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Original article

HEMIPARESIS AFTER ISCHEMIC STROKE

TIMNEA OLIVIA CARMEN[1], STĂNESCU MARIUS[2], POTOP VLADIMIR[3]

Abstract

Objectives. This study intends to show the evolution, recovery and the treatment in left-sided predominantly brachial hemiparesis after ischemic stroke.

Methods. This scientific approach led to a case study with a female subject aged 72 years of Bucharest. Research methods used: review of specialized literature, pedagogical observation, medical history, method of test (clinical and lab tests), KABAT method. Based on the studied medical history, the subject has the following diagnoses: left-sided predominantly brachial hemiparesis after ischemic stroke; recurrent paroxysmal atrial fibrillation; HBP E stage 3; IHD; left-side EDR post fracture state; state after left-sided hemiarthroplasty with Moore prosthesis on fracture of femoral neck; anxious-depressive syndrome; locomotor disability and moderate self-care limitation. The study was conducted during the period 2007 -2016, divided into 3 stages, each one with its own history of evolution, recovery and treatment. Depending on the stage of the research, the study monitored the following indicators: a) Objective clinical exam (Central facial paresis, left-sided, left UL –distal pred. paretic motor deficit, brisk deep-tendon reflexes, Spasticity degree 2 fist articulation; left-side LL – paretic motor deficit, brisk deep-tendon reflexes, Babinski (+), possible to walk with a walking stick; b) Lab exam (TA, HB, HT, WBC; LYM, cholesterol, Trig., glycaemia, creatinine, lipids, urea, VSH, TGO, TGP, Urinalysis ITU with E.Coli).

Results. In order to highlight the functional-clinical evolution and the stage rehabilitation treatment, the study results are presented in several stages with different diagnosis, rehabilitation and treatment. After the hip surgery, when she received a cemented hip prosthesis, the patient was submitted to a rehabilitation program lasting 6 weeks approximately, similar to the previous program, but without the intended effects; the patient still has spasticity of the upper limb and the operated lower limb. Currently she is brought by her daughter for neurological reassessment. Conscious patient, transport by means of manually driven wheelchair; she needs maximum help when making the transfers, she can sit on the side of the bed for a short time.

Conclusions. We found out that the observance of the medical recommendations regarding the clinical-functional assessment and the stage rehabilitation treatment, consistent with the observance of a low-calorie diet and the administration of the pharmaceutical treatment can lead to the improvement of patient's condition.

Key Words: ischemic stroke, assessment, hemiparesis, testing, treatment.

Introduction

The cardiovascular (circulatory) system keeps constant quality and quantity of the "tissue fluid", namely the body internal environment. The main task of this integrating system of the body is to carry the oxygen and the nutrients to the tissues and to transport the carbon dioxide and the dissimilation products (metabolites) to the organs that perform their elimination (Baciu, 1981; Timnea, Baican, 2017).

The vascular system is formed of arteries, capillaries, veins and lymphatic vessels. Blood vessels compose a network where the blood is carried away from the heart towards all body organs (through the arteries) and back to the heart again ((through the veins). The arteries from the cephalic extremities originate in the aortic arch, through the common carotid artery in the left half (directly) or through the brachiocephalic trunk in the right half (indirectly); the external carotid artery is distributed to the anatomic structures located in the neck, visceral cranium and calvaria. The internal carotid artery participates in the vascularization of the brain (Timnea, Baican, 2017).

The nervous system is one of the human body systems that mirror faithfully the relationship between structure and function. The nervous system is divided into the central nervous system (or the nervous system of the relationship life) which connects the body with the environment (Gavrilescu,

[1]Faculty of Physical Education, Sport and Kinesiotherapy, Romanian-American University, Romania, oliviatimnea@yahoo.com
[2]Central Military Hospital "Carol Davila", Bucharest, Romania, b01drj@yahoo.com
[3]Faculty of Physical Education and Sport, Ecological University of Bucharest, Romania, vladimir_potop@yahoo.com
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2010) and the peripheral nervous system. The activity of the internal organs is coordinated by the autonomic or vegetative nervous system, governed by the central nervous system.

The cerebrovascular accident (CVA) is the clinical term used when a severe loss of perfusion occurs in a vascular territory of the brain, resulting in consecutive ischemia and implicitly the loss of the neurological function associated to the area without perfusion.

Classified as hemorrhagic or ischemic, the vascular accident is typically shown by a sudden occurrence of focal neurological deficit such as weakness, sensorial deficit or speaking difficulties.

The ischemic cerebral attack has a heterogeneous group of causes including the thrombosis, embolism or hypoperfusion, while the hemorrhagic cerebral attack can be intraparenchymatous or subarachnoidian one.

The specialized literature identifies the CVA as the most important cause of long-term morbidity and disability in Europe; the demographic changes led to an increase of both incidence and prevalence of the stroke. (Brainin, Bornstein, Boysen, Demarin, 2000; Weimar, Roth, Zillessen, et al, 2002; Rothwell, Coull, Silver, et al, 2003; Slăvilă, 2004; Lopez, Mathers, Ezzati, et al, 2006).

CVA is the second cause of dementia and the most frequent cause of epilepsy in elderly people and also a frequent cause of depression in Europe; it is one of the main causes of morbidity and mortality worldwide. There are differences in terms of prevalence, incidence and mortality between the countries of Eastern Europe and Western Europe. These differences can be explained by various risk factors, the high blood pressure particularly, leading to more severe CVA in the Eastern Europe countries. In the case of the Western Europe countries, one can notice regional differences (ESO - Guidelines for Management of Ischaemic Stroke, 2009).

Purpose of the study: to highlight the evolution, rehabilitation and recommendations regarding the left-sided predominantly brachial hemiparesis after ischemic stroke.

Hypothesis of the study: we consider that the observance of the medical recommendations referring to the clinical-functional assessment and the stage rehabilitation treatment, in conformity with the observance of a low-calorie diet and the administration of the pharmaceutical treatment will lead to the improvement of patient's optimal condition.

Methods

A 72 years old female subject, domiciled in Bucharest, participated in this study. She had the following diagnoses:

1. left-sided predominantly brachial hemiparesis after ischemic stroke (CVA)
2. recurrent paroxysmal atrial fibrillation
3. HBP E stage 3
4. ICD
5. left-side EDR post fracture state
6. state after left-sided hemiarthroplasty with Moore prosthesis on fracture of femoral neck
7. anxious-depressive syndrome
8. moderate locomotor disability and self-care limitation

The case will be presented per several stages in terms of evolution, rehabilitation and recommendations.

1) the 1st stage, from 2007 to 2009:

The patient was admitted in several hospitals:

- „Dr. Carol Davila" Central Military Emergency Clinical Hospital, Bucharest (02-16.11.2007);
- National Institute of Rehabilitation, Physical Medicine and Balneoclimatology, Neurological Rehabilitation Clinic III (11.02-22.08.2008);
- „Ana Aslan" National Institute of Gerontology and Geriatrics, Neurological Rehabilitation Clinic IV (25.02-10.03.2008);
- National Institute of Medical-Physical Rehabilitation and Balneophysiotherapy (02-13.06.2008); (23.06-03.07.2009).

2) the 2nd stage, from 2010 to 2011:

- SUUB Medical Care Unit, ORTO II Department (28.12.2010-12.01.2011);
- National Institute of Rehabilitation, Physical Medicine and Balneoclimatology, Clinic of Neurological Rehabilitation IV (07-18.03.2011); (06-17.06.2011)

3) the 3rd stage – final one (period: 2016)

- INRNFB Outpatients hospital department, Neurology (24.06.2016). Clinic diagnosis: ischemic CVA (cardioembolic mechanism) - November 2007. Left-sided spastic hemiplegia. Recurrent paroxysmal AFib FIA. HBP stage 2 very high risk group. Bilateral carotid atheromatosis . Right side ICA >60 %. Dyslipidemia under treatment. Total prosthesis of left hip comminuted fracture of left femoral neck January 2011. Recurrent reactive depressive disorder. Locomotor disability. Ambulation by wheelchair.

Functional tests used:

a) Objective clinical examination:

Central type left-sided facial paresis, left UL – ROT vii distal pred. paretic motor deficit, fist

articulation 2nd degree spasticity; left LL – paretic motor deficit, ROT vii, Babinski (+), walk possibility with a walking stick.

b) Lab tests: TA, HB, HT, WBC; LYM, cholesterol, Trig., glycaemia, creatinine, lipids, urea, VSH, TGO, TGP, Urinalysis ITU with E.Coli). *Methods of research*:

a) Method of bibliographic study of specialized literature.

b) Method of pedagogic observation.

c) Method of pedagogic experiment – study of case.

d) Method of tests used in the clinic and lab examination (Sidenco, 2009).

e) KABAT method (Sbenghe, 1987).

Program of rehabilitation used: KABAT method. Therapeutic means – procedures of facilitation used in the re-education process (Sbenghe, 1987; Crețu, 2003; Nicolescu, 2010):

1. Maximum strength – opposing patient's active movement up to its neutralization; thus the respective muscle is obliged to contract isometrically.
2. Stretching (muscle elongation). The author considers that a paralyzed muscle can become active by stretching; therefore strength shall be applied to it.
3. The global schemes of Kabat movement prove that usually the spiral-diagonal movement patterns are more effective in terms of facilitation than the straight line movement schemes.
4. The schemes of global exercises have the advantage of actuating a large number of muscle groups; the treatment addresses several involved muscles, leading to faster results.

- The Kabat diagonals of flexion and extension for lower limbs: diagonal 1 Movement bottom up; diagonal 2; Variants for knee movement made on both diagonals; besides these rehabilitation exercises, the patient was submitted to procedures of physiotherapy – electric currents, electrical muscle stimulation, paraffin wraps, therapeutic massage, reflexotherapy; balance exercises and fist spasticity exercises; bike and rib stall exercises; pull-downs for the left arm.

All these procedures were performed before the hip surgery.

After the hip surgery, when a cemented hip prosthesis had been implanted, the patient underwent a rehabilitation program of 6 weeks approximately, similar to the previous program. The effects were not the intended ones and the patient remained with spasticity of the upper limb and of the operated lower limb too.

Results

Table no. 1 shows the functional indicators regarding the systolic and diastolic arterial blood pressure, the EKG in initial and final testing.

Table 1. Indicators of functional assessment

Variables	Initial	Final
SABP (mmHg)	120	120
DABP (mmHg)	80	70
AV(b/min)	76	64
EKG	Left side ventricular hypertrophy	Lateral ischemia

SABP – systolic arterial blood pressure, DABP – diastolic arterial blood pressure, without big variations because the patient was on medication.

The indicators of motor assessment referred to the evolution of the left upper limb (left UL) and the left lower limb (left LL) demonstrated in the initial and final testing (Popescu, Marinescu, 1999).

Left UL – in initial testing it has a distal predominant paretic motor deficit, ROT vii, spasticity degree II joints elbow + fists ; in final testing – left upper limb (*left UL*) - distal plegic proximal - intermediate paretic motor deficit, proximal-intermediate motor control recovered, distally absent, spasticity of flexor muscles of elbow (Ashworth = 2), fist and fingers (Ashworth = 4), irreducible flexum of fist and fingers 1-5, ROT vii.

Left LL – in initial testing it has a deficit paretic motor, ROT vii, Babinski present, possible orthostatism with bilateral support; in final testing -

paretic motor deficit, motor control partially recovered - distal, Ashworth spasticity = 2 plantar flexors, plantar clonus (2-3 muscular contractions), Achilles tendon retraction, Babinski present, ROT vii, genu flexum(flexed knee) 20º, Left side hip - limited mobility : ROE = 30º, ROI = absent, flexion = 90º, absent abduction and extension, abduction = 15º.

In both cases, the patient needs help to make the transfer to sitting position but she maintains the sitting down position without help; the orthostatism is possible with bilateral support.

The results of the rehabilitation progress in terms of clinical – functional evolution and the staged rehabilitation treatment are shown in several phases (Gavrilă, Babeti, Kronbauer, Tandara, 2009):

1) In the 1st stage (initial one, year 2007) - the results of the objective clinical examination of the patient aged 62 years are the following ones: central type left facial paresis, left UL –ROT vii distal pred. paretic motor deficit , fist joint spasticity degree 2; left LL. –paretic motor deficit, ROT vii, Babinski (+),walk possibility with a walking stick. The evolution was favorable after medication and physical therapy-kinesiology.

In 2008, the results of the clinical examination highlight the following elements: normal weight patient, paretic motor deficit, brachial pred. left limb, walk with walking stick, bilateral ROT vii, BP with values from 140/80 to 110/60, rhythm disorders, without valve murmurs.

Following the clinical examination, the paraclinical investigations and the kinetic – medication treatment with neurotrophic and neuro-relaxing drugs, the functional state of the patient improved partially.

In 2009, the patient (aged 64 years) performs the transfers without help, holds the sitting down position without assistance, can walk using a walking stick but the gait scheme is modified. She was submitted to physical-kinetic treatment (ET, KT, massage) and medication resulting in a favorable evolution with moderate amelioration of the left hand spasticity and correction of the gait scheme.

2) the 2nd stage, intermediate, refers to the period 2010-2011. The clinical and radiological examination of the patient of 65 years old identified the diagnosis of left side femoral neck fracture and left side Erdradius. A reduction is made under local anesthesia, then a plaster AB-P is applied for a 6 weeks long immobilization. Hemiarthroplasty with prosthesis for the left-sided femoral neck fracture was made on 05.01.2011.

Afterwards, the patient is able to make the transfers without help; she maintains the short sitting position, orthostatism and walk with the help of another person and using a tetrapod walking stick with modified gait scheme.

The patient has a slow favorable evolution (partial reduction of hip flexum, with rest ortheses and improvement of gait scheme) under medication against high blood pressure and ischemia; administration of blood thinners, antispastic drugs, lipid lowering drugs, neurotrophic and anxiolytic drugs; treatment of urinary incontinence and neuropathic pain; physical treatment – KT.

3) The 3rd stage (final one) of the study (2016). Following up the surgical intervention (hemiarthroplasty with Moore prosthesis on fracture of femoral neck) the patient remains with a spastic motor deficit in the left lower limb. The patient was brought by her daughter for a new neurological assessment. Conscious patient; ambulation by means of manually driven wheelchair; bilateral support by other persons, orthostatism with bilateral support for short periods; she needs maximal help for performing the transfers; she can sit at the bedside a short time.

Discussion

The worldwide incidence of the cerebrovascular accident will be larger because the population over 65 years old will increase from the present number of 390 millions up to 800 million in 2025, representing 10% of the total population. The World Health Organization (WHO) estimates that each year 15 millions of persons from the whole world suffer a stroke, resulting in deaths or permanent disabilities. The CVA can occur at any age, even in children. The number of CVA cases increases with age, namely 75% of the patients over 65 years old have the risk of CVA (Acute Stroke Management).

Bacterial pneumonia is one of the most important complications in stroke patients; it is mainly caused by the aspiration and it occurs frequently in patients with consciousness disorders and in the patients with deglutition problems (Horner, Massey, Riski, et al,1988; Weimar, Roth, Zillessen, et al., 2002). That is why the oral feeding must postponed until the moment when the patient is able to swallow small amounts of water and to cough upon request.

The risk of deep venous thrombosis (DVT) and pulmonary embolism (PE) can be diminished by hydration and early mobilization. In the patients with CVA, the low- molecular-weight heparins (LMWH) in small quantity reduced both DVT and PE incidence, without a high risk of intracerebral hemorrhage (1. 39), or extracerebral one, while the unfractionated heparin (UFH) in small amount

decreased the risk of thrombosis but had no influence on the pulmonary embolism; the risk of intracerebral hemorrhage did not have a statistically significant increase (Kamphuisen, Agnelli, Sebastianelli, 2005).

For the patients with high risk of developing bed-sores, the use of special sustaining surfaces, frequent repositioning, optimization of nutritional status and hydration of the sacral region skin are proper preventive strategies (ESO – Guidelines for Management of Ischaemic Stroke).

Conclusions

The results of the study highlight the evolution, rehabilitation and recommendations in case of left-sided predominantly brachial hemiparesis after ischemic stroke.

The observance of the medical recommendations related to the clinical-functional assessment and to the stage rehabilitation treatment as well, associated to a low-calorie diet and to the pharmaceutical treatment lead to the improvement of patient's condition.

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