

PATELLAR FRACTURE-DISLOCATION INCARCERATED INTO A DISTAL FEMUR FRACTURE: A CASE REPORT AND REVIEW OF THE LITERATURE**Karim El Hammiri*, Tarik El Mountassir, Moncef Boufettal, Reda Allah Bassir, Jalal Mekkaoui, Mohamed Kharmaz, Moulay Omar Lamrani and Mohamed Saleh Berrada**

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ABSTRACT

We report on the case of a sagittal plane fracture of medial femoral condyle associated with dislocation of the patella which was found completely locked into the distal femur fracture. A 19-year-old male presented with a history of road traffic accident to our emergency. He sustained injury to his left knee with anterolateral wound. Plain X-ray showed fracture-dislocation of the patella which was incarcerated into a distal femur fracture. C.T angiography showed permeable vascular axes. Early surgery was done with anterolateral approach. Postoperative X-ray showed anatomical reduction of the distal femur fracture, with adequate positioning of the patella. At 4-month follow-up, the patient was pain-free, could walk independently and has regained a good range of knee motion. The patella was completely stable and plain X-ray demonstrated satisfactory union.

KEYWORDS: Patellar fracture-dislocation, Incarceration, Distal femur fracture.**INTRODUCTION**

Certainly, both of distal femur fracture and patellar fracture-dislocation are severe lesions to the knee joint that ordinarily do not happen in the same patient. In the literature, sagittal plane fracture of medial femoral condyle with an incarcerated patella has not yet been described and hence, in our knowledge, this is the first case report of its kind.

We report on the case of open medial femoral condyle fracture associated with dislocation of the patella which was found completely locked into the distal femur fracture trapped between the two condyles, as well as an avulsion fracture of the insertion of the lateral collateral ligament (LCL).

CASE PRESENTATION

A 19-year-old male presented with a history of road traffic accident to our emergency.

The mechanism of the accident was in fact a collision of 2 motorcycles. On admission to the emergency department, he was conscious and hemodynamically stable. He had cranial, thoracic, upper and lower left limbs trauma. Full-body CT scan revealed a left pneumocephalus involving temporal and frontal lobes, left pneumothorax or left collapsed lung, fracture of the

fifth rib at left side, a splenic rupture and peritoneal fluid in the pouch of Douglas.

Furthermore, the patient sustained injury to his left knee with anterolateral wound 3 cm long axis. (Fig1)

**Fig. 1: Wound next to the fracture side.**

The knee was tender and swollen with restriction of movements. The patient had a normal dorsalis pedis pulse without neurovascular injuries.

Plain X-ray showed complete fracture-dislocation of the patella which was incarcerated into a distal femur fracture between the two condyles and also showed a fracture of the fibular head indicating potential (LCL) avulsion. (Fig 2)



Fig. 2: Patellar fracture-dislocation incarcerated into a distal femur fracture.

A C.T angiography showed permeable vascular axes. (Fig3)

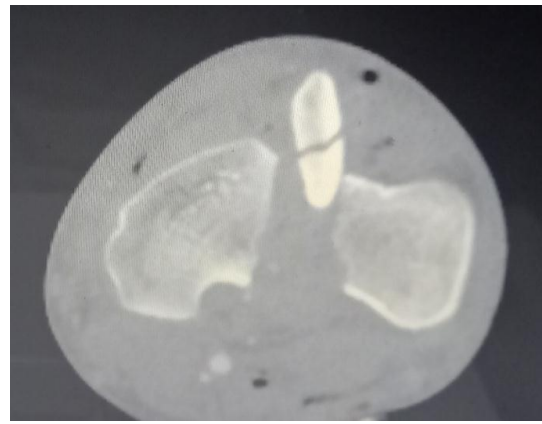
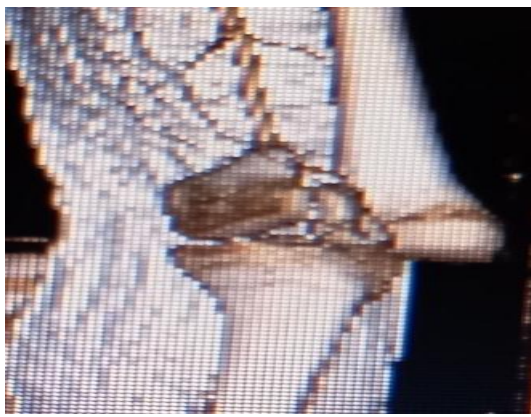


Fig. 3: C. T. Angiography → permeable vascular axes.

C.T → A sagittal plane fracture of medial femoral condyle fracture associated with fracture-dislocation of the patella

Otherwise, at the upper left limb, the patient had acromioclavicular dislocation injury that was managed by non-surgical treatment with sling immobilization (arm sling brace shoulder immobilizer).

Pneumothorax was drained urgently and for spleen injury, visceral surgeons opted for non-operative treatment. Early surgery was done 6 h post-injury with anterolateral approach. The choice of this approach was made on the basis of the wound location. Through debridement and lavage of the wounded skin on the knee were performed. With anterolateral incision while widening of the wound, the skin and subcutaneous and joint capsule were opened.

Intraoperatively, the patella was found to have rotated 180° and was completely locked into the distal femur fracture. The dislocated patella has been discovered with displaced fracture trapped between the two condyles. The meniscus, the patellar and quadricipital tendons were found intact. An avulsion fracture of the insertion of (LCL) at the fibular head and a disruption of the lateral retinaculum of patella were noted. The patella was pulled out of the fracture site and returned to its anatomic position upon the femoral trochlea. The sagittal plane

fracture of medial condyle was reduced while maintaining intact articular surface. The reduction was provisionally held with smooth K-wires and definitive fixation was carried out with three cancellous bone screws checked with C-arm. All the three partial threaded screws were 4-5 large fragment, were used with the lag-screw technique causing compression of the fracture fragments upon tightening and were placed through the non-articular surface of the femoral condyle. (Fig 3)

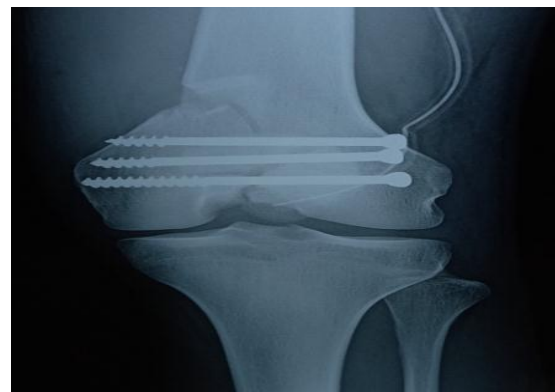


Fig. 3: Reduction and fixation with three cancellous bone screws checked with C-arm.

Since the displaced fracture of the patella was in anatomical position and it is an open fracture, in our judgment, this might don't require osteosynthesis and the avulsion fracture of the fibular head was fixed by transosseous suture technique.

The drain was applied. Fascia and subcutaneous and skin were sutured in layers and knee immobilizer was used in extension.

Clinical outcomes

Postoperative wound has healed well, without infection or other complications.

The patient reported no overall loss of function. Postoperative X-ray showed anatomical reduction of the

distal femur fracture, with adequate positioning of the patella.

The patient has begun functional rehabilitation with the use of an orthosis at the first 4 weeks. The early physiotherapy consisted in passive motion and quadriceps function with closed chain exercises.

At 4-month-follow-up, the patient was very pleased with the outcome of the surgery and has returned to a normal way of life. He was pain-free, could walk independently without using crutch and has regained a good range of knee motion without any complaint of instability. The patella was completely stable and plain X-ray demonstrated satisfactory union. (Fig 4)

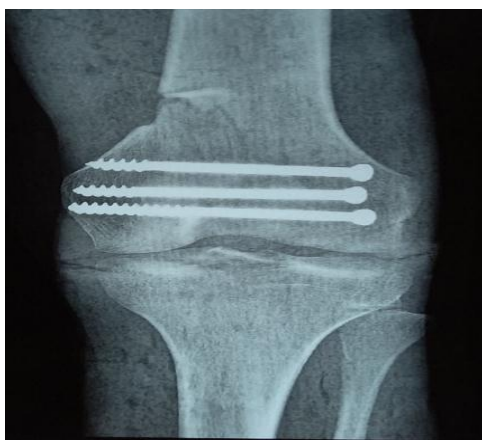


Fig. 4: X-ray control at 4 months.

DISCUSSION

As far as we know, this is the first case report of an extremely rare clinical case of an open sagittal plane fracture of medial femoral condyle with intra-osseous fracture-dislocation of the patella. The most challenging thing to understand the etiology of the intra-osseous dislocation of the patella into the distal femur in this case.

Unicondylar fractures of the distal femur are uncommon,^[1,2] complex, intra-articular fractures and usually happen in young males.^[3,4] These fractures constitute only 0.65% of all femur fractures^[5] and concern the lateral femoral condyle three times more often than the medial condyle.^[6] Unicondylar fractures may be isolated or associated with patellar dislocation or with ipsilateral supracondylar or intercondylar femur fracture, diaphyseal or cervical fracture of the ipsilateral femur.^[6,7] Articular fractures of the medial condyle is one of rare lesions of the knee that usually follows high-energy trauma and happens after shear force or direct impact on the knee, most often secondary to road accidents or sports.^[8,9]

The type of condylar fracture depends on the degree of knee flexion at the time of the impact injury.^[10] At the medial condyle, the fracture line is seldom in the coronal

plane (Hoffa fracture or AO-33 B3 [B3] type fracture)^[11] and more often in the sagittal plane (Trélat fracture or AO-33 B2 [B2] type fracture).^[12,15] Medial condyle fractures in the sagittal plane may pass through the notch where the fracture line initiates in the medial intercondylar-trochlear groove^[12] (such as our case) or through the condylar load-bearing surface.

They generally result from a varus stress, associated with a rotational component and they may cause ligament injuries to the knee. The patella needs to have been submitted to powerful forces to be at the origin of a complete patellar malposition between the two condyles of distal femur. Another thing to consider is the associated patella fracture, while thin, this could have an additional effect on the overall stability of the knee.^[16]

In our case, we suggest that the injury mechanism was as follows: The impact force was presumably deep, which caused sagittal plane fracture of medial condyle along with avulsion fracture of the insertion of (LCL) and perhaps of posterolateral ligamentous complex resulting in knee instability in the frontal and sagittal plane. We think that, in addition to that, traumatic injury of the lateral load-bearing structures of the patella among others the lateral retinaculum may be involved in the

dislocation of the patella which was pushed then into the intercondylar femoral region.

As these injuries are due to high-velocity trauma or fall on the knee from height, there might be associated fractures of the tibial plateau, tibial spine, ligamentous injuries of knee joint, patella, and even fracture of ipsilateral limbs or pelvis, this requiring through clinic-radiological examination and evaluation.^[17,16] It is also essential to conduct a careful neurovascular assessment on the affected limb to look for any symptom of neurovascular compromise.^[10]

As it is an articular fracture, operative management is the most warranted for unicondylar fractures of the distal femur.

It consists in (ORIF) an open reduction followed by fixation by one of various techniques of osteosynthesis, such as cannulated screws, cancellous bone screws, Herbert screws, dynamic compression plate (DCP), Low-compression-plate (LCP), dynamic condylar screw plate or retrograde nail.^[6] After adequate fracture reduction, lag-screw technique may be used to ensure compression of the fracture fragments (via either partial or fully threaded screws). There is no consensus about the number and diameter of the screws used although most authors utilized 4–5 large fragment partial threaded cannulated screws.^[18,20,21]

Until now, there is not clear recommendation regarding the surgical approach, or optimal internal fixation technique for unicondylar distal femoral fractures.^[13,12,23] In the literature, there is also much of debate concerning the postoperative management of the unicondylar femoral fracture, but in order to avoid knee stiffness, instrumentation failure (breaking or bending of the implant) as well as the loss of reduction, gradually knee mobilisation is advised.

CONCLUSION

We believe that prompt operative intervention consisting of anatomic reduction and strong fixation followed by early functional rehabilitation may lead to better long-term clinico-radiological outcomes as in our clinical case.

However, this case report is restricted in its length of follow-up, and post-traumatic osteoarthritis is something that needs to be taken into account in the long-term care of this patient.^[16] That's why we have the intention to hold this patient under close follow-up in the near future.

In our opinion, this first case report of its kind is of an important learning point for all clinicians involved in the treatment of such injuries.

Consent

The patients have 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.

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