Published online: 2020-04-06

Mind Health Before and After Total Knee Arthroplasty*

Saúde mental antes e depois da artroplastia total do joelho

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Rev Bras Ortop 2020;55(6):783–786.

Abstract

Objective To assess the preoperative and postoperative outcomes of patients diagnosed with severe knee osteoarthritis who underwent a total knee arthroplasty (TKA) using a mobile-bearing implant with a rotating platform and removing the posterior cruciate ligament. The present study focused on the outcomes relative to depression, pain, functional limitations, and fall episodes.

Methods The Lequesne questionnaire was used to assess pain and functional limitations before and after TKA. In addition, the geriatric depression scale (GDS) was also used. Episodes of falls before and after the surgery were estimated.

Results The mean Lequesne score before the surgery was 15.95, and that after surgery was 6.5. This finding was statistically significant ($p < 0.001$). The mean GDS score before the surgery was 7.43, and that after TKA was 2.22 ($p < 0.001$). The mean number of fall occurrences before the procedure, over a 1-year period, was 1.22, and that after TKA was 0.27 ($p = 0.004$). A direct relationship was found between the Lequesne scores before the surgery and the GDS scores ($p = 0.004$).

Conclusions Total knee arthroplasty resulted in the improvement of pain and functional limitation, decrease or disappearance of the depressive condition, and decrease of fall rates in the evaluated patients.

Keywords
- arthroplasty, replacement, knee
- osteoarthritis
- depression

Resumo

Objetivo Avaliar os resultados pré e pós-operatórios em relação à depressão, dor, limitações funcionais e episódios de queda em pacientes diagnosticados com osteoartrite (OA) grave do joelho submetidos a uma artroplastia total do joelho (ATJ), usando um implante móvel com uma plataforma rotativa e removendo o ligamento cruzado posterior.

* Work developed at the Faculty of Medicine, Universidade Unichristus, Fortaleza, CE, Brazil.

received
September 30, 2019
accepted
December 20, 2019

DOI https://doi.org/10.1055/s-0040-1708519.
ISSN 0102-3616.

Métodos O questionário de Lequesne foi utilizado para avaliar a dor e as limitações funcionais antes e após a ATJ. Além disso, a escala de depressão geriátrica (EDG) também foi utilizada. Os episódios de quedas antes e após a cirurgia foram estimados.
Resultados O escore médio de Lequesne antes da cirurgia foi de 15,95 e após a cirurgia foi de 6,5. Esse resultado foi estatisticamente significativo ($p < 0,001$). O escore médio da EDG antes da cirurgia foi de 7,43 e após a ATJ foi de 2,22 ($p < 0,001$). O número médio de ocorrências de queda antes do procedimento, em um período de 1 ano, foi de 1,22 e após a ATJ foi de 0,27 ($p = 0,004$). Foi encontrada uma relação direta entre os escores de Lequesne antes da cirurgia e os escores da EDG ($p = 0,004$).
Conclusões A ATJ resultou em melhora da dor e limitação funcional, diminuição ou desaparecimento da condição depressiva e diminuição das taxas de queda nos pacientes avaliados.

Palavras-chave
- artroplastia do joelho
- osteoartrite
- depressão

Introduction

There is strong evidence showing an association between severe osteoarthritis and psychiatric disorders, such as anxiety and depression. Depression is mentioned in several studies as a very frequent disorder usually caused by chronic pain, functional limitations, history of falls, and impairment of social functions.[1,2]

Total knee arthroplasty (TKA) has been increasingly used in orthopedics. As more modern and resistant anatomical implants are developed, better results are expected.[3,4] The increased life expectancy of the world population correlates with a higher incidence of degenerative diseases. Therefore, the number of TKAs is expected to increase in the coming decades.[5,6] In the United States, a 69% increase in the incidence of this surgery is expected in 2050 in relation to 2012.[7]

Osteoarthritis (OA) progresses with pain and functional limitations, impairing the performance of simple daily activities. Some studies also show an increased incidence of depression and falls in OA patients.[8–10]

The objective of the present study was to evaluate the rates of depression, pain, and functional limitations as well as the frequency of falls in OA patients before and after TKA. The hypothesis was that patients undergoing TKA would have less pain, functional limitations, falls, and depression after surgery.

Materials and Methods

This is a retrospective study that included patients diagnosed with knee OA who were older than 55 and willing to sign the Informed Consent Form (ICF). The inclusion criteria were to have a complete medical record containing information that could be analyzed by the researchers and an orthopedic recommendation for TKA with a rotating-platform knee prosthesis after physical and imaging examination. The indication of surgical treatment was based on the severity of pain and functional limitations confirmed by physical examination or refractoriness to clinical treatment. These patients had OA grade 3 or higher according to the Ahlbäck classification. Patients under 55 years of age, those not willing to sign the ICF, those with incomplete medical records, and patients not diagnosed with knee OA or not indicated for surgery with rotating-platform knee prosthesis were excluded.

A total of 37 patients with Lequesne scores equal or greater than 8 were included, and 32 patients were excluded. All patients underwent treatment and surgery in a tertiary philanthropic hospital in the country of the study between January 2015 and January 2016. All 37 patients received a rotating-platform knee prosthesis following a technique based on the mechanical alignment theory with spatial equalization.

The data were collected from January 2015 to January 2017 and filed in February 2017. The Lequesne questionnaire was used before surgery and 5 months after the procedure, along with the geriatric depression scale (GDS). In addition, researchers were trained to ask patients the same questions about falls before and after the surgery. Falls before and after surgery had to be related to pain, functional limitations, or knee instability, occurring within a year before or after the surgery. All researchers were trained to apply the Lequesne and GDS questionnaires for consistency. The researchers decided that orthopedists and radiologists would not have access to the Lequesne score results until the study was completed.

The questionnaire by Lequesne et al.[11] was introduced in 1987 to evaluate pain and functional limitations and was reviewed by Faucher et al.[12] in 2003. This evaluation tool consists of a self-administered questionnaire containing 11 questions about pain, discomfort, and function. Depending on the score, the patient is classified as having mild (1–4 points), moderate (5–7 points), severe (8–10 points), very severe (11–13 points), or extremely severe (greater than or equal to 14 points) handicap. The GDS version used in this study had 15 questions, in which a score greater than or equal to 6 indicated depression.[13]

The IBM SPSS Statistics for Windows, version 20.0 software (IBM Corp., Armonk, NY, USA) was used for the statistical analysis. The Chi-squared hypothesis test was used to investigate the association among categorical variables and

sample distribution. The Wilcoxon test was used for the number of falls before and after TKA. A p-value < 0.05 was considered statistically significant.

This study followed basic principles of ethics in human research, such as autonomy, justice, beneficence and non-maleficence, guided by resolution 466/12 of the National Health Council. The study was submitted to the Human Research Ethics Committee (HREC) using the platform of the country of study, sent to the university center and accepted according to protocol no. 44595315.1.0000.5049.

Results

Before surgery, 70.3% of the patients were classified as having extremely severe handicap, 21.6% very severe, and 8.1% severe. After surgery, 13.5% were classified as having extremely severe handicap, 2.7% very severe, 21.6% severe, 13.5% moderate, and 48.6% mild, as described in the Lequesne questionnaire (►**Fig. 1**). The mean score before surgery was 15.95, and after surgery it was 6.5. The score reduction in each patient after surgery was statistically significant ($p < 0.001$) (►**Fig. 1**).

The analysis of these scores allowed the identification of certain characteristics of the patients' pain: 63.2% of the patients had pain during nighttime sleep, even without any movement; 75% had morning pain of up to 15 minutes; and 68.4% said they had pain when they started walking that worsened with continuous walking.

As for frequency of falls, the mean number of occurrences before surgery in a 1-year period was 1.22. The mean number of falls after TKA in a 1-year period was 0.27 (►**Table 1**). A decreased number of falls was observed after TKA in 73.68% of the patients ($p = 0.004$). The Wilcoxon test was also applied for this variable, with a significance level of $p = 0.003$.

As for the GDS, the mean score before surgery was 7.43, decreasing to 2.22 after TKA (►**Table 1**). This reduction was also statistically significant ($p < 0.001$). In addition, the higher the Lequesne score of a patient before surgery, the higher the GDS score ($p = 0.004$).

Table 1 Episodes of falls and geriatric depression scale

	Mean before surgery	Mean after surgery	P-value
Episodes of falls	1.22	0.27	$p = 0.004$
GDS	7.43	2.22	$p < 0.001$

Abbreviation: GDS, geriatric depression scale.

Discussion

The Lequesne questionnaire was developed in France in the 1970s and is widely used in Europe to evaluate OA patients. It contains several questions about pain, discomfort, and function that should be answered by patients. The severity of symptoms and physical ability limitations can be evaluated in OA patients from any country or culture.[14]

As for the scores before and after surgery, a French study reported that the mean score of its patients before and after arthroplasty were 14.5 and 7.9, respectively.[15] In the present study, the mean score before TKA was higher, 15.95, and the mean score after TKA was lower, 6.5 ($p < 0.001$).

Falls can be common in knee OA patients due to the pain, functional limitations, and muscle atrophy caused by the disease. The expected number of falls should be lower[16] after a successful TKA, with a significant difference in Lequesne scores before and after surgery. In this present study, the number of falls after the surgery was significantly lower ($p < 0.05$).

A total of 80% of the patients prone to falling did not fall again after TKA, and it is very close to the data provided by another study that showed a total of 76%.[16] In a British study, the

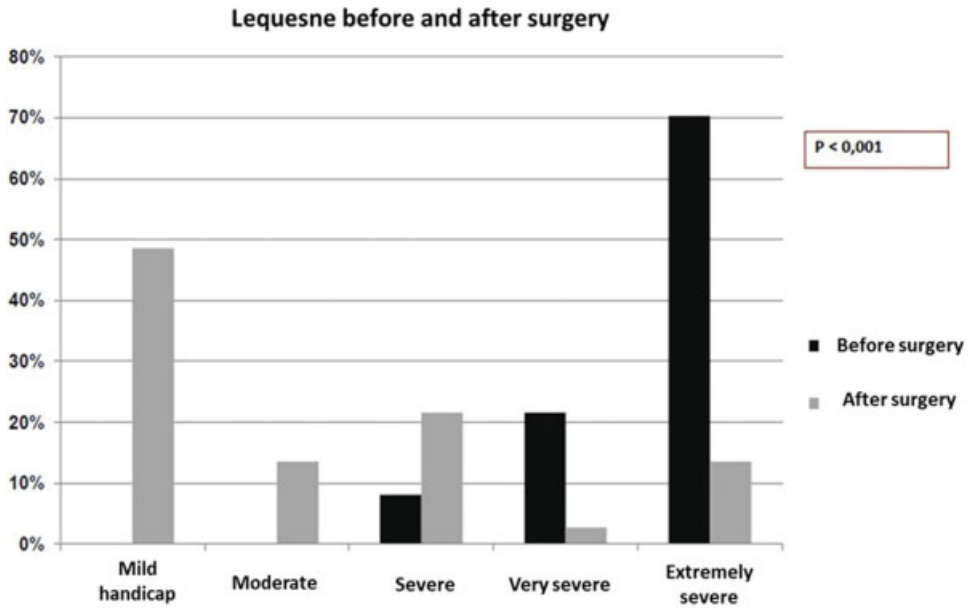

Fig. 1 Lequesne scores before and after surgery (source: the author).

scholars presented a total of 54,2% of patients prone to falling who did not fall again.[8] Some older patients may have forgetfulness, and this may cause a limitation for this study. Weekly or monthly fall data checks should probably be more accurate.

Some studies reported a high prevalence of depression in OA patients.[8,17,18] The GDS is widely used to track depression in the elderly.[13] It is considered a reliable and important scale that can be also used to estimate the risk of suicide.[19] The GDS was used in the present study to track depression and to evaluate if depressive symptoms improved after surgery. Thus, similarly to some international studies, this study showed a statistically significant ($p < 0.05$) decrease in patient depression.[17,18] In addition, the higher the Lequesne score of a patient before surgery, the higher the GDS score ($p = 0.004$). We have no knowledge of other studies correlating the Lequesne score to the GDS questionnaire.

The number of patients selected for this study may be considered a limitation. Inclusion requirements, questionnaires with missing information, and patients who did not answer one of the questionnaires reduced the number of patients in the sample.

Due to the importance of depression and its consequences during treatment and for patient satisfaction before and after surgery, further studies are necessary to verify the importance and efficiency of a psychological and/or psychiatric follow-up before and after TKA.

Conclusion

Total knee arthroplasty can decrease pain, functional limitations, the number of falls, and depression. In addition, in the present study, we observed that the higher the Lequesne score of a patient, the higher the GDS score. This suggests the presence of an association between pain and functional limitations, and the occurrence of a depressive disorder.

Conflict of Interests

The authors have no conflict of interests to declare.

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