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Functional outcome of non-resurfacing patelloplasty in primary total knee arthroplasty- A one year follow up study of 62 knee replacements

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Abstract

The management of the patella during total knee arthroplasty is still controversial. This study aims at assessing the functional outcome of total knee replacements with a non-resurfacing patelloplasty technique. We had a total of 53 patients and 62 total knee replacements. The patients were assessed preoperatively with Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score and were treated with total knee replacements with a non-resurfacing patelloplasty technique. The patients were followed up for 1 year and WOMAC score was calculated to assess the functional outcome. The results showed a very promising improvement in the functional status of the patient. The authors recommend the use of non-resurfacingpatelloplasty, as the procedure gives comparable results with resurfacing patelloplasty while avoiding its complications.

Keywords: Anterior knee pain, Patelloplasty, Patellar resurfacing, Total knee arthroplasty.

Introduction

Total knee arthroplasty is one of the most efficient surgical solutions to the pain caused by arthritis of the knee. It is a very common surgery with a high patient satisfaction rating [1]. Still, the management of patella in total knee arthroplasty remains controversial. The surgical options for the management of patella during total knee arthroplasty are patellar resurfacing, tidying up of the patella and the patelloplasty [2]. Patellar resurfacing is the option that provides maximum patient satisfaction, but is associated with a wide variety of complications such aspatellar fracture, avascular necrosis), patellar tendon injury, extensor mechanism rupture, patellar clunk syndrome, and instability [3]. The aim of this study is to assess the functional outcome in terms of post-operative anterior knee pain for patients who underwent total knee replacement with non-resurfacing patelloplasty.

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Patient and Methods

This study includes a total of 53 patients with 62Total total knee replacements who had primary total knee arthroplasty for degenerative and inflammatory tricompartmental osteoarthritis at Baby Memorial Hospital, Calicut.

The inclusion criteria included patients with tricompartmental osteoarthritis and anterior knee pain who underwent Total total knee arthroplasty in our institute.

The exclusion criteria were patients with prior realignment surgeries like such as high tibial osteotomy and patients with revision total knee arthroplasty.

Forty-four patients underwent unilateral Total total knee arthroplasty, two patients had staged bilateral total knee arthroplasty, and seven had bilateral single-stage total knee replacements. The functional assessment after surgery for all the patients were was done at the end of 1 year.

Operative technique

Anesthesia: Spinal + Epidural anesthesia.

All patients had foleys catheterisation of the bladder 1 hour before surgery and was removed once the patient was mobilised postoperatively.

A pneumatic tourniquet was used for all the cases with an

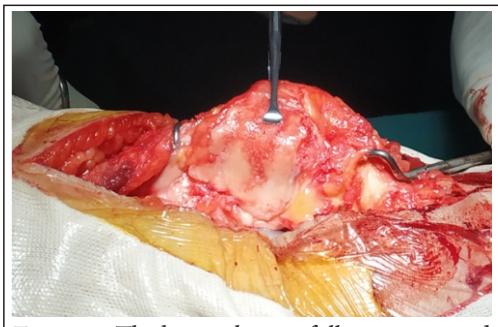

Figure 1: The knee is kept in full extension, and the patella is everted fully. The picture shows arthritic changes in the patellar articular facets.

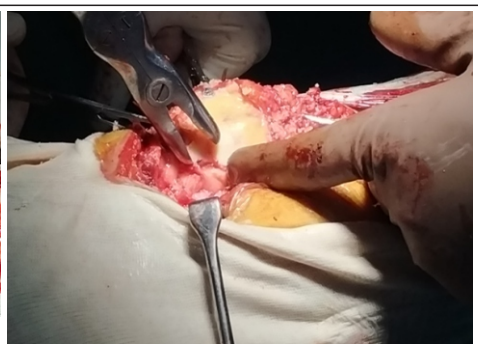

Figure 2: The osteophytes are removed from all around the patella.

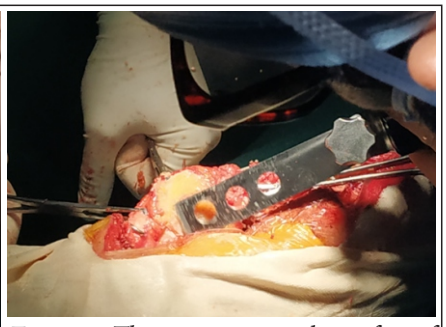

Figure 3: The worn-outarticular surface of the patella is removed using an oscillating bone saw and smoothened and reshaped.

inflation pressure of 280 mm Hg.

Surgical Approach: Medial The medial parapatellar approach was used in all the cases.

Prosthesis used: Either posterior stabilising stabilizing or cruciate retaining.

All patients were treated with patelloplasty and patellar denervation.

Steps of patelloplasty

1. After taking appropriate femoral and tibial cuts, and balancing the extension and flexion gaps, trial insert is placed.
2. The knee is kept in full extension, and the patella is everted fully.
3. The osteophytes are removed from all around the patella.
4. The articular cartilage of the patella is removed using an oscillating bone saw, taking care to restore the normal anatomy of the medial and lateral facets.
5. The surface of the patella is smoothen using a filer.
6. Denervation of the patella: Denervation using electrocautery was done only on the lateral side of the patella, as the medial parapatellar approach leads to denervation from the medial side. Superior and inferior denervation was avoided to prevent damage to the quadriceps and patellar tendon, respectively.
7. This was combined with the lateral release for patients with severe valgus knee or those with tight lateral retinaculum for attaining perfect patellar tracking.

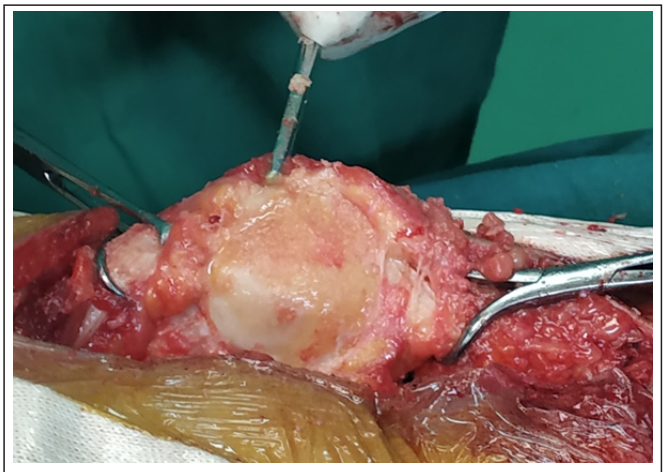

Figure 4: The patella after smoothening of the surface by the bone filer.

Results

We had a total of 53 patients, and 62 knee replacements. Out of these, eight patients suffered from rheumatoid arthritis and the rest were suffering from primary osteoarthritis of the knee. The functional knee scoring system of WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was used to determine the pre-operative disability level. All patients underwent total knee replacements with non-resurfacing patelloplasty under the standard protocol. The scoring was repeated one year after the procedure to note the post-operative WOMAC score.

- The mean age of the patients was 61.2. Out of these, 11 patients were males and 42 patients were females.
- Out of the 62 knees that were operated upon, 46 had varus deformity, and 16 had valgus deformity.
- 41 Forty-onepatients underwent cruciate cruciate-retaining total knee arthroplasty, whereas 21 had posterior stabilising stabilizing prosthesis.

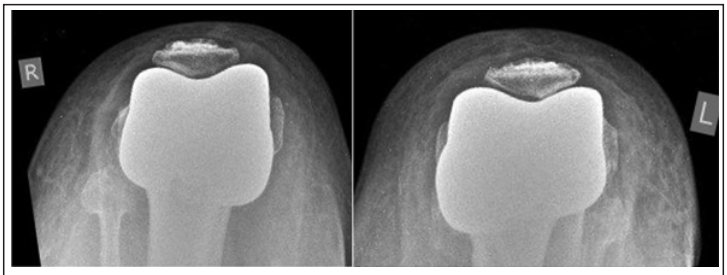

Figure 5: Post-operative skyline view X-rays showing the positioning of the patella in the trochlear groove of the prosthesis.

• The mean pre-operative WOMAC score was 68.34.
• The mean post-operative WOMAC score was 27.56 at one 1 year follow-up.

The WOMAC scores showed clear improvement after the procedure.

Three patients in our study had complaints of anterior knee pain persisting after 1 month. The patients were managed with physiotherapy, quadriceps strengthening, and analgesics. At one year follow-up, the patients are relatively symptom symptom-free. No patients in our study group needed conversion to resurfacing patelloplasty.

Discussion

This study aims at assessing the functional outcome of non-resurfacing patelloplasty as regard to the WOMAC [4]. The management of the patella during primary total knee arthroplasty remains controversial despite three decades of evolution in the arthroplasty techniques. There are many different approaches to the management of patella. Some surgeons do the traditional excision of osteophytes combined with denervation of the patella, while some resort to complete patellar resurfacing. The patellar resurfacing surgery, though it provides excellent post-operative functional outcome, is associated with a set of dreaded complications such ascomponent failure, fracture of the thinned out patella, tendon rupture,and even anterior knee pain due to the overstuffing of the anterior compartment [5,6].

Non resurfacing patelloplasty is a rarely used surgical technique, which allows for better tracking of the patella when compared to traditional patellar osteophyte removal with denervation while avoiding the complications associated with patellar resurfacing. In this technique, worn-out patellar articular surfaces are resected using an oscillating saw and the surface smoothened using a bone filer. Both facets of the patella are reshaped to match the trochlea of the femoral component, mimicking the normal anatomical shape of the patella with 130 degree angle between the facets, thus aiding in improving congruence and helping in improving patellar tracking [5,6].

In any case, care must be taken to retain a minimum thickness of the patella to prevent post-operative extensor mechanism damage. On the other hand, some studies reported that a thicker patella is associated with an increased incidence of lateral patellar subluxation and maltracking, increased patellofemoral joint contact pressures, eventually leading to patellar instability, and anterior knee pain [7,8]. Other authors have reported that anterior patellar strain increases with a thinner patella and that any patellar thickness of <15 mm causes significant strain at the extensor mechanism of the knee [5,9].

Zupanet al. [5], in a systematic review of published works on patelloplasty, found out that non resurfacing patelloplasty yielded better functional results when compared to traditional osteophyte removal and denervation, but the results were inferior to those obtained with patellar resurfacing. Patelloplasty without resurfacing remains a safe alternative in the management of patella in total knee replacement as no intraoperative or post-operative complications have been reported yet in literature. In addition, this procedure retains enough bone stock in the patella that it can be easily converted to patellar resurfacing if the patient continues to complain of anterior knee pain postoperatively [10]. In the present study, no patient needed conversion to resurfacing patelloplasty.

Conclusion

Even after three decades of evolution of arthroplasty techniques in total knee replacement, the ideal management of patella remains controversial. Among the various techniques available, non-resurfacing patelloplasty, though rarely used, is a promising solution to the conundrum. This procedure offers a solution to the problem of anterior knee pain, helps in improving the patellar tracking, and reduces chances of lateral patellar subluxation, all the while avoiding the complications of patellar resurfacing such ascomponent loosening and patellar fractures. Non-resurfacing patelloplasty also has the advantage that the procedure retains enough bone stock in the patella so that we can easily convert it into a resurfacing patelloplasty if the need arises postoperatively.

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