

OSTEOARTHRITIS OF THE KNEE IN THE ELDERLY: IS KNEE REPLACEMENT ALWAYS JUSTIFIED?

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Osteoarthritis is a condition that mostly affects the elderly population and tends to be localized to the knee joint. At old age, active treatment options are limited by co-morbidities and a higher risk for surgical complications. Therefore, the search for strategies that could become a temporary alternative to knee replacement is a pressing concern. The aim of this study was to analyze how justifiable is total knee replacement in elderly patients with knee osteoarthritis and to propose a less aggressive therapeutic alternative to this surgery. The study included 178 patients over 60 years of age with clinically established knee osteoarthritis who had been previously recommended knee replacement but chosen not to undergo it. The choice of a treatment strategy tested in the study was based on the original grading scale for the evaluation of the knee joint dislocation syndrome. The treatment consisted of therapeutic arthroscopy and intraarticular injections of hyaluronic acid and platelet-rich plasma (PRP). The data were processed in Statistica 12. Data analysis revealed that 39.3% of the participants did not have compelling indications for knee replacement. The proposed combination therapy with intraarticular PRP injections and arthroscopy allowed all the patients to delay knee replacement for at least a year; unaided by arthroscopy, intraarticular injections worked well for only 40%.

Keywords: knee arthroplasty, total knee replacement, arthroscopy of the knee, intraarticular injection

Author contribution: Lychagin AV devised a KJDS scale, planned the study, performed arthroscopy and follow-up observation, processed and analyzed the data. Garkavi AV planned the study and proposed its design, performed arthroscopy, intraarticular injections and follow-up observation, processed and analyzed the data, and wrote the manuscript. Meshcheryakov VA performed arthroscopy, intraarticular injections and follow-up observation, surveyed the patients. Kaykov VS performed arthroscopy, intraarticular injections, and follow-up observation, surveyed the patients.

Compliance with ethical standards: this study was approved by the Ethics Committee of I. M. Sechenov First Moscow State Medical University (Protocol No. 17–18 dated 2018); the patients gave informed consent to participate.

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ОСТЕОАРТРОЗ КОЛЕННОГО СУСТАВА У ПОЖИЛЫХ — ВСЕГДА ЛИ ОПРАВДАНО ЭНДОПРОТЕЗИРОВАНИЕ?

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Остеоартроз — заболевание преимущественно пожилых людей, и по локализации первое место уверенно удерживает коленный сустав. Именно в пожилом и старческом возрасте возможность активного лечения пациентов с гонартрозом ограничена их полиморбидностью, а также повышенным операционным риском. Поэтому весьма актуален поиск методик лечения, способных хотя бы на время стать альтернативой эндопротезированию коленного сустава. Целью исследования было проанализировать оправданность операции эндопротезирования коленного сустава у пациентов пожилого и старческого возраста с гонартрозом и разработать комплексную систему лечения, сохраняющую сустав. В исследовании участвовали 178 пациентов старше 60 лет, которым ранее было предложено, но не выполнено эндопротезирование коленного сустава по поводу верифицированного гонартроза. Для определения лечебной тактики использовали оригинальную балльную систему оценки дислокационного синдрома коленного сустава. Применяли сочетание санационной артроскопии с внутрисуставным введением гиалуроновой кислоты и обогащенной тромбоцитами аутоплазмы (PRP). Для анализа результатов определяли статистическую значимость отмеченных отличий по стандартному пакету программ «Statistica 12.0». Показано, что 39,3% пациентов эндопротезирование было предложено без достаточных объективных оснований. Проведение комплексного лечения, сочетающего внутрисуставную PRP-терапию с предварительно проведенной санационной артроскопией, стало альтернативой эндопротезированию для всех пациентов как минимум на год, а внутрисуставная терапия без артроскопии — только для 40%.

Ключевые слова: эндопротезирование коленного сустава, артроскопия, внутрисуставная инъекционная терапия

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Osteoarthritis of the knee is one of the most common orthopedic conditions. Presenting with pain and the loss of joint function, it debilitates the patient leaving them unable to engage in the usual daily activities. Most typically, osteoarthritis affects the elderly, causing a dramatic impact on their social life, making them dependent on others and leading to depression [1–5].

On the one hand, conservative treatment of knee osteoarthritis in elderly patients with marked age-related changes in the joint merely seeks to achieve temporary relief. On the other hand, advances in arthroplasty techniques have made knee replacement safer, less traumatic and more available [6–12].

In recent years, arthroplasty in the elderly has been on the rise because the indications for this procedure have been expanded [13–15]. Sometimes, the severity of medically diagnosed knee osteoarthritis seems to leave no other option for an aging patient but a knee replacement; other, less aggressive treatments, such as arthroscopy, systemic medication therapy, intraarticular injections, or physical rehabilitation, are not even considered by the physician. But if we really think about it, doesn't it deprive patients of the chance to avoid a surgical intervention that, in spite of the advances in the medical science, still poses certain health risks [16, 17]?

Unfortunately, there is no universal approach to establishing compelling indications for endoprosthetic knee replacement; therefore, this surgery may not always be a reasonable or adequate therapeutic option.

The aim of this study was to analyze how justifiable is total knee replacement (TKR) in elderly patients with knee osteoarthritis and to propose a less aggressive alternative to this surgery.

METHODS

We had 178 retired patients aged 60 to 82 years in our care who had been previously offered to undergo TKR but chosen not to for a variety of reasons (fear of surgery, a long waiting list, etc.). The patients agreed to try an alternative treatment

strategy and then revisit the idea of surgery. The study included patients aged over 60 years with a previously established diagnosis of knee osteoarthritis and a recommendation to have knee replacement surgery, who gave written informed consent to try a different treatment strategy developed by the authors of this work. The treatment course and the follow-up observation period lasted for 1 year each. The following exclusion criteria were applied: severe comorbidities that significantly limited patients' ability to walk or were a direct contraindication for the offered rehabilitation; intraarticular fractures with persisting joint incongruence; failure to cooperate.

The grading scale proposed by Lychagin AV [18] was applied to determine the severity of the knee joint dislocation syndrome (KJDS) in the examined patients. The following parameters were evaluated: degeneration of the articular cartilage, paraarticular bone damage, joint instability, the narrowing of the joint space, and the total WOMAC score. Each parameter was scored on a scale of 0 to 4; the maximum total score was 20 points.

The total of 0–5 points scored on this scale suggested that a patient could benefit from a conservative medication therapy; 6–12 points, a complex treatment including arthroscopy and intraarticular injections should be offered; 13–20 points, a patient should be advised to undergo TKR.

Of 178 patients with stage II/III knee osteoarthritis (according to Kellgren–Lawrence classification) who had been recommended to undergo TKR, only 108 (60.7%) scored 13 points

Table 1. The evaluation of the severity of the knee joint dislocation syndrome (KJDS) expressed in points

Changes to the anatomy or function	Severity of pathology	Score (points)
Articular cartilage (classification by ICRS) evaluated by MRI or arthroscopy	normal	0
	Grade 1–2	1
	Grade 3	2
	Grade 4 (slight defect < 2.5 cm ²)	3
	Grade 4 (significant defect > 2.5 cm ²)	4
Paraarticular bone region	– normal	0
	– osteoporosis	1
	– cysts	2
	– mild bone deformity	3
	– pronounced bone deformity	4
Joint instability	No instability detected	0
	Compensated (grade 1)	1
	Subcompensated (grade 2)	2
	Uncompensated (grade 3)	3
	Arthrogenic contractures	4
Narrowing of the joint space (%)	0–5	0
	6–30	1
	31–50	2
	51–75	3
	76–100	4
WOMAC score (points)	≤ 30	0
	31–50	1
	51–70	2
	71–90	3
	> 90	4

and above; this confirms that surgery is justifiable for such patients (Fig. 1).

The patients were distributed into 3 groups. Group 1 consisted of 54 patients who received intraarticular platelet-rich plasma (PRP) injections; group 2 was constituted by 64 individuals who received intraarticular injections of hyaluronic acid. The patients from group 3 received systemic medication therapy (chondroprotective agents + non-steroidal anti-inflammatories).

Knee arthroscopy was performed on 118 patients who had scored 6 or more points on the KJDS scale. Of them 32 (59.3%) were from group 1, 44 (68.8%) from group 2, and 42 (70.0%) from group 3 (Fig. 2).

RESULTS

The patients were divided into several groups based on the severity of osteoarthritis. The severity of the condition was inferred from their total KJDS scores that reliably showed whether the patient needed knee replacement; unlike this scale, radiographic findings do not always correlate with patients' complaints of pain and decreasing lifestyle, so we did not use them as a criterium. Of 178 patients who had been recommended TKR, as many as 70 turned to have no compelling indication for surgery (Table 2).

This, however, does not mean that by the end of observation the patients were fully determined to never revisit the idea of a surgical intervention, but rather suggests that they were satisfied with the outcomes of an alternative treatment strategy

for the time being and did not intend to have TKR in the nearest future.

Of 70 patients who had been offered to undergo TKR without having a compelling indication for it (KJDS < 13 points), only 15 (21.4%) still thought that surgery would be beneficial for them, even after completing the treatment course. Those were mostly patients from group 3 (no intraarticular injections administered): 13 individuals out of 28, or 46.4%. All patients from group 1 (100%) and 22 patients from group 2 (91.7%) decided they no longer wanted knee replacement (Fig. 3).

Of 108 patients with severe articular damage and indications for TKR (KJDS ≥ 13 points), 39 (36.1%) still thought about having surgery after completing the treatment course. Therefore, it can be assumed that 69 (63.9%) patients believed that their condition had significantly improved (Fig. 4).

The patients receiving intraarticular injection therapy benefited the most from the treatment course and saw it as a real alternative to surgery (86.1% in group 1 and 77.5% in group 2). At the same time in group 3, 25 of 32 patients (78.1%) still considered TKR as an option because they were not satisfied with the result, although 90.6% of those patients had received therapeutic arthroscopy.

DISCUSSION

The efficacy of intraarticular injections and therapeutic arthroscopy at the onset of treatment can be assessed separately or in combination with each other.

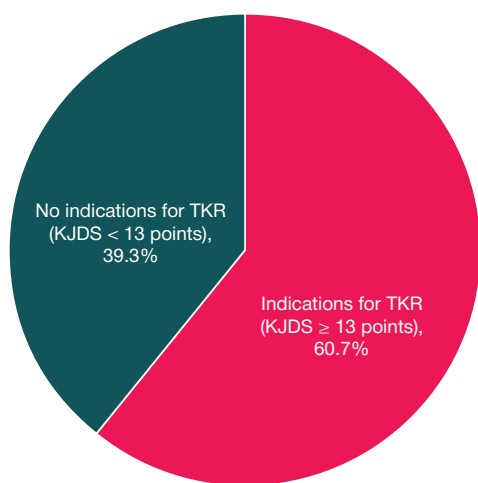


Fig. 1. Indications for knee replacement based on the KJDS score in patients who had been previously recommended to undergo TKR

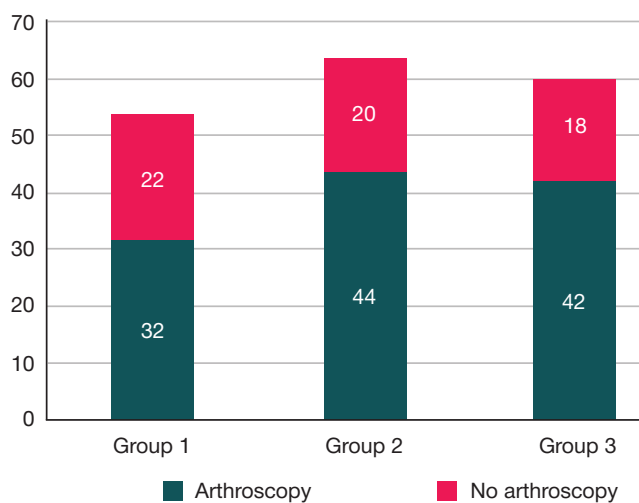


Fig. 2. The distribution of patients based on therapeutic arthroscopy

Table 2. Patients' attitude to TKR a year after completing the suggested treatment course

	Number of patients who agreed to try a different treatment strategy instead of TKR	Number of patients who received therapeutic arthroscopy			Number of patients who did not receive therapeutic arthroscopy	
		Total	Of them, number of patients willing to reconsider TKR after completing the treatment course	Total	Of them, number of patients willing to reconsider TKR after completing the treatment course	
Group 1 (n = 54)	No compelling indication for TKR	18	5	0	13	0
	TKR justified	36	27	0	9	5 (55.6%)
Group 2 (n = 64)	No compelling indication for TKR	24	15	0	9	2 (22.2%)
	TKR justified	40	29	2 (6.9%)	11	7 (63.6%)
Group 3 (n = 60)	No compelling indication for TKR	28	13	4 (30.8%)	15	9 (60.0%)
	TKR justified	32	29	22 (75.9%)	3	3 (100%)
Total (n = 178)	No compelling indication for TKR	70	33	4 (12.1%)	37	11 (29.7%)
	TKR justified	108	85	24 (28.2%)	23	15 (65.2%)

If we look at the efficacy of intraarticular injections alone, we should note that of 118 patients from groups 1 and 2, who had previously considered a possibility of surgical intervention, 42 had no compelling indications for surgery. After completing a course of intraarticular PRP or hyaluronic acid injections, only 2 (4.8%) patients still thought of undergoing TKN versus 13 (46.4%) out of 28 patients in group 3 who had no injection therapy.

Seventy-six patients from groups 1 and 2 had serious indications for surgery and received intraarticular injections. Of them, only 14 (18.4%) did not give up the idea of surgery after completing the treatment course.

In group 1, 32 of 54 patients received therapeutic arthroscopy. If we look at the efficacy of this procedure performed at the beginning of the treatment course, we will see that none of those 32 patients was still willing to undergo TKR a year after completing the treatment course. In group 2, 44 of 64 patients received arthroscopy, and only 2 (4.5%) of them decided they were satisfied with the result. In group 3, 42 of 60 patients received therapeutic arthroscopy, and TKR was still considered by 18 of them (42.9%) a year later, whereas 14 (77.8%) of 18 "arthroscopy-free" patients still thought they would benefit from TKR (Table 2).

Unsurprisingly, in patients who had no compelling indications for TKR, our treatment course tended to be a good alternative

to surgery. After arthroscopy, 29 (87.9%) of 33 patients said they had benefited from it. The proportion of such patients in groups 1 and 2 was 100%. Thirty-seven (77.1%) of 48 patients who had not received arthroscopy were able to delay or avoid TKR; the proportion of such patients was 100% in group 1, 81.8% in group 2 and 62.5% in group 3 (Fig. 5).

Of all the patients who had objective indications for TKR, 71.7% (61 of 85 individuals) decided against after the treatment course. The proportion of such patients was 100% in group 1, 93.1% in group 2 and only 24.1% in group 3, which confirms the efficacy of intraarticular PRP injections included into the complex therapy of knee osteoarthritis. Arthroscopy was not performed in 23 patients who had objective indications for TKR. Of them, only 8 (34.8%) benefited temporarily from the suggested therapy course, more specifically intraarticular injections: 4 (44.4%) of 9 patients in group 1 and 4 (36.4%) of 11 patients in group 2 (Fig. 6).

CONCLUSIONS

1) Endoprosthetic knee replacement is often overused in elderly patients with osteoarthritis who do not have compelling indications for this surgical procedure. The KJDS grading scale proposed by Lychagin AV shows that only 60.7% of

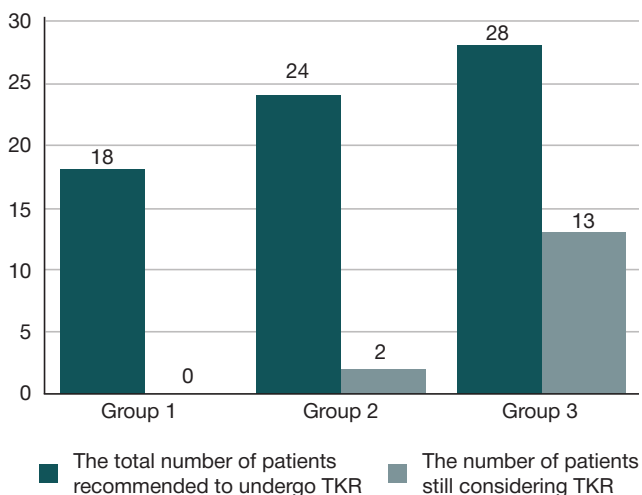


Fig. 3. The attitude of patients who had no compelling indications for TKR to this surgical intervention after completing the suggested treatment course

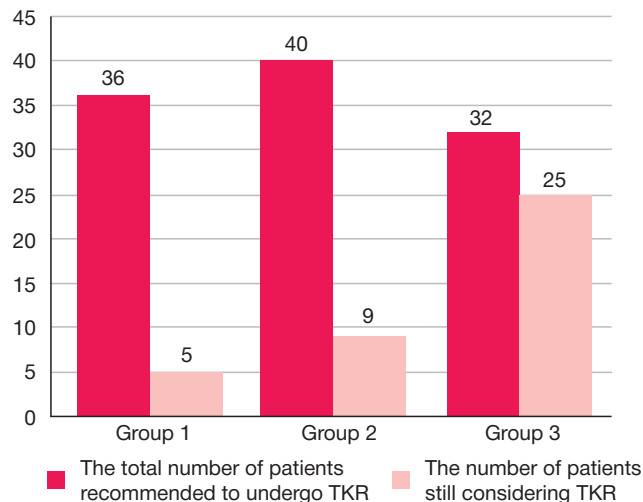


Fig. 4. The attitude of patients who had compelling indications for TKR to this surgical intervention after completing the suggested treatment course

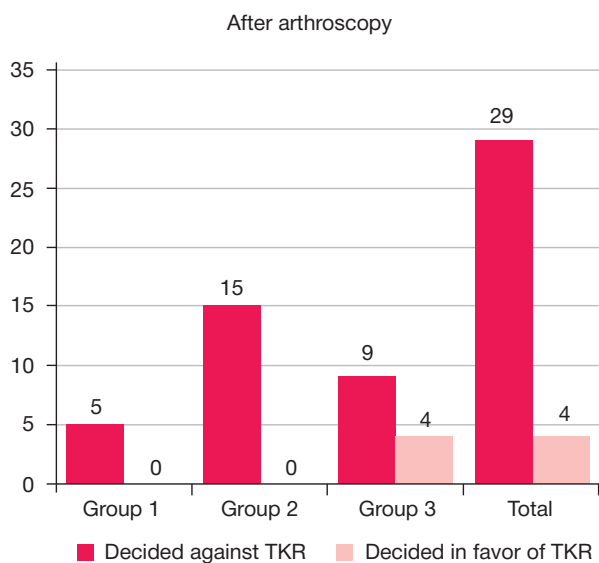
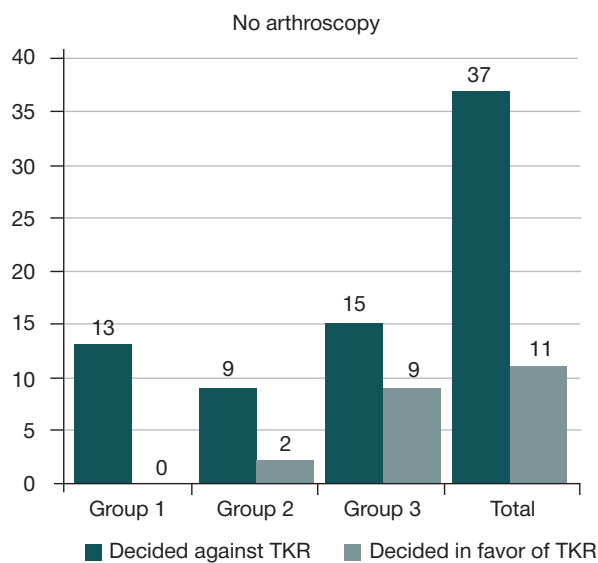


Fig. 5. The impact of arthroscopy on the attitude to TKR in patients with no compelling indication for TKR



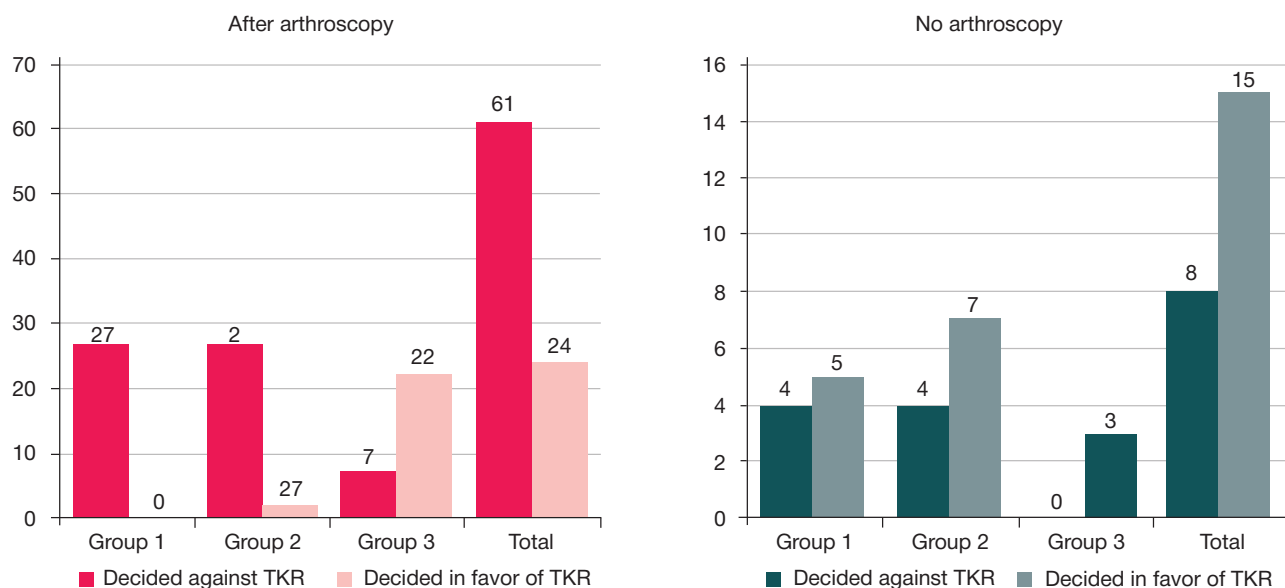


Fig. 6. The impact of arthroscopy on the attitude to TKR in patients with compelling indications for TKR

such patients have objective indications for surgery. 2) A combination therapy with arthroscopy and intraarticular PRP injections ensures durable improvement that can delay TKR for

at least a year. 3) Unaided by arthroscopy, intraarticular injections can be an alternative to knee replacement in 40.0% of patients with compelling indications for TKR.

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