Anterior Cruciate Ligament Rerupture Due to a Neglected Posterolateral Corner Injury

Atlanmış Posterolateral Köşe Hasarı Sonrası Oluşan Ön Çarpraz Bağ Rerüptürü

Atlanmış Posterolateral Köşe Hasarı / Neglected Posterolateral Corner Injury

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Özet

Ön çarpraz bağ rekonstruksiyonu ortopedik cerrahide sık uygulanmaktadır. Kısa dönem sonuçları iyi olmakla beraber uzun dönem sonuçları göreceli olarak daha kötüdür. Posterolateral köşe hasarı yüksek enerjili travmalar sonucu oluşan nadir yaralanmalardır ve ön çarpraz bağ hasarı olanlarda posterolateral köşe hasarının teşhisini koymada başarısızlığa yol açar. Posterolateral köşe hasarı ön çarpraz bağ cerrahisi başarısını da olumsuz etkiler. Biz atlanmış posterolateral köşe hasarı sonrası oluşan ön çarpraz bağ rerüptürü ve ön çarpraz bağ rerüptürü ve posterolateral köşe hasarının aynı seansta rekonstrükte edildiği hastayı sunmayı amaçladık.

Anahtar Kelimeler

Ön Çarpraz Bağ; Diz; Posterolateral Köşe Yaralanması

Abstract

Anterior cruciate ligament reconstruction is performed frequently in orthopaedic surgery. The short-term results of the reconstruction is good but has relatively poorer long-term results. Posterolateral corner injuries of the knee are rare injuries that result from high-energy trauma and failure to diagnose a posterolateral corner injury in patients with a tear of the anterior cruciate ligament. Posterolateral corner injuries negatively affect the success of the anterior cruciate ligament reconstruction. We aimed to present a case with an anterior cruciate ligament rerupture due to a neglected posterolateral corner injury and revision of the anterior cruciate ligament rerupture and posterolateral corner reconstruction in a single session.

Keywords

Anterior Cruciate Ligament; Knee; Posterolateral Corner Injury

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Introduction

Anterior cruciate ligament (ACL) reconstruction is performed frequently in orthopaedic surgery for restoring the knee stability . The short-term results of the procedure are good to excellent in 75–97% of patients . However, 11–30% of the cases had relatively poor outcomes, with an over 15% persistent pivot-shift of these cases. Many factors affect the outcome of ACL surgery. One important factor for the ACL reconstruction failure is associated posterolateral corner(PLC) injuries of the knee that are untreated or unrecognised. Failure to recognise a posterolateral injury may cause instability with normal gait, and may result a varus-thrust pattern. Some studies showed that a deficiency of the posterolateral structures of the knee may increase the risk of failure by increasing varus load on the ACL graft [1]. Consequently, missing a posterolateral injury can affect the outcome of ACL reconstruction.

PLC injuries are not common and result from high-energy trauma with hyperextension and varus or external rotation forces affecting the knee cause posterolateral rotatory instability and posterolateral tibial subluxation. These injuries often occur with injury to the anterior or posterior cruciate ligament and these concomitant injuries make an accurate diagnosis and the subsequent management challenging . The diagnosis of a PLC injury can be elusive, and is called as the “dark side” of the knee because of the anatomical complexity. The failure to diagnose and treat a PLC injury for patients with ACL tear can increase the varus load on the ACL graft and negatively affects the success of the reconstruction of the ACL [2].

This article reports an ACL rerupture due to a neglected PLC injury and revision of the ACL rerupture and posterolateral corner reconstruction in a single session.

Case Report

A 24-year-old female sustained a right tibial plateau and supracondylar humeral fractures in a traffic accident 2 years earlier, and was treated surgically. At follow-up, a left ACL rupture was detected and an arthroscopic transtibial ACL reconstruction was performed. At the 1-year follow-up, the anterior drawer test was positive and she was referred to our clinic with rerupture. In the physical examination, the Lachman, anterior drawer, external rotation genu recurvatum, and dial tests were positive. The patient had 2+ opening to varus stress at full extension and at 30°. There was no neurovascular deficit. Bilateral standing knee anteroposterior and lateral x-rays were normal and there was no malalignment on lower extremity axis radiographs. Magnetic resonance imaging showed ACL rupture and a posterolateral corner injury. (Fig. 1-2)



Figure 1. Total rupture of lateral collateral ligament on coronal short tau inversion recovery (STIR) (a) and coronal T2 weighted image (b).



Figure 2. Total rupture of biseps femoris tendon on coronal T2 weighted image (a) and ACL rupture on sagittal STIR image (b).

The ACL was reconstructed using an anatomical single-bundle technique with a tibialis anterior allograft. Anteromedial, anterolateral, and far anteromedial portals were used for this technique. The optimal position of the far anteromedial portal was established by using spinal needle. It was located as far medial as possible with considering to prevent any risk of medial femoral condyle and with the low position considering to avoid any damage of the medial meniscus anterior horn. Marking was done with a microfracture awl (Chondral Pick; Arthrex, Naples, FL, USA) to the the femoral insertion of the ACL by using a free-hand technique with visualising the remnant fibres of the ACL. The femoral tunnel was drilled with a reamer according to diameter of the graft. The tibial guide was set at 55° and tibial tunnel drilled. The tip of the tibial aimer positioned medial of the centre of the ACL’s tibial attachment and 3 mm anterior to the posterior border of lateral menis¬cus anterior horn. The graft was passed from the tibial and femoral tunnel and then fixed with interference screws. Then, the knee joint evaluated for the tension of the graft and position of the tibial fixation device to ensure that it did not protrude into the joint. The knee was tested with the anterior drawer and Lachman tests.

The posterolateral corner was reconstructed using the technique described by Laprade et al. [3] An Achilles tendon allograft was used to create two grafts. One of the graft used for reconstructing the popliteofibular ligament and lateral collateral ligament. The other allograft was used for reconstructing of the popliteus tendon. The grafts were fixed with interference screws into the femur, tibia, and fibula. (Fig. 3)

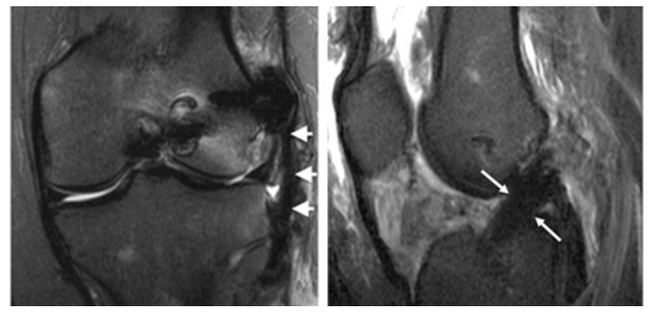


Figure 3. Postoperative posterolateral corner reconstruction on coronal STIR image (a) and ACL graft on sagittal STIR image (b).

A varus/valgus stabilising brace was applied with the first postoperative day and the grafts were protected by immobilisation for the first 4 weeks after the surgery. Patella mobilisation and isometric quadriceps-strengthening exercises and mobilisation were initiated. Weight-bearing was allowed as tolerated. Four weeks postoperatively, knee flexion was permitted as tolerated.

At 6–8 weeks after the surgery closed-chain kinetic exercises were began. Stationary cycling, single-leg stance, stair-stepping were allowed at 10–12 weeks. Fast walking and swimming were allowed at 5 months after surgery. Returning to full activity was let at 6 months postoperatively.

Discussion

PLC injuries of the knee are not common and can cause disability due to an instability. These injuries may be associated with anterior or posterior cruciate ligament injuries. Approximately 7.5–11% of ACL tears are with posterolateral corner injuries, but most are unrecognised and untreated, resulting with failure of the reconstruction of the ACL [4]. The outcomes of anatomical posterolateral reconstruction were satisfactory when diagnosed and treated.

The popliteofibular ligament, popliteus tendon, and lateral collateral ligament are main stibilisators of the PLC. Fibular collateral ligament is the primary static stabiliser for varus opening of the knee and prevents varus instability at the initial 0–30° of flexion of the knee. The popliteus muscle and tendon complex provide static and dynamic stabilisation to posterolateral rotation of the knee. The popliteofibular ligament is an important stabiliser of external rotation. The iliotibial band is important for preventing varus opening with posterolateral knee injuries [5].

Many surgical techniques for PLC reconstruction were reported. We think that anatomical reconstruction is more effective at restoring of the stability and regaining the knee motion at the postoperative period. PLC reconstruction technique described by LaPrade et al. [3] is closest to the native situation. By reconstructing the fibular collateral ligament, popliteofibular ligament and popliteus tendon based on their attachment anatomy, the surgeon is able to restore stability for external rotation and varus forces.

Biomechanical studies showed that the PLC structures of the knee functionally interact with the posterior and anterior cruciate ligaments. LaPrade et al. [6] examined the force on ACL grafts of cadaver knees with cut posterolateral structures and found that grade III PLC injuries led to the increased force on the grafts of the ACL. Markolf et al. [7] found an increased force on the ACL with after cutting the PLC structures of the knee. Zantop et al. [8] found that, the fibular insertion of the fibular collateral ligament is tightened and moved anteriorly with internal rotation. Consequently, neglected posterolateral injuries of the knee can cause an increased varus load, which causes graft failure, such as in our case. Therefore, when knee instability occurs, a carefully history and detailed physical examination must be performed to avoid missing a diagnosis of injured ligaments. Injured PLC can be reconstructed in the same session when the reruptured ACL is reconstructed.

Competing interests

The authors declare that they have no competing interests.

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