08 - IMPROVEMENT OF THE MOTOR CONTROL BY MEANS OF PHYSICAL THERAPY IN THE CASE OF PATIENTS WITH HEMORRHAGIC VASCULAR ACCIDENTS – CASE STUDY

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INTRODUCTION TO THE RESEARCH TOPIC

In the whole world, the hemorrhagic vascular accident is the third cause of death after the heart diseases and cancer (according to WHO), and during the next years we anticipate that the death caused by vascular accidents will be on the first place in the statistics. The functional deficiencies that appear as a consequence of these accidents are multiple; from the motor deficiency of body position, speech and sensorial deficiencies, to bed immobilization, total dependency and even death caused by subsequent complications.

The cerebral vascular accident occurs when the input of oxygenated blood is interrupted or severely reduced into a certain area of the brain. A localized reduction leads to neurological deficiencies. According to Vlad T., Pendefunda L., 1992, vascular accidents are classified into: ischemic cerebrovascular accidents caused by thrombosis (atherosclerosis) and embolism (disorders of the heart rate, atrial fibrillation) and hemorrhagic vascular accidents (which may be intracerebral or subarachnoid) caused by aneurism or arteriovenous malformations.

MATERIALS AND METHODS

The purpose of this study was to achieve a proper familial and social functional integration and to improve the quality of life.

In the research, we started from the hypothesis that: if, during the recovery programme, specific proprioceptive and neuromuscular facilitation techniques will be used in each stage of the motor control, we will achieve an improvement of the voluntary motricity on the level of the hemibody affected.

The research methods used were: the theoretical documentation method, the anamnesic interview, the observation method, the experiment, the graphical representation method, and the assessment method used in order to establish the functional deficiency: the Asworth scale for assessing the muscular spasm (Bleton., J-P, 2000, p. 54-56), the PASS scale (The Postural Assessment for Stroke Patients) (Benaim, Ch., 1999), the Hammersmith score (Hammersmith Motor Ability Score) (http://www.cofemer.fr) and the Barthel index (Collin, C., Wade, OT., 1988, p. 61-63) for measuring the functional independence.

The research was carried out on a 47-year-old female subject with the clinical diagnosis of left hemorrhagic hemiparesis, over a period of 20 months, with a frequency of 5 sessions/week, sessions with the duration of 90-110 minutes.

CASE PRESENTATION

On the 11.07.2010 the patient is hospitalized with cephalalgia, vomiting and right hemiparesis. The computer tomography (CT) shows an intraparechymal haematoma in the right temporal area and the angiography showed an aneurism on the level of the right middle cerebral artery;

On the 12.07. 2010 there was a surgical intervention for clipping the aneurism; 2 days after the intervention, the patient has a comitial crisis, and on the 23.07.2010 a tracheotomy is performed.

The CT on the 28.08.2010 showed a right ischemic thalamic injury.

After 6 weeks of coma, the recovery programme starts and the patient is discharged from the hospital after 4 months, moment when we started the programme.

After the assessment performed on 25.12.2010, the functional diagnostic was:

The left upper limb: spasm of the elbow, hand and finger flexors (Aschort 3), limited range of the passive movement of the shoulder, elbow and hand, as well as pain during the mobilizations, the absence of active voluntary movement,

The left lower limb: active flexion of the thigh on the pelvis, flexion and extension of the knee performed with difficulty and lack of coordination, without the normal amplitude, spasm on the level of the ischial and shank muscles (Aschort 2) and of the triceps surae (Aschort 3).

The patient moves using the wheelchair and does not use the upper limb.

The recovery programme followed as objectives: preventing the improper postures and the dysfunctional positions on the level of the upper and the lower limbs, relaxing the muscle spasm and inducing voluntary motor activity, maintaining joint mobility and progressively increasing the muscle strength, increasing the stability and the balance in the following positions: on all fours, kneeling, knight servant (the body leaning forward, hands on the floor) and in orthostatism, improving the coordination and the use of the upper limb, educating a stable and balanced walking, regaining the functional independence during the activities of daily living (ADLs).

In the content of the recovery programme, we used preponderantly the following proprioceptive and neuromuscular facilitation techniques (PNF): Rhythmic initiation, Rhythmic rotations, Stretching and the Myotensive method – for spasm relaxation; Slow inversion, Slow inversion with opposition – for improving the mobility and the motor response; Repeated contractions, Active movement of relaxation-opposition – in order to facilitate voluntary contractions; Sequentiality for strengthening, Isometric contractions in the shortened area - in order to increase muscle strength; Alternative isometric contractions and Rhythmic stabilization – for stability; Normal sequentiality and Progression with resistance – for coordination and ability of the upper limb as well as for coordination and balance during the walk.

Besides these techniques, we also used: reflex inhibiting postures according to Bobath, Kabat's diagonals, postural re-education exercises, gym ball exercises, exercises using the cane, the gym ladder, the Canadian balance board, exercises using the ergometric bike and the walking frame (normal, lateral, backward walk, climbing and descending stairs), breathing and relaxation exercises.

Within the programme, we took into consideration the following aspects: avoiding fatigue and the lack of coordination, the active and voluntary participation to the exercises, and the progressive passage from one stage of the motor control to the next one.

RESULTS AND DISCUSSIONS

According to the initial and the final evaluation, as we can see in table 1, after applying the recovery programme the postural control (PASS) improved, the value of the tested items increased from the initial value of 6,6% (corresponding to the score 6) up to the value of 94,4% (the score 34), the difference between the normal value and the one achieved by the patient being on only 5,6%, which shows a remarkable improvement of the postural control.

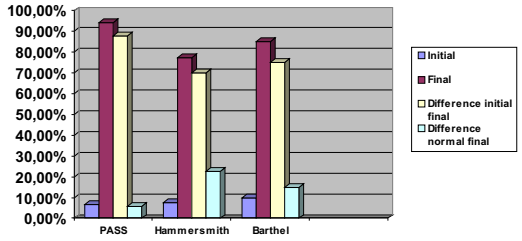
table no.1. Initial and final values and the difference between them according to the initial and the final tests

Nr.	Test	Normal		Initial		Final		DIF		DNO	
1.	PASS	36	100%	6	6.6%	34	94.4%	28	87.8%	2	5.6%
2.	Hammersmith	40	100%	3	7.5%	31	77.5%	28	70%	9	22.5%
3.	Barthel index	100	100%	10	10%	85	85%	75	75%	15	15%

Legend:
DIF-The difference between the initial and the final values
DNO-The difference between the normal values and the ones achieved

The score of the motor ability (Hammersmith) also increased from the value of 3 points, corresponding to 7.5%, to 31 points in the end, with a percentage of 77.5%. The difference between the final and the normal values is of 22.5%, and the difference between the initial and the final values is of 70%, which shows a progress in achieving motor activity of 70%, with a difference of only 22.5% up to the complete performance of the functional motor activities.

In the case of the Barthel index, which assesses the functional independence, we started from 10% (10 points) and reached 85% (85 points) in the end, the difference between the initial and the final values being of 75%, while the difference between the normal values and the ones achieved by the patient is of 15%, which means a functional independence close to the normal one.



graphic no.1. Graphical representation of the initial and final values and of the differences recorded after the tests

As it follows from the graphic above, after the application of a recovery programme with a specific strategy using preponderantly facilitation techniques, the motor control improved visibly with a difference of only 5.6% compared to the normal values, the ability of performing different voluntary motor activities also improved, with a difference of 22.5% compared to the normal values, and the functional independence has values close to the normal ones, with a difference of only 15%. The muscular spasm is present only on the level of the triceps surae and of the finger flexors, with a value of 1, compared to the values of 3 and 2 recorded initially, which allows the independent performance of the daily activities to a great extent.

CONCLUSIONS

After the study carried out on a patient suffering from hemorrhagic vascular accident with multiple characteristics (surgical intervention, coma for 6 weeks, comitial crisis, etc), study that lasted for a long period of time (20 months), the hypothesis formulated in the beginning was confirmed: by using a proper strategy during the recovery, focusing on the proprioceptive and neuromuscular facilitation techniques, by covering all the stages of the motor control step by step, we can achieve an improvement in the postural control and in the motor ability, improvement manifested through the functional independence of the patient, respectively the autonomy in movement and the use of the upper limbs during the daily activities. The facilitation techniques which can be combined during the different stages of the motor control with remarkable results are: Slow inversion, Slow inversion with opposition, Sequentiality for strengthening, Repeated contractions, Rhythmic initiation, Alternative isometric contractions, Rhythmic stabilization, and Progression with resistance.

In conclusion, I will make a brief presentation of a series of aspects specific to the recovery in the case of the hemiparetic patient after the hemorrhagic vascular accident, such as:

·The global approach, obeying the particular features of the patient pertaining to age, sex, associated affections and possible complications, within an interdisciplinary team, with a fundamental part played by the family;

·Achieving a programme performed twice a day (made by the physical therapist and supervised by a family member who will perform and monitor the exercise programme recommended by the physical therapist) and using ortheses for the upper and the lower limb;

·Ensuring the accessibility, progression and continuity of the programme by following all the stages of the motor control; passing from one stage to the next one only after the previous stage has been reinforced.

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ABSTRACT

This paper is a case study of a 47-year-old female patient with hemorrhagic vascular accident – left hemiparesis, carried out over a period of 20 months with sessions performed daily. The purpose of this experiment is to achieve the proper family and social integration by reaching functional independence. In the recovery strategy used, the focus was on the use of the proprioceptive and neuromuscular facilitation techniques in order to improve postural control and motor ability, by using different combinations of these techniques during each stage of the motor control. The results achieved support the statement according to which remarkable results can be achieved only through a cooperation of the interdisciplinary team in which the patient, his/her family and the physical therapist have the main role.

KEY WORDS: hemorrhagic vascular accident, motor control, physical therapy, proprioceptive and neuromuscular facilitation techniques

APERFEIÇOAMENTO DO CONTROLE MOTOR POR MEIO DE FISIOTERAPIA NO CASO DE PACIENTES COM ACIDENTE VASCULAR HEMORRÁGICO - ESTUDO DE CASO

RESUMO

Este artigo é um estudo de caso de um paciente de 47 anos de idade, com acidente vascular hemorrágico - hemiparesia esquerda, realizado ao longo de um período de 20 meses, com sessões realizadas diariamente. O objectivo desta experiência é conseguir a integração familiar e social adequada, alcançando a independência funcional. Na estratégia de recuperação utilizado, o foco foi a utilização das técnicas de facilitação neuromuscular proprioceptivos e, a fim de melhorar o controle da postura e da capacidade do motor, através da utilização de diferentes combinações de tais técnicas, durante cada fase de controlo do motor. Os resultados alcançados apoiar a afirmação segundo a qual os resultados notáveis só pode ser alcançada através de uma cooperação da equipe interdisciplinar em que o paciente, seu / sua família e do fisioterapeuta tem o papel principal.

PALAVRAS-CHAVE: acidente vascular hemorrágico, controle motor, fisioterapia, técnicas de facilitação neuromuscular e proprioceptiva