Original Research Article

Outcomes and analysis of total knee arthroplasty with non-patella resurfacing techniques for patients with osteoarthritis of the knee in a subpopulation of Western India

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Abstract

Introduction: The decision to resurface the patella during total knee arthroplasty remains controversial. Even though some surgeons routinely resurface the patella to avoid the increased rates of postoperative anterior knee pain and reoperation for secondary resurfacing, others selectively resurface based on the presence of anterior knee pain, notably damaged articular cartilage, inflammatory arthritis, isolated patellofemoral arthritis, and patellar subluxation and maltracking. It is often said that there is no difference in clinical and functional outcome of Total Knee Arthroplasty (TKA) for knee osteoarthritis using patellar resurfacing and non-resurfacing techniques. Thus, this study was performed to evaluate the outcome of non-patella resurfacing total knee arthroplasty. **Materials and Methods:** A total of 50 patients in series who came to Ruby Hall Clinic, Pune with clinical signs and symptoms of osteoarthritis confirmed radiologically, were operated. The functional and clinical outcomes with Knee society score and VAS score were measured. **Results:** There was significant difference in outcome of non-resurfaced patella pre-operatively and post-operatively. There was significant improvement in mean range of motion (ROM). It was 87.2 Pre-op vs 104.4 Post-op. The Knee Society Score (KSS) had a mean Pre-op 39.66 v/s Post-op 83.26. The improvement in functional score was from a Pre-op 52.5 to post-op of 83.36. The mean Visual Analogue Score (VAS) score decreased from 7.98 to 2. **Conclusion:** The results showed significant difference in both the main indicators of Knee Society Score (KSS) and Visual Analogue Score (VAS), both pre-operatively and post-operatively.

Keywords: Non-patellar resurfacing, Osteoarthritis, Total knee arthroplasty.

Introduction

Historically, the patella accounted for up to 50 % of total knee arthroplasty (TKA) failures in the 1980s and early 1990s when dissociation or failure of a cementless metal-backed patellar component was the most common device-related complication of TKA. However, contemporary studies show that relatively fewer TKAs fail because of patellofemoral complications [1-4].

Total knee arthroplasty is a reliable procedure used to correct knee deformities, relieve pain and improve knee function following arthritis. Anterior knee pain is a major post-operative complication that compromises patient satisfaction. Patellar resurfacing have offered varying results. The hesitancy to resurface the patella routinely in total knee arthroplasty stems from the history of higher than acceptable complications with patellar component. A lack of patellofemoral symptoms preoperatively creates further doubt as to whether all patients need patellar resurfacing.

The results comparing knee pain in resurfaced and non-resurfaced patella are mixed. There are authors recommending routine resurfacing [1-4] routine retention [5, 6] and selective resurfacing of the patella [7-11]. Wisdom of adding a patellar component routinely has been tempered by concerns about implant loosening, patellar fractures, avascular necrosis, patellar

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subluxation and dislocation, and extensor mechanism rupture [12-14]. The issue of whether or not the patella should be resurfaced routinely during total knee arthroplasty is still controversial. The issue concerns whether long term patient satisfaction is improved by patellar resurfacing and whether patellar symptoms and complications can be avoided by not resurfacing the patella.

Resurfacing the patella is performed the majority of the time in the United States and in many regions, it is considered standard practice. In many countries, however, like India, the patella is left un-resurfaced an equal amount of the time or even rarely ever resurfaced. Patella resurfacing is not a simple or benign procedure. There are numerous negative sequelae of resurfacing including loosening, fragmentation, avascular necrosis, lateral facet pain, stress fracture, acute fracture, late fracture, and restricted motion.

There are numerous advantages of not resurfacing the patella including less surgical time, less expense, a lower risk of "major" complications (especially late complications), and if symptoms develop in an un-resurfaced patella, it is an easier salvage situation with more options available. A small percentage of total knee patients will be symptomatic whether or not their patella is resurfaced. Not resurfacing the patella retains more options and has fewer complications.

The major determinant of clinical result and the presence of anterior knee pain after knee replacement is surgical technique and component design not whether or not the patella is resurfaced. Patella resurfacing is occasionally necessary for patients with inflammatory arthritis, a deformed or maltracking patella, or symptoms and pathology that are virtually restricted to the patellofemoral joint. For the vast majority of patients, however, patella resurfacing is not necessary [7-11]. Numerous controlled clinical trials have compared Total Knee Arthroplasty outcomes between patellar resurfacing and non-resurfacing procedures, but the results have been inconclusive. Our hypothesis is that patellofemoral resurfacing would not influence the disease specific outcome of osteoarthritic patients undergoing Total Knee Arthroplasty.

Methodology

Setting, duration & type of study- All 50 patients in the series presented to the Orthopaedics OPD of Ruby Hall Clinic, Pune, from October 2017 to October 2018 with clinical symptoms and signs of osteoarthritis confirmed radiologically for tricompartmental osteoarthritis and were treated as indoor patients. This was a prospective observational study. Patients were followed up for minimum 1 year and evaluated with follow up x-rays.

Patients with no ipsilateral knee or ankle arthritis or fracture or spine deformity were advised for operation. Patients were sent for medical and anaesthetic fitness. Fit patients giving consent taken for operation.

Inclusion criteria

1. All patients undergoing Total Knee Arthroplasty in Ruby Hall Clinic, Pune
2. Age 50 and above
3. Neuro-vascular status– Normal
4. Patients diagnosed with tricompartmental Osteao-arthritis of the Knee

Exclusion criteria

1. All patients who are medically unfit
2. Patients not satisfying any inclusion criteria
3. Ipsilateral hip and knee arthritis
4. Total knee replacement done in pathological fracture/ stress fracture/ healed fracture in proximal tibia or distal femur.
5. Spine deformity or disc pathology
6. Patients not consenting for inclusion in the study.

Scoring system- Operated patients were evaluated by Knee society score and Visual Analogue Score.

Surgical procedures- All surgeries were performed by a single surgeon. Standard surgical techniques including midline incision and medial parapatellar exposure was utilized.

Standard femoral and tibial cuts were taken, and Johnson & Johnson Depuy posterior cruciate sub-stituting total knee replacement prosthesis was used with cemented components.

In all patients, patellar osteophytes were removed, rim was cauterized in 5mm edge of patella, fibrillated cartilage smoothened and denervated.

A standard protocol was followed ensuring all subjects received similar preoperative, perioperative and post-operative care. Early mobilization was encouraged starting first post- operative day.

Results

Paired t test was used for analysis. The mean pre-op knee society clinical scoring is 39.66. The mean post op knee society clinical scoring is 83.26 indicating a huge shift. The p-value is less than 0.0001 which is statistically significant.

The mean pre-op functional score was 52.5. The mean post op functional score was 83.36. This indicates that the post-operative functional scores were well within the acceptable range and indicated improved functional outcomes for patients who underwent total knee arthroplasty without patella resurfacing. The p value of the patient was less than 0.0001 which is statistically significant. In the present study pre-operative VAS scoring was 7.98 and post- operative was 2.

This huge shift can be partially attributed to the successful functional outcomes, and this also downplays the role of anterior knee pain that most advocates of Patella resurfacing insist upon.

Discussion

It is a not so uncommon clinical scenario: well-fixed, well-aligned, balanced total knee arthroplasty with continued pain. However, radiographs also demonstrate an unresurfaced patella. The debate continues and the controversy remains as whether or not to routinely resurface the patella in total knee arthroplasty. In perhaps the most widely referenced article on the topic, the overall revision rates were no different between the resurfaced (9%) and the unresurfaced (12%) groups and thus their conclusion was that similar results can be obtained with and without resurfacing. However, a deeper look into the data in this study shows that 4 times more knees in the unresurfaced group were revised for patellofemoral problems [17].

Precise and accurate diagnosis of the etiology of a painful TKA can be very difficult, and there is likely a strong bias towards early revision with secondary patellar resurfacing in the painful TKA with an unresurfaced TKA. At first glance, secondary resurfacing is associated with relatively poor outcomes. Correia, et al. reported that only half the patients underwent revision TKA with secondary resurfacing had resolution of their complaints. [18].

The total number of patients in the study is 50. The prevalence of male and female in the present study was equal. The mean pre-operative and post-operative knee society clinical and functional scoring is extremely significant $p<0.0001$.

The knee society clinical score in the present study was 83.26 which was excellent. The scoring of the present study was compared with that of resurfaced patella.

A. J. Smith, D.J. Wood, M.G. Li et al [15] did a randomized study on 181 patients. Clinical follow up was available in 159 knees. On comparing the pre-op and post-op clinical outcome with their resurfaced group, excellent outcome was achieved.

Fig 1 – Pre-op and Pos-op case of Total Knee Arthroplasty

Figure 1: Pre op and Post op case of total knee arthroplasty without patella resurfacing

Table 1: Pre and Post-operative knee society score.

Column 1	Pre-operative	Post- operative
Resurfacing	39.7	92
Non- resurfacing	40.08	83.26

The functional score was independent of clinical score and evaluation through the walking distance, act of climbing and descending stairs, and use of aids while walking. Functional outcome in A.J. Smith, D.J. Wood, M.G. Li et al [15] were lower compared to the present study.

Table 2: Pre and Post-operative knee function score.

Column 1	Pre-op	Post-op
Resurfacing	51.9	60
Non resurfacing	52.5	84.06

Visual analogue score is another method used to evaluate the outcome based on the intensity of pain.

The mean VAS score in study of Mohammad H. Kaseb, Mohammad N. Tahmasebiet al [16] in case of pre-operative and post- operative were 8.67 and 1.5. In the present study pre-operative VAS scoring was 7.98 and post-operative was 2. Moreover, The knee society clinical outcome of non-patellar resurfacing was not statistically significant in comparison to resurfacing of patella

The functional outcome of non-patellar resurfacing was good and comparable to other studies. The number of patients having anterior knee pain was quite low. The reason of having less anterior pain may be related to denervating the patellar rim by cauterization and removing the osteophytes and decompressing it [18].

Table-3: Pre and Post-operative VAS scoring

Column 1	Pre-op	Postop
Resurfacing	8.67	1.5
Non resurfacing	7.98	2

Conclusion

The result of this study indicates no superiority of non-patellar resurfacing as compared to patellar resurfacing in terms of clinical outcome. The knee society clinical outcome of non-patellar resurfacing was not statistically significant in comparison to resurfacing of patella.

What the study adds to the existing knowledge?

The functional outcome of non-patellar resurfacing is good and comparable to other studies. The number of patients having anterior knee pain was anyway quite low. The present results establish that not resurfacing the patella gives equally good results. However, it is recommend that selective resurfacing of patella as indicated in conditions such as rheumatoid arthritis, age more than 60 years, and also depending on the surgeon experience and training.

Author's contributions

Dr. Umang R. Barot & **Dr. Milan M.** Chaudhari were involved in identifying the required cases, manuscript preparation, and collecting data.

Dr. Kavyansh Bhan was involved in Manuscript preparation, data analysis and drawing relevant conclusions and the entire correspondence.

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