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## Cerebral Ischemia versus MS in Young Adults Clinical Imaging Diagnosis Difficulties and Recovery Methods

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### Abstract

*Introduction:* Ischemia in young adults is often the result of non-atherosclerotic vasculopathies, cardiac embolism or clotting disorders. One third of young adults ischemic stroke etiology remains undetermined. *Materials and methods:* We present the case of a patient aged 42, diagnosed with probable MS without cardiovascular or metabolic risk factors, presented to our clinic for decrease of force at right limbs and recent dysarthria. *Results and discussion:* The history revealed recurrent episodes of right hemi-body numbness and vertigo labeled as relapse in MS. Patient is non smoker, does not take oral contraceptives and has no history of cerebrovascular disease in the family. Extensive imaging and laboratory investigations confirms the ischemic clinical picture, carotid Doppler ultrasound showing significant stenosis of the bulbo-left carotid. The patient is guided to the cardiovascular surgery clinic for specialized treatment. Two weeks postoperatively we apply a kinetic-therapy program. *Conclusion:* Uncertain imaging and lack of vascular and metabolic risk factors do not preclude ischemia in young adults. Transient evolution of symptoms even in young patients with no apparent risk factors requires differential diagnosis for cerebral ischemia. Young patient with normal conventional imaging but with transient symptoms and focal neurological deficits require extended laboratory investigations, biochemistry and imaging. Occupational and physical therapy applied postoperatively had an important role in social rehabilitation of the patient.

**Keywords:** ischemic stroke, young adult, recovery

### Rezumat

*Introducere:* La adultul tânăr, ischemiile sunt adesea rezultatul unor vasculopatii non-aterosclerotice, embolii cardiace sau tulburări de coagulabilitate. La o treime dintre accidentele vasculare ischemice ale adultului tânăr etiologia rămâne nedeterminată(1,2). *Materiale și metode:* prezentăm cazul unei paciente în vârstă de 42 ani, cunoscută cu diagnosticul de SM probabilă, fără factori de risc cardio-vasculari sau metabolici, se prezintă în clinica noastră pentru deficit de forță la nivelul membrelor drepte și dizartrie cu debut recent. *Rezultate și discuții:* Anamneza relevă episoade repetate de parestezii hemicorp drept și vertij etichetate ca puseu în cadrul SM. Pacienta nu este fumătoare, nu consumă anticoncepționale orale și nu are istoric de boli cerebro-vasculare în familie. Investigațiile imagistice și paraclinice extinse confirmă caracterul ischemic al tabloului clinic, ecografia Doppler carotidiană evidențiind stenoza semnificativă bulbo-carotidiană stanga. Pacienta este îndrumată către clinica de chirurgie cardiovasculară în vederea unui tratament de specialitate. Postoperator la 2 săptămâni se aplică un program kinetoterapeutic particularizat. *Concluzii:* Imagistica incertă și absența factorilor de risc vasculari și metabolici nu exclud posibilitatea ischemiei la tânăr..Evoluția tranzitorie a simptomelor chiar la pacienții tineri aparent fără factori de risc impune ca diagnostic diferențial ischemia cerebrală. Pacientul tânăr cu imagistică convențională normală dar cu

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simptomatologie tranzitorie și deficiente neurologice de focar necesită investigații paraclinice, biochimie și imagistică, extinse. Terapia ocupațională și fizică aplicată postoperator a avut un rol important în reinserția socială a pacientului.

**Cuvinte cheie:** *accident vascular ischemic, adult tânăr, recuperare*

## Introduction

Ischemia in young adults is often the result of non-atherosclerotic vasculopathies, cardiac embolism or clotting disorders. One third of young adults ischemic stroke etiology remains undetermined [1,2]. Buffery and Burton [3] compare the human brain to a symphonic orchestra capable to perform the complex "hemispheric" symphony. The "sound" complexity is achieved with the help of many categories of instrumentalists led by a conductor (the cortex) that harmonizes scales, tonalities, sounds. Strokes may be compared with aggressions that make an important number of "instrumentalists" disappear. In this case, the brain may react by increasing cortex plasticity and by introducing compensatory mechanisms. To these biological reactions, there will be added the modern medical interventions, that is: recovery procedures, the use of electronic stimulation or inhibition devices etc.

Multiple Sclerosis (synonyms: multiple sclerosis, leuconevraxitis) is a condition characterized by multiple demyelization foci of scattered in the white matter of the central nervous system.

The onset is through variable symptoms with respect to the many possibilities of locating the first demyelization lesions. In practice the most common modes of onset are:

- retrobulbar optic neuritis. Visual disturbances - central scotoma, blurred sight - are generally rapidly declining. After a period of several months to several years there are new neurological signs indicating locations that retrobulbar neuritis was just the first symptom of leuconevraxitis. The possibility that retrobulbar neuritis is followed by

signs of multiple sclerosis was estimated at 20-40%.

- pyramidal signs, especially paraparetic type.
- predilection for extremities localized paresthesia.

Cerebellum and cerebellar brainstem pathways pathia are translated by ataxic gait, and in the presence of concomitant pyramidal syndrome through an ataxospasmodic walk. In the index-nose test there was an intentional quiver. Speech is often of the cerebellum type, explosive and chanted. Vestibular syndrome is usually confined to a nystagmus present in 3/4 of patients. Vertiginous phenomena themselves are rare, and the high intensity ones are comparable to vertigo. Meniere are exceptional.

Optic neuritis may be the first symptom or it may occur at any time. It usually starts off as unilateral but can become bilateral in time. The sight disorder often has an acute onset, in a few days translating to a central scotoma with complete amaurosis. In the form of retrobulbar neuritis, the optic nerve papilla is normal in the beginning, but later becomes pale. Papillary paleness more pronounced in the temporal region of the papilla is a valuable diagnostic sign in multiple sclerosis. More rarely there can be encountered a papilledema. To the four main symptoms of the disease we can add:

- Sensitive symptoms translated primarily by numbness that can add vibration and discriminative sensitivity disorders, lack of sensitivity, rarely thermo-algesia within the Brown-Sequard syndrome. At neck flexion, there sometimes appear electrifying sensations in the limbs as Lhermitte's sign. This looks like a symptom of

demyelization of the sensory cords at the cervical spine level. Lhermitte's sign is useful for the diagnosis of multiple sclerosis, but is also encountered in traumatic lesions or cervical spinal compression.

- Symptoms of the brainstem. In addition to vestibular syndrome, we can meet eye paralysis translated by diplopia, paresthesia in the trigeminal territory, trigeminal neuralgia.
- Mental Damage in Multiple Sclerosis is rare but can occur in some patients in advanced stages of the disease.

A maximum recovery point is reached in the first 6-9 months, after which the progresses are no longer that significant. Abandoning systematic recovery from various reasons predisposes to tendinous and capsulo-articular reactions. The prolonged bed immobilization and passive non-immobilized cases develop achilean retraction, humeral capsulo-articular retraction and algo-dystrophic syndromes. At this stage it was noticed a net benefit from active kinetic-therapy in the case of ACA territory stroke (hemiparesis with crural predominance) and a favorable evolution in the case of ACM stroke (hemiparesis with facio-branchial predominance) where prehension and the fine movements of the fingers were incomplete.

Thus, the practice of a systematized recovery over the first 6-9 months seems to ensure important progress, imposing the realization of a complex, yet individualized, work scheme in order to facilitate psycho-social reintegration.

#### Materials and methods

We present the case of a patient aged 42, diagnosed with probable MS without cardiovascular or metabolic risk factors, presented to our clinic for decrease of force at right limbs and recent dysarthria. Balance in standing and gait are the main primarily affected functions in the early stages

of multiple sclerosis that way is possible to appear some mistake diagnosis at young people.

#### Results and discussion

The history reveals recurrent episodes of right hemi-body numbness and vertigo labeled as relapse in MS. Patient is non smoker, does not take oral contraceptives and has no history of cerebrovascular disease in the family.

Extensive imaging and laboratory investigations ischemic confirms the clinical picture, carotid Doppler ultrasound showing significant stenosis of bulbo-left carotid. The patient is guided to the cardiovascular surgery clinic for specialized treatment. Two weeks postoperatively we apply a kinetic-therapy program:

The kinetic therapy objectives for this stage are:

- promoting the activity of the antagonists by the inhibition of the spastic muscles (the agonists)
- promoting a complex movement scheme
- promoting the control of the proximal muscles during some increased performance exercises
- promoting the motor control of the intermediary joints.

In the medium or spastic stage, the characteristics are:

- the muscular tonus is high - hypertonicity is installed
- the osteo-tendinous reflexes on the affected side are increased
- the initiation of movement is improved, there can be made movements in more difficult positions, but the control of the movement is still insufficient because of spasticity
- usually, the tonus of the upper limb flexors and of the lower limb extensors is greatly improved.

The following set of exercises is one of those used in the study:

- with the arm raised at different levels, there are made extensions-flexions of the elbow, the hand with spread fingers is taken to the opposite shoulder, thus making movements above or below the horizontal, the sports teacher opposes resistance on the shoulder both for the forward and the backwards movements; the lowered or raised position of the elbow entails the mobility of the scapula
- from the lateral decubitus, the training of the lower limb for walking in order to independently mobilize the joints: the hip is maintained flexed and the knee is extended-flexed, then the hip is maintained extended and the knee is moved; concomitantly, independently from the coxofemoral and knee movements, the foot is flexed-extended. These movements are trained (are facilitated) in the dorsal decubitus
- from ventral decubitus with forearm support, the shank is flexed and maintained at different angles
- rolling from dorsal to lateral and ventral decubitus
- from the four limbs position, the weight of the body is alternatively transferred on the paralyzed limbs: forwards-backwards and left-right balancing, gradual raising of a healthy limb, than both
- also from the four limbs position, the patient raises at first the head, then the torso, remaining only on knee support
- from the kneeled position, the teacher balances the body from side to side, especially forwards
- seated on a stool, with hip and knee flexed at a 90° angle, with the flexed foot, the heel in support on the floor, the weight is increased on the affected side: the teacher stimulates with the point of the fingers, the sole and the toes in order to release dorsiflexia
- from the seated position, the upper limb is raised with the elbow stretched, the hand in supination, and maintained horizontally

- from different heights stools, the patient raises himself: the teacher presses the affected knee to help flexion, once the body is up and the IM are extended, the teacher brings forward the knee to prevent hyperextension; reverse exercises are made – sitting down on different heights stools.
- The patient is upright, the teacher is holding the arm and hand, there are balances with weight shifting from one side to the other; the base polygone is decreased by feet being moved closer together.

### Conclusions

- Uncertain imaging and lack of vascular and metabolic risk factors do not preclude ischemia in young adults.
- Transient evolution of symptoms even in young patients with no apparent risk factors requires differential diagnosis for cerebral ischemia. [3,4]
- Young patient with normal conventional imaging but with transient symptoms and focal neurological deficits require extended laboratory investigations, biochemistry and imaging.
- Occupational and physical therapy applied postoperatively had an important role in social rehabilitation of the patient. [6,7]

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