Case Report

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Case Report of a Medial Femoral Condyle Fracture in a Unicompartmental Oxford Knee Replacement Surgery

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Abstract

Introduction: *The unicompartmental Oxford prosthesis has been used as a goodalternative for medial unicompartmental osteoarthritis because it is associated with earlyrehabilitation and a low rate of intraoperative complications. This case describes a rarecomplication during the procedure.*

Case Presentation: *We present an intraoperative fracture of the medial condyle in a 70-year-old woman that was treated with 6.5 mm cannulated screws with a compressiontechnique. The patient remained in a non-weight bearing protocol for 6 weeks andreached a full range of mobility at 3 months. Complete radiological consolidation and agood functional outcome were observed.*

Conclusion: *Intraoperative fractures benefit from a stable osteosynthesis that allows freerange of mobility and does not delay postoperative rehabilitation.*

Keywords: Unicompartmental Knee Replacement, Complication, Knee Arthroplasty

Level of Evidence: Case Report, Level IV

Bullet Points: Intraoperative fractures during unicondylar arthroplasty is a rare complication, but using a stable osteosynthesis is possible to achieve a good functional result without implant complications

Introduction

Osteoarthritis of the knee can become a very invalidating pathology due to the symptomsit produces, characterized by pain, insecurity and functional loss. The incidence of unicompartmental knee osteoarthritis is 20%, being more frequent on the inner side [1]. Areasonable option for cases of unicompartmental osteoarthritis has been tibia osteotomy,although the treatment of choice remains total arthroplasty. Unicompartmental arthroplasty has been used as an alternative to total replacement and is preferred by some surgeons for minimal blood loss, reduction of postoperative pain, a better range of mobility and associated early rehabilitation [2,3]. It is indicated in patients with degenerative or traumatic osteoarthritis and osteonecrosis that affects a single compartment of the knee, with an indemnity of the anterior cruciate ligament and medial collateral and only in cases of correctable deformity. In the last two decades, the unicompartmental Oxford Knee replacement has become an accepted procedure formedial osteoarthritis with good long-term results in experienced hands [4,5]. In addition, it has proven to be a safe procedure and is associated with a low perioperative complication rate [6]. The most important complications are aseptic loosening (0.25-1.4%), dislocation of polyethylene (0.4-3%), unexplained pain (0.5-1.6%), infection (0.25-3%) and periprosthetic fractures (0.1%) [2,3,7]. Periprosthetic fractures are an uncommon complication and have been described mostly in the tibia plateau. Pandit et al report anincidence of less than 1% in 1000 arthroplasty cases[8].

Case Report

A 70-year-old woman with a history of unicompartmental medial arthroplasty of the leftknee ten years ago with a favorable evolution. Her case presents symptomatic medialright knee osteoarthritis secondary to avascular necrosis with three years of evolution thatdid not respond to conservative treatment (Figure 1). A unicompartmental

right kneearthroplasty was performed by an experienced orthopedic surgeon following the manufacturer's technical guidelines. In the intraoperative, at the moment of impacting thecemented femoral component, there was a fracture of the medial femoral condyle of thecoronal type (Hoffa's fracture) with minimal displacement. An anatomical reduction andstabilization were carried out with 2 compressive screws. Correct reduction and stabilization were observed (Figure 2 and 3). The patient completed 6 weeks without weight bearing with two crutches and allowed a mobility range to tolerance in the immediate postoperative period. Twelve weeks after surgery the patient could walk correctly without crutches with flexion of 120° and no extension deficit. The result at two years of follow-up is satisfactory, with a KOOS score of 92.7 points.

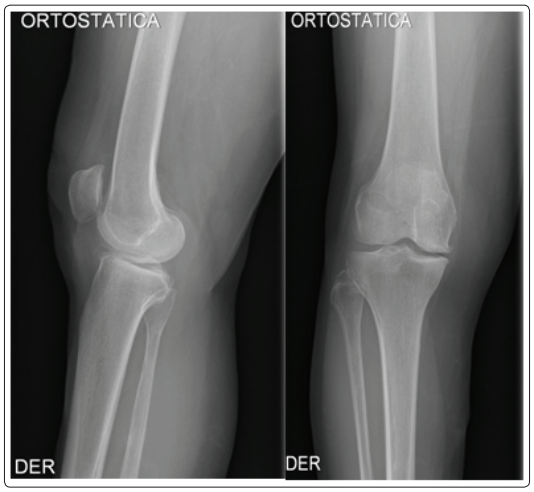

Figure 1: Preoperative Orthostatic X- Ray showing medial unicompartmental osteoarthritis

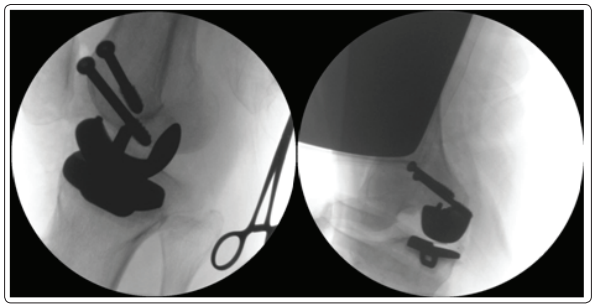

Figure 2: Intraoperative Fluoroscopy after the osteosynthesis

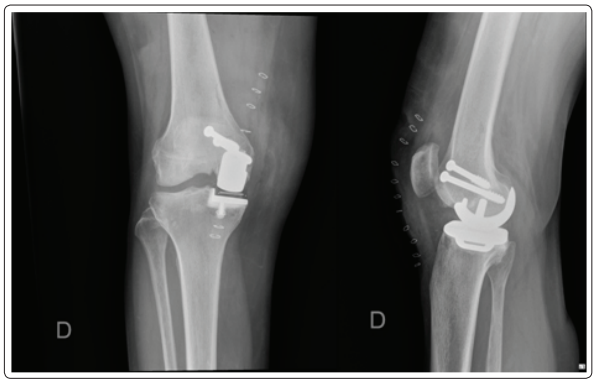

Figure 3: Postoperative anteroposterior and lateral X- Ray, showing anatomic reduction and correct position of the unicompartmental components

Discussion

Unicompartmental arthroplasty is a minimally invasive procedure that allows rapidrecovery, protects the bone reserve and reproduces more normal knee kinematics; associated with lower morbidity and excellent results in the medium and long term [2-5]. Some studies have even reported better functional results than with total knee prosthesis,but with a higher associated revision rate [9].

The case study describes the finding of a periprosthetic fracture of the medial femoralcondyle as an intraoperative complication during unicompartmental knee arthroplasty.

Only one case of intraoperative periprosthetic fracture of the medial femoral condyle waspreviously reported [10]. Two other femoral condyle fractures have also been reported, occurring respectively one and three years after placement of the prosthesis [11,12].

The mechanical resistance of the femur and the impaction technique has been describedas possible causes of the fracture [10]. Factors that would contribute to decreased mechanical resistance are osteoporosis and bone resection during the preparation of the distal femur. As for the impaction technique described this should be in line with thefemoral condyle, but slightly tilting towards the dorsal could increase the shear force inthe medial condyle and produce the fracture. In addition, the force of the impact must be considered according to the size of the hammer used. Another hypothesis considersthe use of the intramedullary alignment guide of the femur as an increase of the femoral tension[11].

Fractures with minimal displacement of the femoral condyle with good bone quality canbe treated with 6.5 mm cannulated screws. A review by Arastu, et al. reaffirms that osteosynthesis is the best treatment option for fractures of the femoral condyle in the coronal plane since conservative treatment has been associated with poor results [13]. Brinkeet, et al. described a medial femoral condyle fracture also in a non-displaced intraoperative coronal plane that was treated with a 10° flexion knee immobilizer without varus-valgus and a no–weight bearing protocol for 6 weeks, achieving satisfactory results after 12 weeks [10]. However, a fracture appeared in the immediate postoperative control radiography, which probably determined the conservative management. Akan, et al. reported a case of fracture of the medial femoral condyle with minimal displacement at one year of evolution [11]. Closed reduction and percutaneous fixation were performed with 6.5mm cannulated screws after checking that the tibia and femoral components werestable. Kim, et al. reported another case with minimal displacement three years aftersurgery, which also performed closed reduction and percutaneous fixation with 6.5mm cannulated screws, had a no–weight bearing protocol for 6 weeks, and at 12 weeks theyhad consolidation, full painless support and full functional ranges [12]. Periprosthetic fractures associated with unicompartmental arthroplasty are in frequentand are mostly observed in relation to the tibia plateau, unlike periprosthetic fractures in the total prosthesis in which they are most frequently described in relation to the femur [14,15]. Both fractures can be managed with reduction and osteosynthesis in the absence of loosening of the components. Kim, et al. described a series of 1,576 arthroplasties with six cases of periprosthetic fractures, in which the only one corresponded to femoral location. The remaining five fractures corresponded to fractures of the tibia plateau (1 intraoperative), of which two were converted to total knee prosthesis. There are noreported cases of

revisions of unicompartmental arthroplasty secondary to a prosthetic femoral fracture[15].

In the case described, a Hoffa fracture was produced as an intraoperative complication with minimal displacement and a stable intraoperative fixation was used to allow mobility exercises in the immediate postoperative period and to avoid the risk of stiffness and/orarthrofibrosis. The patient was in a non-weight bearing rehabilitation protocol for 6 weeks and achieved complete consolidation and excellent functional outcome at 12 weeks postoperative, with a follow-up of two years.

Conclusion

Medial femoral condyle fracture is a rare complication of unicompartmental arthroplasty, and according to this report, only two intraoperative cases have been reported in the literature. The resolution of this type of fracture depends on fracture displacement, bone quality and the condition of the implants. Fractures with minimal displacement without loosening of the components and good bone quality can be treated with anatomical reduction and stable fixation with cannulated screws. In our experience, adequate stability, early mobility and excellent functional results were achieved with a KOOS score of 92.7 points.

References

1. Duncan R, Peat G, Thomas E, Hay EM, Croft P (2011) Incidence, progression and sequence of development of radiographic knee osteoarthritis in a symptomatic population. C Rheum Dis 70: 1944-1948.
2. Dervin GF, Carruthers C, Feibel RJ, Biachino AA, Kim PR, et al. (2011) Initial experiencewith the Oxford unicompartmental knee arthroplasty. J Arthroplasty 26: 192-197.
3. Deshmukh RV, Scott RD (2001)Unicompartmental knee arthroplasty, long-term results. Clin Orthop 392: 272.
4. Faour-Martín O, Valverde-García JA, Martín-Ferrero MA, Vega- Castrillo A, Gallego MA, et al. (2013) Oxford phase 3 unicondylar knee arthroplasty through aminimally invasive approach: long-term results. Int Orthop 37: 833-838.
5. Kim KT, Lee S, Park HS, Cho KH, Kim KS (2007) A prospective analysis of Oxford phase 3 unicompartmental knee arthroplasty. Orthopedics 30:15-18.
6. Morris MJ, Molli RG,Berend KR, Lombardi AV Jr (2013) Mortality and perioperative complications after unicompartmental knee arthroplasty. Knee 20: 218-220.
7. Kim SJ, Postigo R, Koo S, Kim JH (2014) Causes of revision following Oxford phase 3 unicompartmental knee arthroplasty. Knee Surg Sports Traumatol Arthrosc 22: 1895-1901.
8. Pandit H, Murray DW, Dodd CA, DeoS, Waite J, et al.(2007) Medial tibial plateaufracture and the Oxford unicompartmental knee. Orthopedics 30: 28-31.
9. Newman J, Pydisetty RV, Ackroyd C (2009) Unicompartmental or total knee replacement: the15-year results of a prospective randomized controlled trial. J Bone Joint Surg Br 91: 52-57.
10. Ten Brinke B, de HaanLj, Koenraadt KL, van Geenen RC (2016) Medial femoral condylefracture as an intraoperative complication of Oxford unicompartmental knee replacement. Knee Surg Sports Traumatol Arthrosc 24: 3191-3193.
11. Akan B, Yildirim T, Karaguven D (2013) Medial femoral condyle fracture after cementless unicompartmental knee replacement: a rare complication. Knee 20: 295-297.
12. Kim KT, Lee S, Cho KH, Kim KS (2009) Fracture of the medial femoral condyle after unicompartmental knee arthroplasty. J Arthroplasty 24: 1143.
13. Arastu MH, Kokke MC, Duffy PJ, Korley REC, Buckley RE (2013) Coronal plane partial articular fractures of the distal femoral condyle current concepts in management. Bone Joint J95: 1165-1171.
14. Hoffman MF,Jones CB,Sietsama DL, Koenig SJ, Tornetta P (2012) Outcome of periprosthetic distal femoral fractures following knee arthroplasty. Injury 43: 1084-1089.
15. Kim KT, Lee S, Lee JI, Kim JW (2016) Analysis and Treatment of Complications after Unicompartmental Knee Arthroplasty. Knee Surg Relat Res 28: 46-54.