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Arthroscopic knee debridement in osteoarthritis in the older age can be satisfactory

Lee Fuchs*, Assaf Givon, Fadi Shweiki, Tavor Hovav

Department of Orthopedic Surgery, Kaplan Medical Center, Rehovot, Israel

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ABSTRACT

Introduction: Knee arthroscopy is one of the treatments for knee pain. In recent years, the use of knee arthroscopy in the treatment of osteoarthritis was challenged by several randomized-controlled trials, systematic reviews and meta-analyses. However, some design flaws are making the clinical decision harder. This study specifically explores the patient satisfaction from these surgeries to aid in clinical decision.

Hypothesis: Knee arthroscopy can relieve symptoms and delay further surgical treatment in the older age.

Patients & methods: Fifty patients accepted participation and were invited to a follow-up examination eight years post knee arthroscopy. All patients were above age 45 and diagnosed with degenerative meniscus tear and osteoarthritis. The patients filled follow-up questionnaires of function (WOMAC, IKDC, SF-12) and pain. The patients were asked to appreciate if they would have repeated the surgery retrospectively. The results were compared to a previous data base.

Results: Thirty-six patients (72%) reported satisfaction of 8 and above (scale of 0–10) from the surgery and would have repeated it. A higher SF-12 physical score pre-surgery predicted a higher satisfaction rate ($p = 0.027$). Patients who were more satisfied from the surgery improved post-surgery in all parameters compared with the less-satisfied group ($p < 0.001$). Patients above the age 60 had similar parameters pre- and post-surgery compared with patients under the age 60 ($p > 0.05$).

Conclusions: Patients between the ages 46–78 with degenerative meniscus tear and osteoarthritis felt they benefited from knee arthroscopy in an eight-year follow-up and would repeat the surgery. Our research may help with better patient selection and suggest knee arthroscopy can relive symptoms and delayed further surgical treatment for the older patient with clinical symptoms and signs of meniscus related pain, mild osteoarthritis, and failed conservative treatment.

Level of evidence: IV.

1. Introduction

Knee osteoarthritis (OA) is a common form of joint arthritis. It is the main source for knee pain over the age of 50 years or older and affect more than 10% of the population over 60 years old.[1–3] Concomitant degenerative meniscus tear appear in 76% of asymptomatic patients over the age of 50 without radiographic evidence of osteoarthritis, and in up to 91% of symptomatic patients.[4] Conservative treatment options includes oral and topical anti-inflammatory drugs, weight loss, bracing, physiotherapy, various knee injections such as intra-articular cortisone, viscosupplementation and other upcoming treatments.[2] Non-conservative treatment includes partial or total knee arthroplasty, and arthroscopy.

Knee arthroscopy has traditionally been a common tool in the treatment of osteoarthritis.[1] However, in the recent 20 years, the use of arthroscopy in the treatment of osteoarthritis was challenged by several randomized-controlled trials, systematic reviews and meta-analyses,[2,4–7] starting with Moseley et al. publication in 2002.[8] Those studies concluded against the use of arthroscopy in patients with osteoarthritis. However, the evidence-based data is

Abbreviations: OA, Osteoarthritis; TKA, Total Knee Arthroplasty; VAS, Visual Analog Scale; WOMAC, The Western Ontario and McMaster Universities Arthritis Index; IKDC, International Knee Documentation Committee.

* Corresponding author. Orthopedic department, Kaplan Medical Center, 1st Pasternak road, Rehovot, 7661041, Israel.
E-mail address: leefu@clalit.org.il (L. Fuchs).

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insufficient to support or advise against arthroscopy treatment for osteoarthritis.[5,7]

We suggest focusing on the patient satisfaction in the long-term following knee arthroscopy in the settings of degenerative meniscus tear and osteoarthritis. The patient-reported outcome measures are important in quality-of-life surgeries, as in orthopedic surgery.[9] Patient satisfaction has become the most important criterion of success. A large cohort study reviewed these parameters in total joint replacements and highlighted three main factors that determine satisfaction following surgical intervention: meeting preoperative expectations, achieving satisfactory pain relief, and having a satisfactory hospital experience.[10] It is broadly accepted to translate this to knee arthroscopy.[9] Could patients with mild osteoarthritis and degenerative meniscus tear feel they benefit from the knee arthroscopy in the long-term?

2. Methods and materials

2.1. Patients

Our facility conducts about 120 arthroscopies per year. Sixty patients met the below inclusion criteria in the years 2019–2020. A total of 50 patients came to the follow-up invitation and signed an informed consent to participate in this study. The inclusion criteria were:

1. They had clinical symptoms and signs of meniscus related pain.
2. They were above the age of 45 years old in 2011/2012.
3. They had only mild (Kellgren and Lawrence grade 1–2) or non-osteoarthritis signs in the pre-surgery x-ray.
4. They all performed an MRI of the knee prior to their surgery which showed degenerative meniscus tear and osteoarthritis.
5. Failed conservative treatment after at least three months.
6. They were all discussed possible treatments for their problem with the senior physician and were scheduled after informed consent for arthroscopy, debridement of meniscus and lavage.

Exclusion criteria included those not met with the inclusion criteria above, and patients underwent arthroscopy due to ligamentous injury or infection.

2.2. Methods

This study was approved by the local ethics committee. The study uses a database of our arthroscopy clinic, which was established in 2011. Patients who were accepted to the arthroscopy clinic and scheduled for surgery completed a series of questionnaires before their surgical treatment (VAS, WOMAC, IKDC, SF-12). All patients underwent arthroscopy under general anesthesia, partial meniscectomy, lavage, and debridement as needed. Most patients had a medial meniscal lesion, six patients had either lateral lesion or both medial and lateral lesions.

2.3. Methods of assessment

We invited patients who filled in the questionnaires in the years 2011 and 2012 and underwent knee arthroscopy to a follow-up examination in the years 2019 and 2020 (respectively). A total of 50 patients came to the follow-up invitation and signed an informed consent to participate in this study. They filled in the same questionnaires as eight years before: VAS, WOMAC, IKDC, SF-12. They were also asked in a VAS-type scale of 0–10 were they satisfied retrospectively with their decision to perform the surgery and would they repeat this decision again, 0 = not satisfied, 10 = most satisfied. The follow-up included examination and a follow-up X-ray, in addition to the questionnaires.

The questionnaires included:

1. Visual analog scale (VAS) for pain. It is a psychometric response scale 0–10. The patient is presented with the scale and chooses the level of pain contracted.
2. The western Ontario and McMaster Universities Arthritis Index (WOMAC). It is a self-administered questionnaire consisting of 24 items divided into three subscales: pain, stiffness, and physical function. This questionnaire was chosen to compare activities of daily living, functional mobility, gait, general health, and quality of life.[11]
3. International Knee Documentation Committee (IKDC). It is a subjective scale that provides patients with an overall function score at three categories: symptoms, sports activity, and knee function.[12]
4. The 12-item Short Form Survey (SF-12). It is a self-reported measure of health using eight domains (physical activity, social activity, role activity (physical and mental), bodily pain, general mental health, vitality, general mental health perceptions). The SF-12 is a shorter version of the SF-36 questionnaire.[13]

2.4. Statistical analysis

The results were summarized, and SPSS was used for statistical analyses (IBM SPSS statistics for Windows, version 25, IBM corp., Armnok, NY, USA, 2017).

Continuous variables were reported as means and standard deviation or as medians and range. Categorical and Nominal variables were reported by prevalence and percentages. Continues variables between the various study groups were tested for normality by Shapiro- Wilk test. For abnormal distribution non-parametric tests were performed - Mann- Whitney test to compare two groups. For normal distribution *t*-test was performed to compare two groups. Categorical and nominal variables were analyzed by Pearson's chi-square (χ^2) test.

Spearman's rank order correlation was used for correlation testing between continuous quantitative variables that are of non-normal distribution. A repeated measures analysis of variance was used to determine any significant differences between variability over time. P value < 0.05 was considered statistically significant.

3. Results

Fifty patients had accepted participation and were eligible for this study. The age range was 46–78 (median 57). There were 46% (23/50) males and 54% (27/50) females.

The main indication for surgery was meniscus tear clinically and radiographically. The major indication for surgery was medial +/or lateral meniscus tear and osteoarthritis in MRI in 30 patients (60%), medial +/or lateral meniscus tear and osteoarthritis in x-ray in 18 patients (36%), and additional pathology in 3 patients (6%) (avascular necrosis in left femoral condyle, osteoarthritis post ACL reconstruction, and medial femoral condyle damage and loose body).

The objective long-term follow-up of eight years showed 11 patients (22%) subsequently had total knee arthroplasty, 9 patients (18%) progressed to a higher Kellgren and Lawrence,[3,4] 26 patients (52%) either remained Kellgren and Lawrence 1–2 or progressed from grade 1 to grade 2, in two patients (4%) the objective data was missing.

We defined a high satisfaction rate as 8 and above. Thirty-six patients (72%) were satisfied with the surgery and would

retrospectively choose to perform it again. Fourteen patients (26%) graded their satisfaction as lower than 8. The distribution is presented in Fig. 1.

Patients who were more satisfied from the surgery had a higher SF-12 physical score pre-surgery when compared with the less-satisfied group ($p = 0.027$). The results are summarized in Table 1.

Patients who were more satisfied from the surgery improved post-surgery in all parameters compared with the less-satisfied group (WOMAC $p < 0.001$, IKDC $p < 0.001$, SF-12 mental $p = 0.001$, SF physical $p < 0.001$, Pain $p < 0.001$).

There was no difference in the satisfaction levels when compared with the different indications for surgery. Men were slightly less satisfied than the women, but not statistically significant (most probably due to low number of observations). Patients who progressed to total knee arthroplasty were less satisfied. The results are summarized in Table 2.

Patients who underwent TKA eventually had the same pre-surgery parameters as patients who didn't have the surgery ($p > 0.05$). Post-surgery their WOMAC and IKDC scores were lower than patients who didn't undergo TKA ($p = 0.002$ and $p = 0.0014$, respectively), and their pain scale was higher ($p = 0.005$).

The women were older than the men and had lower pre-surgery functional and pain scores in almost all parameters (except for SF-12 physical). Their pain score and SF-12 physical improved more than the men. Results are summarized in Table 3.

In this study, 30 patients were in the age of 46–59 (60%). There were 20 patients in the age of 60–78 (40%). The only difference between those age groups was that there were more older women (75% above the age 60) compared with men (25% above the age 60) ($p = 0.015$). There were no differences between those age groups in terms of pre-surgery parameters (WOMAC, IKDC, SF-12 mental and physical, Pain (VAS)), post-surgery parameters (WOMAC, IKDC, SF-12 mental and physical, Pain (VAS)), major indication for surgery, satisfaction from surgery, and subjective follow-up (in all p values were above 0.05).

A higher SF-12 physical score prior to surgery was found in correlation with patients wanting to repeat the surgery ($r = 0.31$) ($p = 0.031$). Lower SF-12 mental score prior to surgery was not correlated with satisfaction or dis-satisfaction ($r = 0.21$) ($p = 0.153$).

4. Discussion

Arthroscopy is a minimally invasive procedure, which allow the surgeon to evaluate concomitant meniscal tear, debridement of cartilage and lavage debris that accumulate in the joint during the osteoarthritis inflammation process and therefore eliminate pain[3,4,6].

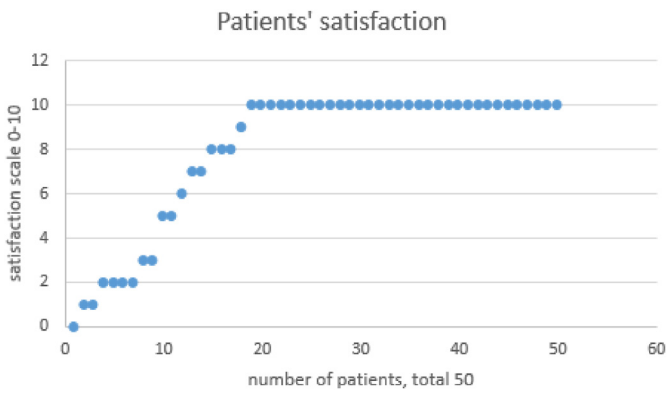

Fig. 1. Patients' satisfaction results, as 10 = most satisfied.

The European Society of Sports, Traumatology, Knee surgery, Arthroscopy (ESSKA) stated a degenerative meniscus lesion is defined as occurring without any history of acute trauma in a patient older than 35 years. A degenerative tear is usually characterized by linear intrameniscus MRI signal (including a component with horizontal pattern) often communicating with the inferior meniscus surface on at least two image slices. A more complex tear pattern can also occur. The most common location is the body and/or posterior horn of the medial meniscus. There is little evidence that the knee pain is attributed to the meniscus tear, but there is a consensus that unstable tears can cause symptoms. Although the definition of "mechanical symptoms" remains unclear, ESSKA suggests to propose knee arthroscopy for considerable mechanical symptoms that did not improved after three to six month of conservative treatment.[7]

The ESSKA menisci consensus was an attempt to solve the recent 20 years controversy regarding knee arthroscopy treatment in the settings of osteoarthritis. The use of arthroscopy in the treatment of osteoarthritis was challenged by several randomized-controlled trials, systematic reviews and meta-analyses,[2,4–7] starting with Moseley et al. publication in 2002.[8]

Moseley et al. found knee arthroscopy of no benefit when compared with lavage and "sham operation". Kirkley et al.[14] compared between conservative treatment group (medical and physical therapy, intra-articular injections) and arthroscopy group (debridement of articular cartilage and meniscus, excision of osteophyte and removal of loose bodies) and found no difference in function or other outcomes of quality of life between the groups. A systematic review by Siemieniuk et al.[15] concluded against the use of arthroscopy in patients with osteoarthritis. Siparsky et al.[5] reviewed 18 studies and concluded that arthroscopy might have some utility in low grade osteoarthritis.

Guidelines supporting their findings were published in 2008 by the American Academy of Orthopaedic Surgeons[16] and NICE guidance recommendations[17] and the publishing of ESSKA in 2016.[7] However, the decrease in arthroscopy surgeries was not as expected.[18]

Some of the design flaws in those studies still cause a debate among surgeons. The flaws include lack of stratification of the arthritis severity, use of different classification methods to describe arthritis severity, small samples, short term follow-up, and difficulty to determine clear indications.[5,7] For example, difficulty to determine "mechanical symptoms" or the exact time for a failed conservative treatment.[7] Weakness of this studies include retrospective design, selection bias and lack of randomization.[5] In our study, we focused on mild osteoarthritis degree and long-term follow-up of eight years. We could only find long-term follow-up of up to five-six years in the literature. Our research focuses on the patient's satisfaction: Even patients with osteoarthritis progression were satisfied, although those who didn't progress were more satisfied, naturally.

In cases of moderate to severe osteoarthritis, the evidence today is that knee arthroscopy is not more helpful than "sham operation" or lavage. Nonetheless, in some of the facilities the number of knee arthroscopies did not change. Surgeons either do not trust the current recommendation, or are not familiar with them, or simply want to help the patient with a "minor" procedure.[18,19] Some of the surgeons might claim arthroscopy as a major surgery with complications,[19] and therefore it is important to follow-up the patients and compare between the parameters of satisfied and non or less satisfied patients.

Our research showed a high satisfaction rate from knee arthroscopy. We used a VAS-type scale to measure satisfaction rate.[20] We chose comparison between 0 and 7 and 8 and above to compare the most satisfied patients with those who were less

Table 1
Patients' parameters prior to surgery.

Pre-surgery parameters Median (IQR)	Satisfied[8–10]	Less satisfied (0–7)	P value
Age	57 (46–78)	58 (48–74)	0.957
WOMAC	37.9 (18.9–59.1)	34.5 (25–50)	0.320
IKDC	25.85 (12.6–55.2)	25.3 (17.2–56.3)	0.657
SF12 mental	39.67 (20.48–62.12)	38.81 (23.2–51.65)	0.305
SF12 physical	31.5 (20.98–57.62)	26.66 (19.5–50.7)	**0.027**
Pain (VAS)	9[6–10]	9[5–10]	0.762

Table 2
Difference in satisfaction between male/female, indications, and subjective follow-up. MM = medial meniscus, LM = lateral meniscus, OA = osteoarthritis, K&L = Kellgren and Lawrence osteoarthritis classification. Progression as viewed in an x-ray.

		Satisfied 8–10 n(%)	Less satisfied 0–7 n(%)	P value
Sex	male	14 (38.9)	9 (64.3)	0.106
	female	22 (61.1)	5 (35.7)	
Indication	MM/LM + OA in MRI	24 (66.7)	6 (42.9)	0.292
	MM/LM + OA in x-ray	10 (27.8)	7 (50)	
	MM + other	2 (5.6)	1 (7.1)	
Objective follow-up	Total knee arthroplasty	6 (17.1)	7 (53.8)	**0.035**
	Progressed to K&L grade 3-4	8 (22.9)	1 (7.7)	
	No/minimum progression to K&L 1-2	21 (60)	5 (38.5)	

Table 3
Men/Women pre-surgery and post-surgery parameters.

Median (IQR)	Men	Women	P value
Age	55 (46–71)	62 (48–78)	**0.008**
WOMAC pre-surgery	40.9 (26.5–59.1)	36.4 (18.9–56.8)	**0.055**
WOMAC post-surgery	64.6 (39.4–100)	78.8 (28.8–100)	0.282
IKDC pre-surgery	25.3 (17.2–56.3)	24.1 (12.6–42.5)	**0.029**
IKDC post-surgery	52.9 (25.3–100)	76.45 (25.3–95.4)	0.131
SF12 mental pre-surgery	40.96 (30.09–62.12)	38.62 (20.48–51.75)	**0.017**
SF12 mental post-surgery	45.2 (25.87–65.03)	51.34 (30.3–62.37)	0.330
SF12 physical pre-surgery	26.84 (19.5–47.92)	33.14 (20.98–57.62)	**0.011**
SF12 physical post-surgery	34.12 (22.05–56.57)	47.97 (26.66–56.57)	**0.011**
Pain (VAS) pre-surgery	8.5[5–10]	9[8–10]	**0.030**
Pain (VAS) post-surgery	4 (0–9)	1 (0–10)	**0.021**
Would you repeat the surgery	10 (0–10)	10[1–10]	0.087

satisfied, to research better the factors that can contribute to success. Although patients who underwent total knee arthroplasty were less satisfied, six of them were highly satisfied from making the decision to treat first with arthroscopy and would have repeated their decision.

The patients improved in all parameters, regardless of their age and main indication. There were no differences in the parameters of patients below and above the age of 60, meaning arthroscopy can be beneficial at any age with the appropriate indications. Patients who were satisfied from the surgery improved in all post-surgery parameters-if one feels improvement in pain and function, one will most probably feel satisfied from the decision to undergo the procedure.

Higher SF-12 physical score and the gender women were predictive factors of higher satisfaction rate. The minimal clinically important difference (MCID) is the smallest difference in score in any domain or outcome of interest that patients can perceive as beneficial. Interpretation or application of the MCID requires consideration of the clinical context.[21,22] The pre-surgical SF-12 physical score was 6 points higher in the satisfied group (score 8 and above). Higher SF-12 physical score prior to surgery was found in correlation with patients wanting to repeat the surgery. The higher satisfaction rate implies this difference is important.

Some studies show that even a difference of 3–4 points in the SF-12 physical score can be clinically significant after total knee arthroplasty[23] and low back pain assessment.[24] In our study, men improved in 8 points in the SF-12 physical score and women improved in almost 15 points. Women also improved in VAS score by 8 points compared with 4.5 point of improvement in men. Therefore, the gender women seem predicative factor for a higher satisfaction rate.

In our study, even patients who progressed to a higher Kellgren & Lawrence grade were satisfied with their surgical decision. Loss of meniscus function can impair the force transmission and load distribution capabilities on the knee and increase the risk of developing osteoarthritis. However, it is unclear whether a degenerative meniscus is a cause or consequence of knee osteoarthritis.[7]

This study has several limitations. Our group is not compared to a control group. The cohort is relatively small and makes it harder to clearly identify the predictive factors for a higher satisfaction rate. The study design does not differentiate completely between meniscal lesion and osteoarthritis. It relies uncertain if the post-operative benefit is due to the meniscectomy or the debridement.

In conclusion, arthroscopy in the settings of age above 45, failed conservative treatment in the presence of a degenerative meniscus tear and mild osteoarthritis in x-ray or MRI showed a high satisfaction rate among the patients in this study. Patients above the age of 60 were as satisfied as younger patients. Higher SF-physical score and gender women were predictive for higher satisfaction rate. We

therefore conclude that older patients can benefit from knee arthroscopy treatment.

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Ethics approval

The study was performed in line with the principles of the Declaration of Helsinky. Approval was granted by the Ethics committee of Kaplan Medical Center, Israel.

Consent to participate

Informed consent was obtained from all individual participants included in this study.

Consent to publication

All participants were informed of the possibility of publishing an article based on the study's results.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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