CASE REPORT

Painful patellofemoral instability secondary to peroperative patellar fracture during bone-patellar tendon-bone autograft harvesting for anterior cruciate ligament reconstruction

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Summary
Reconstructive surgery of the anterior cruciate ligament (ACL) of the knee in young active patients is a routine procedure, but with certain risks that need to be taken into account. Peroperative patellar fracture after bone-patellar tendon-bone autograft harvesting is a rare complication, which can significantly impair the functional outcome of ACL single-bundle reconstruction. We report the case of a patient presenting with disabling patellofemoral syndrome 3 years after arthroscopic ACL reconstruction by bone-tendon-bone autograft, revealing unnoticed mal-union of a iatrogenic sagittal patellar fracture. Patellar osteotomy corrected this painful iatrogenic patellar instability.

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Introduction

Anterior cruciate ligament (ACL) reconstruction is a procedure of proven benefit for quality of life and pursuit of physical activity over the medium and long terms [1–3]. Autograft is the technique of choice in ACL tear. Reconstruction is generally arthroscopic, using either a hamstring graft or a bone-patellar tendon-bone (BPTB) graft [4].

Among the various fractures described in BPTB autograft reconstruction [5,6], peroperative patella fracture is one of the most rare and may go unnoticed, entailing serious long-term sequelae [7–9]. Onset is more often during the first 2 postoperative months [10–12] than peroperative, with distinct clinical and radiological aspects and treatment strategy.

Case report

A 47-year-old woman consulted for disabling right patellofemoral syndrome 3 years after arthroscopic
BPTB ACL reconstruction. History found no intercurrent factors, but only anterior knee pain persisting since the previous operation; there had been no patellofemoral dislocation. The initial surgical reports and imaging records were not available.

Her patellofemoral syndrome prevented walking downstairs and caused her to apprehend climbing stairs. Ranges of motion were 0°–115°. Examination found positive direct anterior drawer and positive Lachman test; Smillie test was positive on the operated side. The patella was unstable in flexion, with lateral displacement as of 60°. Recent full-limb weight-bearing X-rays showed normal knee axes, a tibial interference screw in contact with the tibial spine, and a very anterior femoral tunnel. Merchant views showed patellar dysplasia, with a flattened joint surface and lateral patellar subluxation, without clear degenerative remodeling. Caton index was normal (Fig. 1).

CT scan found sagittal patellar mal-union, opening the posterior patellar angle (Fig. 2).

Diagnosis was therefore patellofemoral syndrome with chronic patellofrochlear instability secondary to mal-union of a previously unnoticed iatrogenic peroperative sagittal fracture.

Anterior sagittal closing wedge patellar osteotomy was performed to restore the joint angle, and fixed by a cerclage and K-wires (Fig. 3), allowing early rehabilitation. The osteosynthesis material was removed at 1 year. By 18 months, the patient had resumed sports.

At 12 years’ follow-up, the patient presented with nascent unilateral patellofemoral syndrome with painful sensitivity on climbing up or down stairs, a knee free of swelling with ROM 0°–130°, and a transversally mobile patella. X-ray found degenerative patellofemoral remodeling (Fig. 4).
Discussion

Patella fracture during BPTB autograft ACL reconstruction is rare (0.2% to 2.3%) [8—10]. There are few reports of peroperative fracture, and management is not codified. Onset impairs knee joint motion recovery and sagittal stability due to delayed joint mobilization and its relation to transplant ligamentization [11].

Pseudo-dysplasia of the patellar side of the patellofemoral joint is an arthrogenic architectural abnormality. Lateral hyperpressure combined with patellofemoral instability "passage" lesions induces arthritic remodeling [13,14]. Such a iatrogenic architectural abnormality must therefore be corrected as soon as it is detected, with osteosynthesis to enable immediate joint mobilization.

There were several possible treatment options for restoring stable patellar insertion in the trochlear groove. Medializing the extensor apparatus by anterior tibial tuberosity transposition could deal with the lateral subluxation but not the instability of the patella, the latter being due to dysplasia secondary to sagittal fracture. Trochleoplasty did not seem recommended, there being no dysplasia of the trochlear side of the joint. The patellar osteotomy that was in fact performed had been described as a 3rd intention treatment for patellofemoral dysplasia, with the possibility of associating trochleoplasty in the same procedure [15,16]. It was performed as an isolated procedure (without soft-tissue involvement), as it was enough to restore satisfactory peroperative patellar congruence.

Conclusion

Peroperative patellar fracture during BPTB graft harvesting is rare but demands full attention on the part of the surgeon to detect and treat it so as not to jeopardize outcome for the operated knee.

The originality of the present case report lies in the unusual and late presentation of the complication and the use of sagittal patellar closing osteotomy to correct the patellar mal-union underlying the patellofemoral instability.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References