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Клиническая оценка различий при тотальной артропластике коленного сустава с заменой суставной поверхности надколенника и без нее у пациентов с остеоартритом IV степени

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Clinical assessment difference between patellar resurfacing and retention groups with grade IV osteoarthritis in total knee arthroplasty

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Введение. Несмотря на прекрасные клинические успехи при проведении тотальной артропластики коленного сустава (ТКА), остаются разногласия по поводу того, проводить или не проводить замену суставной поверхности надколенника. Это побудило к проведению рандомизированных контролируемых исследований. Подобные исследования являются наиболее надёжным источником доказательства эффективности потенциального вмешательства. Но большинство этих исследований включает изучение результатов при всех степенях остеоартрита пателлофеморального сустава. Поэтому авторы провели проспективное исследование с целью сравнения клинических и рентгенологических исходов после ТКА с проведением замены суставной поверхности надколенника у пациентов с остеоартритом пателлофеморального сустава IV степени. **Материалы и методы**. В исследование включены 123 пациента с остеоартритом пателлофеморального сустава IV степени по Kellgren-Lawrence. Пациентов рандомизированно распределили по группам, в одной из которых проводили замену суставной поверхности надколенника (62 случая), в другой – не проводили, т.е. сохраняли надколенник (61 случай). Среди них было 114 пациентов, которых удалось пронаблюдать более двух лет (группа с заменой суставной поверхности – 59 случаев; группа без замены – 55 случаев). Оценивали дооперационные и послеоперационные клинические данные, которые оценивали по шкале Госпиталя Специальной Хирургии Надколенника [Hospital for Special Surgery Patellar (HSSP)] (общее число баллов – 100; наличие боли в переднем отделе коленного сустава, функциональные ограничения, болезненность при пальпации или давлении, крепитация, Q-сила). Также использовали шкалы, разработанные в Госпитале Специальной Хирургии (HSS), и шкалу WOMAC, а также оценивали объём движений (ROM). **Результаты**. Средняя оценка HSSP в группе с заменой суставной поверхности надколенника составила 85 баллов и 83 балла – в группе без проведения замены, что демонстрировало отсутствие значимых различий между группами (p=0,75). При оценке наличия боли в переднем отделе коленного сустава также не отмечалось значимых различий между группами (40 в группе с заменой суставной поверхности, 36 – в группе без проведения замены, p=0,52). Показатели по HSS улучшились до 94 баллов в группе с заменой суставной поверхности и до 95 баллов – в группе без проведения замены, что также указывало на отсутствие значимой разницы (p=0,92). Оценка по WOMAC и объём движений составили 32 и 128°±10,5° в группе с заменой и 29 баллов и 126°±11,5° – в группе без проведения замены, значимой разницы между группами не было (p>,05). **Заключение**. Таким образом, идентичные хорошие клинические исходы без значимых различий были достигнуты после ТКА с проведением и без проведения замены суставной поверхности надколенника у пациентов с высокой степенью остеоартрита пателлофеморального сустава. ТКА без проведения замены суставной поверхности надколенника является хорошим вариантом выбора у пациентов с высокой степенью остеоартрита пателлофеморального сустава.
Ключевые слова: остеоартрит коленного сустава, тотальная артропластика коленного сустава, замена суставной поверхности надколенника.

Introduction. Despite the excellent clinical success of total knee arthroplasty (TKA), controversy remains concerning whether or not to resurface the patella. This has led to a number of randomized controlled trials. Randomized controlled trials constitute the most reliable source of evidence for the evaluation of the efficacy of a potential intervention. But most of these studies include all degree of osteoarthritis of the patellofemoral joint. So we did this prospective study to compare clinical and radiological outcomes after TKA with or without patellar resurfacing in patients with grade IV osteoarthritis on patellofemoral joint. **Materials and Methods**. 123 cases with Kellgren-Lawrence grade IV osteoarthritis on patellofemoral joint were enrolled for this study. At the operating room, they were randomly assigned to undergo patella resurfacing (62 cases) or patella retention (61 cases). Among them, 114 cases that could be followed for more than 2 years were included in this study (resurfacing group; 59 cases, retention group; 55 cases). Preoperative and postoperative clinical outcomes were evaluated and compared regarding the Hospital for Special Surgery Patellar (HSSP) score (total 100 point; anterior knee pain, functional limitation, tenderness, crepitus, Q-strength). We also compared Hospital for Special Surgery (HSS) and WOMAC scores, and range of motion (ROM). **Results**. Average HSSP score was 85 in resurfacing group, 83 in retention group, which were showing no significant differences between groups (p=.75). Anterior knee pain subscale also showed no significant differences between groups (40 in resurfacing group, 36 in retention group, p= 0.52). HSS score improved to 94 points in resurfacing group and 95 points in retention group showing no significant difference (p=.92). While WOMAC score and range of motion was 32 point and 128°±10,5° in resurfacing group, respectively, they were 29 point and 126°±11,5° in retention group, without significant inter-group difference (p>.05). **Conclusion**. Identical good clinical outcomes were obtained after TKA with or without patellar resurfacing in patients with high grade osteoarthritis of the patellofemoral joint without significant differences. TKA without patellar resurfacing is a good choice in patients with high grade osteoarthritis of the patellofemoral joint.
Keywords: knee osteoarthritis, Total knee arthroplasty, Patella resurfacing.

INTRODUCTION

In the patients with knee osteoarthritis widely use total knee arthroplasty (TKA), because the destruction and degree of deterioration of the articular surface cartilage are more occurring [1].

Despite the improvement equipment technologies, surgery techniques, results of treatment knee osteoarthritis and the excellent clinical success of TKR, controversy remains concerning whether or not to resurface the patella [2, 5, 7].

This has led to a number of clinical and randomized controlled trials [3, 4, 5]. Randomized controlled trials constitute the most reliable source of evidence for the evaluation of the efficacy of a potential intervention. But most of these studies

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include all degree of osteoarthritis of the patellofemoral joint [4, 5, 12]. And on the other hand numerous research were conducted to certain solves of the questions resurfacing or retention patellofemoral joint. [6, 7, 8, 10], however precise definition of the issue decision patellar resurfacing in patients with grade IV osteoarthritis on patellofemoral joint, undergoing TKA did not specify no one of the studies.

The purpose of this prospective study was to compare clinical outcomes after TKA with or without patellar resurfacing in patients with grade IV osteoarthritis on patellofemoral joint. We enrolled only patients with Kellgren-Lawrence grade IV or ICRS grade IV osteoarthritis on patellofemoral joint performed primary TKA.

MATERIALS AND METODS

To study our goal we have gathered all the materials of the patient with osteoarthritis grade IV on patellofemoral joint, undergoing TKA in Chonnam National University Hospital during the 2004-2013 years (123 cases). Preoperatively and intraoperatively were confirmed a high grade of osteoarthritis in each patient. The patients assessed clinical outcomes were divided into two groups, 62 cases of patellar resurfacing and 61 cases of patella retention group. Among them, 114 cases that could be followed for more than 2 years were included in this study, 59 cases of resurfacing group and 55 cases of retention group.

In patellar resurfacing group were 59 knees of 42 patients which average age equal 66.3 year and in retention group 55 knees of 49 patients with average age were 65.6 year. Gender demographics shows that most of the researched patients with osteoarthritis grade IV on patellofemoral joint were female: in resurfacing group 31 female, 11 male and in non-resurfacing group 42 female, 7 male. Patients were performed cemented primary TKA with patellar resurfacing and retention with a medial parapatellar approach. In the retention group, we did patelloplasty including osteophyte removal and denervation around patellar using electrocautery (Figure 1). For the patients performing patellar resurfacing were used 3 – Peg all – polyethylene patella implant after remove all osteophytes and synovial insertions from around the patella (Figure 2). For the comparison of preoperative state of the patient and clinical outcomes, we evaluated and compared outcomes regarding the total and subjective anterior knee pain scores based on the Hospital for Special Surgery Patellar (HSSP) scoring system. We also compared Hospital for Special Surgery (HSS) and WOMAC score, and range of motion (ROM) before and after surgery in both groups.

Figure 1. Patellaplasty including osteophyte removal and denervation around patellar using electrocautery

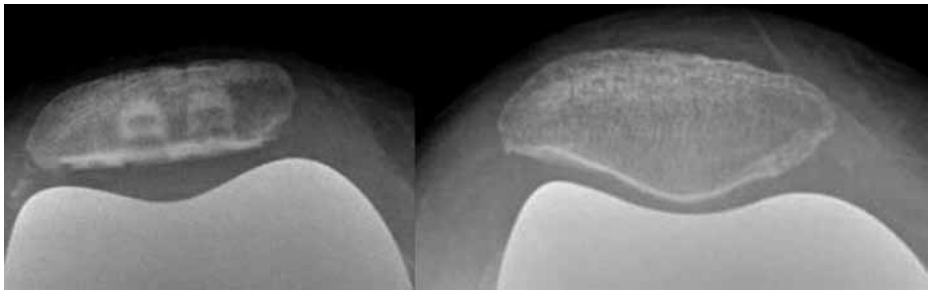

Figure 2. Postoperative Resurfacing and Retention Patellofemoral Joint

RESULTS

The clinical assessment results before surgery in both groups were approximately similar without big difference. Almost repeating the preoperative assessment results between the clinical finds studying groups postoperatively

were inconsiderable difference.

Difference between average preoperative and postoperative HSS score in resurfacing group was 46.3 point and in retention group 49 point. The findings showed significant improving results of treatment (Figure 3).

Preoperative average HSSP score in patients were almost identical 64.3±9.7 within resurfacing and 63.7±10.5 in retention groups. Postoperative measures results showed a marked improvement of indicators average 85.2±6.4 within resurfacing group and 83.4±5.9 in retention group, which were showing no significant differences outcomes assessment between groups (p=0.75). While WOMAC score after surgery was 31.7±6.4 point in resurfacing group, respectively, 29.2±6.9 point was in retention group, without significant intergroup difference (Figure 4).

Anterior knee pain subscale also showed no significant differences between groups (P-value: 0.52). In resurfacing group preoperative anterior knee pain was 28.6±7.6 with growing to 40.3±6.2 postoperatively and in retention group was 29.0±8.7 before surgery with improving to 38.2±5.7 after surgery. Despite the high limitation of movement within knee joints were identified in the patents before surgery, postoperative ranges of motion were sufficiently satisfied (Figure 5). In terms of peripatellar complication, we observed painless patellar crepitus in 3 cases of resurfacing group and 6 cases of retention group.

	Preoperative	Postoperative
Resurfacing group	47.3±8.7	93.6±5.7
Retention group	45.8±9.1	94.8±6.3

(P-value*: 0.92)

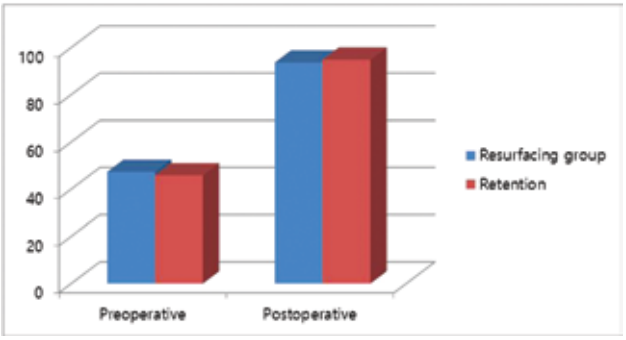

Figure 3. HSS score

	Preoperative	Postoperative
Resurfacing group	55.4±8.5	31.7±6.4
Retention group	52.8±9.2	29.2±6.9

(P-value*: 0.26)

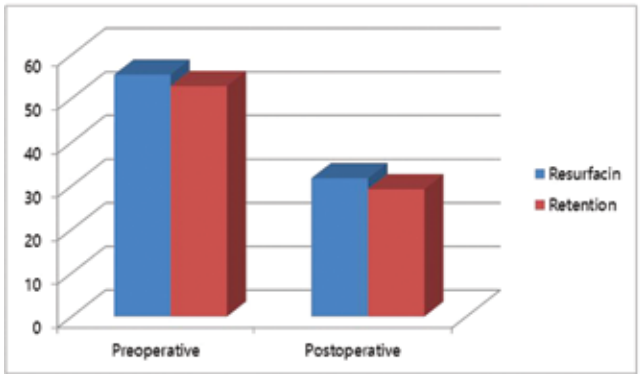

Figure 4. WOMAC score

	Preoperative	Postoperative
Resurfacing group	116±8.8°	128±7.5°
Retention group	114±12.3°	126±8.5°

(P-value*: 0.42)

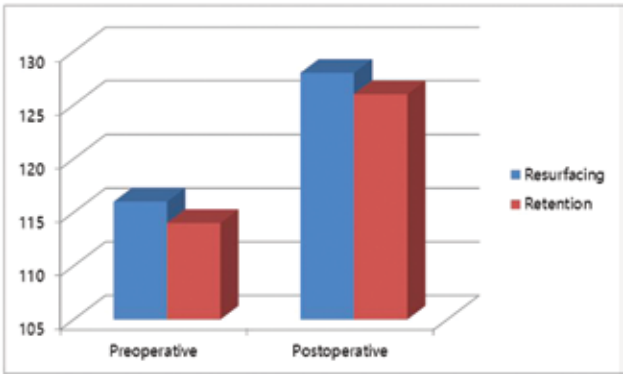

Figure 5. ROM

DISCUSSION

This unresolved questions, performing or not performing patellar resurfacing in TKR still leads to a lot of discussion. Some authors finds shows that patient with not resurfaced knees had slightly better satisfaction than patellar resurfaced patients [3, 9] and with correctly execution TKA, resurfacing patella is unnecessary [10, 13]. But after obtaining good clinical outcomes and because of the possibility of a subsequent deterioration of the patella with osteoarthritis in long-term follow-up, other group of researches consider that resurfacing of the patella during primary total knee arthroplasty is one of the best solution [2, 12, 16, 20]. To studying outcomes result after total knee arthroplasty in the patient with patellar resurfacing and retention we separated particular group of patients.

During the selecting a solution resurfacing or retention patellar surface we must pay attention to a lot of criteria; preoperative clinical diagnostic measures, intraoperative findings and of course postoperative treatment outcomes.

The majority of patients with pathology of the knee osteoarthritis radiologically determined patellofemoral osteoarthritis with severe of grade [16, 17]. However we include in our study only the high degree of patellofemoral osteoarthritis. Determination of the grade of osteoarthritis using with Kellgren-Lawrence grade widely used by many researchers [18, 19].

Based on these decisions we enrolled only patients with Kellgren-Lawrence grade IV or ICRS grade IV osteoarthritis on patellofemoral joint performed primary TKA. Assessment of the patellar cartilage intraoperative and make decision on patellar resurfacing are trustworthy in patient undergoing TKR after osteoarthritis, however, despite the patellar cartilage was damaged, only the status of the patellar articular cannot be determining main factor for patellar resurfacing [5]. Naturally and we intraoperatively checked the preoperative diagnostic findings.

When osteoarthritis has not severe pain even there are many changes in the cartilage, treatment knee arthritis manage without patellofemoral arthroplasty [14]. Patellar resurfacing have better functional results in patient with several arthritis as compared with patellar retention and lead the most reliable clinical results in patient with non-inflammatory groups [2, 4, 7] and has low complications rate and morbidity for the treatment of anterior knee pain [6, 8, 11]. To determine the answer this issue we decided to study difference between clinical assessment outcomes in both group. Some authors showed significantly better

clinical rating Knee Society Scores in the unresurfaced patient group [4, 9]. But many of authors believe that measures of surgical outcomes like WOMAC is more precisely reflect patient satisfaction in patellofemoral arthroplasty [12, 16] or another researchers are prefer using HSS scores to definition patients satisfaction after TKA [20]. To get more detailed clinical results, we used once preoperative and postoperative determination difference between the patients groups several assessment methods: The Hospital for Special Surgery Patellar (HSSP) score (total 100 point; anterior knee pain, functional limitation, tenderness, crepitus, Q-strength), Hospital for Special Surgery (HSS), WOMAC scores, and range of motion (ROM). Our clinical results after surgery showed higher improving (average WOMAC 23.7 point, Anterior knee pain 11.3 point and Range of motion 12 degree) than other authors results [3, 12, 16]. But difference postoperative results between group were equal with other authors results [4, 5, 9] showing not significant statistic results.

In TKA performed without resurfacing, the patella contact force does not significantly increase and cartilage contact stress doesn't increase and this lead to prevent most expected complications [13]. Nevertheless the risk of postoperative complications is highest in patellar resurfacing group than not resurfacing group [3]. To conclude to this view and we believe that getting a good result from the treatment of osteoarthritis of the knee, is more dependent on the correct technical operation, rather than performing patellar resurfacing or not.

Notwithstanding our study intended to achieve a specific decision to making or not patellofemoral arthroplasty during the primary TKR in patient with Kellgren-Lawrence grade IV or ICRS grade IV osteoarthritis and had a wider range of assessment there were some limitations. We cannot include in our study all of the methods of clinical assessment and not described all prosthesis and implants features.

CONCLUSION

Identical good clinical outcomes were obtained after TKA with or without patellar resurfacing in patients with high grade osteoarthritis of the patellofemoral joint without significant differences. TKA without patellar resurfacing is a good choice in patients with high grade osteoarthritis of the patellofemoral joint.

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