CASE REPORT

Ophthalmic manifestations postlightning strike

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SUMMARY

Various ophthalmic complications affecting the anterior and posterior segments have been identified due to lightning strike. We report the first case of an indirect lightning-induced full thickness macular hole formation in the UK as evidenced by slit lamp examination and optical coherence tomography (OCT) scan in a 77-year-old woman presenting with sudden visual loss in her right eye and thermal skin injury affecting her scalp. Her best corrected visual acuities were LogMAR 0.46 and 0.12 in the right and left eyes, respectively. There were no other ocular manifestations observed in either eye. She was initially managed conservatively with non-steroidal anti-inflammatory drug eye drops but surgery was later advised due to minimal changes in the visual acuity and macular hole on follow-up. OCT scanning is important in diagnosing macular holes, which usually warrant surgical intervention.

BACKGROUND

It is well documented that lightning-induced injuries are not uncommon, especially in tropical regions of the world. In the UK alone, it was estimated about 49 people per year were struck by lightning and suffered from injuries.¹ From an ophthalmic perspective, various complications following a lightning strike have been reported, including the formation of thermal keratopathy, anterior uveitis, subcapsular cataract, vitreous haemorrhage, retinal detachment, central retinal artery and vein occlusion, cystoid macular oedema, macular hole and optic neuropathy.²⁻³ These changes, which may occur bilaterally, are equally important, as they can cause significant visual loss.

CASE PRESENTATION

We present a case of a 77-year-old independent woman who was indirectly struck by lightning in July 2014 while in her car. She suffered back pain and minor burns to her scalp and was managed accordingly by her local doctor.

She also experienced sudden painless visual loss in her right eye following the lightning strike. This prompted her, 3 days later, to visit her local optician, who noticed macular oedema in her right eye and referred her to the local eye clinic where she was seen by a visiting consultant ophthalmologist within 10 days.

At the local eye clinic, her best corrected visual acuities were recorded as LogMAR 0.46 and 0.12 in the right and left eyes, respectively, with no relative afferent pupillary defect noted. During the slit lamp examination, macular oedema was again observed in her right eye with an otherwise normal cornea and intraocular pressure of 17 mm Hg, and

a quiet anterior chamber ([figure 1](#)). No complications were noted in the left eye.

She was referred to our department 2 weeks later where the initial optical coherence tomography (OCT) scan of her macula showed a full thickness macular hole in the right eye, and no adverse changes in the left eye.

There were no changes in the best corrected visual acuity and the macular hole on the repeat OCT scan on follow-up after 2 months, hence macular hole surgery was eventually advised.

The patient's ophthalmic history revealed bilateral cataract surgeries in 2011, and a best corrected visual acuity of LogMAR 0.1 in her right eye with no other ophthalmic conditions noted during her previous visits to the ophthalmology department or her local optician (the last in October 2013). Medically, she is a non-diabetic and non-smoker but suffers from ischaemic heart disease, osteoarthritis and Raynaud's phenomenon.

INVESTIGATIONS

The OCT scan results showed a full thickness macular hole in the right eye, and no adverse changes in the left eye ([figure 2](#)).

TREATMENT

The patient was prescribed Acular (non-steroidal anti-inflammatory drug) eye drops to which she developed an allergic reaction; the eye drops were stopped. Surgical intervention was advised when no improvement was noted clinically during her follow-up visit 2 months later.

Figure 1 Fundus photograph illustrating the macular oedema (black arrow) on a background of healthy retina in the right eye.

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Figure 2 Optical coherence tomography image of the full thickness macular hole (white arrow) in the right eye.

OUTCOME AND FOLLOW-UP

The patient was followed up 2 months postlightning strike, and there was minimal change in her best corrected visual acuity in her right eye (LogMAR 0.52), with a sustained full thickness macular hole on the repeat OCT image. She has since been referred to a tertiary centre for macular hole surgery.

DISCUSSION

To the best of our knowledge, this is the first reported case, in the UK, of an indirect, lightning-induced maculopathy and full thickness macular hole as evidenced by OCT imaging.

There have been case reports of lightning-induced maculopathy, however, none have reported findings of a full thickness macular hole as evidenced on the OCT image.^{2–12} Macular hole formation was previously postulated to be an evolvement from macular oedema or cysts based on fundus photographs and the Watzke-Allen test.^{3 6 7}

Bilateral ocular manifestations have also been reported in most cases, while only unilateral retinal findings were seen in this case.^{3 5–9}

There are four postulated mechanisms leading to lightning-induced injuries, those through localised inflammation, cylindrical shock waves, cell electrolysis and thermal damage.^{2–6} It was suggested that thermal effects of a lightning strike are brought about by the poor electrical conduction in the retinal pigment epithelium (RPE) due to its high melanin content.^{4–8} RPE damage causes disruption of the blood retinal barrier, which can play a role in the formation of cystoid macular oedema and macular hole, and which are responsible for the significant deterioration in vision.

Other causes of maculopathy are less likely given the sudden onset of symptoms and good visual acuity previously recorded, while other ocular complications such as cataract formation could not be ascertained due to previous cataract surgeries.

OCT imaging is a key investigation to identify or exclude a macular hole, which usually requires surgical correction. Hence,

it is important to correctly diagnose and follow-up patients presenting with these conditions accordingly.

Learning points

- ▶ Multiple ocular complications causing significant visual loss can arise following a lightning strike.
- ▶ Prompt ophthalmic referral and examination is necessary in the assessment of lightning-induced injuries.
- ▶ OCT scanning is important to confirm or exclude macular holes, as it affects management.
- ▶ Management usually requires surgical intervention and follow-up is required in such cases.

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