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Arthroscopic treatment of femoral trochlear notch fracture caused by intra-articular dislocation of the patella Case report

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ABSTRACT

This case report presents a traumatic intra-articular patellar dislocation – associated intercondylar fracture of the distal femur – and the consequent arthroscopy assisted reduction and percutaneous screw fixation. To the best of our knowledge, this is the first case in which the arthroscopy assisted operative reduction and percutaneous screw fixation of the fracture fragment has been demonstrated. Our patient was a 55-year-old female who was treated by the aforementioned method which concluded with excellent results.

Keywords: *Arthroscopy; Dislocations; Femoral fractures; Patella;*

INTRODUCTION

Intra-articular or inferior dislocation of the patella is a well-documented yet rare clinical condition, in which the majority of cases require open reduction. The reported case is a unique intercondylar distal femur impaction fracture caused by a Type I intra-articular dislocation of the patella. This rare injury was managed using arthroscope assisted fracture reduction and percutaneous screw fixation

CASE HISTORY

A 55-year-old Caucasian female with moderate osteoarthritis slipped in her bathroom and landed directly onto her hyperflexed right knee. She was unable to bear weight on the injured knee locked in 90 degrees of flexion. The patella was closed-reduced in the emergency department using the hyperflexion maneuver. There was palpable joint effusion and limited range of motion however, active knee extension was possible without any palpable gap of the extensor mechanism. Plain radiographs confirmed an impaction of the femoral trochlea (*fig. 1*). Computer tomography was utilized for the exact location and the extent of the intra-articular fracture (*fig. 2*). The wedging of the proximal pole of the patella had caused an osteochondral fracture of the femoral trochlear

notch measuring 25 mm × 15 mm × 20 mm. The consequent magnetic resonance imaging identified a partial quadriceps tendon tear on the lateral portion (*fig. 3*). The patient was then taken to the operating theatre in which, under general anesthesia, an arthroscopy was performed. During the operation, blood was rinsed out from the joint and the fracture was visually identified. In consideration of the lateral femoral condyle, a 2.2 mm wire was hammered behind the fracture in which the position of the wire was controlled using fluoroscopy. Next, the impacted fracture was tilted back to the anatomic position and the reposition was checked by the camera (*fig. 4*). Following these procedures, the fracture fragment was fixed in which a 5.0 mm diameter and 60mm long cannulated partially threaded titanium screw (ASNIS III, Stryker® Trauma Selzach AG, Switzerland) was inserted using the previously inserted wire as its guide. There were no additional injuries in the joint. Following the operation, conventional radiographs and CT scans were performed (*fig. 5–7*). Remarkably, there was no need for immobilization of the joint. Full weight bearing was allowed following six weeks convalescence. Following rehabilitative physiotherapy during the 12 months follow-up, the knee was asymptomatic and had regained full range of movement.



Figure 1
Plain lateral and AP view X-rays obtained at the time of admission



Figure 2

Computed tomography images in three different plains; showing the impaction femoral trochlear notch fracture

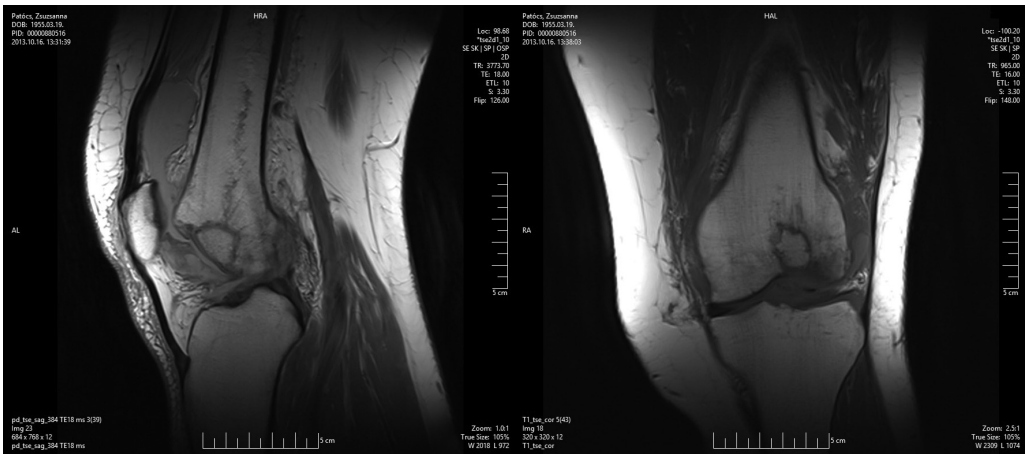


Figure 3

Pre-operative MR images

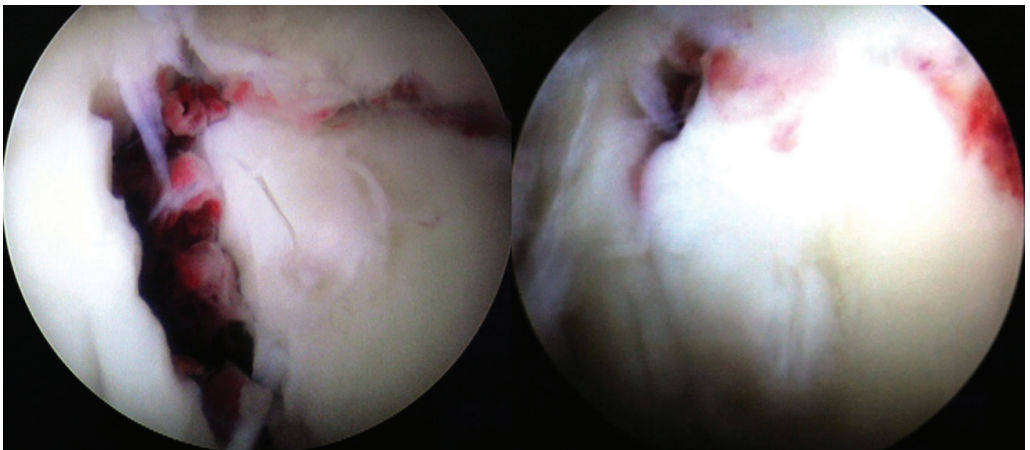


Figure 4

View of the impaction fracture and the fracture after reduction during arthroscopy



Figure 5

Post-operative plain lateral and AP view X-rays



Figure 6

Post-operative computed tomography images in three different plains; showing the anatomic reduction and screw fixation

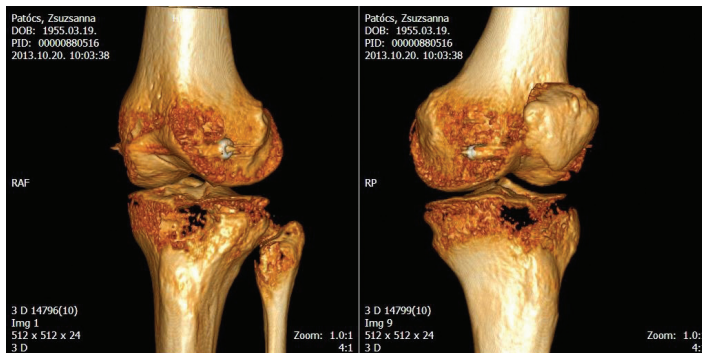


Figure 7

Post-operative three dimensional computed tomography images

DISCUSSION

The first case of intra-articular dislocation of the patella was reported by *Midelfart* in 1887 (13). Only 47 cases of this rare traumatic condition have been reported in published literature. Banks classified the inferior patellar dislocation into two types; the rare degenerate Type II and the common Type I injuries (1, 5, 11, 17, 18). Type I dislocations are usually present among adolescents (14, 17). The horizontal type of dislocation occurs when the victim falls down onto the over-flexed knee and the proximal pole of the patella wedges into the femoral trochlear notch (6, 7, 17, 19, 20). Our case patient had dislocated in the aforementioned way, however, this is the first case in which the wedging caused an impaction fracture of the femoral trochlear notch. Most of these cases require an open reduction as a primary procedure (3, 4, 8, 9, 12, 15, 16), only the cases with incomplete patellar rotation can be treated conservatively (3, 10, 12, 14). Distinctly, only three authors reported an osteochondral fracture of the lateral femoral condyle (2, 6, 18). Two of these authors treated the fracture during open surgery (6, 18). There is only one report regarding the importance

of arthroscopy during the treatment of the inferior patellar dislocation. Barlow et al. reported a case referencing an 88-year-old female, in which the recurrent inferior patellar dislocations caused an impaction fracture of the lateral femoral condyle. During arthroscopy, the superior pole of the patella was trimmed and the ridge on the lateral femoral condyle was smoothed using a fine burr (2). Interestingly, the impaction fracture of the femoral trochlear notch caused by the superior pole of the patella during its inferior dislocation has not been previously described. In our report, we presented an arthroscopically assisted percutaneous screw fixation treatment regarding this type of injury. To assure the finest treatment of these fractures requires a correct diagnosis using a CT scan and a precise reduction and fixation. The best means to reach this area is through the use of arthroscopic guided surgery. Under arthroscopic control, we can reduce the fracture without causing further damage to the joint and visualize additional intra-articular damage. During closed reduction of the patellar dislocation, the intra-articular injuries are easy to miss.

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