CASE REPORT

Traumatic inter-condylar dislocation of the patella: Report of two cases

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Summary Traumatic patellar dislocation usually occurs in the lateral direction. In a few cases, however, the patella rotates around its horizontal axis and becomes wedged between the femoral condyles. We report two cases of traumatic inter-condylar patellar dislocation that required surgical management.
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Introduction

Traumatic patellar dislocation usually occurs in the lateral direction. In a very small minority of cases, however, the patella rotates around its horizontal axis and its upper pole wedges into the inter-condylar notch. Closed manipulative reduction is difficult and surgical treatment is therefore needed. We report 2 cases of traumatic inter-condylar patellar dislocation.

Case reports

Patient #1

A 23-year-old man visited the emergency room after falling from a scooter. Physical findings consisted of postero-lateral dislocation of the left elbow, a fracture of the base of the first metacarpal, and a deformity of the left knee with a 3 cm long antero-medial cut. The left knee was locked in extension. The initial radiographs showed inferior dislocation of the left patella with intra-articular gas indicating that the wound had breached the joint cavity (Fig. 1). The patella was rotated 90° around its horizontal axis, and its superior pole was wedged in the inter-condylar notch. There was no evidence of patello-femoral dysplasia.

Closed manipulation under light sedation then under general anesthesia failed to reduce the dislocation. Open reduction was therefore performed via a medial parapatellar incision. The fibrous sheath was peeled off the patella in continuity with the quadricipital tendon, which was detached from its superior pole. The tendon blended with the fibres surrounding the patella, maintaining the continuity of the extensor mechanism. The patellar retinacula were twisted but not torn. The dislocation was then reduced manually with the knee half-flexed, and the quadricipital tendon was reattached to the superior pole of the patella.

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using two tendon to bone sutures. Patellar tracking was satisfactory.
The knee was maintained in extension for 21 days by a splint allowing full weight bearing. The range of motion 2 months after surgery was $0^\circ - 0^\circ - 130^\circ$. After 16 months, the range of motion was nearly normal and the patient was pain free and had resumed his previous occupational and sports activities with no limitations.

Patient #2

A 16-year-old male presented to the emergency room after an impact from the dashboard during a car accident. His left knee was locked in flexion and excruciatingly painful. A bony prominence was palpable over the tibio-femoral joint space.

Radiographs showed inter-condylar dislocation of the patella (Fig. 2). The growth plates were open and there was no evidence of patello-femoral dysplasia.

Closed reduction manoeuvres failed, and surgery was therefore performed. The intra-operative evaluation confirmed the inter-condylar patellar dislocation with quadriceps tendon avulsion from the superior pole of the patella but preserved continuity of the extensor mechanism. The cartilage and ligaments were intact. The dislocation was reduced and the quadriceps tendon was re-attached to the superior pole of the patella using sutures passed through bone tunnels.

At re-evaluation 20 months after surgery, the range of motion was $0^\circ - 0^\circ - 140^\circ$ and the patient had resumed his previous running activity with no limitations. The radiographs showed ossification of the quadriceps tendon (Fig. 3).

Discussion

Since the first report by Midlefart [1] in 1887, about 50 cases of non-lateral patellar dislocation have been published. Two types can be distinguished based on whether the patella rotates around its horizontal or its vertical axis. The terms used to designate dislocation of a horizontally rotated patella include inter-articular dislocation [2,3], intra-articular dislocation [4,5], inter-condylar dislocation [6], horizontal dislocation [5], central dislocation [7], and inferior dislocation [8]. In the more common of the two described patterns, the superior pole of the patella wedges into the inter-condylar notch and the patellar joint surface is directed towards the tibia, as occurred in our 2 patients. In the other pattern, the joint surface is directed towards the femur [9,10].

Inter-condylar dislocation occurs chiefly in adolescents or young adults and in elderly individuals. In young patients, the most common mechanism is a direct blow to the superior pole of the patella with the knee flexed. Based on a case in an 11-year-old boy, Frangakis [11] suggested that the high degree of ligament laxity in young patients may allow extreme movements of the patella into the tibio-femoral joint space after a direct blow on the superior patellar...
pole with the knee flexed; then, reflex contraction of the quadriceps may detach the tendon from the upper patella without causing the tendon to tear.

In elderly patients with knee osteoarthritis, intercondylar patellar dislocation occurs with lower-energy trauma. Theodorides et al. and Choudhary and Tice [12,13] suggested that patellar osteophytes might lock into the inter-condylar notch during extreme knee flexion. Contraction of the quadriceps muscle during subsequent knee extension can then dislocate the patella.

Desai et al. [5] and Choudhary and Tice [13] reported cases with incomplete patellar rotation around its horizontal axis. The patients presented with irreducible fixed flexion of the knee. Closed manipulation was effective in reducing the dislocation, and there was contusion of the quadricepital tendon, which was not completely detached from the superior pole of the patella.

Two treatment approaches have been described. Closed manipulation is effective in some cases [5,13–15]. The hip is flexed to relax the quadriceps muscle, and the patella is reduced by digital manipulation [15]. When closed reduction fails, open surgery is needed to reattach the extensor apparatus by fixing the quadricepital tendon on the proximal pole of the patella [3,11,16]. According to Brady and Russel [3], the risk of cartilage damage during closed reduction manoeuvres mandates open reduction.

In all the cases reported to date, the outcome was favorable within a few months, regardless of the treatment used. In one patient, however, osteochondral lesions were found, but the follow-up was too short to assess their potential long-term impact [15].

Surgical treatment seems preferable in patients with complete rotation of the patella to allow atraumatic reduction, thereby, avoiding the occurrence of iatrogenic cartilage damage due to closed reduction manoeuvres. In addition, the arthrotomy provides a full assessment of the injuries, as well as repair of any concomitant quadricepital tendon lesions, thus, allowing earlier knee mobilisation and rehabilitation.