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Research Paper

Anterior cerebral artery aneurysm related to unilateral visual loss: a case report

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***Abstract** :*
Introduction: *Intra cranial aneurysms (ICA) are sometimes presented with visual symptoms by their rupture or direct compression of the optic nerve. It is because their prevalent sites are anatomically located close to the optic pathway. Anterior communicating artery and proximal segment of anterior cerebral artery are especially located in close proximity to optic nerve. Aneurysm arising in this area can produce visual symptoms according to their direction while the size is small.*
Materiels and methods *fourty eight year-old women with no pathological history, who presented to the emergency room for progressive painless unilateral loss of vision in the left eye.*
Discussion *: Aneurysms of the anterior cerebral artery remain difficult to characterize due to missing data or not systematically reported in the literature. Ruptured intracranial aneurysms are by far the most common cause of non-traumatic subarachnoid hemorrhage; they are a neurological emergency with potentially devastating consequences*
Conclusion *: The evolution of intracranial aneurysms is towards an increase in their volume under the influence of hemodynamic factors which leads to a weakening of their wall. A rupture of the aneurysm is the most frequent and also the most dramatic mode of discovery.*
Key words*: Anterior cerebral artery aneurysm, Intracrania, Optic pathway, Visual Symptoms.*

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I. Introduction :

Unruptured intracranial aneurysms (ICA) are rarely symptomatic and are most often discovered during brain imaging for other reasons or by vague symptoms such as headache, dizziness or oculomotor paralysis. unilateral visual loss revealing unruptured intracranial aneurysms of the anterior cerebral artery is a very rare case.

Aneurysms are due to a structural modification of the arterial wall of various origins. In a dramatic manner and under the influence of hemodynamic factors, intracranial aneurysms progress towards rupture through an increase in volume and weakening of their wall[1].

Ruptured intracranial aneurysms are by far the most common cause of non-traumatic subarachnoid hemorrhage; they are a neurological emergency with potentially devastating consequences [2].

II. Observation :

We report the case of a 48 year-old women with no pathological history, who presented to the emergency room for progressive painless unilateral loss of vision in the left eye, and episodes of headach over the course of 2 months.

Visual acuity is 10/10 right eye 1/10 left eye, Oculomotor examination is normal, pupillary reflex and relative afferent pupillary defect (RAPD) was normal. Anterior segment was normal both eyes. Fundus however shows a pallor of optic nerve head left eye, retina vascular structure was normal, also the macula was normal. Right eye fundus was normal (figure 1). Blood pressure was 19/10mmhg.

visual evoqued potentials shows Absence of clearly individualizable P 100 wave on the left, and P100 wave of normal latency and morphology on the right (figure 2).

MRI examination shows : Presence of a small left paramedian basi frontal lesion presenting contacts with the supracavernous left internal carotid artery and the left anterior cerebral artery, most likely suggesting an aneurysm of the left anterior cerebral artery (figure 3)

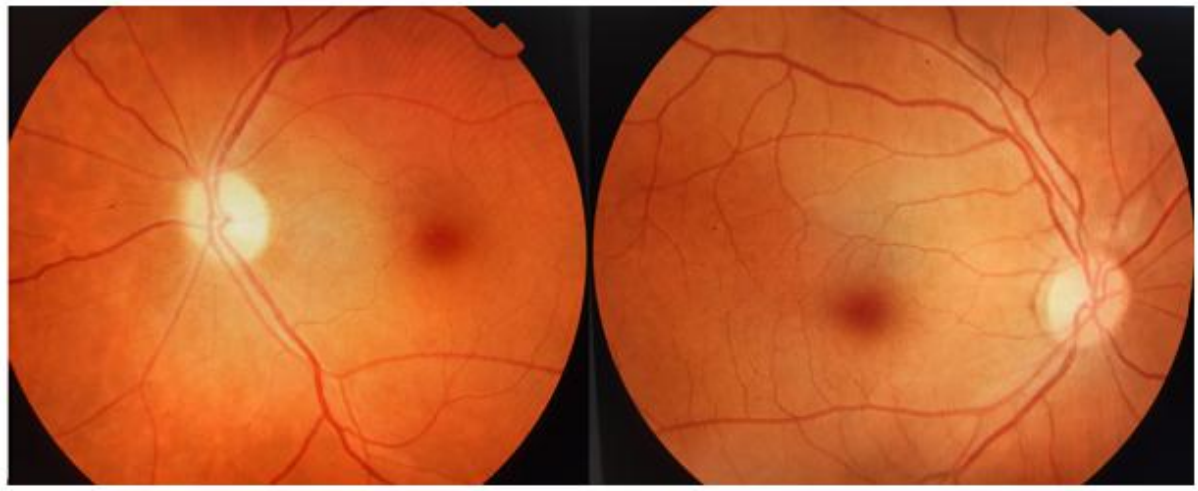

Figure 1: retinography image shows optic disc palor left eye, other structures are normal both eyes.

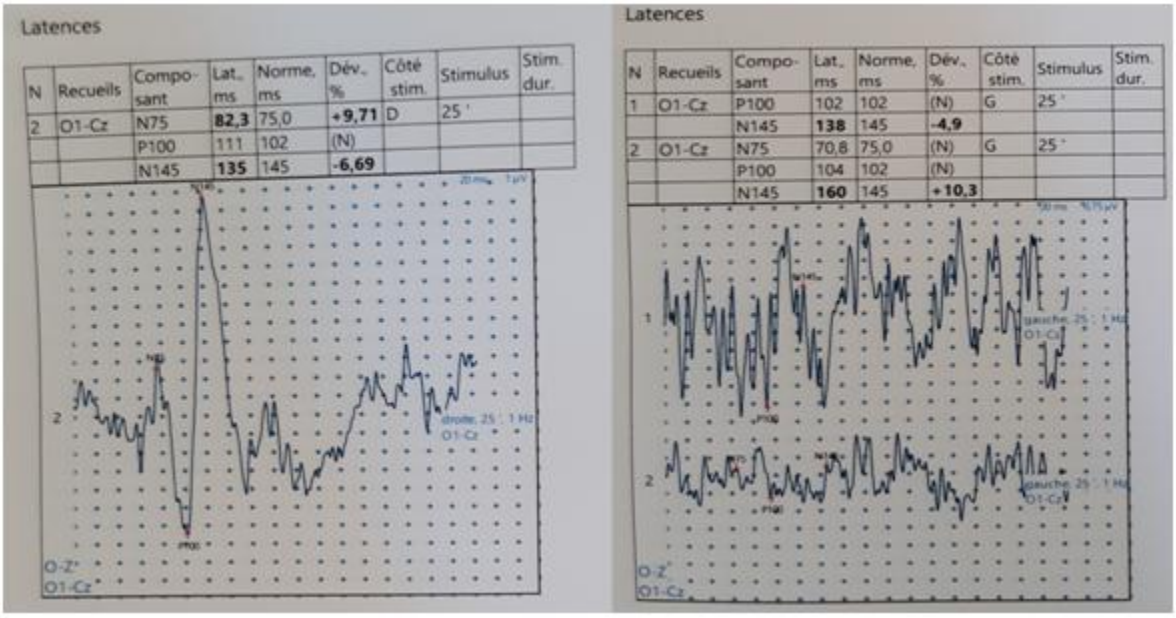

Figure 2 : visual evoqued potentials shows Absence of clearly individualizable P100 wave on the left, and P100 wave of normal latency and morphology on the right.

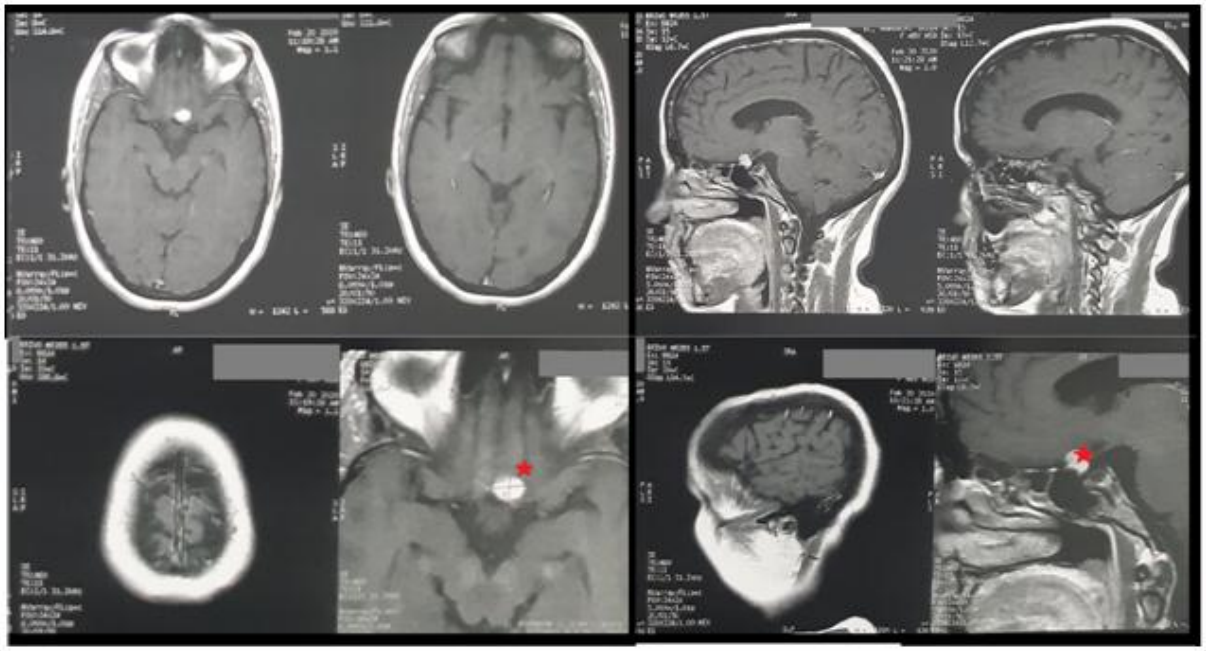

Figure 3 : sagital and coronal MRI sections, demonstration of a small left para-median basi-frontal lesion, located above and in front of the sella turcica and the left cavernous space, rounded, with regular contours and a well-defined boundary measuring 11x 8mm, presenting in T2 iso signal, T1 hyper signal, non-restrictive in Diffusion and enhanced strongly and homogeneously after contrast. This lesion has close contacts with the supracavernous internal carotid artery and with the departure of the left anterior cerebral artery.

III. Discussion :

The main clinical manifestations of unruptured ICA are headache (36%), ischemic stroke (17.6%) and cranial nerve palsy (15.4%). A mode of revelation by unilateral or bilateral blindness is very rare[1][2], accompanied symptoms include unilateral scotoma or blindness owing to the pressure on the nerve, bitemporal hemianopsia caused by the pressure on the optic chiasm or homonymous hemianopsia due to compression on the optic tract. Such symptoms progress slowly, as with the increasing size of intracranial aneurysm, repeating multiple cycles of improvement and deterioration that are explained by development of a thrombus in the intracranial aneurysm as well as its expansion. The fluctuation of visual symptom is what differentiates the aneurysm from brain tumor that is characterized by consistent deterioration of visual symptoms[5] [6].

The aneurysm accompanying the largest number of visual symptoms is carotid-ophthalmic aneurysm. This is due to the area being closely located to the optic nerve as well as relatively higher occurrence of giant intracranial aneurysm. In case of (atypical) binasal or altitudinal field defects, carotid-ophthalmic aneurysm must be considered. According to Ferguson et al, 32 out of 100 patients with carotid-ophthalmic aneurysm showed visual symptom. [7]

Ruptured intracranial aneurysms are by far the most common cause of non-traumatic subarachnoid hemorrhage; they are a neurological emergency with potentially devastating consequences [3]. High blood pressure, smoking and excessive alcohol consumption are recognized as risk factors for the development of AIC. The main risk factor in our patient was severe hypertension [1].

The causes of cerebral aneurysm and the process of aneurysm formation, growth and rupture are poorly understood. Structural damage to the internal elastic limit and muscularis of the basal cerebral arteries, associated with hemodynamic factors, are presumed to be responsible for these vascular growths. In their common form, the aneurysms developed on the intracranial arteries are saccular, as in our patient, and their evolution is towards an increase in their volume under the influence of hemodynamic factors which leads to a weakening of their wall. A rupture of the aneurysm is the most frequent mode of discovery and also the most dramatic with almost 50% mortality[1] [3]

The ICAs are most often located on the vascular bifurcation of the polygon of Willis mainly on the anterior communicating artery, then the middle cerebral and the posterior communicating and the others, anterior cerebral artery aneurysm are rarely primitive, The protrusion direction of intracranial aneurysm is mostly determined by the difference of both anterior cerebral arteries' (right and left) thickness and by the direction of relatively thicker anterior cerebral artery, aneurysms in most cases are located posterior superior as in the direction of the distal anterior cerebral artery. In some cases, however, the relatively thicker anterior cerebral artery arches from the posterior superior portion of the brain down towards the mid inferior portion. In such cases, intracranial

aneurysm should protrude in the anterior inferior direction, in close contact with the optic pathway, and compress the pathway as they increase in size [8] [9].

The most frequently observed cases were those with cerebral aneurysm protruded upward, parallel to the direction of the distal anterior cerebral artery, and when the direction of the anterior cerebral artery arched from the postero-superior towards the antero-inferior, the direction of the aneurysm was antero-inferior. If the aneurysm protruded more towards the anterior direction, it would compress the optic nerve. If the aneurysm is protruded more towards the posterior direction, it may compress the optic chiasm. These aneurysms are sometimes multiple. [4]

Unruptured ICA affects up to 6% of the general population. Most affected people remain asymptomatic. Screening is controversial because of the significant morbidity and mortality associated with their surgical treatment. Spontaneous progression is also fatal in many patients linked to the imminent risk of rupture of the aneurysm. Neuroradiology based on computed tomography, computed tomography angiography, magnetic resonance angiography and digital subtraction angiography is indispensable for the diagnosis of AIC [3] [10].

Nevertheless, it could be possible, that unruptured giant aneurysm with headache and visual loss may require differential diagnosis from brain tumor such as pituitary adenoma or meningioma that are frequently found in this area[4].

Usually, treatment of the cerebral aneurysm causing visual symptom is clipping the aneurysmal neck and to removing the aneurysm sac or hematoma which may compress the optic pathway. Particular care must be taken in order not to damage the nerve[10]. In most cases, clipping operation shows good prognosis, even for the patients with poor findings of fundus. Thus, observation up to two years after the surgery is necessary. Recently, there are reports that coiling of aneurysm, which is commonly performed, has improved patients' visual symptom by reducing thrombus and in particular its size[11].

IV. Conclusion :

The evolution of intracranial aneurysms is towards an increase in their volume under the influence of hemodynamic factors which leads to a weakening of their wall. A rupture of the aneurysm is the most frequent and also the most dramatic mode of discovery.

Aneurysms of the proximal segment of anterior cerebral artery remain difficult to characterize due to missing data or not systematically reported in the literature. When mentioned, the clinical outcome scales used are variable; long-term follow-ups are rarely reported. Prospective studies with standardized data are needed[12]

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