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CASE REPORT

Late Asymptomatic Medial Patella Subluxation Post Total Knee Arthroplasty

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ABSTRACT

Post-operative complications are well known to impair the functional outcomes of total knee arthroplasty (TKA). Patella subluxations post-TKA is a grim complication rendering patients disable post-surgery. Howbeit, medial patella subluxation is a rarely recorded incident altogether. This case report describes a patient post successful TKA two years ago, who was incidentally diagnosed with a medial patellofemoral subluxation during a recent routine yearly follow up. This gentleman, however, had no complaints and the only evident clinical sign was anterior knee skin puckering. A radiograph of the knee confirmed our clinical suspicion of medial patella subluxation. The patient's symptoms, his expectations, radiological findings, what went wrong during surgery and management of this rare entity were analysed. This rarely reported entity requires a high degree of suspicion especially if the patient complains of instability and peculiar anterior knee pain. Diagnosis is customarily clinical and revision surgery is almost invariably necessary.

INTRODUCTION

Medial patella subluxation is a condition characterized by medial translation of the patella resulting in instability, anterior knee pain and/ or popping. Hughston and Deese (1988) first described this entity in patients with preceding arthroscopic lateral retinacular release and associated vastus lateralis release. The complication is almost always iatrogenic with the usual causes being discontinuity of

the vastus lateralis from the patella, previous lateral release, medial tibial tubercle transfer and a tight medial patellofemoral ligament (MPFL) graft. Patients with a history of vastus lateralis deficiency, hyperlaxity and trochlear dysplasia may also experience medial patella subluxation (Akşahin et al., 2010).

A typical complication causing postoperative pain and functional limitation is patella instability which most of the time may require revision surgery. This debilitating condition may occur with or without patella resurfacing. Patella subluxation is more common than dislocation (Assiotis et al., 2019). Main reasons for patellofemoral instability can be associated with surgical technique and component positioning, extensor mechanism imbalance and other causes.

Various approaches for the measurement of patellofemoral congruence have been described in the literature although there is no consensus with regards to an ideal method. In this report, we apply the patella shift index (PSI), a new reliable and valid measure for patellofemoral congruence for evaluation of patella alignment following TKA with an un-resurfaced patella. The PSI is calculated by dividing the patella shift with the trochlear width (PSI = patella shift/ trochlear width) (Metsna et al., 2013). PSI is rounded up to two decimal points. Patella shift can be medial or lateral with medial patella shift marked with a "–" sign.

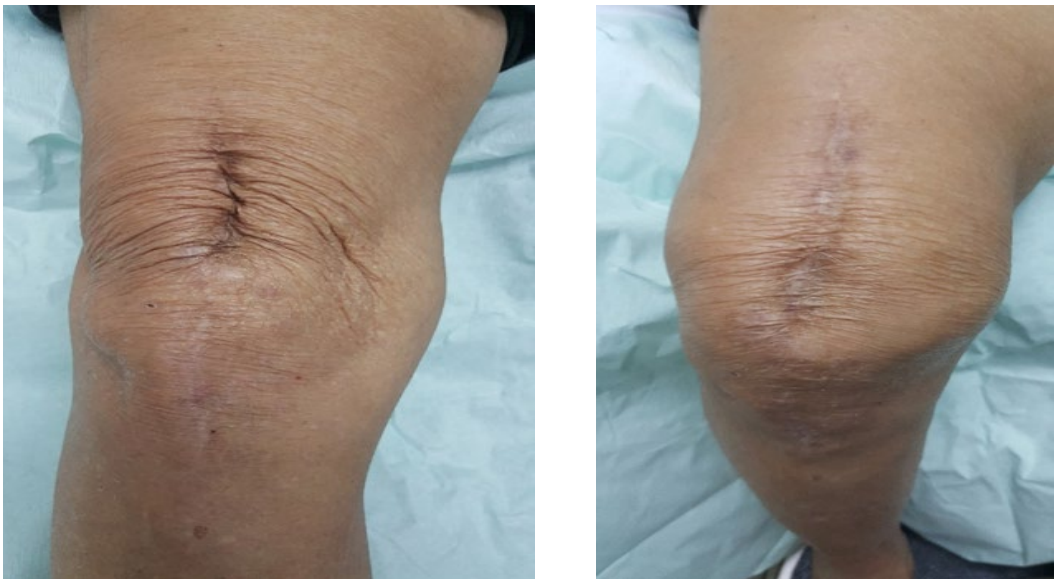
CASE PRESENTATION

An 84-year-old gentleman presented to our specialist clinic two years prior chief complains of pain over the knee exaggerated especially during start-up and ambulation. Clinically, he had a non-correctable varus knee and a range of movement (ROM) of 10 – 90 degrees. Pre-morbidly he had a history of ischaemic heart disease with coronary artery bypass grafting done.

After pre-operative counselling, he consented and successfully underwent TKA of the right knee for severe tri-compartmental osteoarthritis. He was operated on via a medial para-patellar arthrotomy approach with soft tissue release of the lateral patella retinaculum for better patella tracking. Surgery was routine with no intraoperative complications, and we decided against resurfacing his patella due to its small nature.

Postoperatively, the patient recovered well. No acute complications were reported. He achieved a good range of movement post-surgery from 0 to 120 degrees and did not complain about any post-operative pain. He received outpatient physiotherapy and rehabilitation at the hospital. The patient was put on a close chain physiotherapy regime comprising of static quadriceps exercise, straight leg raising, balancing, gait, and proprioceptive exercises. The gentleman was discharged well, and further clinic visits at 6 months and 1 year were unremarkable.

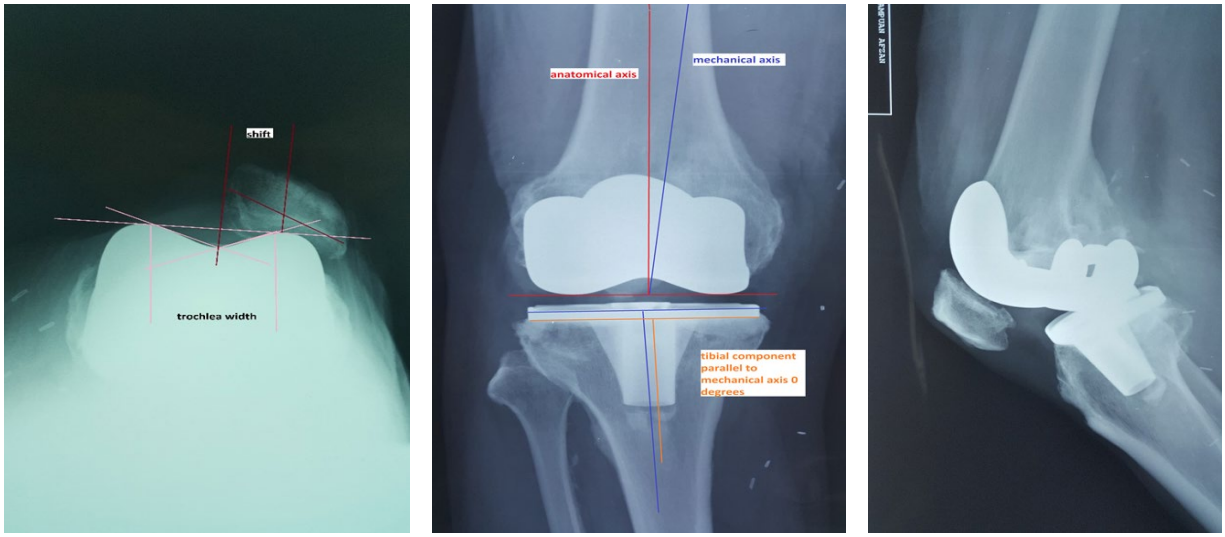
However, during his yearly routine follow up for the second post-operative year, we noticed that he had skin puckering/ dimpling over the anterior knee during extension [Figure 1 (a) and (b)]. The patient nonetheless did not seem bothered about this since he was not in any pain, nor did he complain of any instability. He was ambulating independently without aid.



(a) (b)

Figure 1 (a) Showing puckering of the skin on the knee joint during extension; (b) scarring over the knee joint on flexion

On assessment, he had a respectable knee ROM of 0 – 110 degrees, minimal varus laxity, medial patella tracking and tilt, a positive medial subluxation test, but no tenderness over the medial retinaculum. There was however evidence of muscle atrophy of the right thigh with a girth of 42 cm as compared to 45 cm on the left. His Q-angle measured 15 degrees. The X-ray of the right knee revealed a medial patella subluxation [Figure 2 (a) merchants, (b) anterior, (c) lateral]. Based on Figure 2 (a), the Patella Shift Index (PSI) was noted to be –0.48 and the Patella Tilt (PT) 41 degrees.



(a) (b) (c)

Figure 2 (a) Merchants view of the knee showing a medial patella subluxation, the Patellar shift index (PSI) [PSI = patellar shift/ trochlear width] can be calculated using this view; (b) the AP view the knee showing a restored mechanical axis; (c) Lateral view of the knee showing normal patella position

Further management of this patient involved obtaining a CT scan of the knee to look at the rotation of the femoral component and an MRI to assess the soft tissue balance, thence proceed with revision surgery or a realignment procedure with lateral plication and medial release plus possible patellar resurfacing.

The gentleman, however, is yet to decide on revision surgery as he was not suffering from any symptoms. He can carry out his activity of daily living with ease and has a good range of movement of the knee with no anterior knee pain. He has an occasional 'popping' of the knee, but this does not impair his function.

DISCUSSION

Cases of medial patella dislocation post-TKA are poorly recognized and rarely reported. In our patient, our early inference as to why the patella dislocated medially are abnormal femoral component rotation; excessive lateral patella retinaculum release with a tight medial para-patella repair; partial rupture to the quadriceps tendon which may also cause skin puckering. We fear that if left untreated, he may eventually develop debilitating loss of the knee extensor mechanism, anterior knee pain, aseptic loosening of the implants, severe quadriceps wasting, patella fracture and possible arthrofibrosis.

The presenting complain of patellar instability is consistently anterior knee pain during activities such as climbing up stairs or standing from a sitting position. Pain is commonly at the patellofemoral joint and differs from that prior to TKA. Another common complains include painful patella 'popping' sensation with certain knee movements. Patients generally claim the patella pops laterally and this is commonly mistaken as lateral patellofemoral instability. Customarily, however, the patella is subluxed medially in full extension. It pops laterally into the trochlear groove as the knee flexes. Hughston and Deese (1988) reported that 85% of patients were not able to perform light recreational activities, 69% had disabling knee pain, and 5 of 65 patients managed to go back to competitive sports (Feller, 2015).

Surgical complications are the most frequent cause of patellar maltracking. Patella alta, residual valgus limb malalignment, excessive internal rotation of the femoral and/or tibial component, medial placement of the femoral component, valgus alignment of the femoral component, asymmetrical patellar resection, lateral positioning or excessive thickness of the patellar button, incorrect soft-tissue balancing and missing or insufficient lateral release, have all been shown to have a negative effect on patellar tracking (McCarthy & Bollier, 2015; Motsis et al., 2009).

Premature movement of the knee joint post lateral collateral ligament, lateral retinacular and/or vastus lateralis release could provoke atrophy and retraction of the vastus lateralis tendon and muscle as described by Hughston and Deese (1988). With the absence of the extensor mechanism contributed by the vastus lateralis, this thereupon leads to unbalanced muscle forces on the patella ensuing medial subluxation. Additional contributing factors are patella alta and a shallow trochlear groove of the distal femur.

Spontaneous medial patella subluxations/dislocations are unheard of and are almost always related to previous patella-femoral surgery. This condition was first reported by Hughston and Deese (1988) in 54 patients (60 knees) who had worsening symptoms or failure to improve after a lateral retinacular release. These 54 patients suffered deteriorating symptoms. Of the 60 knees, 30 developed medial subluxation postoperatively (Hughston & Deese, 1988). A total of 94% reported cases of medial patella subluxation occurred in patients with a history of previous lateral retinacular release, albeit with or without a tibial tubercle transfer.

Treatment options can be divided into surgical and non-surgical management. Physiotherapy, specifically quadriceps (vastus lateralis) strengthening and the adoption of a patellofemoral brace during activities can be recommended (Saper & Shneider, 2015). Regrettably, non-operative management is usually futile.

Surgical techniques as the incomplete release of the vastus lateralis muscle and suturing of the vastus lateralis to the quadriceps tendon more proximally may diminish the occurrence of medial patella dislocation and subluxation (Hughston & Deese, 1988). These techniques may prevent loss of lateral stabilization and maintain the biomechanical and soft-tissue balance of muscular forces acting on the patella. Most modalities involve repairing or reconstructing the lateral patellar stabilizers.

CONCLUSION

Patients (post-TKA surgery) who complain of instability, popping or anterior knee pain should raise a strong suspicion of medial patella subluxation. Diagnosis is clinical and, while a constellation of signs and symptoms are typical, the medial patella subluxation test is diagnostic. Unfortunately, conservative management is almost always futile. Surgical intervention has been proven to demonstrate favourable results in most patients. The vigilance of this rare subtle condition will lead to earlier intervention and most definitely decrease its incidence through meticulous surgical indications, procedures, and techniques. In TKA patients with chronic instability or frank dislocation, surgical intervention is paramount. Possible prosthetic causes (limb malalignment, component malposition and soft-tissue issues around the patella) should be attentively assessed to avert revision.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

CONSENTS

Written consent was obtained from the patient to publish the case with some related pictures. A copy of the written consent is available for review by the Chief Editor.

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