CASE REPORT

Successful treatment of central retinal artery thromboembolism with ocular massage and intravenous acetazolamide

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SUMMARY

A 67-year-old woman presented with left-sided headache and blurred vision, worse during hypertensive episodes. CT angiography showed a 4 mm left internal carotid artery (ICA) aneurysm incorporating the ophthalmic artery. She passed a test balloon occlusion, so the aneurysm was coil occluded, without immediate complication. Four days postprocedure she experienced sudden loss of vision in the left eye and funduscopy showed central retinal artery occlusion secondary to emboli from the coiled aneurysm. She was treated promptly with intravenous acetazolamide and ocular massage and regained full visual acuity. Thromboembolism to the eye during or after neurointerventional treatment is a relatively rare but devastating complication. This report demonstrates the effectiveness of combined intravenous acetazolamide and ocular massage in dealing with this complication when delivered promptly.

BACKGROUND

Embolic events are a recognised complication of neurointerventional procedures. Early recognition of central retinal artery emboli, combined with prompt treatment, is paramount to reducing risk of permanent impairment of vision. A number of therapeutic options are available, all of which aim to restore perfusion to the retina.

We describe use of ocular massage and intravenous acetazolamide for successful treatment of retinal artery thromboembolism secondary to endovascular coiling of a carotid-ophthalmic artery aneurysm. This occurred despite preventative treatment with aspirin.

CASE PRESENTATION

A 67-year-old woman with uncontrolled hypertension presented to the accident and emergency department 4 days after an acute onset of left-sided headache and blurred vision. The headache was severe and throbbing in character and associated with left retro-orbital pain.

In addition to hypertension, further medical history included long-term smoking (60 pack years) with chronic obstructive pulmonary disease.

The patient was hypertensive, periodically reaching blood pressures of 260/140 mm Hg (average 180/80 mm Hg), during which time she reported worsening left retro-orbital pain. Visual acuity was 6/6 bilaterally, there was no relative afferent

papillary defect and there was no papillo-oedema on funduscopy.

A plain CT of the head was normal, however, a CT angiogram demonstrated a 4 mm left carotid-ophthalmic aneurysm.

Catheter angiography showed that the left ophthalmic artery originated from the neck of the aneurysm (figure 1) and was at risk of occlusion from coiling the aneurysm sac. A test occlusion was performed with a balloon inflated within the internal carotid artery (ICA) across the aneurysm neck, during which the patient did not experience vision loss and repeat funduscopy was unchanged, with a normal appearance of the central retinal artery. This procedure confirmed that supply to the retina could be maintained via collaterals from the middle meningeal artery and that if the ophthalmic artery was occluded during the coiling procedure vision would be preserved.

Following this, the aneurysm was successfully coil occluded, following which no anterograde flow was seen in ophthalmic artery on injection of the left ICA (figure 2). The patient received 500 mg aspirin intravenously during the procedure and was later started on 75 mg aspirin and treatment dose low-molecular-weight heparin to help prevent an embolism from the coiled aneurysm migrating distally into the ophthalmic artery and the central artery of the retina. She recovered from general anaesthesia with normal vision.

Initial recovery was uneventful. However, day 4 postoperatively, on bending forward, she developed

Figure 1 A lateral image from an internal carotid angiogram demonstrates the aneurysm (long black arrow) and the ophthalmic artery (short black arrows) originating from the aneurysm neck.

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Figure 2 Two coils were placed in the aneurysm that resulted in successful exclusion of the aneurysm from the circulation (long white arrow). However, the ophthalmic artery was also occluded (short white arrows demonstrate the path of the previously identified ophthalmic artery).

acute visual impairment in the left eye, which did not resolve. On clinical examination visual acuity was severely impaired with only light perception. A consultant neurologist performed funduscopy within 30 minutes, and this demonstrated a pale retina. An ophthalmologist was not present on site; however, after a telephone discussion with the on call ophthalmologist, acute central retinal artery occlusion (CRAO) was felt the likely primary diagnosis with the source of the embolus being the recently coiled aneurysm. This was despite the use of antiplatelets and low-molecular-weight heparin during and postprocedure, which were intended to prevent such a complication. Other features of CRAO, such as cherry red spot were not present, however, these tend to take a longer time to develop. A fluorescein angiography was not performed.

TREATMENT

The patient was promptly treated with 500 mg of intravenous acetazolamide and intermittent digital ocular massage for 30 min as per the advice of the on call ophthalmologist. Following treatment there was a complete restoration of vision within 1 h (VA 6/6). On repeat funduscopy, multiple small emboli could be seen within the peripheral branches of the retina. A visual field test and formal mapping were not performed.

DISCUSSION

Management of retinal artery occlusion aims to maintain retinal perfusion pressure. This can be achieved by several methods all of which aim to increase the ocular perfusion pressure:

- ▶ Reducing intraocular pressure (IOP);
- ▶ Dilating the ophthalmic and central retinal arteries;
- ▶ Increasing the ophthalmic artery pressure.

Recent reports suggest that for a successful outcome, treatment must be provided within 6 h from the onset of symptoms.¹

There are two described techniques for ocular massage, one involving the use of a three mirror contact lens or, as used for this case, digital massage.^{1 2} Ocular massage is thought to work by creating fluctuations in the IOP and intermittent retinal

arterial dilation; this method combined with intravenous acetazolamide can reduce IOP to as low as 5 mm Hg. The net result being improved retinal perfusion³ and movement of clots to arterial branches, which in turn has a lower impact on visual acuity than a CRAO. An alternative method to reduce IOP is anterior chamber paracentesis, although there is a lack of clinical efficacy for this.^{1 4}

Other techniques to dilate the retinal arteries include inhalation of carbogen⁴ and retrobulbar administration of vasodilators,^{2 5 6} although the clinical benefit of these techniques is doubtful and they are not widely used.^{2 4} Reported mixed success and associated haemorrhagic risks associated with thrombolysis have also resulted in cautious use of this treatment strategy.^{7–11} It is important to note that there is no definitive treatment for this condition and that therapy is based on observational and retrospective studies.

It has been postulated that ocular massage may cause mechanical disintegration of the clot,² which was indeed seen in our case, where it was noted that the clot fragmented and dispersed into the peripheral branches.

Learning points

- ▶ Thromboembolism can form in the presence of antiplatelet medication.
- ▶ The ophthalmic artery and collaterals from the middle meningeal artery can contribute to flow within the central retinal artery.
- ▶ Ocular massage combined with intravenous acetazolamide represents an effective treatment of acute retinal artery occlusion.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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