RESEARCH ARTICLE

Comparison between Patellar Resurfacing and Retention in Total Knee Arthroplasty Regarding the Postoperative Satisfaction of Patients and Patellar Crepitus

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Abstract

Background: Patellar crepitus after total knee arthroplasty (TKA) is not uncommon. The choice between patellar resurfacing or retention in TKA has remained controversial. Therefore, this randomized controlled trial aimed to evaluate the impact of patellar resurfacing on the incidence of patellar crepitus. In addition, we compared the clinical outcomes and satisfaction between the patients who underwent patellar retention or resurfacing.

Methods: A total of 63 patients randomly received patellar resurfacing or non-resurfacing TKA by one surgeon at Imam Khomeini Hospital Complex, Tehran University of Medical Sciences, Iran during May 2014-February 2017. Finally, 29 patients in the resurfaced group and 44 subjects with retained patella were evaluated pre-op and in an average follow-up period of 8.68 months using the clinical Knee Society Score (KSS), functional KSS, and Knee injury and Osteoarthritis Outcome Score (KOOS).

Results: Our findings demonstrated no significant difference between the two groups regarding the satisfaction of patients, KSS, and KOOS. It was shown that the latter scores improved in both groups in the follow-up period. Nonetheless, patellar crepitus was not statistically different between the two groups.

Conclusion: According to the results of the present study, patellar resurfacing did not lead to decreased patellar crepitus or enhanced clinical outcomes of TKA.

Level of evidence: I

Keywords: Knee crepitus, Patellar resurfacing, Patient satisfaction, Total knee arthroplasty

Introduction

Although total knee arthroplasty (TKA) is a well-accepted treatment for painful degenerative osteoarthritis, the efficacy of patellar resurfacing has still remained controversial (1, 2). Some studies demonstrated the superiority of patellar resurfacing, especially in terms of pain relief and patient satisfaction. On the other hand, some other investigations reported the opposite findings (3-5). In addition, some surgeons believe that patellar resurfacing can be beneficial for limited and selected patients (6, 7).

Among all factors that have been mentioned to be important in making decisions, patellar crepitation is one of the clinical factors that may affect the satisfaction of patients after surgery. Crepitation refers to an asymptomatic unvalued noise or a painful clunk addressing a wide range of complaints (8-10).

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Diverse anatomical factors have been introduced as the risk factors of postoperative crepitation, such as smaller femoral component size, thicker polyethylene bearings, and a high intercondylar box ratio of a femoral component. As a result, new designs were developed for the femoral component and surgical techniques (11-18). However, postoperative crepitus is still a troublesome complication.

Patellar resurfacing is assumed to influence the occurrence of crepitation due to the significant effects on the kinematics of the patellofemoral joint. Nonetheless, few studies have examined the impact of patellar resurfacing on postoperative crepitation (19, 20). With this background in mind, the purpose of this study was to evaluate the influence of patellar resurfacing on the incidence of post-op crepitation and patient satisfaction, in comparison with patellar retention.

Materials and Methods

This prospective, randomized, comparative clinical trial was performed on consecutive patients to examine the effects of patellar resurfacing on the occurrence of patellar crepitus in TKA. This study was approved by the Institutional Review Board and Health Research Ethics Committee of Tehran University of Medical Sciences, Iran.

Regarding the ethical considerations, the study procedure was explained to all patients and written informed consent was received from the participants. This study was carried out on 73 knees from 63 patients who randomly received patellar resurfacing or non-resurfacing TKA using Zimmer® NexGen® Fixed Bearing Knee prosthesis by one surgeon during May 2014-February 2017 in Imam Khomeini Hospital Complex of Tehran University of Medical Sciences.

The exclusion criteria entailed the valgus deformity of knee, history of previous osteotomy around knee, distal femoral osteotomy, high tibial osteotomy, previous patellectomy, femoral or tibial bone loss requiring augmentation or stemmed prosthesis, history of knee septic arthritis, and any arthroscopy procedure of knee, namely meniscectomy, cruciate reconstruction, and degenerative joint disease of knee due to trauma.

Moreover, the patients were excluded in case they had a history of neurological disease, cerebrovascular accident, Parkinson's disease, multiple sclerosis, seizure, poliomyelitis, diabetes mellitus, inflammatory disease, rheumatoid arthritis, systemic lupus erythematosus, and were receiving corticosteroids, antidepressants, or anticonvulsive medicines. Patients with an experience of hip and acetabulum osteotomy or total hip arthroplasty were also excluded.

We recorded the preoperative variables, including age, gender, weight, height, body mass index (BMI), and the measures of knee varus angle. It should be noted that the clinical Knee Society Score (KSS), functional KSS, and Knee injury and Osteoarthritis Outcome Score (KOOS) were determined just before surgery and during the follow-up period as preoperative and postoperative, respectively.

In order to evaluate the incidence of postoperative patellar noise rates, we used the KOOS questionnaire. Furthermore, the size of components, including femoral, tibial, polyethylene, and patellar component in case of resurfacing were documented.

All surgeries were performed by one surgeon using Zimmer® NexGen® Fixed Bearing Knee prosthesis. The operation was completed by the standard surgical technique through a midline incision and medial parapatellar approach under tourniquet with all components cemented at the same time. All the data were statistically analyzed using the SPSS software version 13. Statistical significance was considered at the confidence level of 95% and *P-value* < 0.05.

Results

A total of 29 knees in the resurfaced group and 44 knees in the group of the retained patella were evaluated preoperatively and in the follow-up period using the clinical KSS, functional KSS, and KOOS. The findings of the current study showed that age, gender, height, weight, BMI, preoperative clinical and functional KSS, preoperative KOOS, and surgical side effects were not statistically different between the two groups [Table 1].

Both resurfaced and retention groups showed statistically significant improvements in the clinical and functional KSS and KOOS post-operation. However, no significant difference was revealed between the two groups in terms of the changes [Table 2]. We found patellar noise in nine knees out of 29 subjects in the resurfaced group and in 22 knees among 44 patients in the retention group, which was not statistically different between the two groups (*P=0.1*).

Our findings demonstrated that patellar noise did not significantly impress the postoperative knee scores. In the retention group, pre-op knee varus in patients with post-op knee noise (12.54±4.92) was significantly less than patients without postoperative knee noise (16.27±6.04) (*P=0.03*). In the retention group, patients with post-op knee noise (162.5±7.89) were significantly taller than patients without postoperative knee noise (157.77±4.67) (*P=0.02*). Furthermore, the results of this study indicated that the size of the component did not

Table 1. pre operative variables

Group	Retention	Resurfacing	*P value*
Age	65.75±6.85	68.1±7.65	0.1
Height	160.13±6.84	163.2±7.93	0.08
Weight	74.59±7.46	74±9.16	0.7
BMI	29.19±4.06	28±4.88	0.2
Follow/up	9.34±4.07	8.1±4.18	0.1
KSS	46.31±15.48	45.82±15.27	0.3
KSS Functional	47.61±15.92	48.44±16.44	0.2
KOOS	46.16±15.43	44.4±14.8	0.1
Gender	6 M/38 F	9 M/20 F	0.07
Side	21 Rt/23 Lt	14 Rt/15 Lt	0.9

Table 2. post operative scores			
Group	**Retention**	**Resurfacing**	***P value***
KSS	80.82±10.27	81.65±10.65	0.5
KSS Functional	69.09±23.10	68.44±22.81	0.6
KOOS	69.71±20.57	71.24±21.17	0.1

have a significant influence on the incidence of post-op knee noise.

Discussion

The TKA has been shown to be effective in reducing pain, restoring daily activities, and improving the quality of life in patients with degenerative knee osteoarthritis. Despite remarkable progress in surgical techniques and prosthesis design, most surgeons still seek a definitive indication to perform patellar resurfacing during TKA (2).

Currently, there are three different approaches among surgeons for patellar resurfacing, including never using this technique, always resurfacing patella with a prosthesis, and carrying out this procedure in selected cases (21, 22). Unfortunately, systematic studies, meta-analyses, and randomized clinical trials (RCTs) have been unsuccessful in showing any superiority for the two treatment methods of patellar resurfacing and retention (22-34). The literature is limited in this regard due to the diversity in the used prostheses, equipment, and follow-up assessments.

The present prospective RCT was based on strict inclusion and exclusion criteria. According to our results, the preoperative factors, including age, gender, height, weight, BMI, follow-up period, preoperative clinical and functional KSS, preoperative KOOS, and surgical side effects were matched between the two groups.

In order to omit the effect of the type of prosthesis on postoperative knee noise, in the present study a single surgeon used the same prosthesis and the same technique of surgery in all cases (35). The results of the statistical analysis did not confirm the effect of the size of the component on the post-op knee noise.

We found no significant difference in the postoperative clinical and functional KSS and KOOS between the resurfacing and retention groups. Furthermore, the findings did not reveal any significant decrease in the postoperative clinical and functional KSS and KOOS in neither of the groups with post-op knee noise. In addition, the statistical analysis showed that less preoperative varus deformity and taller height are associated with more postoperative knee noise in the patellar retention group.

According to the results of the current study, patellar resurfacing was not found to decrease patellar postoperative noise. Moreover, this technique did not affect the clinical outcomes of TKA.

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