

The influence of the rehabilitation on the patient recovery after total hip endoprosthesis implantation

Hadžan Konjo, Fuad Julardžija, Adnan Šehić, Amra Mačak Hadžimerović, Amila Jaganjac, Samir Bojičić, Suada Branković, Jasmina Mahmutović, Edina Tanović

Abstract- INTRODUCTION: Physiotherapy and rehabilitation of the patients after the implantation of total hip endoprosthesis have been equally important as the surgical intervention. The main aim of the rehabilitation presents the reducing of pain, renewal of function and muscle strength and achieving the optimal extent of the movement in hip joint necessary for the everyday activities. There are many rehabilitation protocols (kinesytherapy, training with weights, treadmill, conventional physiotherapy, bicycle ergometer, functional exercises etc.), individually adjusted to the patients based on the kind of implanted endoprosthesis. **MATERIAL AND METHODS:** The survey included 100 examinees with the disease of hip joint who had been treated surgically at the Clinics for orthopaedics and traumatology in Clinical center of Sarajevo University by implanting the total endoprosthesis. The examinees were questioned before and after the physiotherapy treatment that was conducted within the postoperative rehabilitation after the implanting the total hip endoprosthesis. The survey covered the period since 1st January 2014. to 31st December 2016. In the survey cross-sectional method of the survey was used where all the data were collected by the corresponding instrument tools of survey, in this case poll questionnaire, WOMAC. The mentioned questionnaire consists of 24 questions which analyse the pain, stiffness and body activity. The span of points is in the form of Likert scale **RESULTS:** Analysing the pain in the hip/groin during the last month while doing certain activities, before and after the conducted physiotherapy, statistically significant improvement was found, and that has been confirmed by Anova test, $p=0.001$. Analysing the stiffness in the hip/groin during the last month while doing certain activities, before and after the conducted physiotherapy, statistically significant improvement was found, and that has been confirmed by Anova test, $p=0.001$ **CONCLUSIONS:** This survey confirms the significance, not only of the surgical procedure of implantation of total hip endoprosthesis in the third age patients, but also the significance of the well organized physiotherapy and rehabilitation that has provided good results in our patients. The improvement degree of the functional status is considerably bigger after the surgery and conducted physiotherapy compared to the preoperative period.

Index Terms— rehabilitation, hip, recovery, total endoprosthesis, WOMAC, orthopedics

1 INTRODUCTION

Osteoarthritis, fractures of femoral neck, rheumatoid arthritis, post traumatic arthritis and avascular necrosis are the most frequent indications for the implantation of total hip endoprosthesis. [1] This is the common surgical procedure that is considered effective and successful compared to complications, mortality and implant continuance. [2] For the qualitative surgical procedure it is very important to have adequate radiological diagnostics done before and after the implant has been embedded.

Physiotherapy and rehabilitation of the patients after the implantation of total hip endoprosthesis have been equally important as the surgical intervention. The main aim of the rehabilitation presents the reducing of pain, renewal of function and muscle strength and achieving the optimal extent of the movement in hip joint necessary for the everyday activities. There are many rehabilitation protocols (kinesytherapy, training with weights, treadmill, conventional physiotherapy, bicycle ergometer, functional exercises etc.), individually adjusted to the patients based on the kind of implanted endoprosthesis. Some are conducted in the hospitals, some in ambulances, and some at home. [3]

It should be mentioned that general rehabilitation principles are applicable after the implantation of total hip endoprosthesis, but in this case the rehabilitation presents special challenge because of the extent of manipulation in the surgical procedure – cutting out big parts of several muscles, reconnecting those muscles and replacing the hip joint. The workout programme has to be modified to adjust it to the limitations as the hip inactivity, abduction or knee flexion in order to protect muscle connection for several weeks. With the corresponding rehabilitation programme patients with the total hip endoprosthesis can achieve satisfying results and high level of functionality and independence. [4]

The aim of this survey was to determine the existence of the improvement degree of functional status of the patients after the rehabilitation compared to the one before the surgical procedure.

2 MATERIAL AND METHODS

The survey included 100 examinees above the age of 65, of both genders, with the disease of hip joint who had been

treated surgically at the Clinics for orthopaedics and traumatology in UKCS by implanting the total endoprosthesis. The examinees were questioned before and after the physiotherapy treatment that was conducted within the postoperative rehabilitation after the implanting the total hip endoprosthesis. The survey covered the period since 1st January 2014. to 31st December 2016. In the survey cross-sectional method of the survey was used where all the data were collected by the corresponding instrument tools of survey, in this case poll questionnaire, WOMAC. The mentioned questionnaire consists of 24 questions which analyse the pain, stiffness and body activity. The span of points is in the form of Likert scale and its range for pain is from 0 to 28, for stiffness from 0 to 8 and for body activity from 0 to 68. The points are summed up, and the lesser number of points presents the better result.

3 RESULTS

Of the total number of the examinees included into this study 34% of them were male, and 66% female. The average age of the male examinees was 71.70±7.26 years, and of the female examinees 71.31±6.52 years.

Analysing the pain in the hip/groin during the last month while doing certain activities, before and after the conducted physiotherapy, statistically significant improvement was found, and that has been confirmed by Anova test, p=0.001. (tabel 1)

Tabel 1. Analysis of the pain in hip/groin during the last month while performing certain activities

		X	SD	SEM	Min	Max
Walking	Before	0,29	0,70	0,07	0,00	4,00
	After	0,00	0,00	0,00	0,00	0,00
F=17.135; p=0.001						
Stairs	Before	1,23	0,72	0,07	0,00	4,00
	After	0,07	0,25	0,02	0,00	1,00
F=228,812; p=0.001						
At night	Before	0,12	0,59	0,05	0,00	4,00
	After	0,00	0,00	0,00	0,00	0,00
F=4.125; p=0.044						
Resting	Before	0,16	0,61	0,06	0,00	4,00
	After	0,00	0,00	0,00	0,00	,00
F=6.769; p=0.010						
With the load	Before	1,18	0,68	0,06	0,00	4,00
	After	0,09	0,28	0,02	0,00	1,00
F=214.053; p=0.001						

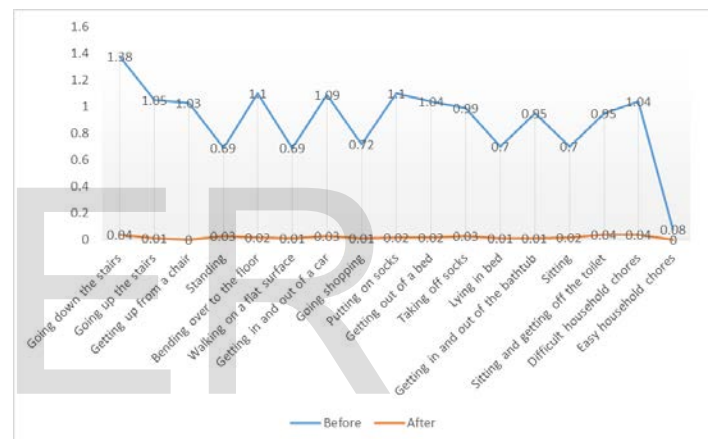
Analysing the stiffness in the hip/groin during the last month while doing certain activities, before and after the conducted physiotherapy, statistically significant improvement was found, and that has been confirmed by Anova test, p=0.001. (tabel 2)

• Hadžan Konjo Ass.prof. University of Sarajevo, Faculty of health studies.
E mail: hadjank@hotmail.com

Tabel 2. Analysis of the stiffness in hip/groin during the last month while performing certain activities

		X	SD	SEM	Mi	Max
Walking	Before	1,08	,52	,05	,00	4,00
	After	,02	,14	,01	,00	1,00
F=379.385; p=0.001						
Stairs	Before	1,06	,54	,05	,00	4,00
	After	,02	,14	,01	,00	1,00
F=338,856; p=0.001						

Analysing the difficulties during the last month in doing certain activities, before and after the conducted physiotherapy, statistically significant improvement was found, and that has been confirmed by Anova test, p=0.001. (graph 1)



Graph 1. Analysis of the difficulties in performing certain activities.

4 DISCUSSION

The main purpose of the total hip replacement is to soothe the pain in the hips and to renew the lost mobility of the joint. Postoperative functionality of the hip endoprosthesis is closely related to the correct physiotherapy. Good movement extent, sufficient reducing of the pain and minimal obstruction of muscle tissue are the conditions that enable the patients to conduct individual exercises of muscle strengthening and to exercise newly found mobility, following the training in early postoperative period while still in hospital. [6]

The aim of the early postoperative physiotherapy is to improve the functioning of the artificial hip joint, as well as recurrence of the patient mobility and independence. Minimal invasive surgical techniques enable the early mobilization with the full weight. Matheis S. and ass. [7] have done the study with the aim to improve the hip function by additional purposeful mobilization and the training of the hip muscles strength in the first postoperative week after the implantation of total hip endoprosthesis. The study included 39 patients divided into two groups, one being intervention

group that had more intensive treatment with the additional mobilization and strength workout, and the other was control group that had the standard physiotherapy programme. Improvement in the intervention group compared to the control group has been recorded in the movement extent (flexion $p < 0,01$, extension $p < 0,001$, abduction $p < 0,01$) and walking performance ($p < 0,001$). No differences have been detected between the groups related to thigh girth, retaining the gluteal muscles power, position of one leg and subjective parameters. Zech and ass. [8] have done the prospective cohort study in order to determine whether the intensity and duration of the standard physiotherapy were related to the changes in the function after the implantation of total hip endoprosthesis. The survey included total 58 patients two weeks after the surgery, and the average age was $62,5 \pm 10,4$ years, which is in the correlation with the results of our survey. Standard rehabilitation included: practical physiotherapy, group exercise therapy, strength training, ergometer cycle therapy, continuous passive motion therapy and aquatic exercise therapy. WOMAC index was estimated before and after the therapy. In the results the authors have stated that the period of individual rehabilitation varied between 12-25 days and it included $48,1 \pm 12,5$ exercise interventions with the intensity between 9,6 and 14,0 points on the Borg rating of perceived exertion scale. Results of WOMAC scale for pain ($p < .001$), stiffness ($p < .001$) and function ($p < .001$), which represents significant improvement and that is in the correlation with the results of our survey. Btehege M. and ass. [9] conducted the controlled multicenter examination of the influence of physiotherapy on the patient recovery after the implantation of total hip endoprosthesis. The implantation of endoprosthesis has been conducted in 11 hospitals. Participants of the intervention group (IG; 3 hospitals) were treated within the IC model (integrated care), and the participants of the control group (CG; 8 hospitals) were treated within the conventional care. The outcome was analysed by WOMAC score. In the survey the 481 patients participated (IG: $n = 249$; CG: $n = 232$). The response in the end of the treatment was 85,9% ($n = 413$), response after 4 months was 89,4% ($n = 430$), and after 1 year 85,9% ($n = 413$). Multivariate analysis confirmed reducing of the treatment time for 4 days ($p < 0.001$) and improved functional results on WOMAC score (4 months: $p < 0.001$; 12 months: $p < 0.001$), which is in the correlation with the results of our survey. In order to estimate outpatients rehabilitation after the impantation of total hip endoprosthesis Müller M and ass. [10] conducted multicenter study for the evaluation of life quality, general health, as well as subjective and objective damage at the beginning (T1), in the end (T2) and 3 months after the rehabilitation (T3). SF 36, EQ-5D and WOMAC were the instrument tools used in the study. 359 patients were included. Average age was 65 godina, and 49% of patients were women. Both the results of clinical parameters and health status have shown very significant positive changes during the rehabilitation, as well as sustainability in the coming observation period, which is in the correlation with the results of this survey. The loss of the effect with the result decline after the rehabilitation has not been detected. Tuncel T. and ass. [11] analyzed the mobility degree after the hospital

rehabilitation. 127 patients with the implanted total hip endoprosthesis participated in this study. In order to reveal the mobility degree of the patients, it was measured in reception, weekly followed after that and finally measured in the release. The study has shown that the biggest progress of the rehabilitation related to the significant improvement of mobility degree has been achieved in the end of the second week of the rehabilitation. It was also concluded that big economic savings were achieved by individual adjustment of the rehabilitation. As the result of this in times of limited financial means, saved resources can be used for other rehabilitation groups.

5 CONCLUSION

This survey confirms the significance, not only of the surgical procedure of implantation of total hip endoprosthesis in the third age patients, but also the significance of the well organized physiotherapy and rehabilitation that has provided good results in our patients. The improvement degree of the functional status is considerably bigger after the surgery and conducted physiotherapy compared to the preoperative period.

6 REFERENCES

- [1] Spalević M, Milenković S, Kocić M, Stanković I, Dimitrijević L, Živković V, et al. Total hip replacement rehabilitation: results and dilemmas. *Acta Medica Medianae* 2018;57(1):48-51.
- [2] Aalund PK, Glassou EN, Hansen TB. The impact of age and preoperative health-related quality of life on patient-reported improvements after total hip arthroplasty. *Clin Interv Aging*. 2017;12:1951-1956.
- [3] Spalević M, Milenković S, Kocić M, Stanković I, Dimitrijević L, Živković V, et al. Total hip replacement rehabilitation: results and dilemmas. *Acta Medica Medianae* 2018;57(1):48-51.
- [4] Katrak P, O'connor B, Woodgate. Rehabilitation after total femur replacement: a report of 2 cases. *Arch Phys Med Rehabil*. 2003;84(7):1080-4
- [5] Stratford P.W. et al. WOMAC pain scale measurement properties. *Osteoarthritis and Cartilage*. 2007;15(3): 266-272.
- [6] Šťastný E, Trč T, Philippou T. Rehabilitation after total knee and hip arthroplasty. *Cas Lek Cesk*. Winter 2016;155(8):427-432.
- [7] Matheis C, Stöggel T. Strength and mobilization training within the first week following total hip arthroplasty. *J Bodyw Mov Ther*. 2018;22(2):519-527.
- [8] Zech A, Hendrich S, Pfeifer K. Association Between Exercise Therapy Dose and Functional Improvements in the Early Postoperative Phase After Hip and Knee Arthroplasty: An Observational Study. *PM R*. 2015;7(10):1064-1072.

- [9] Bethge M, Bartel S, Streibelt M, Lassahn C, Thren K. Improved outcome quality following total knee and hip arthroplasty in an integrated care setting: results of a controlled study. *Rehabilitation (Stuttg)*. 2011;50(2):86-93.
- [10] Müller M, Toussaint R, Kohlmann T. Total hip and knee arthroplasty : Results of outpatient orthopedic rehabilitation. *Orthopade*. 2015;44(3):203-11
- [11] Tuncel T, Simon S, Peters KM. Flexible rehabilitation times after total hip and knee replacement. *Orthopade*.2015;44(6):465-73.

IJSER