Evaluation of clinical outcome of non-patella resurfacing total knee replacement

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Introduction: There is no difference in clinical and functional outcome after total knee arthroplasty (TKA) for knee osteoarthritis between patellar resurfacing and non-resurfacing. Thus, the current study has performed this study to evaluate the outcome of non-patella resurfacing total knee arthroplasty. Methods: A total of 50 patients in series who came to our institute with clinical signs and symptoms of osteoarthritis confirmed radiologically, were operated. The current study measured the outcomes with Knee society score and VAS score. Results: There was a significant difference in the outcome of non-resurfaced patella pre-operatively and post-operatively. There was a significant improvement in the mean range of motion (ROM) 87.2 pre-op vs 104.4 post-ops, KSS pre-op mean 39.66 vs post-op mean 83.26. The improvement in the functional score was pre-op 52.5 to post-op 83.36. The mean VAS score decreased from 7.98 to 2. There was no difference in patella resurfacing and non-patella resurfacing. Conclusion: The results showed a significant difference in knee society score and VAS pre-operatively and post-operatively.

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

Introduction

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 postoperative complication that compromises patient satisfaction. Patellar resurfacing have offered varying results. On one side there is the hesitancy to resurface the patella routinely in total knee arthroplasty as there is the history of higher than acceptable complications with the patellar component, on another side, there is the problem with anterior knee pain post-non-resurfacing of the patella in total knee replacement.
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]. This study is required because, in some of the surgeries, the patella is replaced whereas, in some of the surgeries, the patella is not replaced. Thus, the current study intends to study the results between resurfacing of patella versus not resurfacing of the patella and its impact on the patients after the operation.

Methodology

All 50 patients in the series were referred to as orthopaedic OPD of C.U.SHAH Hospital, Surendranagar with clinical symptoms and signs of osteoarthritis confirmed radiologically by Kellegren Lawrence [12] classification for tricompartamental osteoarthritis and were treated as indoor patients. Patients with no ipsilateral knee or ankle arthritis or a fracture or spine deformity were advised for operation. Patients were sent for medical and anaesthetic fitness. Fit patients giving consent taken for the operation.

Inclusion criteria
01. All patients undergoing total knee replacement in C.U. Shah Medical College and Hospital.
02. Age 50 and above
03. Neuro-vascular status normal

Exclusion criteria
01. All patients who are medically unfit
02. All patients satisfying inclusion criteria
03. Ipsilateral hip and knee arthritis
04. Total knee replacement is done in pathological fracture/ stress fracture/ healed fracture in the proximal tibia or distal femur
05. Spine deformity or disc pathology

Operated patients are evaluated by Knee society score [13] and Visual Analogue Score [14-15]. Patients are followed up for a minimum 1 year and evaluated with follow up x-rays. The current study was a prospective observational study. Standard surgical techniques including midline incision and medial Para-patellar exposure was utilized. Standard femoral and tibial cuts were taken PCL was cut. Soft tissue balancing was done. External rotation of femoral component was kept at 3 degrees from posterior condylar axis according to manufacturer instrumentation. The current study used cemented Johnson and Johnson Depuy posterior cruciate substituting total knee replacement prosthesis. In all patients, patellar osteophytes were removed, the rim was cauterized in 5mm edge of patella, fibrillated cartilage smoothened and denervated. The anatomical patella tracking was ensured. Tourniquet was used during the procedure. A standard protocol was followed ensuring all subjects received similar preoperative, perioperative and post-operative care (Figure 1-5). Early mobilization was encouraged starting first post-operative day. The present study has used paired t-test using the Graph-pad software for analysis.

Results

The mean pre-op knee society clinical scoring was 39.66. The mean post-op knee society clinical scoring was 83.26. The p-value was less than 0.0001 which is extremely statistically significant. This indicated the favourable outcome of our post-operative patients in terms of flexion, extension, valgus-varus orientation, post-operative instability etc (Table 1).

Clinical Outcome- The knee society clinical score in the present study is 83.26 which is excellent.

Table-1: Pre-operative and postoperative clinical outcome with their resurfaced group.

<table>
<thead>
<tr>
<th>Column1</th>
<th>Pre-op</th>
<th>Post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resurfacing</td>
<td>39.7</td>
<td>92</td>
</tr>
<tr>
<td>Non-resurfacing</td>
<td>40.08</td>
<td>83.26</td>
</tr>
</tbody>
</table>

Functional score: The functional score is independent of clinical score and evaluates the walking distance, act of climbing and descending stairs, and use of aids while walking. The mean pre-op functional score was 52.5. The mean post-op functional score was 83.36. The p-value of the patient is less than 0.0001 which is extremely statistically significant (Table 2).

Table-2: On comparing knee society score with their resurfaced patella.

<table>
<thead>
<tr>
<th>Column1</th>
<th>Pre-op</th>
<th>Post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resurfacing</td>
<td>57.4</td>
<td>87</td>
</tr>
<tr>
<td>Non-resurfacing</td>
<td>40.08</td>
<td>83.26</td>
</tr>
</tbody>
</table>

The mean postoperative clinical knee society score in their resurfaced patella and our non-resurfaced patella is 87 and 83.26 respectively, which is excellent according to clinical scoring and comparable (Table 3).
Table-3: On comparing knee society score with their resurfaced patella.

<table>
<thead>
<tr>
<th>Column1</th>
<th>Pre-op</th>
<th>Post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resurfacing</td>
<td>26.97</td>
<td>84.75</td>
</tr>
<tr>
<td>Non-resurfacing</td>
<td>40.08</td>
<td>83.26</td>
</tr>
</tbody>
</table>

Table-4: Functional outcome comparison in pre-op and post-op groups.

<table>
<thead>
<tr>
<th>Column1</th>
<th>Pre-op</th>
<th>Post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resurfacing</td>
<td>51.9</td>
<td>60</td>
</tr>
<tr>
<td>Non resurfacing</td>
<td>52.5</td>
<td>84.06</td>
</tr>
</tbody>
</table>

The outcome of the functional score is also considered good in our post-operative patients considering the criteria such as walking without aid, climbing, descending of stairs etc.

**VAS Score:** Visual analogue score is another method used to evaluate the outcome based on the intensity of pain. In the present study, pre-operative VAS scoring is 7.98 and post-operative was 2 (Table 5).

**Table-5:** Comparison of pre-operative and post-operative VAS scoring in a previously conducted study.

<table>
<thead>
<tr>
<th>Column1</th>
<th>Pre-op</th>
<th>Post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resurfacing</td>
<td>8.67</td>
<td>1.5</td>
</tr>
<tr>
<td>Non resurfacing</td>
<td>7.98</td>
<td>2</td>
</tr>
</tbody>
</table>

**Fig-1:** Incision for TKR.

**Fig-2:** Distal femoral cut.

**Fig-3:** Placement of femoral and tibial prosthesis.
Discussion

Osteoarthritis (OA) is a chronic degenerative joint disease and a major cause of disability in elderly people\[16\]. In most arthritic knees, some degree of instability, deformity, contracture or combination of these elements, can be found \[17-19\].

The surgical techniques have varied from soft tissue interposition arthroplasty to resection arthroplasty to surface replacement arthroplasty.

This prospective study was done to evaluate the outcome non-patella resurfacing arthroplasty using clinical and functional knee society score and VAS score and to find the difference between non-patella and patella resurfacing TKA.

There are three proponents for patella resurfacing-those who routinely resurface the patella, those who never resurface patella and those who selectively resurface patella. There have been reports of anterior knee pain is a common complication, with residual anterior knee pain present between 5% to 45\%\[20-23\] in patients who do not resurface patella. Routine patellar resurfacing appears to be an option to reduce patellofemoral-related pain, but prospective randomised trials have not provided
Consistent results in the short- to medium-term [24-26].

Residual anterior knee pain after TKR is a common cause of early revision surgery, but resurfacing the patella in these circumstances may not relieve the symptoms[27-28].

Routine resurfacing of the patella has also complications. These included patellar fracture, extensor mechanism disruption, osteonecrosis, aseptic loosening, instability and dislocation, overstuffing of the patellofemoral joint, polyethylene wear, and patellar clunk syndrome[29].

The present study compared our scoring with that of the resurfaced patella.

A.J. Smith, D.J. Wood, M.G. Li et al[30] 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, the excellent outcome was achieved. David J. wood, Anne J Smith et al[31] performed a randomized study on patellar resurfacing in 220 osteoarthritic knees. There was no significant difference in knee society clinical score between the present study and result of Mohammad H. Kaseb, Mohammad N. Tahmasebi et al[32]. Functional outcome in A.J. Smith, D.J. Wood, M.G. Li et al [30] was lower compared to the present study (Table 6).

Table-6: The functional outcome comparison between the present study of non-resurfaced patella and study of the resurfaced patella in previously conducted study.

<table>
<thead>
<tr>
<th>Column1</th>
<th>Pre-op</th>
<th>Post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resurfacing</td>
<td>51.6</td>
<td>70</td>
</tr>
<tr>
<td>non-resurfacing</td>
<td>52.5</td>
<td>84.06</td>
</tr>
</tbody>
</table>

From the above the result it is evident that non-resurfaced patella has better functional score than the resurfaced patella.

Table-7: Comparison of the functional outcome in pre-op and post-op groups between the present study of non-resurfaced patella and study of the resurfaced patella in previously conducted study.

<table>
<thead>
<tr>
<th>Column1</th>
<th>Pre-op</th>
<th>Post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resurfaced</td>
<td>28.87</td>
<td>83.75</td>
</tr>
<tr>
<td>Non-resurfaced</td>
<td>52.5</td>
<td>84.06</td>
</tr>
</tbody>
</table>

The present study compared the functional outcome of the present study with Mohammad H. Kaseb, Mohammad N. Tahmasebi et al [32] and the

Functional outcome is similar in both these studies and comparable (Table 7).

The mean VAS score in the study of Mohammad H. Kaseb, Mohammad N. Tahmasebi et al[32] pre-operative and post-operative is 8.67 and 1.5. In the present study, pre-operative VAS scoring is 7.98 and post-operative is 2. Dr. Manjunath KS, Dr.Gopakrishna et al[33] compared VAS scoring pre-operatively and post-operatively (Table 8).

Table-8: Comparison of pre-operative and post-operative VAS scoring.

<table>
<thead>
<tr>
<th>Column1</th>
<th>Pre-op</th>
<th>Post-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non resurfaced</td>
<td>7.9</td>
<td>2</td>
</tr>
<tr>
<td>Resurfaced</td>
<td>7.7</td>
<td>1.9</td>
</tr>
</tbody>
</table>

The anterior knee pain score in Dr. Manjunath KS, Dr.Gopakrishna et al[33] study is 1.4 (Mean) compared to the present study which is 2 (Table 9).

Table-9: Comparision of anterior knee pain score.

<table>
<thead>
<tr>
<th>Column1</th>
<th>Post-op and knee pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resurfaced</td>
<td>1.4</td>
</tr>
<tr>
<td>Non-resurfaced</td>
<td>2</td>
</tr>
</tbody>
</table>

The anterior knee pain in a study conducted by A.J. Smith, D.J. Wood et al[30], in the resurfacing group 18 out of 86 (20.9%) patient had anterior knee pain whereas 4 out of 50 (8%) patient had anterior knee pain in non-resurfacing

The major limitations of the present study were the size of the sample. More the size of the population better comparison in terms of outcome. Also considering the current study did not resurface patella and comparing with other studies was one more limitation. The present study has not resurfaced the patella in our patients and has evaluated the outcome using knee society score and VAS score. The present study has compared our data with those of resurfaced patella using the same parameter.

Conclusion

The result of the present study indicated no superiority of non-patellar resurfacing compared to patellar resurfacing in terms of clinical outcome. The knee society clinical outcome of non-patellar resurfacing is not statistically significant in comparison to the resurfacing of the patella. The functional outcome of non-patellar resurfacing is good and comparable to other studies. The number of patients having anterior knee pain is quite low.
The reason for having less anterior pain may relate to denervating the patellar rim by cauterization and removing the osteophytes and decompressing it.

What does the study add to the existing knowledge?

The results of the present study establish that not resurfacing the patella gives an equally good result, however the current study recommend selective resurfacing of the patella as indicated such as rheumatoid arthritis, age more than 60 years, intraoperative maltracking of patella.

Author’s contribution

Dr. Shreyas Gandhi: Concept, chief surgeon
Dr. Darshil Parikh: Study design
Dr. Tapan Ankleshwaria: Manuscript writing
Dr. Pathik Vala: Data collection

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