



Evaluation the Results from Rehabilitation of Patients with Surgically Treated Pertrochanteric Fracture

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Abstract

Introduction: Adult population generally is more sensitive and exposed to various injuries, which means increased opportunity for the emergence of various kinds of geriatric trauma. By increasing average length of life, solving fractures of the upper end of the femur is a major problem for the modern surgery.

Objectives: 1. To evaluate the effects of treatment and physical rehabilitation kinesitherapy and magnetic therapy versus kinesitherapy and therapy with interference currents of patients with surgically treated pertrochanteric fracture with DHS- type KYLE I, II, according to the protocol results monitoring.

Material and Methods: The study represents a prospective randomized clinical trial implemented at the Institute for Physical Medicine and Rehabilitation - Skopje. Include two cohorts, with 90 participants with surgically treated pertrochanteric fracture with DHS-type KYLE I, II. Respondents are divided into two groups: Examined cohort - 45 patients is treated with kinesitherapy and magnetic therapy and control group - which has 45 patients treated with kinesitherapy and therapy with interference currents. Respondents were followed for one year, during which were performed three examinations, the first control on the day of discharge, 6 and 12 months, from the first review which is input for selected patients who meet the criteria for inclusion in research.

Results: It is recognized that, kinesitherapy and magnetic therapy for $p < 0,05$, increase Harris hip score (improve the condition of patients) in three time combinations. For $p < 0,05$, significant difference with Wilcoxon signed rank test was perceived between Harris hip score at: a) out/6 months $Z = 5,712$ $p = 0,0001$ in addition to 6 months; b) discharge/12 months $Z = 5,842$ $p = 0,0001$ in addition to 12 months; c) 6 months/12 months $Z = 5,844$ $p = 0,0001$ in addition to 12 months. It is recognized that, kinesitherapy and interference currents, for $p < 0,05$, increase Harris hip score (improve the condition of patients) in three time combinations. For $p < 0,05$, significant difference with Wilcoxon signed rank test was perceived between Harris hip score: a) discharge/6 months $Z = 5,842$ $p = 0,0001$ in addition to 6 months; b) discharge/12 months $Z = 5,842$ $p = 0,0001$ in addition to 12 months; c) 6 months/12 months $Z = 5,778$ $p = 0,0001$ in addition to 12 months.

Conclusion: In the postoperative rehabilitation of pertrochanteric fractures, with dynamic fixation implant- DHS, therapy of choice is kinesitherapy and magnetic therapy it resulted with improvement in the functional status, the stimulation of osteogenesis and quality of life in elderly patients.

Keywords: Pertrochanteric Fracture; DHS-dynamic Hip Screw; Magnetic Therapy; Interference Currents; Kinesitherapy

Introduction

The extension of human age, and better quality of life contributes to increased activity of the older population group. Adult population generally is more sensitive and exposed to various injuries, which means increased opportunity for the emergence of various kinds of geriatric trauma. Geriatric patients are at higher morbidity and mortality compared to young people, and it requires a different approach to treatment, which should reduce mortality and increase postoperative success [1].

By increasing average length of life, solving fractures to the upper end of the femur is a major problem of modern surgery. Pertrochanteric fractures are around four times more common fractures of the neck of femur and commonly occur in patients older than 65 years. In this population of patients, osteoporosis in women is very common especially because they are more prone to these fractures, as compared with the male population of 4: 1. 2/3 of the geriatric population involve other comorbidities such as: cardiovascular, respiratory, endocrine and other diseases. Injury worsens existing conditions, resulting in a large percentage of mortality [2].

According to the Kyle classification [3], pertrochanteric femoral fractures are divided into four groups: stable (Type I and II) that are running with the fixation of the femur with DHS (dynamic hip screw); and unstable (type III and IV) which dealt with the fixation of the femur with the AFL (proximal femur nail).

Objectives of the Study

- To evaluate the effects of treatment and physical rehabilitation kinesitherapy and magnetictherapy versus kinesitherapy and therapy with interference currents of patients with surgically determined pertrochanteric fractured femur with DHS- type KYLE I, II, according to the results achieved under the protocol to follow.
- To identify possible differences in the quality of life of patients with surgically determined pertrochanteric fractured femur with DHS- type KYLE I, II according to physical treatment and rehabilitation, kinesitherapy and magnetic therapy versus kinesitherapy and therapy with interfering currents.

Materials and Methods

The study was conducted at the Institute for Physical Medicine and rehabilitacija_ Skopje, in cooperation with the University Clinic- TOARILUC, University Clinic for surgery diseases "St. Naum Ohridski" CGH "8-th September " Skopje, where surgical patients

were treated. The research included two groups with 90 subjects (examined and control group) and patients with surgically determined pertrochanteric fracture, Kyle types I, II with dynamic fixation implant-DHS (Dynamic hip screw).

Respondents are divided into two groups: Examined group - 45 patients with surgically determined pertrochanteric fracture, Kyle types I, II with dynamic fixation implant-DHS (Dynamic hip screw), admitted to the Institute of Physical Medicine and Rehabilitation - Skopje, 2- 3 weeks after surgery. These patients are treated with kinesitherapy and magnetic therapy, low-frequency pulse-field intensity 8mT, 25Hz, 30 minutes for 10 treatments (Magomil 2-Electronic Dizajn). Magnetic therapy application is applied to the mat, where the patient lies down on it. The therapy is administered through clothing in 30 minutes, once a day, 10 treatments.

Control group - 45 patients with surgically determined pertrochanteric fracture, Kyle types I, II with dynamic fixation implant-DHS (Dynamic hip screw), admitted to the Institute of Physical Medicine and Rehabilitation - Skopje, after 2-3 weeks of operating treatment. These patients are treated with kinesitherapy and interfering currents (Neoserv 824- Simens). Interference currents are applied using four rubber graphite quartered electrodes that before the application is coated with multilayer gauze soaked in warm water and good drainage. 10 treatments administered for a period of 30 minutes and once daily directly to the skin, well fastened with constantly frequency of 100Hz. The skin of the patient must be healthy and intact, and the treatment feels like a pleasant vibrations.

Both groups of patients treated with kinesiotherapy. Kinesiotherapy consists of a progressive program of exercises for the lower limbs: strengthening m.quadriceps of the operated and healthy leg muscle of the hip (flexor, extensor, abductor, adductor muscles, rotators), starting with isometric, then with isotonic exercises, walking exercises with aid etc.

Respondents were followed for one year, during which were performed three examinations, the first control on the day of discharge, 6 and 12 months, from the first review which is input for selected patients who meet the criteria for inclusion in research.

The first, second and third control include physical treatment and completed questionnaire of Harris hip score, which consists of 3 parts. The first part has 8 questions in the area of pain, support, everyday activities. The second part has 4 questions regarding the

scope of the developments in the operated hip and length of the operated leg, and the third part consists of 4 questions to individual measurements of the operated hip flexion, abduction, adduction and external rotation. The ranking of scores of Harris hip score is as follows: less than 70 points = bad, 70- 79 rather good, 80 to 89 good and 90 excellent 100 points [4-6]. Questionnaire is filled out Harris hip score at first, second and third control by the researcher.

Statistics

Statistical evaluation was performed using appropriate statistical programs (Statistica for Windows 7,0 and SPSS 17.0). The data obtained are presented in tables and graphics. To test the significance of the differences between certain parameters analyzed were used, depending on the type and distribution of data, parametric Student-ov t-test (two independent samples) and ANOVA (for more independent samples) and neparametarski tests for independent samples and consequently test Mann Whitney U and Kruskal Wallis test. When analyzing more than two numerical series used the Post hoc - Tukey significant difference (HSD) test. Analysis of more than two dependent samples are consequently used Wilcoxon test and Friedman ANOVA test. to establish.

Results

Among subjects (examination and control) Harris hip score was calculated, composed of several parts: a) 8 questions in the area of pain, support, everyday activities; b) 4 questions about the scope of the developments in the operated hip and length of the operated leg and c) 4 questions to individual measurements of the operated hip flexion, abduction, adduction and external rotation. Harris hip score for each respondent is calculated from the research through electronic software in three seasons (discharge, 6 and 12 months).

Within the experimental group was made a single analysis three times (Reports 6 Months 12 Months) of Harris hip score. In two of the three measurements (the Shapiro-Wilk $W < 0,05$), there is an absence of a normal distribution therefore further analysis with applied tests are needed. In this group, the average value of Harris hip score at discharge, 6 months and 12 months is consequently $57,5 \pm 12,1$ v.s $74,3 \pm 9,9$ v.s $86,6 \pm 10,2$. The minimum or maximum value in printouts amounted to 34,8 v.s 83,1; after 6 months amounted to 44,1 v.s 93 and after 12 months was 64,4 v.s 96 (Table 1).

| Descriptive statistics of examined group three times | | | | | | | | |
|--|------------|----------------|----------------|---------------|---------------|------------------|---------------------------|------------------|
| Time of physical examination | Number (N) | Average (Mean) | Std. Deviation | Minimum (Min) | Maximum (Max) | Percentiles | | |
| | | | | | | 25 th | 50 th (Median) | 75 th |
| Discharge | 45 | 57,5 | 12,1 | 34,8 | 83,1 | 47 | 55,8 | 67,8 |
| 6 mounts | 45 | 74,3 | 9,9 | 44,1 | 93 | 67,9 | 76 | 81 |
| 12 mounts | 45 | 86,6 | 10,2 | 64,4 | 96 | 75,3 | 93 | 96 |

Table 1: Analysis of the examined group in Harris hip score.

Friedman test: $N = 45$ Chi-Square = 89,034 df = 2 $p = 0,00001^*$

* сигнификантно за $p < 0,05$.

The analysis of median indicated that in 50% of patients in the experimental group treated with kinesitherapy and magnetic therapy, Harris hip score is: a) to 55.8 in printouts - Median (IQR) = 55,8 (47-67,8) - BAD; b) over 76 after 6 Months - Median (IQR) = 76 (67.9 to 81) - a rather good; and c) more than 93 after 12 months - Median (IQR) = 93 (75.3 to 96) - Excellent (Table 1). In each subsequent measurements perceived improvement of the condition of patients in this group, according to the amount of Harris hip score.

For $p < 0,05$, in the experimental group found a significant difference between Harris hip score (the patient) in the three times of physical examination (Fridman test: $N = 45$ Chi-Square = 89,034 df = 2 $p = 0, 00001$). For determining the significance due to the differences applied is Post Hoc Test, the three time combinations possible testing with Wilcoxon signed rank test with Bonferroni correction (Table 2).

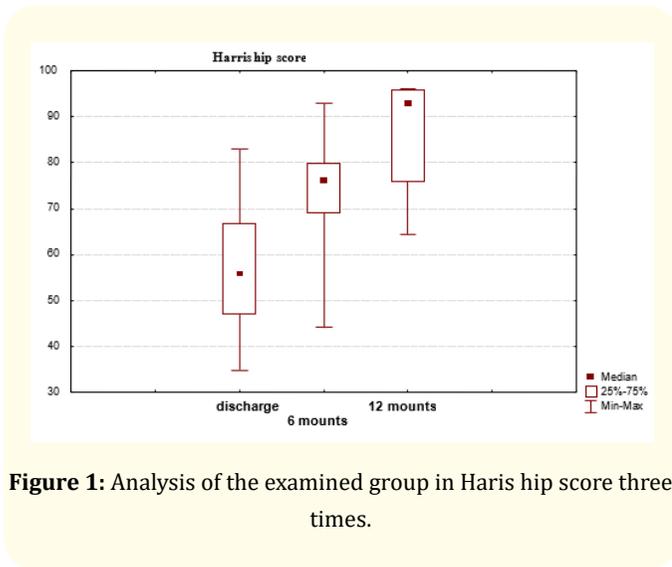


Figure 1: Analysis of the examined group in Haris hip score three times.

It is recognized that, kinesitherapy and magnetic therapy for $p < 0,05$, increase Harris hip score (improve the condition of patients) in three time combinations (Table 2). For $p < 0,05$, significant difference with Wilcoxon signed rank test was perceived between Harris hip score at: a) outs/6 months $Z = 5,712$ $p = 0,0001$ in addition to 6 months; b) discharge/12 months $Z = 5,842$ $p = 0,0001$

in addition to 12 months; c) 6 months/12 months $Z = 5,844$ $p = 0,0001$ in addition to 12 months.

| Wilcoxon Signed Ranks Test | Dis-charge/6 months | Dis-charge/12 months | 6 months/12 months |
|----------------------------|---------------------|----------------------|--------------------|
| Z | (5,712) | (5,842) | (5,844) |
| Asymp. Sig. (2-tailed) | 0,0001* | 0,0001* | 0,0001* |

Table 2: Wilcoxon signed rank test score of Harisonov hip in three time combinations examined group.

* In accordance with Bonferroni correction for significantly $p < 0,008$.

Analysis of the control group according Harris hip score

In the control group, made a single analysis three times (discharge, 6 months, 12 months) of Harris hip score. In two of the three measurements (the Shapiro-Wilk $W < 0,05$), the absence of a normal distribution therefore further analysis applied no parametric tests. In this group, the average value of Harris hip score at discharge, 6 months and 12 months is consequently $48,1 \pm 11,6$ v.s $63,6 \pm 10,1$ v.s $74,6 \pm 8,1$. The minimum or maximum value in printouts amounted to 29,7 v.s 77; after 6 months amounted to 44,8 v.s 84 and after 12 months was 58,6 v.s 96 (Table 3).

| Descriptive statistics in the control group three times | | | | | | | | |
|---|------------|----------------|----------------|---------------|---------------|------------------|---------------------------|------------------|
| Time of physical examination | Number (N) | Average (Mean) | Std. Deviation | Minimum (Min) | maximum (Max) | Percentiles | | |
| | | | | | | 25 th | 50 th (Median) | 75 th |
| Discharge | 45 | 48,8 | 11,6 | 29,7 | 77 | 41,1 | 45,7 | 57,8 |
| 6 mounths | 45 | 63,6 | 10,1 | 41,8 | 84 | 56,8 | 66,4 | 71 |
| 12 mounths | 45 | 74,6 | 8,1 | 58,6 | 96 | 69,3 | 73 | 79 |

Table 3: Analysis of a control group in Harris hip score.

Friedman test: $N = 45$ Chi-Square = 89,508 $df = 2$ $p = 0,00001$ *

* Significant for $p < 0,05$.

The analysis of median indicated that in 50% of patients in the control group treated with kinesitherapy and interference currents, Harris hip score is: a) to 45.7 in printouts - Median (IQR) = 47,5 (41,1-57, 8) - BAD; b) to 66.4 after 6 Months - Median (IQR) = 66,4 (56,8-71) - BAD; and c) over 73 after 12 months - Median (IQR) = 73 (69.3 to 79) - rather GOOD (Table 3). In outs and after 6 months according to the amount of Harris hip score, the condition of patients in this group is BAD, and after 12 months the situation has improved and is rather GOOD.

For $p < 0,05$, in the control group established, found a significant difference between Harisoviot hip score (the patient) in the three days of physical examination (Fridman test: $N = 45$ Chi-Square = 89,508 $df = 2$ $p = 0, 00001$). For determining the significance due to the differences applied is Post Hoc Test, the three possible combinations weather testing with Wilcoxon signed rank test with Bonferroni correction (Table 4).

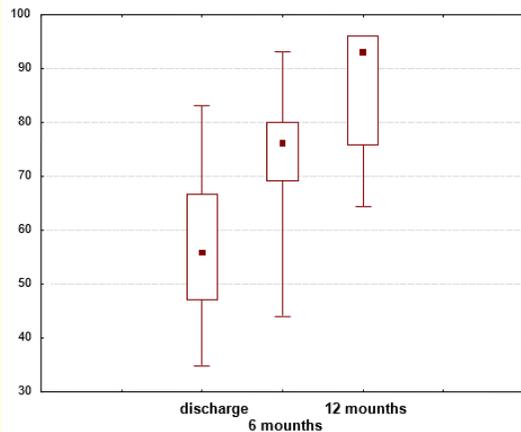


Figure 2: Analysis of the control group in Harris hip score and three times.

It is recognized that, kinesitherapy and interference currents, for $p < 0,05$, increase Harris hip score (improve the condition of patients) in three time combinations (Table 4). For $p < 0,05$, significant difference with Wilcoxon signed rank test was perceived between Harris hip score at: a) discharge/6 months $Z = 5,842$ $p = 0,0001$ in addition to 6 months; b) discharge/12 months $Z = 5,842$ $p = 0,0001$ in addition to 12 months; c) 6 months/12 months $Z = 5,778$ $p = 0,0001$ in addition to 12 months.

| Wilcoxon Signed Ranks Test | Discharge/6 months | Discharge/12 months | 6 months/12 months |
|----------------------------|--------------------|---------------------|--------------------|
| Z | (5,842) | (5,842) | (5,778) |
| Asymp. Sig. (2-tailed) | 0,0001* | 0,0001* | 0,0001* |

Table 4: Wilcoxon signed rank test score of Harrisonov hip in three time combinations in the control group.

* In accordance with Bonferroni correction for significantly $p < 0,008$.

Comparing the two groups, according to Harris hip score

Made a comparison between the two groups of patients in terms of the resultant Harris hip score and individually in each of the three times of physical examination (discharge, 6 months and 12 months).

| | Discharge | 6 months | 12 months |
|------------------------|-----------|----------|-----------|
| Mann-Whitney U | 620 | 451 | 385 |
| Z | (3,168) | (4,535) | (5,085) |
| Asymp. Sig. (2-tailed) | 0,002* | 0,0001* | 0,0001* |

Table 5: Comparison of the two groups after Harris hip score times of physical examination.

a. Group variable: examined/control * significant for $p < 0,05$.

Upon discharge, 6 months and 12 months, $p > 0,05$, the analysis indicated a statistically significant difference between the two groups in terms of Harris score of hip (Table 5). For $p < 0,05$, there is a significant difference between the two groups in terms of Harris hip score for printouts after Mann Whitney U test = 620 $Z = 3,168$ $p = 0,002$; after 6 Months to Mann Whitney U test = 451 $Z = 4,535$ $p = 0,00001$ after 12 Months of Mann Whitney U test = 385 $Z = 5,085$ $p = 0,0001$ (Table 5). On physical examination after discharge, 6 months and 12 months, Harris hip score for the group treated with Magnetic therapy is significantly higher compared with the same in the group treated with interference currents, i.e. the condition of patients was significantly better in the group treated with magnetic therapy.

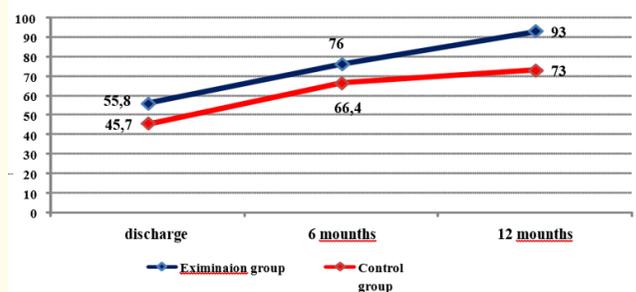


Figure 3: Median score of Harris hip score after group three times.

According to the comparison of median Harris hip score in both groups (Table 1, table 2 and figure 3) analysis indicated that the situation after 12 months in 50% of patients treated with kinesitherapy and magnetic therapy are assessed as excellent compared to the situation in 50% of patients treated with kinesitherapy and interference currents which are assessed as rather good.

Discussion

The worldwide increase in the incidence of hip fractures is a major challenge for the health system and society. Appropriate treatment of fractures of the hip in adults is still controversial, even from an international perspective. Optimizing and standardizing treatment for better results, it is mandatory for both humanitarian and economic reasons. The importance of incorporating the results of treatment in clinical trials of patients is recognized today there are numerous tools for evaluating the quality of life for this group of patients [7].

In our study of physical examination after discharge, 6 months and 12 months, Harris score for hips in the treated group was significantly greater magnetic therapy i.e. the condition of patients was significantly better compared with the same in the group treated with kinesiotherapy and interference currents.

In adults, the effect of hip fracture could be the beginning of a significant decline in the level of functioning, and the transition from living in their own home to live in homes for adults. In a cohort of 2086 adults living in the community and were targeted overseen a period of 6 years, 120 received a fractured hip, and after 6 months in 83 of those who were alive and available to control interview notes a significant decline in their functioning. Ability, the person just to dress, decreases of 86% for people before they get a fracture, only 49% after 6 months of receiving the fracture. Adult patients have less satisfactory results when the fracture of the hip were treated with surgical treatment than younger patients, but data vary in different studies [8]. The main tendency in the acquired hip fracture, is to avoid the patient's still for a longer time interval. Because adults usually have difficulty in walking, with limited ability to carry weight goal, election of the surgical approach in fixation and implants should be faster, to provide faster and verticalisation and bearable carry weight. Intensive rehabilitation for elderly patients may have a positive impact on the ability of a patient with hip fracture to live independently, even in situations of the presence of some degree of dementia [9,10].

The study of Husk in 2000 patients with hip fracture and presence of dementia, conducted an assessment of three months and one year after surgery. Ability to live independently within a year after receiving a hip fracture in the test compared with the control group there were significantly fewer patients with moderate de-

menti, a who have been subjected to intensive rehabilitation, and should be sent to an institution [11].

Although care and surgical techniques have vastly improved in the past, in recent years, the treatment of patients with hip fractures can have worse results than expected. The treatment is assessed, whether the patient recovered, and is independent in daily activities, prior to the fracture [12,13].

The results of several authors, it is estimated that 12 months after pertrochanteric fracture, the patient has lost 6% of body weight. In a study of 90 elderly people, attached is the treatment of 6 months. In the experimental group conducted intensive rehabilitation program, and in the control group conducted a program with exercises with less intensity. It is recognized that in the experimental group and despite the increase in muscle strength in patients also increased the speed and stability of gait, balance and ADL (activities for daily living) features [7,14-16].

Conclusion

On physical examination after discharge, 6 months and 12 months, Harris hip score in the treated group was significantly greater magnetic therapy i.e. the condition of patients was significantly better compared with the same in the group treated with kinesiotherapy and interference currents.

It can be concluded that postoperative rehabilitation pertrochanteric fractures, Kyle types I, II with fixation of dynamic implant-DHS, therapy of choice is kinesiotherapy and magnetic therapy, from which there is an improvement both in functional status, in the stimulation of osteogenesis and quality of life in adult patients.

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