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RESEARCH ARTICLE

EFFECT OF THE SEVERE SPANISH LOCKDOWN DURING THE FIRST WAVE OF SARS-COV-2 ON CLINICAL OUTCOME OF PRIMARY AND REVISION TOTAL KNEE ARTHROPLASTY

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ABSTRACT

Postoperative rehabilitation after knee arthroplasty surgery is considered to be of vital importance. The severe Spanish lockdown during the first wave of the COVID pandemic forced patients to stay at home shortly after their knee surgery. This study compares the clinical outcome after 6 months between patients that completed the postoperative rehabilitation protocol and those that did not receive any professional rehabilitation at all. 146 consecutive knee arthroplasty surgeries were enclosed in this study, 46 of them with no postoperative rehabilitation at all. The result of this study showed no inferior clinical outcome for the group without any rehabilitation.

Key Words:

Rehabilitation, Total Knee Arthroplasty, COVID.

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INTRODUCTION

Postoperative rehabilitation of patients undergoing total knee arthroplasty (TKA) is considered crucial to achieve optimal clinical outcome (Claudio Lisi, 2017). Different modalities of rehabilitation regimes exist. In-hospital rehabilitation, outpatient rehabilitation in specialized centres, home-based rehabilitation with or without control and tele-rehabilitation are only a few of the existing options (Iciar, 2019). Literature comparing clinical outcome of these different options did not find significant differences between these modalities (Mark, 2019; David, 2020; Douglas, 2018). The first wave of SARS-CoV-2 had a dramatic impact in Spain and the Spanish government introduced a complete confinement with severe mobility restrictions on March 15th 2020 until May 2nd 2020. These restrictions were sequentially revoked until June 21st 2020. During this period, patients that had undergone TKA surgery prior to these restrictions were forced to remain at home, and did not receive conventional rehabilitation. Within the public Spanish national health-care-system different TKA pathways exist. At the authors institution rehabilitation pathway starts on the first postoperative day with first mobilisation of the patient using a walking frame.

Additionally several simple workouts are explained. During the rest of this day the patient tries several times to walk around, at least, inside the patients room. On the second postoperative day the patient is again visited by the physiotherapists, and climbing, as well as descending stairs is trained. Discharge is usually at the second postoperative day. The patients are discharged home and depend on family support. In the following two to three weeks, the patients have to visit the outpatient nursery for wound follow-up and removal of suture material. Outpatient rehabilitation starts from week two to four after surgery. This rehabilitation has an average treatment period of four to six weeks and takes place twice to three times a week. Clinical follow-up at the authors institution follows a standard, and clinical, as well as radiological information is fed into the local TKA register. The follow-up sequence is at two years postoperatively. Preoperatively, at six months and two years postoperatively clinical data is evaluated. Knee society score (KSS) and the forgotten joint score (FJS) are used as objective and subjective outcome measurements. Radiological assessment is performed preoperatively and at 6 months postoperatively including long leg radiographs at both time points. All TKA are done with the use of navigation and this data is included in the local TKA register. From February 17th 2020 on, minor restrictions on elective TKA numbers were imposed, and fully stopped from March 17th on. The Spanish government confined the general

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population on March 15th. Individual mobility of the population was completely restricted. Therefore, no rehabilitation activities, except that performed by the patient at home, took place. Patients that underwent TKA surgery in the four weeks prior to this confinement did not receive any rehabilitation at all. Since the confinement was sequentially deescalated over a period of 3 months, these patients did not benefit from any rehabilitation for the first four to six months post-surgery. The aim of this study was to compare the six-month clinical outcome of TKA surgery between patients that underwent the routine postoperative rehabilitation protocol, and those that did not receive any professional rehabilitation after surgery at all.

METHODS

A total of 146 patients were enclosed in this study. All being consecutive primary or revision TKA (RTKA). 100 of these patients underwent surgery between July 27th 2019 and December 2nd 2019. These patients fully completed the postoperative rehabilitation protocol. The remaining 46 patients underwent surgery between February 11th 2020 and March 16th 2020 and did not receive any rehabilitation at all. All data were retrospectively extracted from the local knee register. All surgeries were performed by a members of the knee department (one of the five authors). All primary surgeries were done using a navigated (Knee3 Brainlab), tibia first gap balanced technique. We created four study groups. Group 1 being primary TKA with completed rehabilitation protocol. Group 2 being primary TKA with no rehabilitation. Group 3 being RTKA with completed rehabilitation and Group 4 being RTKA with no rehabilitation. No differences regarding implants, surgical technique or indication between the groups 1 and 3 and the groups 2 and 4 were made. Available data within the local register: Preoperatively; demographic information, range of motion (ROM), leg-axis determined by long-leg-radiograph, Knee Society Score (KSS), Forgotten Joint Score (FJS) in RTKA patients.

Intraoperatively; implant data, navigation protocol, surgical time and the use of tourniquet. Postoperatively at 6 months; ROM, leg-axis determined by long-leg-radiographs, KSS and FJS. Statistical analysis was done using IBM statistics SPSS 22.0. Quantitative data presented a normal distribution following Kolmogorov-Smirnoff criteria. Qualitative variables were compared using chi-squared test, for quantitative variables ANOVA test was used. For paired quantitative variables, t-student test was used. Statistical significant difference was considered with $p < 0,05$. One patient was lost to follow-up because of long distance to the hospital and COVID associated mobility restrictions. The primary TKA implants were Attune CR, Attune PS and HP Partial from DePuy (DePuySynthes, Warsaw, IN, USA). The revision implants used were TC3 and Attune Revision (DePuySynthes, Warsaw, IN, USA) and the RHK from Zimmer (Zimmer Inc., Warsaw, IN, USA).

RESULTS

Out of the 146 patients 124 received a primary TKA (84,9%) and 22 received a RTKA. 86 of those being right knees (58,9%). Group 1 had 89 patients (61%), group 2 had 35 patients (24%), group 3 had 11 patients (7,5%) and group 4 had 11 patients too. Comparison Group 1 and 2: The average age in group 1 was 68,45years (SD 7,39y) and 71,34years (SD

7,54) in group 2, not being significantly different. Preoperative ROM, laterality, surgical time, use of tourniquet or intraoperative navigation data was not significantly different between these groups. Preoperative KSS score showed lower values for group 2 (62,09 SD 24,16) in comparison with group 1 (85,61 SD 29,99) being significant with $p < 0,001$. Postoperative ROM and alignment showed no significant difference at 6 month. Postoperative KSS at 6 month was significantly higher for group 2 (161,54 SD 26,59) in comparison with group 1 (155,77 SD 31,16) with $p < 0,001$. Comparison group 3 and 4: The average age in group 3 was 64,55 years (SD8,98) and 67,27 years (SD9,4) in group 4 not being significantly different. No significant differences were found for preoperative ROM, KSS, FJS, navigation data, surgical time, use of tourniquet, type of implants or laterality. No significant differences were found at 6 month postoperatively for ROM, FJS or resulting mechanical alignment. Significant differences were found for the KSS at 6 month. Group 4 showed higher values (124,63 SD 27,04) than group 3 (118,63 SD 31,40) with $p < 0,001$.

DISCUSSION

The most important finding of this study was, that patients undergoing elective TKA or RTKA surgery with no professional postoperative rehabilitation at all did not show inferior clinical outcome at 6 months postoperatively in comparison with patients that underwent the complete, postoperative routine rehabilitation protocol. The strength of this study is that 146 consecutive TKA and RTKA were enclosed and no differences between the compared groups in terms of surgical technique, implants or surgeons exists. This allows for a reliable comparison between groups concerning the clinical outcome. The weakness of this study is the very limited number of patients available that did not receive any rehabilitation at all and the fact that we know little about the postoperative behaviour of our patients in a non-pandemic setting. It might be possible that patients are less active after TKA surgery than we like to believe and the difference caused by the severe confinement are of lesser importance. A thorough postoperative monitoring of patients activity level would clear these doubts and should be the content of further study.

Conclusion

The severe Spanish lockdown during the first wave of SARS-CoV-2 had no negative effect on the 6-month clinical outcome of TKA and RTKA patients. No conflict of interest exists for any of the authors, no funding was received for this study.

Glossary of Abbreviations

FJS = forgotten joint score
KSS = knee society score
ROM = range of motion
RTKA = revision total knee arthroplasty
SD = standard deviation
TKA = total knee arthroplasty

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