

## Complex aspects of clinical-functional evaluation and ambulatory therapeutic-rehabilitation approach in a young patient with post stroke - spasticity and peroneal nerve palsy

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### Abstract

**Introduction.** Spasticity, a common post-stroke complication associated with signs and symptoms of upper motor neuron syndrome (1), occurs with a 35% prevalence one year after brain injury (2) and can be severely disabling in young patients (3), regarding locomotor dysfunction and also regarding the quality of life. Stroke incidence in young patients increased in the last decades, being correlated with the increasing substance abuse and sedentariness, excessive alcohol consumption, and smoking (4). Peroneal nerve palsy is the most common cause of neuropathy of the lower limb and, in most cases, is caused due to nerve lesion in the fibula head area (5).

**Material and method.** We present the complex case of a young male patient, former alcohol and narcotics user, who suffered an ischemic stroke in the right middle cerebral artery territory along with a posttraumatic paresis of the right peroneal nerve. The patient presents motor deficit – right spastic hemiplegia, right foot drop, locomotion and self-care disorders.

**Results and discussions.** The patient followed medical treatment (antiepileptic, neurotrophic factors, vitamins, antiplatelet) and rehabilitation treatment adapted to the current clinical-functional status (thermotherapy, lasertherapy, magnetotherapy and individual kinesiotherapy), with slow favorable evolution of the improvement of locomotion and quality of life disorders.

**Conclusions.** Therapeutic-rehabilitation management of the spastic patient with disability due to brain injury and peripheral traumatic neuropathy represents a challenge because it doesn't exist a miraculous treatment (yet) to cure completely these nervous injuries.

**Keywords:** *post stroke spasticity, peroneal nerve palsy, rehabilitation,*

### INTRODUCTION

”Stroke is a medical condition characterised as rapidly developing clinical signs of a focal or global injury of cerebral function usually lasting more than 24 h or leading to death, with no apparent cause than vascular origin” (6). From the etiological point of view, stroke can be ischaemic stroke – 80-85% (tromboembolic source: atrial fibrillation, myocardial infarction, valvulopathies, congenital cardiac defects, disturbances of the fluid-coagulant balance, atherosclerosis) or hemorrhagic stroke - 10-15% (haematomas caused by craniocerebral trauma, broken arteriovenous malformation, hypertensive encephalopathy, thrombocytopenias, hemophilia) (7). Stroke is a major public health problem - in Romania and worldwide and more than 60.000 strokes occurs each year in Romania. Stroke is the second common cause of death after coronary heart disease; unfortunately,

Romania has one of the highest stroke mortality rate in Europe (8).

Spasticity, a common post-stroke complication, associated with signs and symptoms of upper motor neuron syndrome (9), occurs with a 35% prevalence one year after brain injury (10), and can be severely disabling in young patients (11), regarding locomotor dysfunction and also regarding quality of life.

Stroke incidence in young patients increased in the last decades, being correlated with the increasing substances abuse together with sedentariness, excessive alcohol consumption and smoking (12).

Peroneal nerve palsy is the most common cause of neuropathy of the lower limb and in most cases is caused due to nerve lesion in the fibula head area (13).

## Material and method

Having the patient's consent, the paper presents the case of a patient aged 39, retired on medical case, from the urban area who was admitted to the Rehabilitation, Physical Medicine and Balneology Ambulatory of the Teaching Emergency County Hospital "Sf. Apostol Andrei" Constanta, during the period 05.01.2021-18.01.2021 for: left spastic hemiplegia, right foot drop, functional impotence for walking and self-care, consecutive. From the personal physiological and pathological antecedents, we remember: an ischemic stroke in the right middle cerebral artery territory (2018), a chronic hepatitis C virus and a right tibia and fibula fracture operated (2015). Our patient was known with risk factors: former alcohol, narcotics user, former smoker and he had an unhealthy lifestyle. The present suffering began suddenly (April 2018) with rapidly progressive motor deficit on the left side, with the preservation of the state of consciousness, but with sleepy state, in addition of the left facial asymmetry. He was admitted to the Clinic of Neurology / Teaching Emergency County Hospital "Sf. Apostol Andrei" Constanta, where he was diagnosed with right ischemic stroke (thrombotic mechanism), with left hemiplegia and left facial palsy and followed anticoagulant, antihypertensive, hypolipemic, hydroelectrolytic rebalancing with favorable evolution. The patient continued at home the pharmacological treatment initiated in the hospital and required permanent assistance from his mother for the daily self-care activities. In evolution, he presented a state of progressive physical deconditioning, with the installation of vicious positions (see below) on the limbs. His chronic treatment was with: antiepileptic, neurotrophic factors, vitamins and antiplatelet.

### General clinical examination at presentation:

- Conscious, afebrile, influenced general state
- Normal weight (BMI = 24 kg / m<sup>2</sup>)
- Normal coloured skin and mucosa, bilateral foot onychomycosis
- BP = 140 / 80 mmHg, AV = 72 b/ min rhythmically
- Pulmonary stetaoustics - no significant changes
- Peripheral arteries pulse present

### Neuro-myo-arthro-kinetic exam:

- facial asymmetry through the left central face paresis
- complete motor deficiency - plegia type at upper left limb and paresis type at lower left limb, with pyramidal hypertonia
- left shoulder sub-luxated, internally rotated, elbow in semi flexion, hand in pronation, fingers in palm flexion
- lower left limb posture in external rotation,

deformed foot in equine var, fingers in hammer

- upper left limb motor control: no motor control at any level
- lower left limb motor control: moderate motor control at the proximal and intermediate level, absent at the distal level
- hyperkinetic deep tendon reflexes in upper and lower left limbs, Hoffman reflex and palmomental reflex present, exhaustible clonus patellar, Babinski (+), Rossolino reflex present, on the left side
- no sensitivity disorders
- right leg muscle hypotrophy
- post surgery scar on the right leg
- right foot drop
- spine - accentuation of physiological curves, left dorsal-lumbar scoliosis, pain on palpation of the lumbar segment, limited active mobilization.



Fig. 1. The right calf - keloid scar

### Functional evaluation

He realizes independently the mobilization in bed, the transfer from dorsal decubitus to lateral decubitus and from lateral decubitus in the sitting position shortened - maintained without support. He was able to perform and maintain orthostatism with support in a Canadian cane but with gait disorders. The patient had psycho-emotional and cognitive status disorders: psycho-motor agitation.

The patient was assessed functionally at admission and discharge using the following scales:

- Modified Ashworth = 3 (admission), 3 (discharge)
- Penn = 1 (admission), 1 (discharge)
- Visual Analogue Scale (VAS) = 0 (admission), 0 (discharge)
- Activity Daily Living (ADL) = 5/ 6 (admission), 5/ 6 (discharge)
- Functional Independence Measure (FIM) = 101/ 126 (admission), 105/ 126 (discharge)
- Quality of Life (QOL) = 85/ 112 (admission), 91/ 112 (discharge)
- Barthel index – 80/ 100 (admission), 80/ 100 (discharge).

### Paraclinical investigations

- Blood Tests showed hepatic cytolysis syndrome (ALT=124 U/L, AST=52 U/L, GGT=457 U/L) and hypercholesterolemia (LDL=197 mg/dL)
- electrocardiogram was within normal limits
- Brain CT: infra and supratentorial pericerebral fluid spaces with dimensions within the age limits. The absence of evocative images for acute ischemia, intra/ extracerebral blood accumulations or tumor masses. Symmetrical ventricular system with normal dimensions. Normally positioned median structures.
- Brain IRM: isolated and confluent lesions located capsulo-nuclear and periventricular on the right side associated with right unilateral cortical edema, rather in an infectious-inflammatory context than an ischemic vascular one (clinical-biological corroboration and imaging monitoring). The suspicion of encephalitis is excluded by the repetition of brain MRI which suggests a cerebral infarction in the right middle cerebral artery territory with hemorrhagic transformations, and also by repeated lumbar punctures. HIV or syphilis, as well as other infectious agents, are excluded by laboratory tests.

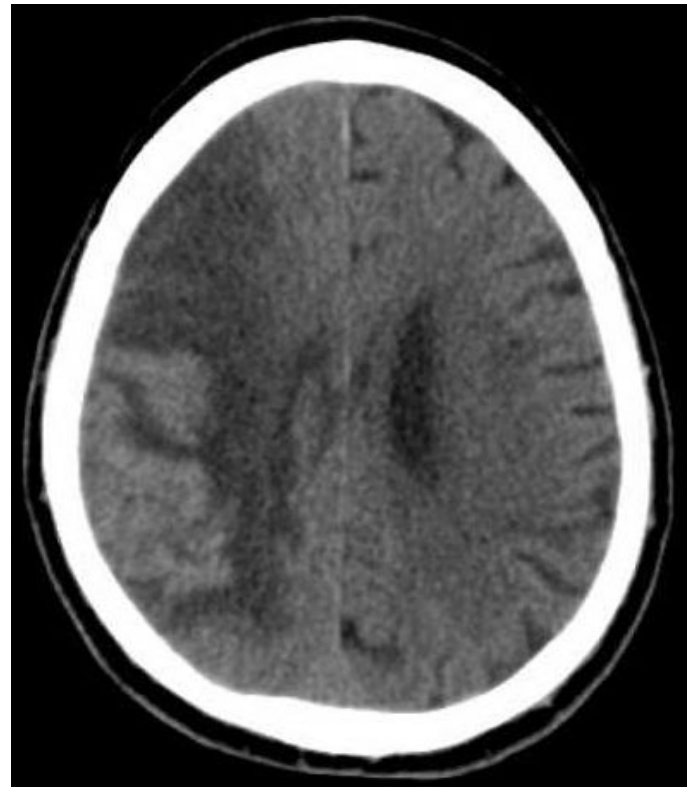


Fig. 2. MRI aspect recorded in April 2018

- Right leg x-ray: synostosis (bone bridge) at the level of the 1/3 proximal on a 5 cm area between tibia and right fibula. Old fractures strengthened at the diaphysis of the right tibia and fibula.

**Positive diagnosis** of our patient is: Spastic left hemiplegia, predominantly facio-brachial, secondary to an ischemic stroke in the right MCA territory (April 2018). Hypercholesterolaemia. Right peroneal nerve palsy. Chronic hepatitis C virus. Medium dysfunction of mobility, self-care and social interaction.

**Differential diagnosis** is made:

For HEMIPLEGIA with: lower motor neuron syndrome (diabetic polyneuropathy, polyradiculoneuritis, brachial plex lesions) and upper motor neuron syndrome (Spinal Cord Injury, Brain Trauma, Multiple Sclerosis, Brain Tumors, Nevaxial Infections).

For STROKE with: cerebral hemorrhage (subdural, subarachnoid).

For PERONEAL NERVE PALSY with: HIV-Associated Multiple Mononeuropathies, Toxic Neuropathy, Vasculitic Neuropathy, Radiculopathy, Diabetic Polyneuropathy, Charcot Marie Tooth disease, Myopathy, Post-polio syndrome.

### The clinically-functional evolution of the patient

The patient performed: lasertherapy and local thermotherapy (paraffin applications) with miorelaxation effect, low frequency current electrotherapy (TENS) at left shoulder and left wrist for analgesic effect, magnetotherapy for sedative effect, kinesiotherapy (postures, passive mobilisation, passive-active mobilisation, bed-side joint stretching and stabilisation exercises, scripetotherapy, exercises on the stall bars, exercises on the bicycle, exercises on the foot pedals, walking between parallel bars, stepper exercises, walking with one-sided support).

The evolution of the patient was slowly favorable by improving the level of collaboration, improvement of the motor control at the lower limb, the patient in the end being able to stand, constantly without the need of the assistance of another person, can walk with Canadian cane support and supervision from another person, improvement of locomotion, improvement of quality-of-life disorders.

**Possible complications** are complications of motor deficiency (decubitus lesions, urinary tract infections, intestinal transit disorders, fractures due to locomotor disorders), complications of treatment (digestive, cerebral hemorrhagic risk, etc.) or complications of the associated diseases (Chronic hepatitis C virus)

#### Prognosis:

Ad vitam: is favorable in the short term but reserved in the long term if he does not respect the treatment and the interdiction to consume alcohol/ narcotics.

Ad Functionem: favorable under conditions of compliance and continuation of the neuromuscular recovery program.

Ad laborem: medical retiree, requires permanent companion.

### Conclusions

The specificity of the case consists in the association of an upper motor neuron syndrome with a lower motor neuron syndrome in a young patient former alcohol and narcotics user. Therapeutic-rehabilitation management of the spastic patient with disability due to brain injury and peripheral traumatic neuropathy represents a challenge because it doesn't exist a miraculous treatment (yet) to cure completely these nervous injuries.

### Conflict of interest

There is no conflict of interest for any of the authors regarding this article.

### Informed consent

In this article was included an informed consent that was obtained from the patient.

### Author contributions

All authors has equal contributions in this publication.

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