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Secondary Patellar Resurfacing as a Rescue Procedure for Persistent Anterior Knee Pain After Primary Total Knee Arthroplasty: Do Our Patients Really Improve?

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ABSTRACT

Background: Secondary patellar resurfacing (SPR) is a procedure that can be used in patients with persistent anterior knee pain (AKP) after a primary total knee arthroplasty. The aim of our study was to analyze the clinical and functional outcomes as well as the complications of this procedure and identify predictive factors for a favorable outcome.
Methods: Forty-six patients who underwent SPR for persistent AKP after primary total knee arthroplasty were retrospectively studied. The patient's mean age was 68 years (range, 36-86 years). The average follow-up time after SPR was 74 months (range, 24-197 months). Demographic data, Knee Society Score scale, range of motion, pain improvement (Visual Analogue Scale), overall satisfaction, and complications were recorded. The statistical analysis was performed using STATA tm/SE v10.
Results: There was an improvement of the Knee Society scale (from 54 ± 11 to 64 ± 16 points; $P < .05$). However, in 59% of the cases, there was no pain improvement, and 65% of patients were not satisfied. Four patients showed complications, and in 2 cases, reoperation was necessary. We did not find any preoperative predictive factor for a favorable outcome after SPR.
Conclusion: Despite improvement of the Knee Society scale, many patients continue with AKP and are dissatisfied with this procedure; therefore, we do not recommend it in this clinical scenario.

There is no consensus in the literature regarding the implantation of the patellar component during a primary total knee arthroplasty (TKA). The Swedish registry shows that 14% of primary TKAs have a patellar component implanted [1,2]. In contrast, the Danish and US registries report this procedure in up to 76% of their cases [3]. Scott and Kim [4] estimated that approximately 10% of patients will have anterior knee pain (AKP) after a TKA regardless of the substitution or not of the patella.

Secondary patellar resurfacing (SPR) is an option for treating this condition; however, there have been mixed results reported regarding pain improvement (Visual Analogue Scale [VAS]), range of motion (ROM), clinical and functional outcomes, and satisfaction rates, which range from 40% to 90% [5-9].

The aims of our study were to (1) Analyze the clinical and functional outcomes of the SPR after primary TKA with persistent AKP and (2) Identify any preoperative factor that can predict a positive clinical or functional outcome after the SPR.

Material and Methods

After institutional review board approval, we conducted a retrospective review of our arthroplasty database. Between January 1999 and May 2012, 46 patients underwent SPR for persistent AKP

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of a total of 2973 primary unsurfaced TKA, representing 1.9% of these cases. All primary TKA implants were Genesis II components (Smith & Nephew Inc, Memphis, TN) and performed by different consultants from our arthroplasty division.

There were 6 males and 40 females with an average age at primary TKA of 66 years (range, 34-75 years). The average age at SPR was 68 years (range, 36-86 years). The average time between index procedure and SPR was 24 months (range, 7-121 months). SPR was performed in 31 right knees and 15 left knees. The average follow-up time after SPR was 74 months (range, 24-197 months), with no cases lost to follow-up. All patients had standing anteroposterior, lateral, and axial Merchant views radiographs preoperatively and after TKA and SPR. Patients with inflammatory arthropathies or other causes of AKP such as prepatellar bursitis, pes anserinus bursitis, and the absence of radiologic abnormalities of the patellofemoral joint such as patellar tilt, incongruence or fracture, or loosening of the femoral or tibial components were excluded. Patients with referred pain from the spine or ipsilateral hip and those who might have had periprostetic infections (who underwent routine preoperative tests of complete blood count, erythrocyte sedimentation rate, and C-reactive protein) were also excluded. Technecium-99 bone scintigraphy was performed before SPR in 37 (80%) patients, and in only 12 (32%) patients, an increased uptake in the patella was observed.

All SPR were performed using the previous incision and a standard medial parapatellar arthrotomy. The implant chosen was a biconvex patella (Smith & Nephew, Schenefeld, Germany). During the resurfacing procedure, the operating surgeons looked for any signs of component malpositioning or instability. Subsequent intraoperative cultures confirmed the absence of infection in all of the cases. In 14 cases, a lateral retinacular release to improve the tracking of the patella was performed. Physiotherapy was given routinely to inpatients, starting with exercises of flexion and extension of the knee. Patients were also instructed in a home exercise program. In addition to ROM exercises, the postoperative rehabilitation protocol includes lower extremity muscle strengthening; gait training, with full weight bearing as tolerated (crutches only for protection/balance), and instruction in performing basic activities of daily living. After a period of 2 weeks, the patients began full weight bearing without crutches (at this point in time they felt comfortable with their gait).

The assessment of outcomes was performed using the clinical and functional Knee Society [10] (KS) scores preoperatively and at 3, 6, 12, and 24 months and final follow-up. ROM preoperatively and postoperatively was also recorded. AKP pain was evaluated using the VAS preoperatively and postoperatively, and the interval time free of pain in patients who presented with temporary remission was recorded. Furthermore, we evaluated the patient's satisfaction with a custom-made questionnaire regarding these criteria: (1) pain improvement after the procedure (a. improved; b. same; c. worse); (2) satisfaction with the outcome of SPR (a. satisfied; b. not satisfied); and (3) if they would undergo SPR again.

Those patients with AKP improvement were included in group A and those with worsening or no improvement in group B.

In addition, complications, such as infection, patellar loosening, periprosthetic fracture of the patella, patellofemoral instability, or additional procedures, such as lateral retinacular release, polyethylene's change, and patella's osteophyte resection, were recorded.

Statistical Analysis

Comparison between preoperative and postoperative resurfacing KS scores was done using Wilcoxon test. Chi-square test was used for the analysis of qualitative variables and the Mann–Whitney test used for the study of quantitative and nonparametric variables. Statistical analysis was set at the 95% confidence level ($P < .05$). The statistical analyses were performed using STATA tm/SE v10.

Results

The average KS [10] knee score improved significantly from 54 ± 11 points before resurfacing to 64 ± 16 points at the latest follow-up ($P = .0005$). KS [10] function score also improved significantly from 45 ± 17 points preoperatively to 51 ± 18 points at the final follow-up ($P = .0094$). There was no statistically significant improvement of the ROM (91° ± 19.7° to 96° ± 15.4°; $P = .08$).

Although there was a statistically significant improvement on the reported pain (8 ± 1 preoperatively to 6 ± 4 at the latest follow-up; $P = .0004$); only 19 patients (41%) stated that their knee pain was better postoperatively (group A, n = 19). Of these, 14 (73.7%) patients reported a temporary resolution of their symptoms. However, at a mean interval of 20 months (2-84 months), the pain returned. They felt subjectively better than before SPR with mean VAS 3, at final follow-up. Only 5 cases (26.3%) reported a continued AKP improvement, with VAS 2, at latest follow-up. Thirteen patients (48.1%) stated that their symptoms were the same, and 14 patients (51.9%) stated that their postoperative symptoms were worse (group B, n = 27).

Thirty patients (65%) were not satisfied with the procedure. Reasons for dissatisfaction were little or no decrease of AKP in 27 patients; and in three patients, although there was significant pain improvement, this was temporary and only lasted 2 months. Furthermore, there were no statistically significant difference between group B and the dissatisfied group ($P = .54$).

An additional procedure such as lateral retinacula release was performed in some patients, which potentially influenced the final outcomes. For this reason, we analyzed 2 groups: (1) group 1: only SPR procedure (n = 32), and group 2: an additional lateral retinacular release (n = 14). We did not find any statistically significant difference between the groups (Table 1).

Bone scintigraphy was performed in 37 patients (80%) before proceeding with SPR, with increased patellar uptake in 12 of these cases (32%). Of these 12 cases, only 5 patients (42%) improved after SPR. Among the 25 patients in whom scintigraphy showed no increased uptake, improvement of AKP was observed in 12 patients (48%), with no significant differences between these groups ($P > .05$).

No preoperative factors were found to predict a successful outcome after SPR (Table 2).

There were 4 (8.7%) surgery-related complications: 2 accidental partial patellar tendon rupture, which were repaired with 2 anchors and a lateral release during the same SPR procedure, 1 patellar instability and 1 patellar aseptic loosening, that occurred

Table 1
Comparison of Knee Functional Outcomes, Pain Improvement, and Satisfaction Rate Between Patients Who Underwent SPR and Patients With Another Procedure Such as Lateral Retinacular Release.

Variables	SPR Without Lateral Release (N = 32)	SPR With Lateral Release (N = 14)	*P*
Clinical KSS postoperative (SD)	45 (10)	62.78 (13)	.6058
Functional KSS postoperative (SD)	55 (8)	53.21 (10)	.97
Total KSS postoperative (SD)	100 (10)	116 (20)	.90
VAS postoperative (SD)	8 (1)	6.9 (3)	.41
Pain improvement	No: 16; yes: 16	No: 11; yes: 3	.07
Satisfaction	No: 19; yes: 13	No: 11; yes: 3	.21

KSS, Knee Society Score; SD, standard deviation; SPR, secondary patellar resurfacing; VAS, Visual Analogue Scale.