperative passive movement should be avoided. Rigorous preoperative examination, early and often, is necessary.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References

1. Simonian PT, Fealy S, Hidaka C, O'Brien SJ, Warren RF. Anterior cruciate ligament injury and patella dislocation: a report of nine cases. *Arthroscopy* 1998;14:80-4.
2. Desio SM, Burks RT, Bachus KN. Soft tissue restraints to lateral patellar translation in the human knee. *Am J Sports Med* 1998; 26:59-65.
3. Muneta T, Sekiya I, Tsuchiya M, Shinomiya K. A technique for reconstruction of the medial patellofemoral ligament. *Clin Orthop* 1999;359:151-5.
4. Noyes FR, Barber-Westin SD. Reconstruction of the anterior and posterior cruciate ligaments after knee dislocation: use of early protected postoperative motion to decrease arthrofibrosis. *Am J Sports Med* 1997;25:769-78.
5. Twaddle BC, Hunter JC, Chapman JR, Simonian PT, Escobedo EM. MRI in acute knee dislocation: a prospective study of clinical, MRI, and surgical findings. *J Bone Joint Surg [Br]* 1996;78-B: 573-9.