DE GRUYTER OPEN

J Biomed Clin Res Volume 6 Number 2, 2013

DOI: 10.1515/jbcr-2015-0113

Original Article

EVALUATION OF RECOVERY OF ACTIVITIES OF DAILY LIVING IN PATIENTS WITH SEQUELAE FROM CEREBRAL VASCULAR DISEASE

Danelina E. Vacheva, Verjinia K. Simeonova[1], Boyko St. Stamenov[1]

Clinic of Physical Medicine and Rehabilitation,
University Hospital "Dr. Georgi Stranski"
[1]Clinic of Neurology,
University Hospital "Dr. Georgi Stranski"
Pleven, Bulgaria

Corresponding Author:
Danelina Vacheva
Clinic of Physical Medicine and Rehabilitation
University Hospital "Dr. Georgi Stranski"
8a, Georgi Kochev str.
5800, Pleven
Bulgaria
e-mail: danelina@abv.bg

Received: March 19, 2013
Revision received: December 12, 2013
Accepted: December 27, 2013

Summary

Bulgaria ranks first in the world in incidence, morbidity and death associated with cerebrovascular disease. The aim of the study was to investigate, follow-up and register recovery of activities of daily living (using the toilet and maintaining personal hygiene) in patients with sequelae from cerebrovascular disease in a subacute stage, who underwent physiotherapy and rehabilitation. Sixty-one patients were included and followed up. They were given tailored physiotherapy and rehabilitation. This included kinesitherapy, occupational therapy and electrotherapy. All the patients filled in self-assessment questionnaires before and after the rehabilitation course. Major parameters were assessed, irrespective of the limb affected –dominant or non-dominant. Results were analyzed using the Wilcoxon rank test. At the end of the rehabilitation course, the Wilcoxon curves 'were driven to the right, confirming improvement concerning independence, irrespective of involvement of dominant or non-dominant limb.

Key words: rehabilitation, occupational therapy, cerebrovascular disease

Introduction

Bulgaria is among the countries with highest morbidity, incidence and death rates associated with cerebrovascular diseases (CVD). The numbers of younger individuals affected are on the increase, with subsequent severe disabilities - motor impairment, difficulties in self-care, professional and social isolation and associated deterioration in quality of life and depressive states [1, 2]. About 80% of survivors of cerebrovascular incidents overcome the dependence on other people's help, about 26% are diagnosed with vascular dementia and impairment of communication, and about 20% remain bed-ridden [3-5].

The causes for this epidemic of CVD include the increase in the frequency of risk factors such as

atherosclerosis of the brain vessels, arterial hypertension, chronic ischemic heart disease, overweight, diabetes mellitus, malnutrition, alcohol abuse and smoking, chronic stress, etc [6].

Physical and rehabilitation medicine is of vital importance for optimal recovery and preserving self-dependence abilities achieved in patients with consequences of CVD, with a stress laid on activities of daily living from the very beginning of the rehabilitation process [7, 8].

The aim of our research was to investigate, follow up and assess the degree of recovery of the most important activities of daily living (ADL) in patients in the subacute period of cerebrovascular disease who were given physical rehabilitation.

Materials and Methods

During the period 2011-2012, 61 patients diagnosed with consequences of CVD (23 women and 38 men, age range 37-79 years) were treated at the Department of Rehabilitation at the Clinic of Physical Medicine and Rehabilitation at the University Hospital in Pleven. The patients included in the study were in stage four were assessed using the Brunnstrom Recovery Scale. During this stage, pathological reflexes disappear and isolated voluntary movements are seen [12, 13]. Performing ADLs depends on involvement or non-involvement of side of the dominant upper limb. Of the 61 patients included in the study, paresis involved the dominant upper limb in 29 cases (47%). The non-dominant limb side was affected in the remainder 32 (53%).

The patients were given physiotherapy and rehabilitation consistent with their individual physical status. In general, the course included kinesitherapy, occupational therapy (ADLs) and electrotherapy [14-16].

All patients were tested for ability to perform ADLs at the beginning of the rehabilitation course, using a test designed by Rusk [17]. Performance in maintaining personal hygiene and grooming, putting on clothes and shoes, preparing food and feeding, some working and household activities [17]. Self-evaluation of the patients was based on a six-grade scale (0-5), and was focused on the following basic activities, irrespective of involvement or non-involvement of the side of limb dominance:

- grade 0 – the patient could not perform an activity;
- grade 1 – the patient tried to perform an activity but needed significant help;
- grade 2 – the patient performed the activity but observation, control and instructions were necessary;
- grade 3 – the patient performed the activity slowly, with limited capacity;
- grade 4 – the patient performed the activity at a speed, capacity, endurance and coordination close to normal;
- grade 5 – the patient performed the activity independently, with normal endurance and quality.

Signs (+) and (–) were given when values were not whole numbers.

To achieve the purpose of our study we focused only on the ADL part of the test – toileting, and maintaining of personal hygiene in particular [18-21]. The rehabilitation course was carried out within the subacute period, about one month after the cerebrovascular incident. Results from testing before and after the course were compared.

Activities for personal hygiene evaluated were using the toilet, hand and face washing, tooth brushing, wiping of hands/face, hair-combing, shaving with a safety-razor, cutting of nails, and taking a shower.

These activities proved too difficult and we had to train the patients [22] how they could be facilitated [22]. Recommendations included:

- wearing larger-size clothes (sportswear, skirts/trousers with elastic belts) to make going to the toilet easier;
- when washing hands, the healthy hand had to hold the soap or washing gel and rub it on the paretic one, and then rinse the affected hand with water;
- when washing the face, the unaffected hand had to support the affected one;
- for washing the face - the healthy hand was to support the affected one in supination, as far as possible, so that it could splash water on the face;
- if the dominant limb was involved, it was the one that had to be trained for tooth brushing; the antebrachium had to be in a neutral position and the up-down movement while brushing the teeth was aided by the shoulder joint (flexion and extension in adduction);
- if the paretic limb was non dominant, the palmar clutch had to be trained for putting tooth-paste on the brush;
- for drying up hands and face, both hands were used, the healthy one drying the injured and

the supporting it to dry the face;

• hair combing could be done with the healthy limb, no matter if it was the DL or not; this activity could be performed comparatively easy by NDLs;

• shaving is a basic part of personal hygiene in males, and very difficult with a paretic DL but it is not impossible if there is a palmar clutch and the activity is supported by the shoulder joint. That included rotation of the head to compensate for the absence of fine movements of the fingers and flexion and extension in the wrist joint;

• for cutting nails, a precise clutch is necessary, as well as enough strength of the clutch, good motion in the wrist and radio ulnar joints and significant coordination of movements. The above made this activity very difficult to perform, especially if the NDL was affected at the beginning of the rehabilitation process. That is why patients were told to use a nail-cutter and orient the nail towards the appropriate clutch of the paretic limb;

• taking a bath (shower) is a complex activity, which requires more attention and efforts of the patient. The most important thing is prevention of slipping and falling in the bathroom, so patients were advised to be seated during the procedure.

The results of the tests performed were registered in a specially designed individual patient chart. The data obtained were processed with EXCEL and Statistical Package of Social Sciences 19.0 (SPSS Inc., Chicago, IL) and the Wilcoxon rank test (a statistical method for analyzing non-parametrical data and distribution). Significance of the results for conclusions and key points were determined at $p<0.05$.

Results

The results of the tests were entered in a specially designed individual patient chart.

Figure 1 presents the Wilcoxon curve which reflects the results from testing going to the toilet in all patients at the beginning and end of the therapeutic course.

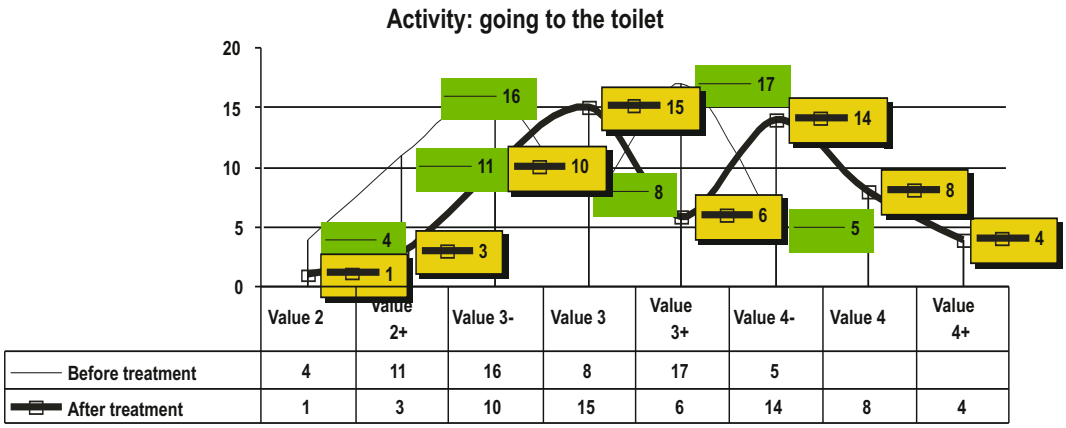

Figure 1. Results from testing going to the toilet before and after therapy

At the beginning of the rehabilitation program, 15 patients had the lowest values (2.2+) for capacity to perform the activity. At that stage, only five patients had a 4- value. At the end of the program, low values as obtained from self-assessment were registered in four patients. Improvement was at its best in 26 patients.

Figure 2 presents results for hand washing activity, which did not prove too difficult for the patients.

Similar results were found for activities like shaving (in the males), nail cutting and taking a shower. These activities were difficult in cases of paretic DL. Results from self-assessment before and after the rehabilitation course are given in Table 1.

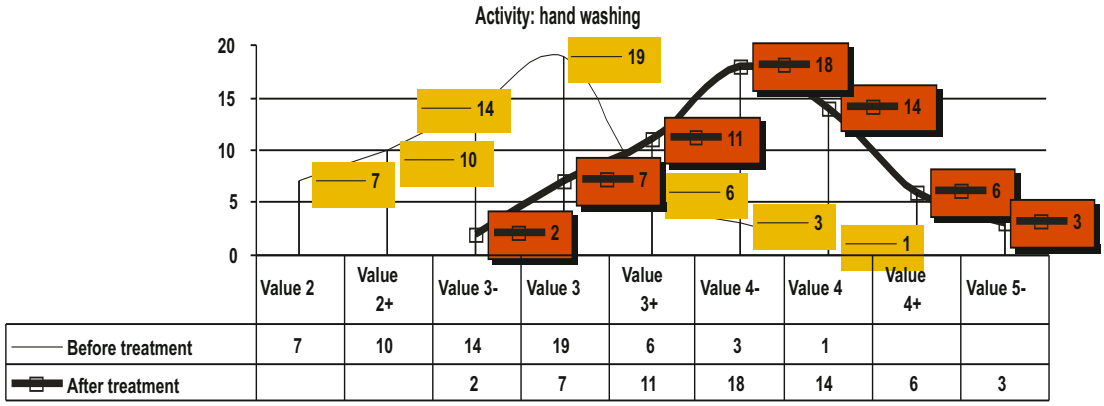

Figure 2. Results from testing hand washing before and after therapy

Table 1. Results for ADLs before and after the rehabilitation course

Type of Activity	Patients with paretic DL		Patients with paretic NDL	
	before	after	before	after
visit the WC	2-	3	3-	4-
shaving with a razor (for men)	2	3-	3	4-
cutting nails	2-	2+	3-	3+
taking a shower	2	3-	2+	3+
washing hands	3-	3+	3+	4
washing face	2+	3	3	4-
tooth brushing	2+	3+	4	4+
drying up hands and face	3	4-	4+	5-
hair combing	3-	3+	4	5-

Discussion

The results from physiotherapy and rehabilitation, including kinesitherapy, occupational therapy and elecroterapy, during the subacute period following cerebrovascular incidents, showed improvement in the capacity of patients to perform ADLs, toileting and maintenance of personal hygiene in particular.

Data concerning functional recovery in patients with motor impairment, their self-service and ADL capacity is sparse in the literature available [23, 24]. These issues have been addressed during the last several years in view of training students of occupational therapy: the specialty is oriented to problems of everyday health and social problems of disabled people [22].

Numerous publications demonstrate the need for systematically conducting comprehensive physiotherapy and rehabilitation program in patients with hemiparesis after stroke to improve ADLs and achieve independent living [16, 25, 26].

The results of our study confirmed that by the end of the period 92% of all patients were independent in carrying out the toilet and maintain personal hygiene. These activities can be performed using the non-paretic limb, whether it is affected or not. They did not prove too difficult for the patients even at the beginning of the therapeutic course.

After analyzing the two-peak curve reflecting the capacity for performing some of the activities we concluded that patients with paretic DL had more difficulties in recovering their capacity for performing ADLs, as compared to patients paretic NDL.

At the end of the course, the Wilcoxon curve shifted to the right, demonstrating improvement

in degree of independence, irrespective of involvement or non-involvement of DL.

The program had a significantly reliable positive effect on functional mobility of paretic limbs. The severity of shoulder pain decreased. So did the degree of depression, whose decrease was attributable to a less-dependent way of life.

Apart from physical recovery of patients with cerebrovascular disease, their mental state is of importance too. Any hobby that may divert a patient's attention from their health issues has a stimulating effect on their general physical and mental state [20]. Treatment through labor tasks (labor therapy) [27] has been known since ancient times. Nowadays it is also successfully applied to help with recovery of lost functions of upper extremities or to favorably influence psychic and emotional state, in the form of interesting labor therapy (hobby). The complex physiorehabilitation program we conducted included labor therapy according to patients' preferences and in compliance with their individual abilities. Latham et al. (2006) [24] have provided evidence that, in the long run, patients involved in labor therapy and ergotherapy are more likely to cope with daily routine and be more independent in coping with toilet and maintain personal hygiene.

Treatment of patients with post-stroke hemiparesis is done step by step and for a long period. The acute period of treatment at an intensive care neurology clinic is followed by an early rehabilitation program to verticalize the patients and train them to walk using auxiliary device and to help them restore their capacity for self-service. Then there is a long period of systematically conducted rehabilitation [28]. Usually, such patients go through some courses in hospital environment, then through continuous physiorehabilitation treatments on an outpatient basis, and the means of the physical and the rehabilitation medicine are in line with the specifics of each case. The aim of all rehabilitation courses is to achieve a maximum functional recovery of paretic extremities and most of all, independence in everyday life.

Conclusion

Early rehabilitation and introducing occupational therapy and performing some ADLs under guidance are of great importance for achieving better results in rehabilitation of patients with disabilities resulting from cerebrovascular incidents. Functional occupational therapy encourages patients to become independent and shortens the time for achieving independence in ADLs and social activities.

References

1. Delank H, editor. [Neurology]. Sofia: Meditsinsko izdatelstvo "Sharov"; 1996. [in Bulgarian].
2. Yancheva S, Milanov I, Georgiev D, Shotekov P. [Motor activity]. In: Yancheva S, editor. Neurology. General neurology. Stara Zagora: Znanie EOOD; 2000. p. 49-82. [in Bulgarian].
3. Kaplan EY, Tzurengapova OD, Shantanova LN. [Optimization of adaptive processes of the organism]. Moscow: "Nauka"; 1990. [in Russian].
4. Pedretti LW, Early MB. Occupational therapy: Practice skills for physical dysfunction. 5th ed. St. Louis, MO: Mosby; 2001.
5. Radomski MV, Trombly CA, editors. Occupational Therapy for physical dysfunction. 4th ed. Baltimore: Lippincott Williams and Wilkins; 1996.
6. Paskaleva R. Motivating role of kinesitherapy in management of obesity. Preventsia i Rehabilitatsia 2011;1:23-29. (in Bulgarian).
7. Busarov S. [Basics of medical and social rehabilitation]. Sofia: Meditsina i Fizkultura; 1982. [in Bulgarian].
8. Gencheva N. [Classificational system for manual capacity (MAGS) in children with cerebral palsy]. Sofia: Sport i Nauka 2011;1:60-65. [in Bulgarian].
9. Hamonet CL, Heuleu JN. Rééducation fonctionnelle et réadaptation. Paris-New York-Barcelona-Milan: Masson; 1998.
10. Koleva I. The bulgarian neurorehabilitation school and the international classification of functioning, disability and health (icf): integrating icf requirements into clinical practice. Journal of Biomedical and Clinical Research. 2009;2(1):8-18.
11. Sinaki M. Basic clinical rehabilitation medicine. Toronto-Philadelphia: W.B. Saunders Co; 1987.
12. Karaneshev G, Sokolov B, Venova L, Markova G, Tsankova E, Slivkov P. [Theory and methods of in therapeutic gymnastics]. Karaneshev G, editor. Sofia: Meditsina i Fizkultura; 1987. [in Bulgarian].
13. Karaneshev G, Milcheva D. [Methods of diagnostic and examination in therapeutic gymnastics]. Sofia: National Sport Academy;

1984. [in Bulgarian].
14. Kielhofner GA. Model of human occupation. Baltimore: Williams & Wilkins; 1995.
15. Punwar AJ. Occupational Therapy. Baltimore: Williams & Wilkins; 1994.
16. Reed K, Sandarson S. Conceps of occupational therapy. 4th ed. Baltimore: Lippincott Williams & Wilkins; 1999.
17. Rusk HA. Rehabilitation Medicine: A Textbook on Physical Medicine and Rehabilitation. 2nd ed. *St. Louis*, MO: CV Mosley; *1964.*
18. Topuzov I. [Occupational Therapy]. I part. Sofia: RIK "Simel"; 2006. [in Bulgarian].
19. AOTA Council on Standards, Occupational therapy: its definition and function. Am J Occup Ther. 1972;26:204-5.
20. Hansen RA, Atchison B. Conditions in Occupational Therapy. Baltimore: Williams & Wilkins; 1993.
21. van Bruggen H. The European employment strategy and opportunities for occupational therapy. Work. 2012;41(4):425-31.
22. Petkova I. [Interactive methods in educators' qualification, Qualy educayion for all through improving teacher training]. Paradigma. 2010;214-6. [in Bulgarian].
23. Paci M. Physiotherapy based on the Bobath concept for adults with post-stroke hemiplegia; A review of effectiveness studies. J Rehabil Med. 2003;35(1):2-7.
24. Latham NK, Jette DU, Coster W, Richards L, Smout RJ, James RA, et al. Occupational therapy activities and intervention techniques for clients with stroke in six rehabilitation hospitals. American Am J Occup Ther. 2006; 60(4):369-78.
25. Steultjens EM, Dekker J, Bouter LM, van de Nes JC, Cup EH, van den Ende CH. Occupational Therapy for stroke patients: A systematic review. Stroke. 2003;34(3):676-87.
26. Logan P A, Gladman J R F, Avery A, Walker M F, Dyas J, Groom L. Randomised controlled trial of an occupational therapy intervention to increase outdoor mobility after stroke. BMJ; 2004;11;329(7479):1372-5.
27. Legg LA, Drummond AE, Langhorne P. Occupational therapy for patients with problems in activities of daily living after stroke. Cochrane Database Syst Rev. 2006;(4):CD003585.
28. Walker MF, Gladman JRF, Lincoln NB, Siemonsma P, Whiteley T. Occupational therapy for stroke patients not admitted to hospital: a randomised controlled trial. Lancet; 1999;354(9175):278-80.