

Comparative Study of the Effect of Rehabilitation Treatment of Peripheral Neuropathy in Patients with Type 1 and Type 2 Diabetes

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ABSTRACT: The purpose of the work is to compare the contribution of the rehabilitation treatment in diabetic peripheral neuropathy between patients with insulin-dependent diabetes (type 1) and non-insulin-dependent diabetes (type 2). Material and method. The study has been done on two groups, first with a number of 36 patients with type 1 diabetes and second with a number of 47 patients with type 2 diabetes, ages between the 50 and 86 years. All patients have been diagnosed with diabetic peripheral neuropathy. Patients progress has been monitored by determining next parameters: Visual Analogue Scale for pain (VAS), Neuropathy Symptom Score (NSS), Neuropathy Disability Score (NDS) and Functional Assistant Screening Test (FAST). Each patient followed a rehabilitation treatment for a period of 15 days. Results. VAS, NSS, NDS and FAST presented after the treatment a significant decrease in the average score from initial stage, for both groups of patients. The following revealed an increase in average score value at 3 months and then, at 6 months, their values are maintaining significantly lower than the initial value. There are not significant differences between groups. Conclusions Treatment has had a favorable effect on all patients with diabetic peripheral neuropathy, regardless the type of diabetes.

KEY WORDS: *rehabilitation, diabetic peripheral neuropathy*

Introduction

Peripheral neuropathy (PN) is a common complication of diabetes mellitus [1]. The characteristics of diabetic peripheral neuropathy include numbness, diminished sensation, and pain [2]. Pain is usually worst at night and may disrupt the patients' sleep [3]. PN is also a risk factor for foot ulcers, infection and even amputation [4]. Numbers of studies present data concerning electrotherapy for the treatment of painful diabetic PN are generally poor with reference to evidence-based quality factors, it is difficult to issue recommendations for the use of the individual treatment options [5].

The purpose of the work is the comparison of the rehabilitation treatment effect in peripheral neuropathy at patients with insulin-dependent diabetes (type 1) and non-insulin-dependent diabetes (type 2).

Material and method

The study was done on two lots of patients, one of 36 patients with type 1 diabetes, and the second of 47 patients with type 2 diabetes, patients having aged between 50 and 86 years.

Patients have been diagnosed with peripheral neuropathy ensures the upper limbs or lower limbs.

Diagnosis of peripheral neuropathy was established on the basis of the history, clinical

examination and of investigations task, electro diagnostic evaluation having an important role both for confirmed peripheral neuropathy and the exclusion of other types of damage of peripheral nerve or muscles. Electro diagnostic evaluation has watched the Sensory Nerve Conduction Velocity (CV), Motor Nerve Conduction Velocity, the Nerve Action Potential (SNAP) amplitude, for median nerve, ulnar nerve, peroneal nerve and tibial nerve. Have been excluded from the study patients with peripheral neuropathy with other etiology.

Each patient followed a rehabilitation treatment for a period of 15 days, consisted in electrotherapy, massage and kinetotherapy.

Electrotherapy:

- TENS, duration 15 minutes, longitudinally application at the level of upper limbs or lower limbs, the frequency 150 Hz, 100 ms pulse duration, the frequency trains of pulses 1 Hz.

- Currents of medium frequency, duration 15 minutes, longitudinally application at the level of upper limbs or lower limbs, with variable frequency of between 100-250 Hz

Massage from the limbs

Physical exercises included the increase of range of motion, muscular tone of lower limbs and upper limbs muscles, using strengthening exercises and isometric, eccentric, concentric and isotonic exercises increase the ability of the hand and improve common daily activities (occupational therapy).

Developments in patients have been monitored by determining next parameters:

- Visual Analogue Scale for pain (VAS)
- Neuropathy Symptom Score (NSS)
- Neuropathy disability Score (NDS)
- the Functional Assistant Screening Test (FAST) what relive the degree of difficulty in pursuit of the activities of daily living, transport, activities for recreation.

Evaluating patients with the help of these parameters has been done before applying the rehabilitation treatment, at the end of treatment, at three months and six months of the treatment.

Statistical verification has been done by ANOVA test (the threshold of error fixed is $\alpha = 0.05$) and by Welch, Tamhane, Scheffe Tests and Cohen coefficient (Effect size), assessed by qualifiers (small, medium, large, very large etc).

Results

For all the following parameters (VAS, NSS, NDS, FAST) has been found a decrease in the average value of score for both groups of patients. The decrease in values has been most important immediately after treatment. In the following steps we are seeing an increase in average scores, at three months and six months, the values in these stages remaining smaller than the initial.

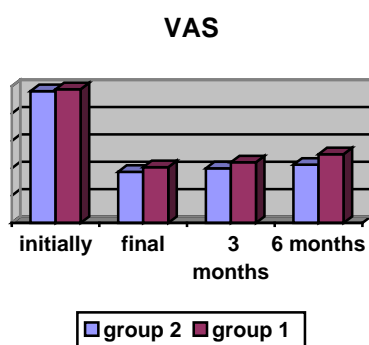


Fig.1. Visual Analogue Scale (VAS)

After the treatment score for Visual Analogue Scale for pain (VAS) presented a significant decrease in the average score for both lots of patients:

- Values for the patients with type 1 diabetes: 9.78 in initial stage, 4.08 after the treatment. In the following steps we are seeing an increase in the average score, 4.44 at 3 months, and 5.03 at 6 months,

- Values for the patients with type 2 diabetes: 9.64 in initial stage, 3.74 after the treatment, 4 at 3 months and 4.26 at 6 months.

The results obtained through the application of test Welch, and for the ANOVA test, show there is a significant difference statistically, scoring between the values obtained at each stage to the initial value, the Sig. being less than 0.05 (Sig. =0,000), for the both lots of patients.

Tamhane and Scheffe tests show that there is a statistically significant difference between average scores corresponding to the following steps: initially and after the treatment, initially and at three months, initially and at 6 months after the treatment, in both lots.

The Cohen coefficient shows a very big difference between average scores corresponding to those four steps for the two groups of patients (Effect size - 0.88 and 0.71).

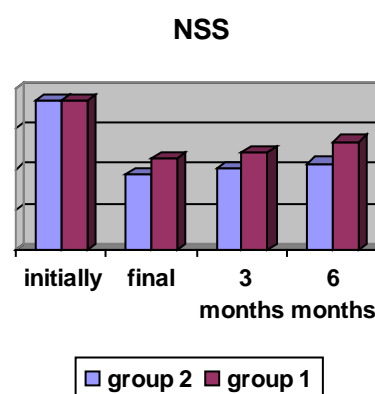


Fig.2. Neuropathy Symptom Score (NSS)

The NSS has presented a significant decline of average score for both groups of patients.

- Values for the first lot of patients: 3.69 initially, 2.28 after the treatment, 2.42 at three months, 2.69 at six months

- Values for the second lot of patients: 3.70 initially, 1.87 after the treatment, 2.04 at three months, 2.15 at six months.

Neuropathy Symptom score results, obtained through the application of test Welch, and for the ANOVA test, shows statistical significant differences exist, the value Sig. being less than 0.05 (Sig. =0,000), between scores obtained in each stage for both groups of patients.

Tamhane and Scheffe tests show that there is a statistically significant difference between average scores corresponding to the following steps: initially and after the treatment, initially and at three-month, initially and at 6 months. The coefficient Cohen indicates large differences to very large environments between scores corresponding to those four steps for both groups of patients (Effect size = 0.56 and 0.61).

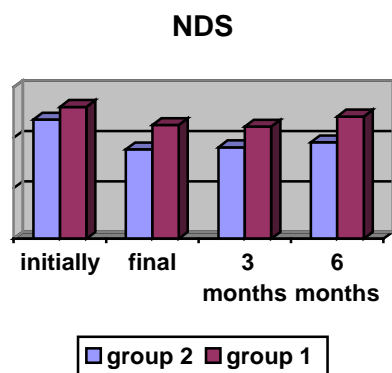


Fig.3. Neuropathy Disability Score (NDS)

The NDS has presented a significant decline of average score for both groups of patients.

- Values for the first group of patients: 2.61 initially, 2.25 after the treatment, 2.22 at three months, 2.42 at six months.

- Values for the second group of patients: 2.36 initially, 1.77 after the treatment, 1.81 at three months, 1.91 at six months.

NDS results obtained through the application of test Welch, and for the ANOVA test, show statistical significant differences exist, the Sig. being less than 0.05 (Sig. =0,000), between scores obtained in each stage, for both groups of patients.

Tamhane and Scheffe tests show that there is a statistically significant difference between average scores corresponding to the following steps: initially and after the treatment, initial and at three-month, and initially and at 6 months. The coefficient Cohen indicates medium differences between average scores corresponding to those four steps for the patients of first group (Effect size = 0.21) and differences medium to high for the patients of second group (Effect size = 0.31).

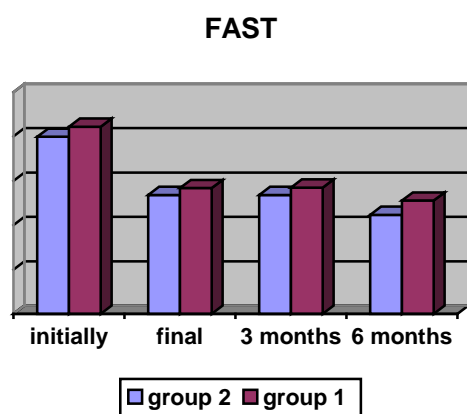


Fig.4. FAST

- Values for the first group patients: 8.44 initially, 5.67 after the treatment, 5.69 at three months, 5.11 at six months

- Values for the second group patients: 7.98 initially, 5.36 after the treatment, 5.36 at three months, 4.47 at six months.

FAST score results obtained through the application of test Welch, and for the ANOVA test, shows that statistical significant differences exist, the value Sig. being less than 0.05 (Sig. =0,000), for both groups of patients.

Tamhane and Scheffe tests show that there is a statistically significant difference between average scores corresponding to the following steps: initially and after the treatment, initial and at three month, initially and at 6 months. The coefficient Cohen indicates large differences in average scores corresponding to those four steps for both groups of patients (Effect size = 0.43 and 0.34).

Discussions

Results obtained for the both groups of patients found that there is not a significant difference between mean values of the parameters being monitored for the both types of diabetes, VAS (Fig.1), NSS (Fig.2), NDS (Fig.3), FAST (Fig.4) in the four phases, specifying, however lower values for the patients with type 2 diabetes.

Initial values of the parameters follow, show average values smaller than for the patients with type 2 diabetes which may suggest that the damages of this patients would be more reduced. However there are not important differences between mean values of the parameters to the two groups of patients.

Conclusions

1. Rehabilitation treatment applied in diabetes peripheral neuropathy contributes to release clinical symptoms and to improve the quality of life to all patients.

2. Positive effect obtained after treatment shall be maintained for a period of six months.

3. Have not exist huge differences between mean values of the parameters in patients with type 1 diabetes or in patients with type 2 diabetes even if lower values at the patients with type 2 diabetes indicate a better answer to treatment.

4. Rehabilitation treatment may complete specific treatment in diabetes peripheral neuropathy.

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