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The Knee

Case Report

A case of anterior cruciate ligament tear accompanied by avulsion fractures of tibial tuberosity and Gerdy's tubercle

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ABSTRACT

A 54-year-old man visited our clinic due to a painful swelling of his right knee. He had attempted a forceful kick by his right leg during a Sepak Takraw-like sports activity, only to fail to hit the ball. He felt a popping sense on the knee and collapsed, even without direct trauma. Imaging studies revealed a disruption of the anterior cruciate ligament (ACL), and separate avulsion fractures of the tibial tuberosity and Gerdy's tubercle. The fractures were stabilized by two cancellous screws, respectively. The intra-operative fluoroscopy demonstrated a manifest ACL insufficiency. A simultaneous reconstruction of the ligament was not performed. At 6 months after surgery, he had no difficulty in his activities of daily living. The involved knee joint was believed to have undergone a forceful pivot shift mechanism. Injuries to the ACL can be suspected from indirect signs on the radiologic images by a careful reconstitution of the injury mechanism and the associated lesions. Manifest osseous lesions on the plain radiographs can herald a major ligamentous injury and may be interpreted as an indirect sign of the ACL injury, which helps to establish a relevant management plan.

1. Introduction

Injuries to the anterior cruciate ligament (ACL) can be predicted and are often confirmed from the indirect signs on the radiology images by a careful reconstitution of the injury mechanism and associated changes. A Segond fracture was considered indicative of an ACL injury before the magnetic resonance imaging (MRI) era [1,2]. In addition, the multitudes of indirect signs on MRI provide an insight into the injury mechanism, help to diagnose the ACL injury, and to organize appropriate management plan, even when the injury history or physical findings are ambiguous [3–6].

We report a case of an ACL tear accompanied by separate avulsion fractures of the tibial tuberosity and Gerdy's tubercle. Direct and indirect signs of an ACL injury and accompanying plateau fracture indicated the mechanism of injury.

2. Case report

A 54-year-old man visited our clinic owing to painful swelling of his right knee. He participated in a community sports activity, which was similar to a Sepak Takraw-like sports activity. In this sport, the game court is divided in two by a net in the middle and the participant

Fig. 1. Schematic illustration of the missed kick in the sports game.

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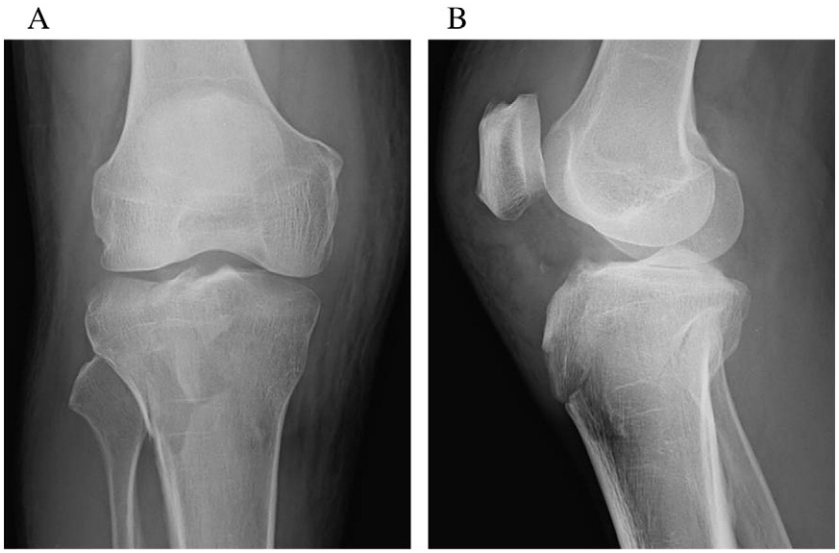

Fig. 2. The initial anteroposterior (A) and lateral (B) plain radiographs of the injured knee. The fractures of the lateral tibial plateau and the tibial tuberosity can be recognized.

can control the ball only by their foot and should kick back the ball to the counterpart within three shots, cooperatively with their team members. He attempted a forceful kick by his right leg standing on his left leg, only to fail to hit the ball (Fig. 1). He felt a popping sense on the knee and collapsed, and was apprehended that something was wrong with his knee. He could not continue the activity and quit the game immediately. The knee was swollen instantly. There was no direct contact trauma. The distal sensory, motor and circulation was intact, and there was no open would. A physical examination could not be performed due to the severe pain. The plain radiograph disclosed a fracture of the tibial tuberosity and lateral tibial plateau (Fig. 2). Subsequent MRI revealed avulsion fractures of the tibial tuberosity via the patellar tendon and Gerdy's tubercle via the iliotibial band, and a disruption of the ACL. There was no definite disruption of the posterior cruciate ligament, the medial collateral ligament and the other lateral ligament complexes (Fig. 3).

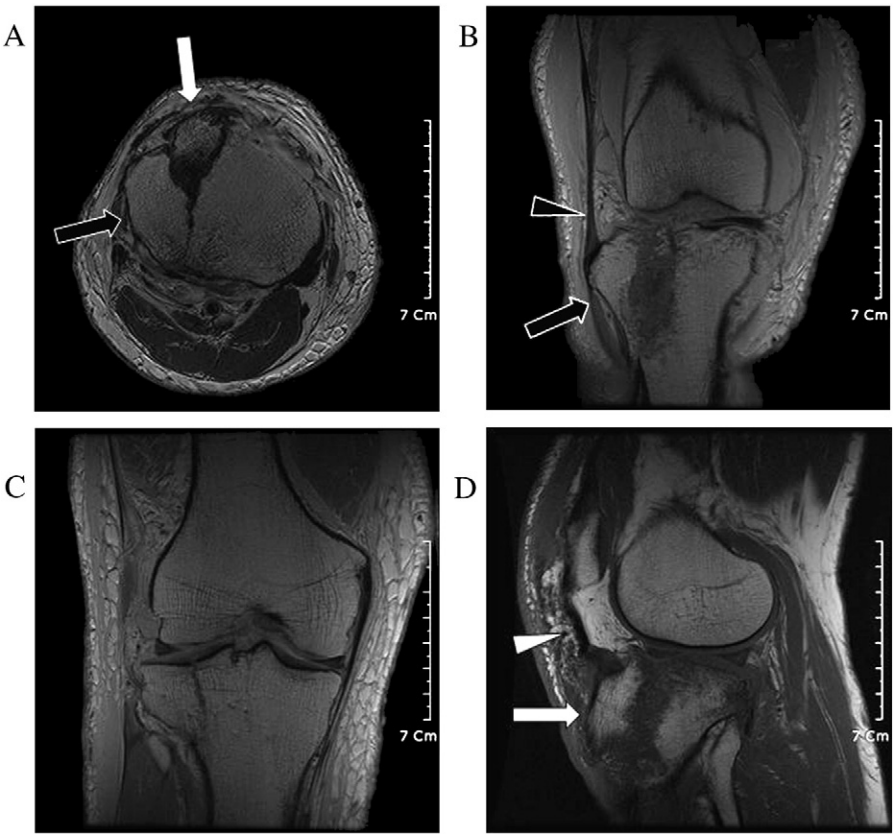

Fig. 3. Axial (A), coronal (B, C) and sagittal (D) MRIs. Separate fractures of the tibial tuberosity (white arrow, A, D) and Gerdy's tubercle (black arrow, A, B) by an avulsive pattern is demonstrated. The iliotibial band (black arrowhead) inserts into the avulsed Gerdy's tubercle (B) and the patellar tendon (white arrowhead) inserts into the avulsed tibial tuberosity (D). The medial collateral ligament was intact (C). There was no depression of the plateau fracture (B, C, D), which suggests that the fracture occurred by tension, rather than by compression.