

Short communication

Lateral epicondylar femoral avulsion fracture combined with tibial fracture: A counterpart to the arcuate sign

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Abstract

We present a case of femoral avulsion of the lateral collateral ligament (LCL) with complete tear of the posterior cruciate ligament (PCL) and popliteus tendon accompanied by demonstrable posterolateral rotary instability (PLRI) of the knee. A 55-year-old man was involved in a road traffic accident. Radiographs revealed an avulsion fracture of the lateral epicondyle of the femur and a fracture of the tibial shaft. An MRI scan showed the lateral epicondyle was avulsed by the LCL and the popliteus tendon. The PCL signal was absent. The tibial shaft fracture was fixed with an intra medullary nail. Sagging of the tibia, with loss of prominence of tibial tuberosity and a positive posterior drawer test, demonstrated a complete tear of the PCL. The avulsion fracture of the lateral epicondyle was treated by an open reduction and internal fixation with two staples. A ligament can be avulsed at either end, and to our knowledge, this pattern of injury as a counterpart to arcuate sign has never been documented in the literature. It is important not to dismiss a small avulsion fracture around the knee joint as insignificant, as it could indicate the presence of a major ligamentous injury.

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Keywords: Arcuate sign; Lateral collateral ligament; Avulsion fracture

1. Introduction

The arcuate sign is an avulsion fracture of the fibular head by the pull of the arcuate complex consisting of the lateral collateral ligament (LCL), the biceps femoris tendon (BFT), the popliteofibular ligament (PFL), and arcuate ligament [1–4]. Most arcuate signs comprise the avulsion of the conjoined tendon of the LCL and BFT from the fibular head even though smaller avulsion by the PFL and arcuate ligament also occurs [3]. The arcuate sign is associated with insufficiency of the LCL and indicates that the latter has sustained an injury. Isolated damage to any ligament stabilising the knee joint is rare and injuries are frequently a combination of cruciate ligament tears and disruption of other capsuloligamentous structures of the joint [5]. The arcuate sign is considered a pathognomonic sign for injuries of the posterolateral corner (PLC) of the knee and an associated posterior cruciate ligament (PCL) injury is frequently found [1–4].

We present a case of femoral avulsion of the LCL with complete tear of the PCL and popliteus tendon, accompanied by demonstrable posterolateral rotary instability (PLRI) of the knee. Even though any ligament can be traumatised by avulsion at either end, as well by substance tear, this pattern of injury as a counterpart of arcuate sign has never been documented in the literature.

2. Case report

A 55-year-old man was involved in a road a traffic accident while riding a bicycle, which resulted in severe pain in the left knee. There was a deep skin laceration at the anteromedial side of the patella and a tear of the joint capsule was shown by a positive leakage test (distending the joint with normal saline). Physical examination was not possible, owing to extreme pain, and the limb was immobilised with a splint. Radiographs revealed an avulsion fracture of the lateral epicondyle and a tibial shaft fracture (Fig. 1). An MRI scan showed the lateral epicondyle to be avulsed by the LCL and the popliteus tendon. The PCL signal was absent (Fig. 2). It was presumed that this

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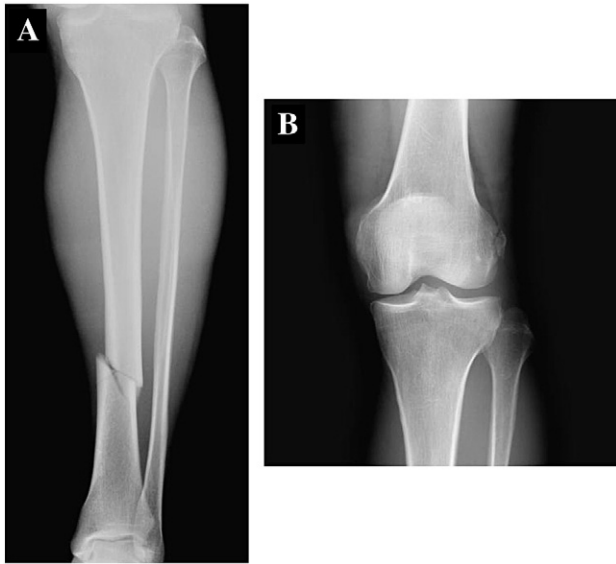


Fig. 1. Initial radiographs. (A) The fracture of the distal one third of the tibial shaft. Note the spiral configuration of the fracture, indicating that the deforming force was torsion. (B) The femoral avulsion fracture of the LCL, or avulsion fracture of the lateral epicondyle of the lateral femoral condyle.

was a high energy injury, and the patient was observed closely to exclude any accompanying neurovascular injury. Intact physical examinations, including pulsation of the dorsalis pedis ar-

tery and unimpaired sensory or motor function, deferred urgent intervention.

Surgery was performed once the overall condition of the patient had stabilised; this was 5 days after the accident. The tibial shaft fracture was fixed with an intra medullary nail, and then an examination under anaesthesia was performed. Varus instability with displacement of the avulsed lateral epicondyle was evident under fluoroscopy, and there was sagging of the tibia with loss of prominence of tibial tuberosity. A positive posterior drawer test showed that there was a complete tear of the PCL (Fig. 3). A concomitant bruise at the posterolateral side of the knee was observed and associated injuries of the ligamentous structures were assumed. The anterior drawer test, Lachman test, and valgus stress test were all negative. An open reduction and internal fixation with two staples were performed for the avulsion fracture of the lateral epicondyle. The age of the patient and the impracticality of creating a tibial tunnel in the presence of the intra-medullary nail led us to manage the PCL injury non-operatively. The final definitive diagnosis was a deep laceration to the knee joint, a tibial shaft fracture, femoral avulsion of the LCL, a complete PCL tear accompanied by PLRI and possible tear of the popliteus tendon (Fig. 4). After 3 weeks of immobilisation, gentle range-of-motion exercises were begun followed by assisted walking with gradual weight bearing. At 6 months after surgery, the patient could perform all activities of daily living with a full range of motion of the knee,

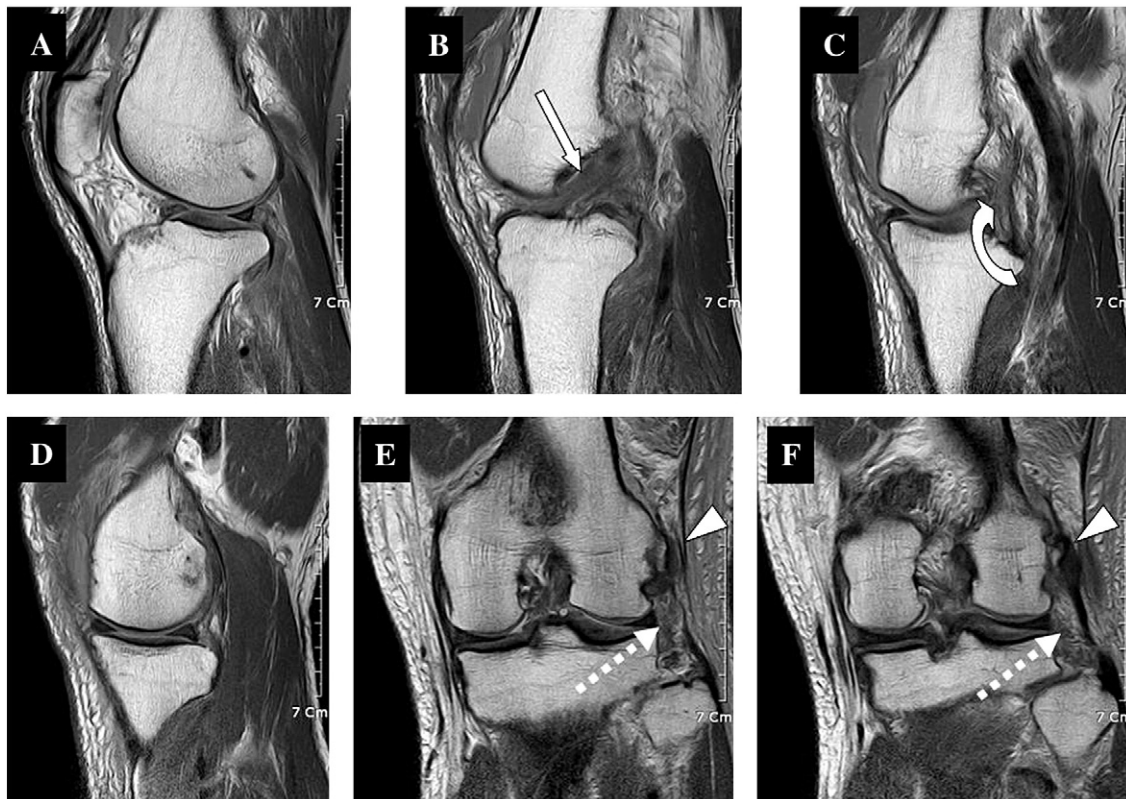


Fig. 2. The preoperative MR images. On sagittal images, a lateral (A) or medial (D) meniscal injury can be excluded. The ACL can be delineated (B) (straight arrow), while the PCL cannot be traced clearly (C) (curved arrow). On coronal images, the avulsion of lateral epicondyle by the LCL is seen (white arrow heads), and the popliteal muscle cannot be identified by the tendon *per se* or its insertion on lateral femoral condyle beneath femoral insertion of the LCL (E, F) (dashed arrows).

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