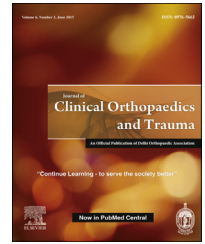


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Case Report

Total knee replacement in triple deformity with posterior subluxation of the knee joint[☆]



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ABSTRACT

Dislocation or subluxation following total knee arthroplasty has been extensively reported, but vice versa that is total knee replacement for subluxed or dislocated knee has not been published. Triple deformity of knee that is flexion, external rotation, valgus at knee associated with posterior subluxation of tibia occurs in rheumatoid arthritis, advanced tubercular arthritis and neglected posttraumatic residual dislocated knee. A 50 year old female with seropositive rheumatoid arthritis had the above disabling deformity in left lower limb and varus with medial tibial thrust in the other. Bilateral total knee arthroplasty was planned. Conservative method of reduction of left knee posterior subluxation preoperatively by 90-90 skeletal traction failed; hence patient was subjected to a staged bilateral total knee replacement using an innovative technique. The most difficult and determining initial surgical step of knee replacement in such dislocated/subluxed knee is reduction of posterior subluxation and gaining flexion at knee, as only after gaining flexion and reducing dislocated tibia, will we be able to do knee arthroplasty in triple deformity of knee. These knees are grossly unstable as most of the capsule-ligamentous structures are attritioned/non-existent. So, a fine balance of bone cuts and soft-tissue release needs to be done in a sequential manner to fine tune valgus and posterior subluxation correction without jeopardising neurovascular structures. After 3 years of knee arthroplasty the patient has painless, stable knee with good range of motion and is able to do all her activities, of living in a hilly terrain.

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1. Introduction

While dealing with the challenge of performing a total knee arthroplasty in a patient with rheumatoid arthritis (RA) the surgeon faces several unique challenges. Besides comorbidities, they have osteopenia and present with wide range of bone and soft tissue deformities, impacting the initial success and long term durability of a total knee replacement. Yet early and long term results of total knee arthroplasty in patients with rheumatoid arthritis have proven to be excellent, and are comparable to in osteoarthritis.¹

The common knee deformity in rheumatoid arthritis is of valgus and flexion deformity. We describe a case of a 50 year female who presented with a classical triple deformity of knee (flexion, valgus, external rotation) with posterior subluxation of the tibia and the technical challenges and tricks to deal with the deformity while performing arthroplasty in such cases. This is also to the best of our knowledge after a thorough review of current literature concerning the topic, the first case report of its kind.

2. Case report

We present a case of 50 year old female from hilly terrain, diagnosed as rheumatoid arthritis on disease modifying anti-rheumatic drugs (DMARD) for the past 10 years with bilateral knee involvement. The patient was able to ambulate with a lot of pain & difficulty, but she could not squat. Besides this she had no other orthopaedic deformity and hand joints were mobile with no deformity.

On examination the right knee had a varus deformity of 10° with medial tibial thrust on weight bearing (Fig. 1A, B). The left knee was subluxed posteriorly with a flexion deformity of 5°, further flexion being possible to 45° and a valgus deformity of 15° with a functional knee society score of 10 (Fig. 1C–G). The overlying skin was normal with no signs of infection and no distal neurovascular deficit. She was not on steroids and was seropositive. Her complete blood count was normal, haemoglobin was 10 g%, Erythrocyte Sedimentation Rate was 40 mm/1st hour. Liver Function tests were normal, kidney function tests were deranged, she had polyuria, blood urea was 80 mg% and Serum creatinine 2.0 mg/dl.

3. Initial treatment

A staged approach to bilateral knee arthroplasty was planned, first stage being application of skeletal 90-90 traction on left lower limb for correcting the triple deformity of the left knee (Flexion, valgus and posterior subluxation) followed by a bilateral Total knee replacement (TKR) at a later stage in a sequential manner. However the 90-90 traction given for 4 weeks failed to correct/or even budge the deformity. So, the

treatment plan was revised, staged arthroplasties first on the right side which was easier followed 2 weeks later by that of triple deformed left knee. The right knee underwent a routine posterior cruciate ligament (PCL) substituting arthroplasty and its technique is not being described further (Fig. 1H); but the highlight being arthroplasty technique for triple deformed subluxed left knee is described below.

3.1. Surgical technique

Under combined spinal-epidural anaesthesia, with patient in supine position, a standard medial para-patellar approach was used to expose the knee. The tibia was externally rotated and soft tissues were sub periosteally erased from posteromedial aspect of tibia by a curved periosteal elevator. Retropatellar fat pad was excised and piecrusting of iliotibial band (ITB) was done. Thereafter both the menisci and the attritional anterior cruciate ligament were excised, but the knee with a preoperative flexion range of 5–45° could be only flexed to 50°, and posterior tibial subluxation was not completely reducible. So a tibial cut of 2 mm depth, measured from more affected antero-lateral tibial plateau was taken which increased the range of motion of knee further to 80°. This failed to reduce posterior tibial subluxation. Hence, thereafter soft tissue (ST) release were re-done as knee could be flexed to a greater extent, first from posteromedial corner of tibia with a curved periosteal elevator; secondly pie-crusting of iliotibial band was done from inside out to correct valgus and posterior subluxation of knee. But it also failed to reduce posterior knee subluxation. Releasing other tight offending soft tissues that is lateral hamstring would have made the knee unstable, and posterior capsule could not be released without hyperflexing the knee. So, there were now two options, either recut the tibia or cut the femur to reduce tibia and flex the knee to do TKR. It was observed that tibial cut brought the cut surface very close to patellar tendon insertion on tibial tuberosity; and further cutting of tibia would jeopardize the patellar tendon integrity. So after flexing the knee to 80° a free 2 mm cut of posterior femoral condyles was done by measured resection technique. The tibia could now be reduced. As knee could be flexed fully now, Whiteside line and transepicondylar axis were marked on distal femur, and intramedullary distal femoral cutting zig was inserted into the femur just anterior to posterior cruciate ligament insertion on femur but just medial to intersection of Whiteside line and transepicondylar axis. After cutting the distal femur, extension gap was checked for passage of minimum 10 mm spacer, limb alignment, stability and rectangular shape. The valgus angle for distal femoral cutting zig was set to 3°. Doing of a total knee arthroplasty on right knee gave us an idea of the size of femur. To ensure correct external rotation of the distal femoral 5 in 1 zig, as posterior condylar referencing was dubious in this case; all the landmarks like transepicondylar axis, perpendicular to

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