Case Report

Re-creating patella in TKR after patellectomy

Suluh B. Fizuhri

Div. Orthopaedic & Traumatology, RS Awal Bros, Batam

ABSTRACT

Patella has an important function to improve the efficiency of quadriceps extensor function. In the past, patellectomy used to be the mainstay of treatment for comminuted fracture. Such patients are prone to early OA, and result of a TKR can be compromised due to absence of patella.

We report a patient with previous patellectomy, who underwent total knee replacement. We recreate the patella using posterior condyle cut. After one year follow-up, patient has better cosmetic and functional result.

We believe this technique avoids the cost and give better functional result.

ABSTRAK

Patella memiliki fungsi yang sangat penting untuk meningkatkan efisiensi dari fungsi otot-otot extensor quadriceps. Pada masa lalu, patellectomy sering dilakukan sebagai pilihan pada penanganan fraktur kominutif. Pada pasien tersebut, cenderung terjadi OA pada usia yang lebih muda, sedangkan hasil dari TKR pada pasien ini cenderung tidak begitu baik karena ketiadaan patella.

Kami melaporkan kasus seorang pasien dengan riwayat patellectomy, yang dilakukan tindakan operasi penggantian sendi lutut. Kami mereka-ulang patella dengan menggunakan potongan tulang condylus posterior. Pada follow-up setelah satu tahun, pasien memiliki fungsi dan kosmetik yang lebih baik.

Kami percaya bahwa teknik ini dapat menghindarkan biaya yang berlebihan dan memberikan hasil yang lebih baik.

Keywords: tkr after patellectomy

Corresponding author: Suluh B. Fizuhri, MD, suluhbfizuhri@icloud.com

INTRODUCTION

The patella, or kneecap, is a sesamoid bone that is located at the front of the knee and make up a knee joint. The patella is embedded inside the quadriceps tendon which connects the quadriceps muscle of the thigh to the tibia and acts as a pulley for the quadriceps to increase the mechanical leverage of knee joint during movements.

A patellectomy is a surgical procedure to remove the patella. A patellectomy can be either a complete patellectomy where the whole patella is removed or a partial patellectomy where only a part of the patella is removed. Historically, a patellectomy was indicated for patella fracture, repeated patellar dislocation, or degenerative arthritis of the patella.1,3

In patient with patellectomy, the extensor lever arm is weaker, quadriceps strength decreases by 40%.2 Problems associated with patellectomy include loss of normal knee power and functions, quadriceps weakness and failure to resolve anterior knee pain if done for patellofemoral OA. It also predisposes patients to early OA.

This procedure is no longer recommended as it places patients at an increased risk of knee instability, pain, reduced flexion with gait, and can lead to difficulties with stairs.3

The main indication for knee arthroplasty in patients with patellectomy is pain. However, total knee arthroplasty in patellectomy patients has higher complication rate of 36% with inferior results compared to patients with intact patella.4,6

One of the techniques to reconstruct the disruptions of extensor mechanism and improving the quadriceps leverage uses a patellar tendon bone allograft. Extensor mechanism of allograft reconstruction shows an adequate overall intermediate-term survival, however with high re-operation rate and associated with worse functional outcomes.5

We used a technique to recreate patella from the bone cuts during knee replacement in order to gain more benefits of improved lever arms and more efficient functioning of quadriceps.7

CASE DETAILS

A 54-year old male, presented with left OA knee (Fig. 1, 2, 3) following patellectomy three decades ago for patella fracture.

Figure 1.

Figure 2.

Figure 3.

He had extensor lag and flexion up to 100 degrees. He complained about the pain felt during walking. He underwent total knee replacement (TKR) with concurrent patella re-creation from the bone graft.

SURGICAL TECHNIQUE

The standard medial parapatellar surgical approach for TKR was used and the bone cut was taken with great care. The posterior cut from medial condyle was preserved and used to recreate the patella. The bone cut was bigger in size and resembled the patellar implant and was also considered to preserve the cartilage better (Fig. 4). After an implantation trial, the quadriceps tracking was observed. The place for patella was determined by tracking a small calcified and scarred tissues in the muscle that gave an indication of the previous position of the patella. A pouch was created in the quadriceps mechanism at the place of patella implantation, and the bone chunk was sutured in place using heavy sutures (Fig. 5) The patellar tracking was confirmed before closure.

Figure 4.

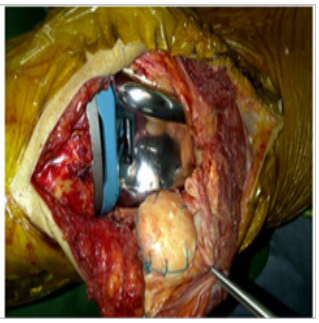

Figure 5.

Follow up

The patient is now 6 years postop. At his 12 months follow-up, he was returned to his previous job as a governor staff and was able to walk without pain. The knee was stable to climb up and down the stairs and the ROM of the knee was 0-120. The X-rays did not show any absorption of the new patella, and it stayed firmly in its position (Fig. 6,7).

Figure 6.

Figure 7.

DISCUSSION

The negative effects of patellectomy in the static and kinematics of the knee are now well recognized. The main indication for total knee arthroplasty in patellectomy patients is pain. However, TKR has higher complication rate and inferior results compared to intact patella.

A procedure for restoring the extensor mechanism and improving the quadriceps leverage by an allograft containing tibial tubercle, patellar tendon, patella and quadriceps tendon has been reported. The outcome of the extensor mechanism allograft (EMA) shows adequate intermediate term survival in a limited small case series, however, the reoperation rate was high and associated with worse functional outcome.

In our case, restoring the extensor mechanism is provided by a bony cut autograft implanted in the previous patella location. By using an autograft, the risk of tissue rejection is annulled. Even though the bone graft is thinner compared to the patella at EMA, this kind of bone graft is available in every primary total knee replaced. We also did not see any absorption of the graft at 12 months postop. The result of this technique for this particular patient is excellent due to no pain felt during walking or at rest and the ROM of the knee is more than 90 degrees. However, the limitation of this technique is that we do not have any radiologic evidence at 5 years postop. A further follow up is needed to see whether the patient develops any long-term complication and the survivorship of the bone graft.

CONCLUSION

Although typically patients with knee arthroplasty, after previous patellectomy, had more complications and generally less successful outcomes than those with intact patellas, the result for our special patient is sufficiently good to continue operation.

As an alternative to EMA, in order to reconstruct the extensor mechanism, an autograft bone cut from posterior medial femur condyle can be used.

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