VI. RADIOLOGY

PARTICULAR CASES OF SYMPTOMATIC JUVENILE EPILEPSY OF CEREBRAL VASCULAR CAUSE

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Summary

The work presents two particular cases of symptomatic juvenile (adolescent) epilepsy of vascular cause: dural venous malformation and ischemic CVA (lacunary infarct) underlined the importance of the imagistic investigations (classical cranial radiography, CT native and with contrast substance, cerebral angiography) for establishing the incriminated anatomical substratum.

Key words: - symptomatic juvenile epilepsy of cerebral vascular cause; the diagnostical and etio-pathogenical importance of the imagistic investigations

Introduction

Epilepsy represents a cerebral suffering symptom caused by extremely various factors and characterized by the appearance of some paroxism (accesses and attacks) of sensitive, sensorial, vegetative or psychical order, sometimes preceded (in the generalized forms) by the loss of conscience. The mechanism of the epileptycal attacks cause the clinical form of the suffering: the generalized epilepsy with "grand mal" attacks, the motor, sensitive and sensorial focal epilepsy (cortical), the diencephalic or striated subcortical epilepsy, hysteroepilepsy etc.

Among the incriminated causing factors there are the cerebral vascular pathology, cerebral vascular anomalies through fatal disembrioplasy (the encephalotrigeminal angiomatosis), perinatal vascular accidents (cerebral epileptogene hematomum) or postnatal (aneurismal breakage, cerebral lacunary infarct, cerebral atherosclerosis, cerebral embolisms, cerebral vasospasms, hemopathies and coagulopathies of different causes.

At children with epileptic attacks must be taken into consideration the possibility of incrimination of the cerebral vascular pathology for whose diagnostication the progressive and adequate imagistic investigations are absolutely necessary.

Material and method

In the present work have been selected two particular cases of symptomatic epilepsy; the first case is the one of a 15 years old child, who when she was 3 had her first attack of absence type and whose symptoms persisted, appearing in alternating degrees (sporadic attacks or absences associated with motor automatisms); the second case is the one of a child with the same age as the first one who presented hemiparesis on the left side (frustum form associated with left partially convulsive attacks).

For the clearing of the etiopathogenic cause, the two patients were clinically, paraclinically and through different imagistic methods investigated (standard cranian radiography, native and with contrast substance computerized tomograph investigations and cerebral angiography). In the first case, thus was diagnosticated a dural venous malformation, while in the second case was discovered a lacunary infarct at the right putamen.

Results

Case no. 1

The patient B.F., a female, hospitalized in the Neuropsychiatry Stationery for children in Timişoara, presents a neuropsychiatric history starting when she was 3 years old under the form of a first absence type attack. Despite the different treatments applied, the neurological symptoms persist, alternating only under the aspect of their importance: sporadic absence type attacks associated with motor automatisms.

In 1997, at the age of 15, the cranian radiography made in the anteroposterior incidence reveals an evident asymmetry of the dural lateral sinus in the favor of the left side sinus. (Fig. 1).

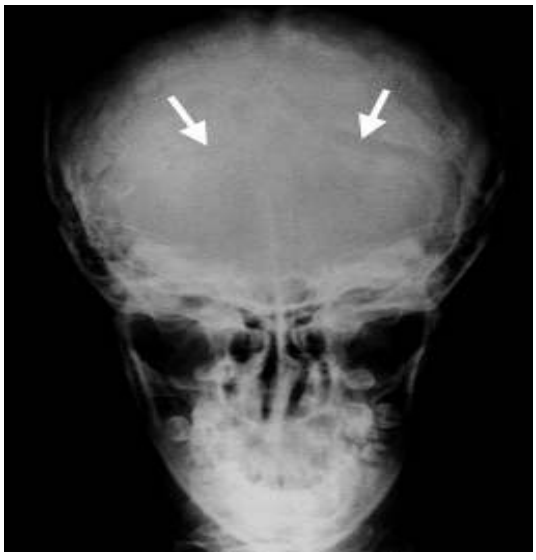


Fig.1. Asymmetry of the dural lateral sinus in the favor of the left side sinus.

This aspect entails the recommendation for a cerebral angiography. This investigation made by the Cardiology Centre in Timişoara underlines – in the venous time – a significant stenosis of the superior sagittal sinus (with 75%) in the region proximal to the confluence of sinuses (dural Herophile crossroad), as well as a pronounced diminution (with 50%) in the diameter of the right transverse sinus (Fig. 2 and Fig. 3) in its distal half.

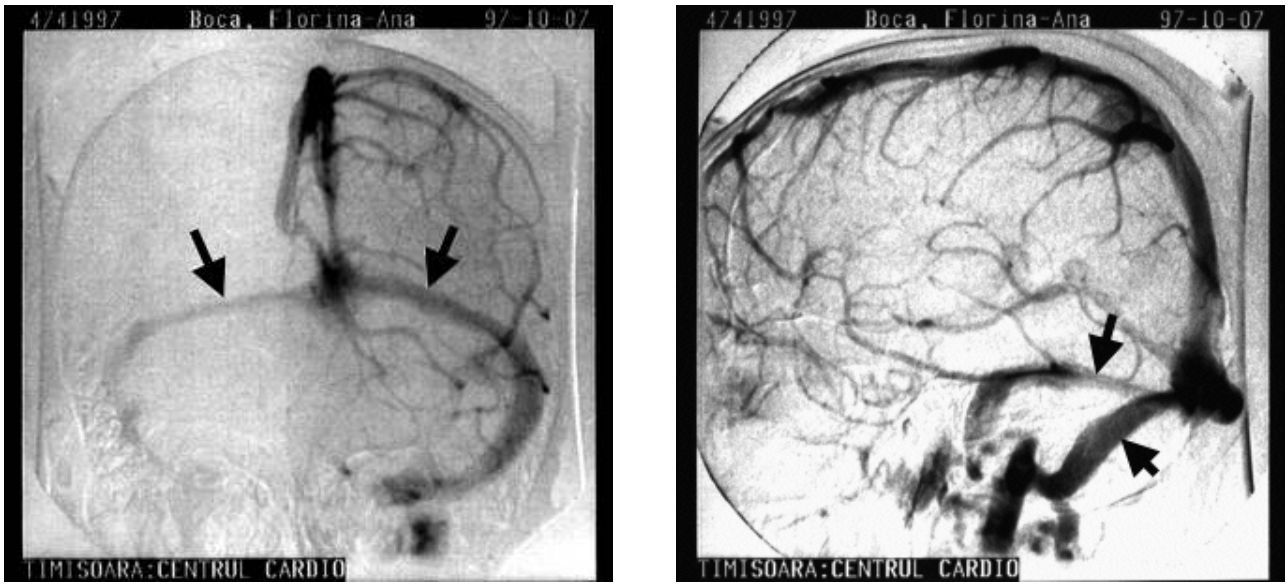


Fig. 2 and 3. Cerebral angiography – a significant stenosis of the superior sagittal sinus.

The classic radiography examination as well as the venous time of the cerebral angiography reveals the presence of a dural venous malformation. To clear the etiopathogeny of the absence attacks associated with motor automatisms was made the native cerebral CT exam that revealed normal aspects (Fig. 4 and 5), thus excluding the other types of cerebral pathology (hydrocephalus, cerebral tumour etc.) which could explain the above symptomathology.

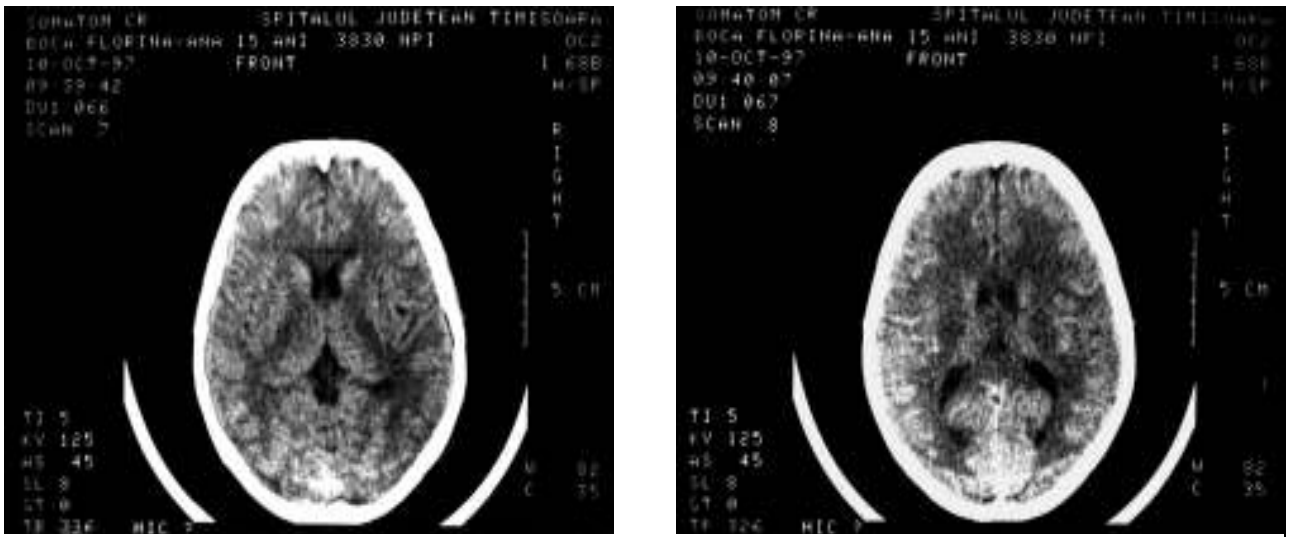


Fig. 4 and 5. Native cerebral CT exam that revealed normal aspects.

Case no. 2

The patient S.I., a female of 16, hospitalized in the Neuropsychiatry Stationery for children in Timişoara, with the neurologic diagnosis of left hemiparesis (frustum form) presented left partially convulsive attacks. In 2001, when she was 14, in order to establish the cause that generated this clinical situation, the doctors made a native CT exam and with contrast substance in the middle of an acute access. This examination underlined an irregular hypodensity of 3/2/1,5 cm, visible on the medium transventricular sections at the right side putamen, near the insula (Fig. 6 and Fig. 7).

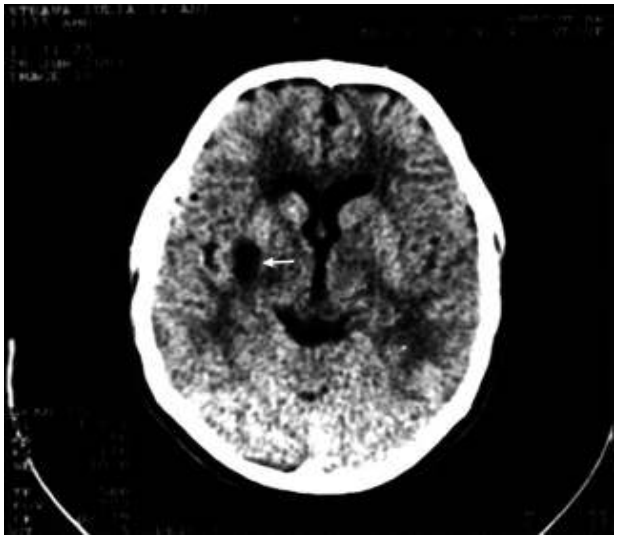


Fig. 6. Native CT exam.

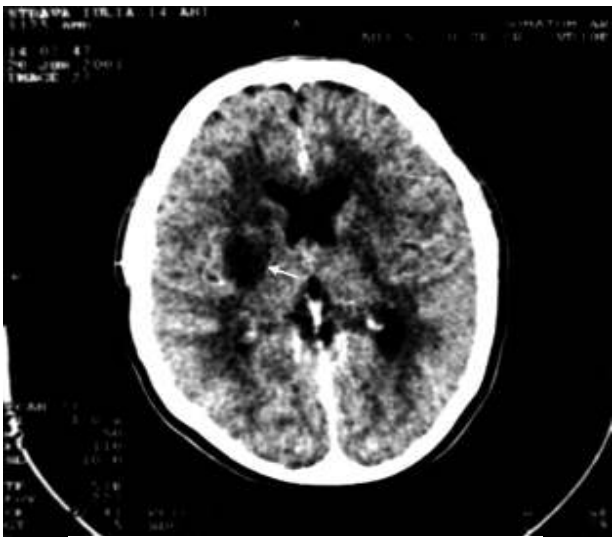
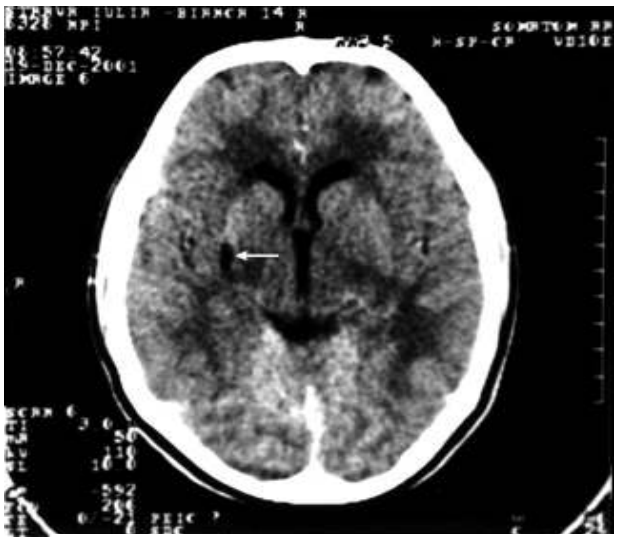


Fig. 7. CT exam with contrast substance.

After administrating the contrast substance (50 ml Ultravist) it appeared a discrete diminution of the hypodense area. The CT image establishes the cause of the previous mentioned clinical aspects, by installing an ischemic vascular accident supervened on an artery of a reduced diameter. At an interval of about 6 months after the first examination, was made a CT of control, pointing out a hypodense image of net diminished size (Fig. 8 and Fig. 9), of liquid aspect, resembling cerebrospinal fluid. It is thus confirmed the typical evolution of a cerebral lacunary infarct – term used by T. Pop for the arteriolar infarct of reduced dimensions.



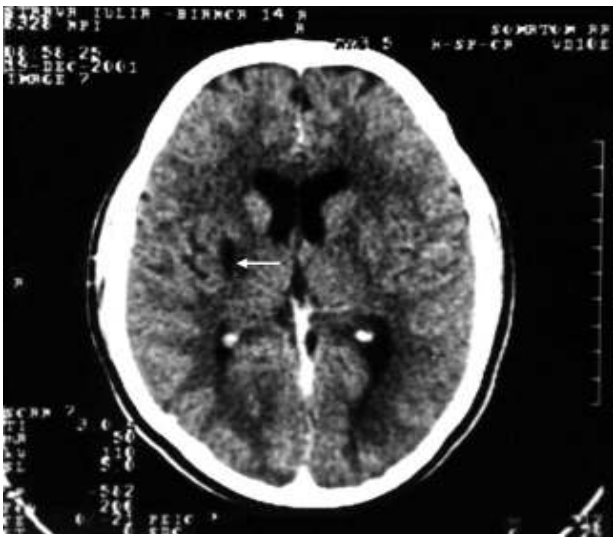


Fig. 8 and Fig. 9. CT control exam 6 months after the first examination.

Discussions

In the first case, the precocious clinical debut (at the age of 3) and long lasting persistence under treatment of neurologic symptoms, as well as angiographic aspects of stenosis (aspect in clepsydra) of the superior sagittal sinus as well as of the right transverse sinus near the confluence of sinuses (dural Herophile crossroad) plead for a congenital cerebral vascular anomaly (dural venous malformation of posterior fossa).

The dural venous malformations are rare. On the other hand, the changes in diameter of the dural sinuses evidenced by imagistic methods must be correctly evaluated to be differentiated from the anatomical variants which are normal situations and do not provoke craniocerebral venous drainage disorders of clinical response.

The position and duality of the stenotic injury in the proximal area of the confluence of sinuses (dural Herophile crossroad) shows the importance of the obstruction which, by impeding the cerebral venous drainage may explain the physiopathology of the absence attacks accompanied by the motor automatisms.

The second case presented refers to a very rare situation at children, namely the cerebral vascular accident (CVA). The ischemic CVA etiology knows (according to Solomon and the associates quoted by C. Aldescu) as more frequent causes: cerebral atherosclerosis, cerebral embolisms (cardiac, fat etc.), inflammatory and non-inflammatory arteriopathies, vasospasms (cerebral posthemorrhage, migraineous, etc.), hemopathies, coagulopathies, other various causes – traumatical, anoxical, iatrogenical (cerebral postangiography, after interventions of the internal carotid artery etc.). In the presented case, the lab exams had excluded the incrimination of the above causes and the age of the patient excluded the cerebral atherosclerosis. In this context was taken into consideration the possibility of the vascular malformative etiopathogeny.

Paturet, Lazorthes, D. Sutton and other authors describe at the level of the putamen the lenticulostriate arteries group (Fig. 10).

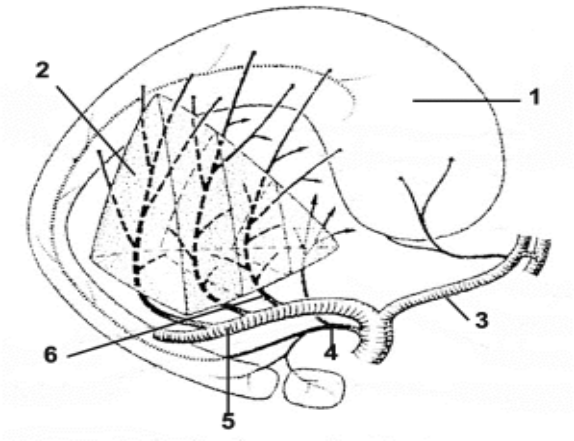
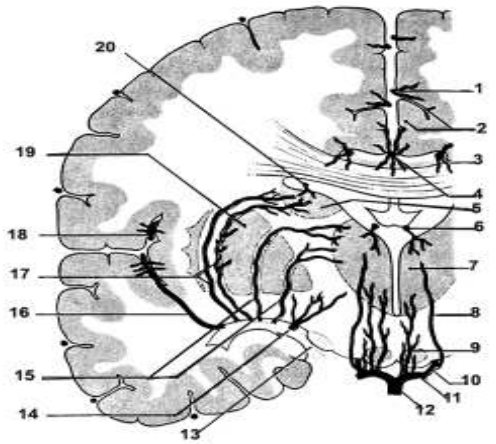


Fig.10. Arterial supply of corpus striatum (after G.Lazorthes)1.nucleus caudatus; 2.nucleus lentiformis; 3.a. cerebri anterior; 4.a. choroidea anterior; 5.a. cerebri media; 6. rr. striati (lenticulostriate arteries)

The reduced size of these arteries as well as their terminal character explains the diminished size of the ischemic injuries. One ramus, usually the largest, was termed by Charcot the "artery of cerebral haemorrhage". Classic authors (Paturet, etc.) consider that some of these arteries touch the superior portion of the lateral nucleus of the thalamus (Fig. 11) under the name of lenticulooptic arteries, contested fact by the majority of neurosurgeons (Lazorthes and others) by the study of the cerebral arterial theories through modern imagistic methods (cerebral CT with contrast substance) (Fig. 12) as well as by the above presented case.



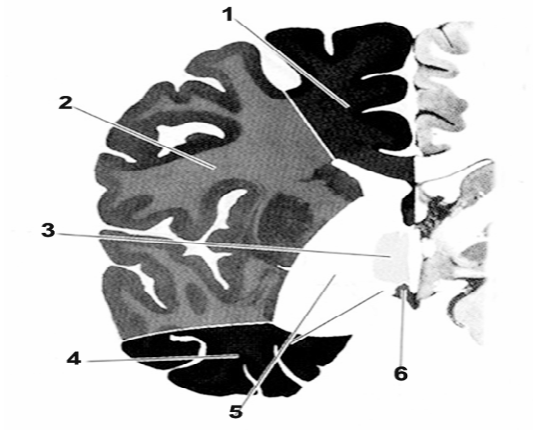


Fig.11. Deep cerebral arterial supply (after G.Paturet): 1.r. sulci cinguli (a. cerebri anterior); 2.sulcus cinguli et gyrus cinguli; 3.a. cerebri anterior; 4.a. cerebri anterior mediana; 5.nucleus caudatus; 6.a. choroidea anterior; 7.thalamus; 8.r. thalami (a. communicans posterior); 9.r. thalami dorsolateralis; 10.a. communicans posterior; 11.a. cerebri posterior; 12.a. basilaris; 13.a. cerebri media; 14.a. choroidea anterior; 15.lenticulooptic arteries (a. cerebri media); 16.a. cerebri media; 17.lenticulostriate arteries (a. cerebri media); 18.r. sulci lateralis (a. cerebri media); 19.putamen (nucleus lentiformis); 20.a. choroidea media.
Fig. 12. Arterial cerebral teritories (cerebral CT with contrast substance): 1.a. cerebri anterior; 2.a. cerebri media; 3.A. communicans posterior; 4.a. cerebri posterior; 5.a. choroidea anterior; 6.a. cerebri posterior.

Conclusions

1. The work presents two cases of children with cerebral vascular anomalies that, through cerebral circulatory disorders can cause different symptoms, such as epileptic attacks.
2. The etiopathogenic clearing of such cases needs the corroboration of clinical and biological aspects with the results of imagistic investigations.
3. The simple classical radiographic examination may draw the attention over possible cerebral vascular anomalies, requiring the use of modern imagistic methods (cerebral angiography, cerebral CT, RMN, etc.) for the exact clearing of the situation and for establishing the presence, topography and of spreading of possible cerebral injuries.
4. A complexe investigation of such cases is due to the paediatrician, to the neurologist and to the radiologist work in a team, who must choose the type and the order of the optimum investigations needed to a correct diagnosis step.

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