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Unexpected angiographic and visual findings after clipping of a carotid-ophthalmic aneurysm

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Summary

A 56-year-old woman underwent surgery for a ruptured carotid-ophthalmic artery aneurysm. Intraoperative visual inspection confirmed that the ophthalmic artery was left intact. She had no light perception on the operated side right after surgery. Angiography one week after surgery confirmed exclusion of the aneurysm, no filling of the proximal portion of the ophthalmic artery, and a very faint filling of its distal orbital part. She gradually recovered from this deficit and 9 months after surgery she is capable of counting fingers. At this time angiography displayed filling of all the portions of the ophthalmic artery, absence of recruitment of collateral blood supply, and exclusion of the aneurysm as before. Surgical manipulation seems to either have induced vasospasm or thrombosis of the ophthalmic artery. Regression of vasospasm or secondary recanalization of the thrombus without development of collateral blood supply may account for the gradual improvement of vision. A risk of monocular blindness is associated with the surgical treatment of para-clinoid aneurysms. Nevertheless, when it occurs, a perspective of recovery may exist if certain etiologies are involved.

KEY WORDS: Ophthalmic artery. Aneurysm. Surgery. Angiography. Transitory visual deficit

Hallazgos angiograficos y visuales inesperados tras clipage de aneurisma carotido-oftálmico

Resumen

Una mujer de 56 años fue intervenida de un aneurisma carotido-oftálmico roto. La inspección visual intraoperatoria confirmaba que la arteria oftálmica estaba intacta. Tras la cirugía la paciente no percibía luz por dicho ojo y la angiografía una semana después de la cirugía confirmó la exclusión del aneurisma, con falta de relleno de la porción proximal de la arteria oftálmica, y un relleno muy débil de la porción orbitaria distal. La paciente se fue recuperando progresivamente del déficit y 9 meses después de la cirugía es capaz de contar dedos. La angiografía actual demuestra un relleno de todas las porciones de la arteria oftálmica, con ausencia de circulación colateral, y exclusión del aneurisma. La manipulación quirúrgica parece haber inducido vasoespasmo o trombosis de la arteria oftálmica. La regresión del vasoespasmo o la recanalización secundaria del trombo sin desarrollo de circulación colateral pueden justificar la mejoría gradual de la visión. Hay un riesgo de amaurosis unilateral asociado al tratamiento quirúrgico de los aneurismas paraclinoideos, aunque existe posibilidad de mejoría en algunos casos.

PALABRAS CLAVE: Arteria oftálmica. Aneurisma. Cirugía. Angiografía. Déficit visual transitorio.

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Introduction

Para-clinoid aneurysms are in close proximity to delicate anatomical structures such as the ophthalmic artery and the optic nerve. Hence a risk of visual dysfunction is associated with the surgical exploration of this complex area. The puzzling case of a patient who suffered visual deterioration after clipping of a complex para-clinoid aneurysm is presented. The purpose is to illustrate a reversible phenomenon that occurred and induced a visual deficit. In this context a potential of recovery exists and amaurosis may not necessarily be unremitting. Related anatomical, etiological and patho-physiological aspects are reviewed. Adjuvant techniques that may minimize the risk of visual deficit associated with para-clinoid aneurysm surgery are outlined.

Case report

A 56-year-old woman complained of headache of sudden onset. Physical examination was unremarkable. CT scanning disclosed spontaneous subarachnoid hemorrhage.

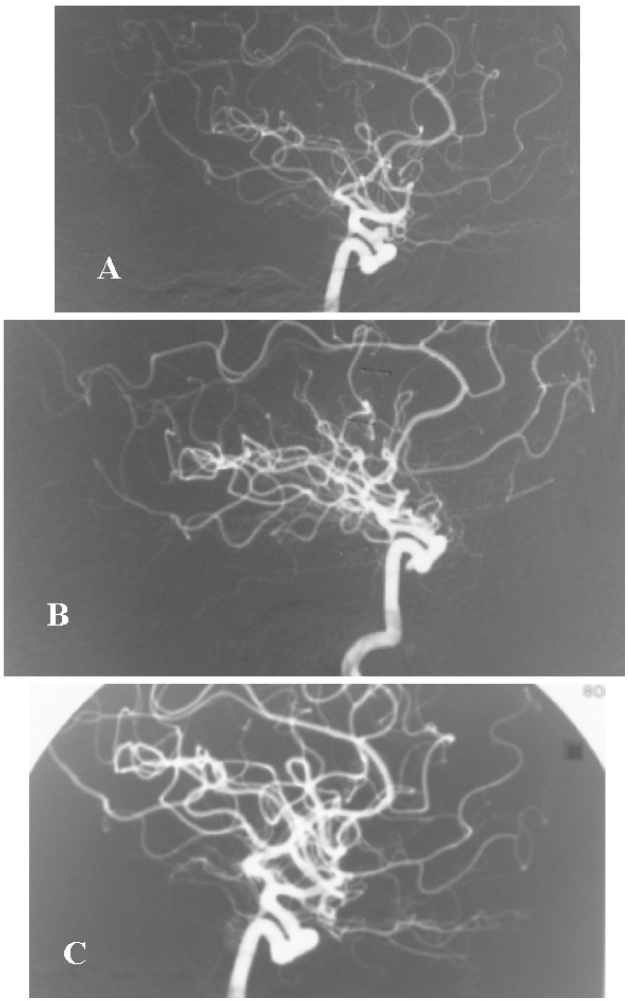

Figure 1. *A: pre-operative angiography showing a carotid-ophthalmic artery aneurysm and patency of the ophthalmic artery. B: angiography one week after surgery confirming exclusion of the aneurysm, no filling of the proximal portion of the ophthalmic artery, and a very faint filling of its distal orbital part. C: 9-month follow-up angiography displaying filling of all the portions of the ophthalmic artery, absence of recruitment of collateral blood supply, and exclusion of the aneurysm as before.*

Angiography confirmed the presence of a para-clinoid aneurysm on the right side (figure 1A). The senior author (CA) operated the patient with microsurgical technique. A pterional trans-sylvian approach was employed. The anterior clinoid process was partially drilled to allow for a wide local exposure. An aneurysm of the ophthalmic segment of the internal carotid artery in very close proximity to the origin of the ophthalmic artery was found. The aneurysm was clipped with one straight clip. Great care was taken in confirming the integrity of the origin of the ophthalmic

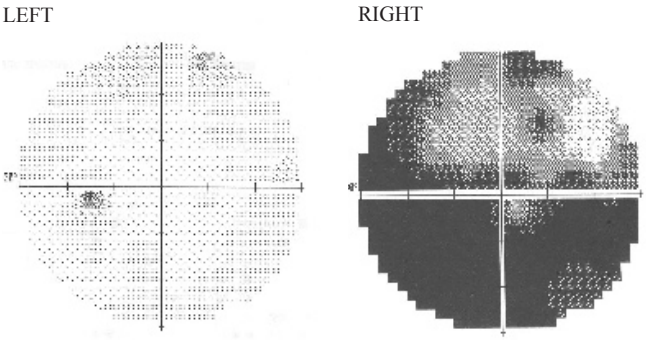

Figure 2. *Perimetry nine months after surgery illustrating partial visual field deficit of the right eye, a significant improvement when compared to the immediate post-operative period when there was no light perception.*

artery. After placing the clip, intraoperative visual inspection confirmed that this was achieved. The optic nerve was seen intact as well. Severe deterioration of visual acuity of the right eye occurred in the immediate post-operative period, and the patient didn't have light perception on the affected side. An angiography one week after surgery confirmed exclusion of the aneurysm, no filling of the proximal portion of the ophthalmic artery, and a very faint filling of its distal orbital part (figure 1B). Despite this, one month after she had partially recovered from this deficit in a gradual fashion to a point where she could perceive large figures. She was on nimodipine since admission and remained on the drug for a total of three weeks. Intravenous fluids were administered vigorously in the first post-operative week and then tapered without any major hemo-dynamic imbalance. In the 9-month follow-up visit she was capable of counting fingers and perimetry confirmed partial recovery of the visual field deficit (figure 2). Angiography at this time showed filling of the ophthalmic artery, absence of recruitment of collateral blood supply, and the aneurysm remained excluded as before (figure 1C).

Discussion

Classification of para-clinoid aneurysms

A proposed classification for para-clinoid aneurysms includes the following categories: (1) carotid cave aneurysms i.e. those arising from the internal carotid artery proximal to the origin of the ophthalmic artery; (2) ophthalmic artery aneurysms i.e those that arise from the ophthalmic artery proper; and (3) ophthalmic segment aneurysms i.e. those arising from the internal carotid artery between the origin of the ophthalmic artery and the origin of the posterior communicating artery. The latter category includes carotid-ophthalmic artery aneurysms i.e. those that have a clear relationship with the origin of the