

CORTICAL BLINDNESS IN THE OCCIPITAL ISCHEMIC SYNDROMES

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Abstract: This article aims at the establishment of the patterns of clinical presentation, lesion topography and etiology in the patients with ischemic stroke limited to the superficial territory of the posterior cerebral artery (PCA). The presumed etiology was embolism in 43% patients, PCA atherothrombosis in 36%, migraine and multiple potential sources of embolism. The clinical findings were hemianopsia, quadranopsia and bilateral visual field defects. Motor, sensory or sensorimotor deficits were detected. Neuropsychological dysfunction included memory impairment.

Keywords: ischemic stroke, posterior cerebral artery (PCA), embolism, atherothrombosis, hemianopsia, bilateral visual field defects

Rezumat: Articolul vizează stabilirea modelelor de prezentare clinică, topografia leziunilor și etiologia la pacienții cu accident vascular cerebral ischemic limitat la teritoriul superficial al arterei cerebrale posterioare. Etiologia presupusă a fost embolism la 43% pacienți, aterotromboza ACP la 36%, migrena și multiple potențiale surse de embolism. Constatările clinice au fost hemianopsia, quadranopsia și defectele bilaterale de câmp vizual. Deficitele motorii, senzoriale sau senzoriomotorii au fost detectate. Disfuncția neuropsihologică a inclus slăbirea memoriei.

Cuvinte cheie: accident vascular cerebral, artera cerebrală posterioară, embolism, aterotromboză, hemianopsia, defecte de câmp vizual bilaterale

PURPOSE

The article aims at the clinical presentation, lesion topography and etiology in the patients with ischemic stroke limited to the superficial territory of the posterior cerebral artery.

MATERIAL AND METHOD

The research comprised 14 patients hospitalized in the Neurology Department of the County Clinical Emergency Hospital of Sibiu, between 14.05.2003 and 14.03.2008. These patients were found with cortical blindness, as a result of ischemic strokes. The following characteristics were recorded: demographic, etiology, neurological deficits (motor, sensory or sensorimotor), ophthalmologic disorders (deficits of visual field),

neuropsychic dysfunctions, localization of the cerebral lesion (CT).

RESULTS AND DISCUSSIONS

A. Repartition of the patients with cortical blindness per age groups:

If in the recent publications, the average age for the ischemic strokes on the territory of the posterior cerebral artery is of 61,5 years, in our country, the largest frequency was recorded in the age group above 70 years old.

B. Repartition of the patients with cortical blindness per gender:

Gender percentage repartition of the patients with cortical blindness was of 57% in men and 43% in women, while the recent publications of the English Medical Centre suggested that the ischemic strokes of the posterior artery registered 58% in men and 42% in women.

C. Risk factors in ischemic strokes on the territory of the PCA:

1. Main factors:

- Arterial hypertension;
- Diabetes mellitus;
- Association between arterial hypertension and diabetes mellitus;

Within the group of those 14 patients hospitalized with ischemic stroke on the territory of the PAC:

- 11 (55%) patients were hypertensive,
- 3 (15%) patients were registered with diabetes mellitus,
- and 3 (15%) patients registered both hypertension or diabetes mellitus.
- only 3 (15%) patients did not register either hypertension or diabetes mellitus;

a). The largest frequency was registered by the patients with arterial hypertension. Arterial hypertension is the most important risk factor in the ischemic stroke.

The incidence of the ischemic stroke increases proportionally with the systolic and diastolic arterial tension. This relation is a direct, continuous and apparently independent one.

CLINICAL ASPECTS

- The arterial tension, especially the systolic one increases along with the age.
- The increased systolic tension, with or without the increase of the diastolic tension, increases the risk of ischemic strokes.
- Isolated systolic arterial hypertension is an important risk factor for the ischemic strokes in the old people (systolic arterial tension > 160 mm Hg; diastolic arterial tension < 90 mm Hg).

The therapeutic management of the arterial hypertension leads to the prevention of the ischemic stroke or to the reduction of the risk for affecting other target organs, including congestive cardiac insufficiency and renal failure.

The regulated screening of the arterial hypertension, every two years at least, in the adults and the proper treatment are recommended.

b). Type I – Insulin-dependent diabetic patients have an increased susceptibility for atherosclerosis and an increase of the prevalence for the atherogenic risk factors, especially arterial hypertension, obesity and dyslipidemia.

Type II – A constellation of metabolic risk factors, called **the metabolic syndrome**, was also detected in certain patients with type 2 diabetes mellitus. The main characteristics of the metabolic syndrome are:

- Hyperinsulinemia,
- Insuline-resistance.

These bring about the secondary characteristics of the metabolic syndrome, including:

1. hyperglycemia,
2. increase of VLDL (very low density lipoprotein),
3. the decrease of HDL (high density lipoprotein),
4. arterial hypertension

c). Arterial hypertension is common in the patients with type 2 diabetes mellitus, with a prevalence of 40-60% in adults.

- The association between hyperglycemia and arterial hypertension was long time believed to increase the frequency of the complications of diabetes, including the ischemic stroke.
- The control of the arterial tension in diabetics reduces the incidence of the ischemic strokes significantly.
- The measures taken in order to obtain a sustained control of glycaemia were less efficient in preventing the ischemic stroke.

2. Other risk factors:

1. Cholesterolemia > 220;
2. Triglycerides > 160;
3. Obesity / dislipidemia;
4. Urinary infection.

Within the group of 14 patients with ischemic stroke on the territory of PCA, other risk factors were identified:

- Cholesterol > 220 in 1 (7%) patient;
- Triglycerides > 160 in 4 (29%) patients;
- Obesity/Dislipidemia in 5 (35%) patients;

- Urinary infection in 4 (29%) patients.

Dyslipidemias represent an important risk factor in the ischemic stroke, especially in the conditions of the association of arterial hypertension, obesity and diabetes mellitus, as in the case of the metabolic syndrome.

D. Etiologic factors of the PCA occlusions:

1) Our statistics talk about 43% of cases with cardiac and arterial embolism. Cardioembolism is the most known cause for the PCA stroke.

a) Embolus may be formed at heart level due to multiple basic affections:

The most known is the arterial fibrillation. Our patients were diagnosticated with:

- arterial fibrillation with average ischemic stroke,
- one with paroxistic rapid ischemic stroke;
- chronic ischemic cardiopathy;
- hypertensive cardiopathy;
- ventricular extrasystoles (bigeminism).

There were three cases diagnosticated with “basilar type syndrome”, where an embolus may produce the occlusion of the rostral basilar artery and brings about diencephalic ischemia.

b) The starting point of an embolus may also be the result of:

- atheromatous affections of the ascendant aorta. This etiology was found in two of the studied cases. Due to the occurrence of the transesophageal echocardiography, the examination and the quantification of the atheromatous diseases of the aortic arch was made possible. The thickness of the plate larger than 4mm and/or the presence of the mobile thrombus are stroke predictive.

2) Atherothrombosis was diagnosticated in 36% of the patients. The thromboembolic process determines the acute arterial occlusion.

Atherosclerosis represents the most frequent cause for the stenosis of the arteries, which provides the cerebral irrigation. Atheromatous and/or thrombotic lesions represent important sources of emboli, which at their turn, may determine ischemic strokes. PCA intrinsic stenosis due to atherosclerosis is very rare. Yet, it is a well known cause of attack.

The headache usually affects the posterior circulation. It often occurs in the occipital lobes.

3) Occlusions of the cortical branches of the PCA may also occur within a hypertensive encephalopathy.

Clinical observations

Neurological deficits: Generally, due to the diversity of the PCA syndromes, a complete neurological examination, focused on the major areas of the neurological dysfunction is very necessary. For example, it is important to supervise the primary motor functions, sensorial decrease and ataxia; lower cranial nerves, level of conscience and language, semi-attention, ocular movements, visual field. The cardiologic examination (valvular diseases, arterial fibrillation), examination of atherosclerosis and of hyperlipidemia (gerontoxon, xanthomata tendency) should also be made.

CLINICAL ASPECTS

In this research:

6 (26%) patients registered disequilibrium when moving.

- When the blood flow towards the cerebral pedunculi has its origin in the P1 segment, the myocardial infarction may occur, with the result of hemiplegia or hemiparesis. Out of the batch of 14 patients, 9 (40%) presented hemiparesis.

- Babinski sign was found in 6 (26%) patients.

One patient was diagnosed with Anton-Babinski syndrome (anosognosia, asomatognosia, anosodiaphoria, the lesions being at the parieto-temporal-occipital level of the right cerebral hemisphere).

- Central facial paresis was diagnosed in one patient (4%).

- No coordination between the motility of the upper limbs was found in 1 (4%) patient.

Sensorial and sensorimotor neurological deficits:

Regarding the 14 examined patients, the following symptoms were found:

- dizziness in 1 (9%) patient,
- sleepiness in 1 (9%) patient;
- occipital headaches - 4 cases (37%);
- giddiness – 1 case (9%);
- vomiting – 1 case (9%);
- dysarthria - 3 cases (27%).

The patients in coma may or may not present hemiplegia or hemisensorial decrease. The hemisensorial loss results in an infraction of the postero-lateral-ventral nucleus of thalamus. The vessel involved is a thalamogeniculate branch. It is one of the lacunar syndromes. A related disorder is Dejerine-Roussy syndrome, where by resolving hemiparesis and hemiataxia, the patient remains with a hemisensorial disorder with paroxysmic pain in the affected area.

- In 1 (13%) patient, psychomotor agitation was presented;

- In 2 (25%) patients, confusion was presented;

- In 2 (25%) patients, aphasia was recorded.

Regarding the bilateral lesions of the occipital lobe, the following symptoms were recorded: temporospatial disorientation and topographic memory disorders. In this study, 3 (25%) patients mentioned the temporospatial disorientation.

Ophthalmologic manifestations in the ischemic stroke on the territory of PCA.

All those 14 patients taken into the study were diagnosed with cortical blindness.

- Out of these patients, 2 (67%) recorded conjugated gaze paresis,

- In 1 (33%) patient, the loss of the pupil's reflexes was recorded.

Cortical blindness occurs as a result of the bilateral dysfunction of the optical paths beyond the external geniculate bodies or on the striated area.

The symptomatology of the pure cortical blindness may be summarized this way: blindness, normal optic fundus, preserved light reflex, abolition of the

blinking visual reflex, abolition of direction reflexes and of the optokinetic nystagmus.

The differentiated diagnosis of the cortical blindness is made with subcortical blindness, where the pupillary light reflex is abolished and the pupil presents an atrophic bleaching.

Double hemianopsia may be differentiated by cortical blindness, by the fact that within hemianopsia, the macular sight is preserved.

Cortical blindness is very rarely encountered in pure condition; it is usually accompanied by other disorders; hallucinations, visual anosognosia, disorientation in time and space, physical disorders.

Bilateral infractions of the occipital lobes may produce different levels of cortical blindness.

The unilateral infraction may produce homonymous hemianopsia. Macula sparing is frequently encountered in the infraction of the occipital lobes due to PCA occlusion. Macula sparing is probably caused by the collateral muscular suppleness of the occipital pole from the posterior branches of the median cerebral artery and the maintenance of the optic radiations.

The infraction of the lateral geniculate nuclei may produce hemianopsia, quadrantanopsia, or sectoranopsia.

Visual agnosia is the consequence of the affection of the projection area of the visual paths at the level of the occipital lobe. Visual agnosia is also called psychical blindness. The patient ignores his deficiency. Visual agnosia was divided in subgroups: aperceptive visual agnosia and associative agnosia.

Balint syndrome is a triad: visual simultaneous agnosia, optic ataxia and apraxia of the insistent gaze.

Facial-prosopagnosia recognition disorders. This deficit results from bilateral lesions of the lingual and fusiform gyrus.

Polynopsia, micropsia and macropsia are illusory phenomena.

Pure alexia may result from the infraction of the occipital dominant cortex. Classic alexia without agraphia was described by Dejerine. In his study, the lesion of the left occipital cortex is suggested, as well as the infraction of splenium of the corpus callosum, which unplugs the fibres from the right occipital lobe, reaching the angular gyrus.

Colours perceptions disorders. This deficit occurs in the collateral visual field and is called "hemiacromatopsia". A similar problem is the colour agnosia.

Upon the computerised examination of the patients with cortical blindness, the following items were identified:

- Right lower temporal inhomogeneous area. Right occipital ischemic stroke. Cortical atrophy.

- Left parietal and occipital ischemic stroke.

- Bilateral accentuated ischemic stroke. Cortical atrophy.

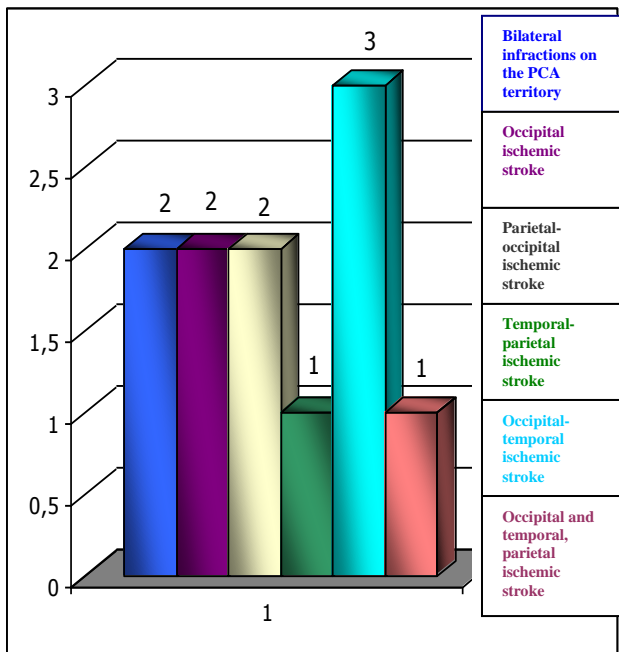
- Bilateral parietal temporal ischemic stroke.

- Enptg Sella

CLINICAL ASPECTS

- Left temporal-occipital ischemic stroke. Possible ischemic stroke in evolution - right temporal-occipital. Cortical atrophy.
 - Right occipital ischemic stroke. Ancient right parietal ischemic stroke. Without expansive processes. Polyp on the left lateral wall of the sphenoidal sinus.
 - Bilateral-occipital hypodense intense areas. Gaps in the posterior arm of the right internal capsule. Cortical atrophy.
 - Bilateral infractions on the PCA territory.
 - Cerebral lacunar state. Dilatation of the left occipital cornu.
 - Right verminian cerebral hypodense area. Right occipital sequelae ischemic stroke. Cortical atrophy marked with the hypodensity of the white substance, periventricularly, more accentuated in the posterior part.
 - Cerebral and cerebellar atrophy. Ischemic strokes of different ages, localized in the right occipital part and in the left temporal and parietal part.
 - Ischemic stroke recently extended in the bilateral temporal – occipital part and with right hemorrhagic petechiae. Periventricular gaps.
4. Silvia Andreicuț, Arseni C, Așgian B, Lazăr L, Pascu I, Popoviciu L. Bolile Vasculare ale Creierului și Măduvei Spinării 1984.

Picture no. 1. Computerized examination in the ischemic stroke on the PCA territory



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