

Post-traumatic Arthritic Stiff Knee in a Malunited Distal Femur Fracture Treated with Total Knee Arthroplasty – A Case Report

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Learning Point of the Article:

TKR is a viable option in osteoarthritic patients with severe stiffness though it's technically challenging because of contracted extensor mechanism.

Abstract

Introduction: Post-traumatic knee arthritis is defined as any structural osteochondral damage to the knee after an injury. About 12% cases of symptomatic osteoarthritis of the knee mainly due to post-traumatic arthritis. Primary total knee arthroplasty in a post-traumatic arthritic stiff knee with a malunited distal femur fracture is a technically difficult procedure due to secondary deformity, poor bone quality, bone loss, ligament incompetence, tissue adhesion, and stiffness.

Case Report: A 65-year-old male presented with chief complaints of pain and stiffness in the left knee for 15 years. On inspection no scar, sinuses, and dilated veins on palpation, tenderness was present over both the medial and lateral joint lines. Radiographs of the left knee in anteroposterior and lateral views were taken, which showed united distal femur fracture with Grade 4 Kellgren Lawrence knee arthritis. Due to severe knee stiffness and with the patient demanding early mobilization and functional knee ROM, total knee arthroplasty with intra-articular and extra-articular adhesion release was planned for the patient.

Conclusion: In cases of post-traumatic arthritis with severe stiffness, total knee arthroplasty is a viable option in providing good pain relief with excellent functional improvement; however, the procedure is technically more demanding.

Keywords: Stiff knee, malunited distal femur fracture, knee arthritis and total knee arthroplasty.

Introduction

Post-traumatic knee arthritis is defined as any structural osteochondral damage to the knee after an injury. About 12% cases of symptomatic osteoarthritis of the knee mainly due to post-traumatic arthritis. It occurs predominantly due to intra-articular fractures of the tibia, femur, and patella fracture even though it can be caused by extra-articular injuries as well. Factors responsible for osteoarthritis after traumatic injury are ligament laxity, meniscal tear, malalignment, non-union, and malunion after fractures or due to direct chondral injuries [1]. Intra-articular tibia and femur fractures are major causes of post-traumatic arthritis of the knee [2]. Stiffness in post-traumatic

arthritic knee is mainly due to femoral non-union, anterior adhesions, and patella baja which affects flexion; malunion of intercondylar eminence, and PCL contracture and posterior capsule contracture which affects extension [3]. Non-operative management consists of physiotherapy, anti-inflammatory drugs, activity modifications, and ambulatory assisting devices. Surgical treatment options available for the posttraumatic arthritic stiff knee are manipulation under anesthesia, arthroscopic debridement, arthrodesis, and total knee arthroplasty [4]. Primary total knee arthroplasty in a post-traumatic arthritic stiff knee with a malunited distal femur fracture is a technically difficult procedure due to secondary

Access this article online

Website:
www.jocr.co.in

DOI:
10.13107/jocr.2022.v12.i08.2976

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Submitted: 17/03/2022; Review:27/05/2022; Accepted: July 2022; Published: August 2022

DOI:10.13107/jocr.2022.v12.i08.2976

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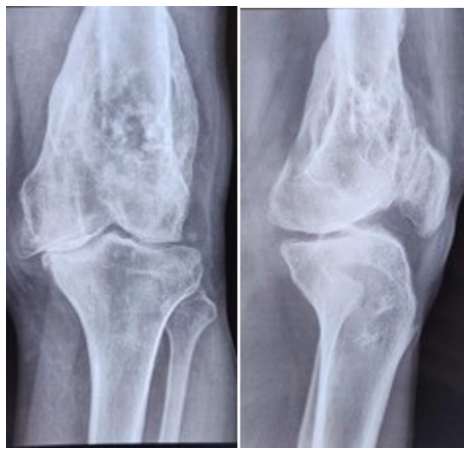


Figure 1: Pre-operative AP and lateral view.



Figure 2: Immediate post-operative X-rays.

tenderness was present over both the medial and lateral joint lines. Further, examination revealed a fixed flexion deformity of 10° with shortening of 2 cm. Radiographs of the left knee in anteroposterior and lateral views were taken, which showed united distal femur fracture with grade 4 Kellegren Lawrence knee arthritis. (Fig. 1) CBC, ESR, and CRP values were within the normal range.

Due to severe knee stiffness and with the patient demanding early mobilization and functional knee ROM, total knee arthroplasty with intra-articular and extra-articular adhesion release was

deformity, poor bone quality, bone loss, ligament incompetence, tissue adhesion, and stiffness.

We present a case of post-traumatic arthritic stiff knee in a malunited distal femur fracture treated with total knee arthroplasty highlighting the functional outcome, technical difficulties of the operative procedure, and release of intra-articular and extra-articular adhesions.

Case Presentation

A 65-year-old male presented with chief complaints of pain and stiffness in the left knee for 15 years. The patient was apparently alright 15 years back when he developed pain in the left knee which was sudden in onset gradually progressive aggravated by movements and walking, relieved with medication and rest. The patient also complained of stiffness in the left knee.

The patient had a history of the left distal femur fracture 15 years back for which he was treated with a plaster cast. The patient was a known case of diabetes mellitus on medication for 10 years. The patient at time of presentation was severely restricted in his ADL due to severe stiffness.

On inspection no scar, sinuses, and dilated veins on palpation,

planned for the patient. After obtaining the fitness for surgery, the patient was operated on in a supine position under spinal anesthesia using the medial parapatellar approach. As a result of the previous distal femur fracture, the extensor mechanism was contracted and adhered to the anterior femur along with intra-articular adhesions which led to difficulty in patellar eversion and flexion of the knee; hence, a Thompson quadriceps plasty and recreation of medial and lateral gutter was done to aid in exposure.

The extensor mechanism was elevated and intra-articular fibrous tissue was removed with electro cautery and osteotome. The eversion of the patella was done gradually monitoring the tension on the patellar tendon insertion to avoid a extensor peel off. The intramedullary femoral jig was inserted with serially increasing diameter drill bits and checking under C arm to prevent breaching of the femoral cortex, as the bone was porotic and deformed. Following which femur was prepared. A proximal tibial cut was done using an extramedullary jig. The gaps were checked and trial implants were placed followed by checking stability, range of motion, and patellar tracking.

A cemented total knee arthroplasty using PFC sigma implant (femoral component size – 4, tibial tray size – 4 and spacer size –



Figure 3: Two-year follow-up clinical pictures.

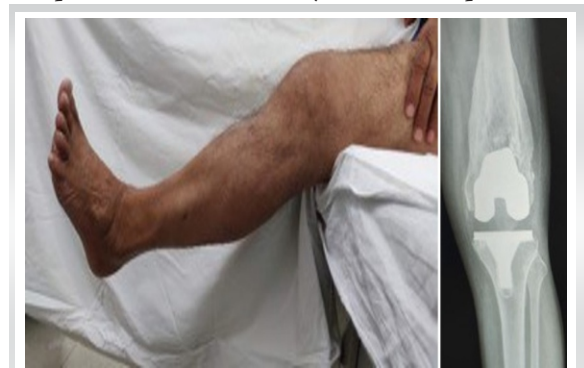


Figure 4: Two-year follow-up X-ray (AP view).

15 mm) was done (Fig. 2).

Intraoperatively, 120° of flexion was achieved by releasing extra- and intra-articular adhesions. After the prosthesis implantation, stability, patellar tracking, and range of motion were checked intraoperatively. The wound was closed in layers. Postoperatively, the knee was maintained in extension using a long knee brace. Continuous passive motion of 0–45° and isometric quadriceps strengthening exercises started the day after surgery.

Full weight-bearing started immediately on post-operative day 1 using a long knee brace.

The outcome at 2 years was good with the patient having a good knee range of movements (0–110° of flexion with extension lag of 10°) and no pain on weight-bearing. The patient is comfortable with no pain and difficulty walking. The Oxford knee scores preoperatively were 11 and after 2 years of follow-up was 47 (Fig. 3).

Two years postoperatively, the knee radiographs showed no signs of osteolysis and subsequent implant loosening (Fig. 4).

Discussion

Total knee arthroplasty in a post-traumatic stiff knee is a challenging procedure due to the high risk of complications, mainly avulsion of the patellar tendon, popliteal artery injury, cutaneous necrosis, intraoperative fracture, revision of implants for deep infection, and pseudarthrosis of the anterior tibial tuberosity [5].

The most serious complication is patellar tendon avulsion which is mainly seen in patients with flexion <80° and patella Baja. The intraoperative patellar tendon avulsion can be managed with CC screw fixation or metal cables and direct repair with ethibond [6]. Studies have recommended using a hamstring tendon to augment the patellar tendon repair as well.

The extension lag is seen after TKA in post-traumatic arthritic

stiff knee common due to weakness of extensor apparatus which may be released during the procedure [7] as in our case.

Lunebourg et al. reported their experience of treating post-traumatic knee arthritis with primary total knee arthroplasty, they concluded that clinical outcome and implant survival is lower in patients treated with TKA for post-traumatic knee arthritis as compared to TKA for primary knee OA [8].

According to Weiss et al., total knee arthroplasty is an effective treatment method for patients with arthrosis after the fracturing of the proximal tibia and distal femur fracture which was unresponsive to other treatment options. They also concluded that TKA in the post-traumatic arthritic stiff knee has more complications and requires higher skills [9].

Debett et al. reported their experience of treating 304 cases of the stiff knee with total knee arthroplasty, they concluded that total knee arthroplasty in osteoarthritis with the stiff knee has a higher rate of satisfactory results [5].

Kundu et al. in their study stated that Thompsons' quadricepsplasty followed by a strict and vigorous post-operative physiotherapy protocol successfully increases the range of knee flexion as in our case [10].

Conclusion

In cases of post-traumatic arthritis with severe stiffness, total knee arthroplasty is a viable option in providing good pain relief with excellent functional improvement; however, the procedure is technically more demanding.

Clinical Message

Total knee arthroplasty is a viable option for patients with malunited arthritic stiff knees but it is technically more demanding.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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Conflict of Interest: Nil
Source of Support: Nil

Content: The authors confirm that informed consent was obtained from the patient for publication of this case report

How to Cite this Article

Bhaskaran S, Gadod LL. Post-traumatic Arthritic Stiff Knee in a Malunited Distal Femur Fracture Treated with Total Knee Arthroplasty – A Case Report. *Journal of Orthopaedic Case Reports* 2022 August;12(8): 85-88.