Decrease of Visual Fields Due to Re-growth of a Big Aneurysm after Coiling

A case report

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Key words: visual field, re-growth aneurysm, coiling, clipping

Summary

We report the case of a 50-year-old man with the chief complaint of narrowing of the visual fields and blurring in his right eye. He had undergone coiling for bilateral aneurysms of the ophthalmic segment of the internal carotid arteries 15 months previously. Angiography showed re-growth of the left ophthalmic aneurysm. The patient underwent clipping and resection the coiled aneurysm. Following surgery his visual fields improved. Therefore, re-growth of aneurysms following coiling sometimes requires resection for decompression.

Introduction

Disturbance of visual function in an ophthalmic segment aneurysm is not uncommon. It can be caused by direct compression of the optic pathway or vascular compromise. We report re-growth of a big aneurysm in the ophthalmic segment of internal carotid artery after coiling which resulted in aggravation of visual problems that was relieved by surgical removal of the coil and aneurysm sac for decompression.

Case report

A 50-year-old male came to our clinic with the complaints of headaches, narrowing visual fields, and blurring in his right eye (his left eye

being blind). Past history revealed presentation one year ago for headaches and blurred vision (being nearly blind in his left eye). Further investigations showed he had two "mirror" aneurysms, one small aneurysm in the ophthalmic segment right carotid artery (7 mm in diameter) and the other one a large aneurysm in the ophthalmic segment left carotid artery (16 mm in diameter). He underwent coiling for both aneurysms. Following treatment, his headaches disappeared but his visual function decreased in his left eye and finally led to blindness.

About one year later, he started having headaches and a disturbance of vision in his right eye. Angiography showed that the aneurysm in his ophthalmic segment right carotid artery was stable, but the aneurysm in the left carotid artery was large and partly opacified (Figure 1).

We decided to perform surgery to clip the aneurysm and resect the aneurysm sac and coils to decompress the right optic pathway.

Surgery was carried out successfully. No morbidity related to surgery was noted, and he was discharged on the fifth post operative day. His complaint of headaches gradually disappeared and he returned to his daily activities. Subsequently, the vision in his right eye has remained stable and slightly better than before. As shown by the follow-up ophthalmology parameters, his visual acuity on the right eye had

Figure 1 Coil compaction in the left IC aneurysm.

increased from 0.6 to 0.8 and there was also improvement in the visual field especially in the temporal region (Figure 2). The blindness on the left eye was not changed.

Discussion

The goal for treatment of an aneurysm is to achieve total occlusion of the aneurysm while preserving the parent artery to prevent subarachnoid hemorrhage. In many cases of giant aneurysms, an additional goal is to reduce the mass effect leading to clinical symptoms. These clinical symptoms are caused by the mass of aneurysms compressing the cranial nerves or adjacent structures¹.

Loss of visual function can be caused by an aneurysm from the IC-cavernous segment, IC-opthalmic segment, or anterior communicating

artery. Several studies have found that about 25 - 32 % of IC-opthalmic segment aneurysms can cause visual disturbance^{1,2,3}. If an aneurysm has grown to be big, visual disturbance can be found in 72 % of the cases⁴.

The choice of treatment of a large opthalmic segment aneurysm falls under great debate regarding the clinical outcome, visual function preservation and patency of ICA⁵. This type of aneurysm can be treated either by surgery or by endovascular means, either each preserving ICA or sacrificing it. Meanwhile, if this aneurysm is left untreated, it bears a high risk for rupture and in patients with visual disturbance the vision will be worse in time^{6,7}.

Our patient had a “mirror aneurysm”, of both IC-opthalmic segments, a rare case. Accordingly, it was decided to treat these with embolization procedures⁸. On the right side, this treatment gave complete occlusion of the aneurysm. Meanwhile on the left side, due to its large size it was difficult to perform complete occlusion.

Endovascular treatment seems to give good results. It is a relatively atraumatic approach. It does not reduce the size of the aneurysm but stops the aneurysm's growth and pulsating effect, and this will allow the brain or adjacent structures to accommodate to mass effect and relieve neurologic symptoms^{9,10,11}. Studies by Heran et al found that in an incomplete aneurysm occlusion the patient usually will require another procedure to save the vision (the improvement being only temporary), including the possibility of sacrificing ICA or optic nerve decompression⁶. Improvement in visual function can be achieved in 37 - 80% of patients with this method of treatment^{7,9,10,12}.

In our patient vision was stable for one year, but then he gradually experienced disturbance of the visual field in the right eye, which we believed was due to the aneurysm's regrowth as was confirmed by follow-up angiogram. In giant aneurysms it is difficult to achieve dense packing, and hence an increased tendency for re-growth¹³.

Surgical treatment of IC opthalmic segment aneurysm are one of the difficult aneurysms to treat because of its anatomic location: under the anterior clinoid process, near the opthalmic artery, and the difficulty for proximal control^{2,14}. In 2007, Nonaka T et Al studied the surgical results of paraclinoid aneurysms that presented visual symptoms. They found that

Figure 2 Visual fields examination before surgery (left) and three months after surgery (right).

65% of their patients experienced improvement of their visual function while 30% showed deterioration and 5% remained unchanged following surgery³.

Studies in treatment either by embolization or surgery found that small size, short duration of symptoms and partial dysfunction of the cranial nerves are good prognostic factors, while the presence of a thrombus or calcification in the aneurysm are bad prognostic factors^{3,11,12}.

In our case, the patient had already lost his visual function in his left eye. Due to regrowth of the aneurysm in left carotid artery, he experienced visual disturbance in the contralateral eye (right side). Even though the right side also had an IC-aneurysm, it did not disturb his visual function and the aneurysm was embolized.

We decided to perform surgery in this aneurysm to reduce mass effect to the optic nerve. In surgery, we clipped the aneurysm

neck, excised the aneurysm sac, and removed the coil and thrombus inside the sac. After surgery the patient felt his vision was stable and started to improve gradually.

Conclusions

There is a chance for an aneurysm to regrow, especially in a giant aneurysm where dense packing of coils is not achieved. Another strategy is needed to permanently occlude this kind of aneurysm. If an aneurysm experiences regrowth and shows mass effect, surgery is indicated to reduce its mass effect.

Acknowledgement

The authors thank David Fairholm and Shad Maechtle for helping and discussion in preparation of the manuscript.

References

- 1 Date I, Asari S, Ohmoto T: Cerebral aneurysms causing visual symptoms: their features and surgical outcome. *Clinical Neurology and Neurosurgery* 100: 259-267, 1998.
- 2 Ferguson GG, Drake CG: Carotid-ophthalmic aneurysms: Visual abnormalities in 32 patients and the results of treatment. *Surg Neurol* 16: 1-8, 1981.
- 3 Nonaka T, Haraguchi K et Al: Clinical manifestation and surgical results for paraclinoid cerebral aneurysms presenting with visual symptoms. *Surg Neurol* 67: 612-619, 2007.
- 4 Heros RC, Nelson PB et Al: Large and giant paraclinoid aneurysms: surgical techniques, complication and results. *Neurosurgery* 12: 153-163, 1983.
- 5 Tribolet ND: Editorial: Large ophthalmic segment aneurysms. *J Neurosurg* 106: 965-967, 2007.
- 6 Heran NS, Song JK et Al: Large ophthalmic segment aneurysms with anterior optic pathway compression: assessment of anatomical and visual outcomes after endovascular coil therapy. *J Neurosurg* 106: 968-975, 2007.
- 7 Vargas ME, Kupersmith MJ et Al: Endovascular treatment of giant aneurysms which cause visual loss. *Ophthalmology* 101: 1091-1098, 1994.
- 8 Baik SK, Sohn CH, Woo SK: Bilateral distal posterior cerebral artery - a case report of endovascular treatment and literature review. *Interventional Neuroradiology* 10: 231-234, 2004.
- 9 Halbach VV, Randall TH et Al: The efficacy of endosaccular aneurysm occlusion in alleviating neurological deficits produced by mass effect. *J Neurosurg* 80: 659-666, 1994.
- 10 Kazekawa K, Tsutsumi M et Al: Internal carotid aneurysms presenting with mass effect symptoms of cranial nerve dysfunction : efficacy and limitation of endovascular embolization with GDC. *Radiation Medicine* 21 (2): 80-85, 2003.
- 11 Mansour N, Kamel MH et Al: Resolution of cranial nerve paresis after endovascular management of cerebral aneurysms. *Surg Neurol* 68: 500-504, 2007.
- 12 Malisch TW, Guglielmi G et Al: Unruptured aneurysms presenting with mass effect symptoms: response to endosaccular treatment with Guglielmi detachable coils. Part I. Symptom of cranial nerve dysfunction. *J Neurosurg* 89: 956-961, 1998.
- 13 Sluzewski M, Rooij WJ et Al: Relation between aneurysm volume, packing and compaction in 145 cerebral aneurysms treated with coils. *Radiology* 231: 653-658, 2004.
- 14 Rhoton AL: Aneurysms. *Neurosurgery* 51 (Suppl 1): 121-158, 2002.

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