

Treatment of Posterior Cruciate Ligament Disinsertion by Posterior Screw Fixation: A Review of 3 Cases

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Abstract

Original Research Article

Posterior cruciate ligament (PCL) injuries have a reported incidence of between 3% and 37%, depending on the clinical setting [1]. Posterior cruciate ligament (PCL) avulsion fracture is a rare trauma pathology. Oriented by a careful clinical examination, magnetic resonance imaging (MRI) confirms the diagnosis. Surgical treatment gives good functional results in most cases. The evolution of knee ligament surgery has not made posterior cruciate ligament (PCL) surgery as reliable and reproducible as anterior cruciate ligament (ACL) surgery. The treatment of posterior cruciate ligament (PCL) injuries remains a particularly debated subject in terms of indications but also in terms of technical choices and approach. We describe in this work the reinsertion of the posterior cruciate ligament in its retro-spinal surface of the tibia by screwing in 2 sportsmen victims of high energy sports accidents and a 3rd patient victim of a fall in the stairs knee in hyperextension, the patients are carriers of an "isolated" desinsertion of the posterior cruciate ligament (PCL).

Keywords: posterior cruciate ligament, knee, avulsion, instability.

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INTRODUCTION

In this work, we report a retro-spinal surface screw fixation used for tibial reinsertion of the posterior cruciate ligament in three patients with high-energy trauma.

MATERIALS AND METHODS

Our work concerns 3 patients hospitalized for tibial disinsertion of the posterior cruciate ligament (fig.1). Our series consisted of two professional athletes and a young patient who had fallen down the stairs. On examination, they presented with significant pain and swelling of the knee. The pain made it impossible to mobilize the knee. Their initial radiographs showed a

bone avulsion at the posterior edge of the tibial plateau, which was found on CT scan (Fig. 2), which confirmed the PCL pull-out fracture in its tibial insertion, with a displacement that measured approximately 11 mm without any associated lesions. Surgical treatment was decided upon using a conventional posterior approach. Repositioning of the bone fragment with the PCL was performed using a conventional posterior approach, which allowed excellent exposure of the retro-spinal surface of the tibia and very satisfactory control of the pedicles. The screw used was 4.5 mm in diameter. The patient has given their informed consent for the case to be published.



Fig-1: CT scan of the knee in frontal and sagittal sections showing bony pullout of the PCL tibial insertion



Fig-2: Posterior approach to the retro-spinal surface and visualization of the tibial PCL disinsertion



Fig-4: Reduction control radiograph and fixation of the avulsed bone fragment with a 4.5 mm screw

RESULTS

The postoperative course was simple. No pre or postoperative complications were noted, neither postoperative hematoma, nor thrombo-embolic accidents, nor major infections. The patients were discharged 4 days later with a hamstring extension cast for a period of 6 weeks. The functional rehabilitation protocol was the same for the 3 patients in our series, based on careful postoperative rehabilitation. The postoperative examination at 6 weeks showed a dry knee, with flexion reaching 100°. At 2 months after surgery, the patients were walking with full support. Joint examinations at one year follow-up showed flexion up to 140°, full extension, and no anterior or posterior drawer, with no residual pain. Finally, sports were prohibited for 6 to 9 months. Satisfactory functional results were obtained with resumption of the previous sport level for 2 athletes in our series.

DISCUSSION

Avulsion fracture of the posterior cruciate ligament (PCL) is a rare trauma pathology. The most common mechanism of injury in motor vehicle accidents is a dashboard injury or direct force on the proximal anterior tibia. Sports-related injuries result from hyperflexion of the knee, with the foot usually in plantar flexion. The latter mechanism is the most common cause of isolated PCL injuries [1].

In our case series, the mechanism was indirect hyperextension. The initial clinical examination is always difficult. Knee radiographs are normal due to osteochondral avulsion that is difficult to see. The CT scan can be interesting and shows the detachment of the posterior cruciate ligament in its tibial or femoral attachment, often associated with an avulsion of a tibial or condylar bone pad. MRI remains the key examination to confirm the diagnosis. In our series, CT scanning was used to make the diagnosis and to measure the displacement, which was approximately 1 cm.

The treatment of PCL tear fracture is orthopedic or surgical. However, all combined ligament injuries generally respond better to surgical management. Isolated, partial PCL injuries (grades I and II) can be treated orthopedically, whereas complete injuries (grade III) may require surgical treatment depending on clinical symptoms.

In the cases we report, a displacement of approximately 1 cm was measured without associated lesions, and allowed us to opt for surgical treatment. Orthopedic treatment was ruled out because of the risk of secondary displacement or pseudoarthrosis [2, 3].

For surgical treatment, all authors recommend a posterior approach to the popliteal fossa [4, 5]. This approach, which is mainly used in posterior cruciate ligament surgery, respects in particular the medial

gemellus and the popliteus muscle, which are known to play an important role in the control of posterior and posterolateral laxity.

Some authors, such as Ugutmen *et al* [6] and Quintart and Elbaum [1], propose screwing the torn fragment, while others, such as Hesse *et al* [7], use a suture with a non-absorbable thread or stapling the fragment when it is smaller [1, 8]. Based on our results and a review of the literature, in particular the results of a cadaveric anatomical study performed on 20 knees by R. Badet and P. Neyret [9, 10], it can be said that this posterior approach allows excellent exposure of the retro spinal surface of the tibia, with very satisfactory control of the vessels, the medial condyle, and the retro spinal surface, while avoiding extensive tendon and muscle sections or disinsertions, which are often recommended in this surgery [9].

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Consent

The patient has given their informed consent for the case to be published.

Competing Interests

The authors declare no competing interest.

Authors' Contributions

All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the manuscript.

CONCLUSION

Although rare, PCL avulsion-fracture should be sought in the face of knee trauma. The treatment of PCL injuries remains a particularly controversial subject in terms of the indications and technical choices for the approach.

The posterior approach is excellent, but to be performed without risk, it requires a perfect knowledge

of the anatomical landmarks and the various operating steps.

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