

Case Report

Bilateral Impending Macular Hole, Cataract and Uveitis following Electrical Injury

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Keywords

Bilateral impending macular hole · Cataract · Uveitis

Abstract

The present case describes bilateral impending macular holes, cataract and anterior uveitis in a 36-year-old male patient after having sustained a high-voltage electrical shock. Ocular complications following electrical injury have been rarely reported in the literature. To the best of our knowledge, this is the first report of bilateral high intraocular pressure, corneal epithelial keratitis, anterior uveitis cataract and impending macular holes after high-voltage electrical injury.

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Introduction

Electrical injuries can present with a variety of ocular manifestations [1] including eyelid edema, conjunctival chemosis, corneal epithelial keratitis, anisocoria, iritis cataract, macular edema, macular cyst, full-thickness macular holes, retinal detachment, vascular occlusions and retinal pigment epithelial changes [2–5]. The severity of the injury is closely related to the voltage power, electrical current intensity, polarization and contact duration [6].

Case Presentation

A 36-year-old male patient with an electrical injury sustained at the workplace and without any protective equipment at the time of injury was referred to our hospital. A current of 1,200 V passed through his right arm and exited from his right lower extremity. The patient lost his consciousness at the site of the accident and fell. He was admitted to the intensive care unit. He suffered third-degree burns all over his extremities.

Once the patient had resumed consciousness 2 days later, he was starting to complain from a painless decrease in vision in both eyes. His best corrected visual acuity was 20/100 in the right eye and 20/200 in the left eye. The intraocular pressure (IOP) was 13 mm Hg in both eyes, and pupil examination showed a round, regular and reactive pupil without relative afferent pupillary defect. Second-degree burns were also noticed on the lids and face. Anterior segment examination showed conjunctival chemosis, mild corneal edema, diffuse superficial punctuate keratitis and a quiet anterior chamber bilaterally. Posterior segment examination revealed macular changes that clinically resembled macular holes in both eyes (Fig. 1). A Watzke-Allen test was negative. Optical coherence tomography revealed bilateral impending macular holes with intact limiting membranes (Fig. 2).

Two weeks later, the patient started to complain from severe pain and photophobia in the right eye. Iridocyclitis with fibrin covering the pupil margin was found with an increase in IOP to 30 mm Hg. Proper treatment with topical prednisone as well as mydriatic and antiglaucoma medication was given to the patient. This attack was followed by another separate episode of anterior uveitis and high IOP of 25 mm Hg in the left eye, while the corneal superficial punctuate keratitis and edema completely resolved after medical treatment in both eyes.

Two months after the initial insult, anterior subcapsular stellate-shaped cataract was seen bilaterally (Fig. 3). The cataract became significant in both eyes over the next 2 months. The patient underwent cataract surgeries, and his vision improved to 20/80 in the right eye and 20/100 in the left eye, while the fundus findings and optical coherence tomography findings stayed the same at his presentation.

Discussion

Electrical currents can exert damaging effects on the retinal pigment epithelium (RPE). Also, melanin acts as a barrier to electric currents, leading to heating of these tissues and the production of thermal denaturation of the outer retina and RPE. Ischemia resulting from coagulation and necrosis of the vasculature are the proposed pathogeneses of retinal complications after electric shock injury [3]. The macula is very sensitive to thermal damage, as the macular RPE is thicker and tightly packed. It has a high concentration of melanin granules, which can increase resistance, leading to more thermal denaturation than in other areas of the retina [7]. Our patient had macular changes that resembled macular holes in both eyes, more severe in the left eye than in the right eye. These did not improve over time.

The most common ocular sequela of electrical injury is bilateral cataract, with an incidence of 6.2%, and it usually requires surgery 3–27 months after the injury for excellent return of vision [8–10]. Our patient's cataract had increased in both eyes, and his visual acuity became 20/200 OD and 20/400 OS. He underwent cataract surgery with implantation of intraocular lenses in both eyes (OS, then OD), and his visual acuity improved to 20/80 in the right eye and 20/100 in the left eye within 2 months. Visual acuity can return to 20/20 only

after cataract surgery, as Handa and Jaffe [11] showed. However, final visual acuity depends on other ocular damage from an electrical current [12]. Another study showed that after retinal surgery, a hole closed within 1 week and vision improved with a decrease in retinal edema [13]. Sony et al. [5] investigated the spontaneous resolution of a macular cyst along with visual improvement in one eye after 1 month of follow-up. On the other hand, progression to a full-thickness macular hole was also observed, which may result in retinal detachment [14].

Uveitis induced by electrical injury is a rare complication of unknown mechanism that has been described either unilaterally [4, 15] or as an isolated complication [16]. In most cases, the condition is treated with mydriatic and corticosteroid drops. Our patient developed severe bilateral nongranulomatous anterior uveitis with a fibrinous reaction more in the left eye than in the right eye associated with a high IOP of 30 mm Hg OD and 24 mm Hg OS with an open angle on gonioscopy in both eyes. We successfully controlled the inflammation with a tapering dose of topical corticosteroid (prednisolone acetate 1%) and the increased IOP with topical antiglaucoma drops (brimonidine and dorzolamide/timolol), lowering it to a level of 16 mm Hg OD and 13 mm Hg OS. We also prevented posterior synechiae with a mydriatic (atropine sulfate 1%) over 3 months.

To the best of our knowledge, our patient is the first case reported with bilateral corneal epithelial keratitis, a high IOP, nongranulomatous anterior uveitis and impending macular holes as a complication from electrical current injury.

Conclusions

Electrical injuries may affect any structure in the eye, with debilitating sequelae. Prompt screening with a high index of suspicion is recommended for an early diagnosis and the prevention of complications. Long-term follow-up is usually required, as the latency period for most complications is long. Considering our case and the previous reports, it is recommended that impending macular holes or macular cysts be observed after electrical injury with frequent follow-up visits, as many cases show spontaneous improvement.

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Statement of Ethics

The patient participating in this report has signed a written informed consent to publish his case including images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Osama Alamri: Introduction. Danya Alturkistani: Case Presentation. Amjad Saifaldein: Discussion. Karim Talatt: Conclusion and review of the Introduction.

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Fig. 1. a, b Fundus photographs of both eyes.

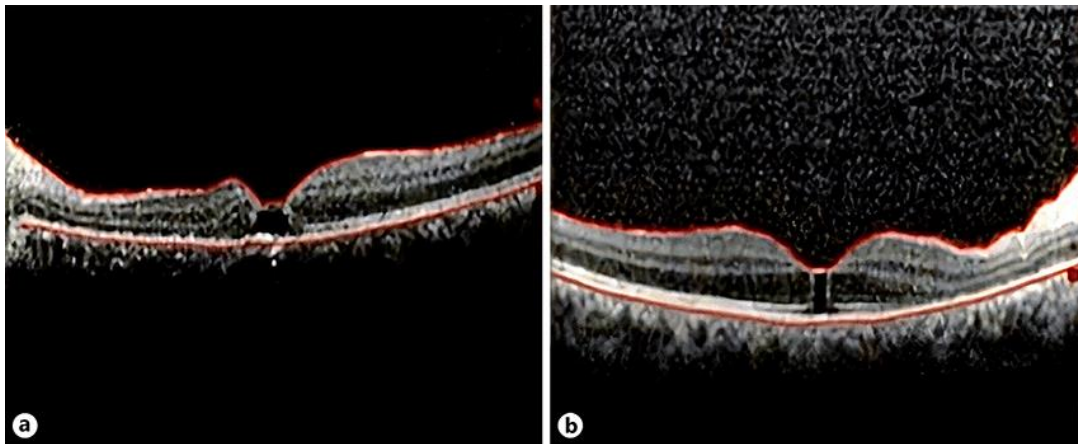


Fig. 2. a, b Optical coherence tomography images of both eyes.

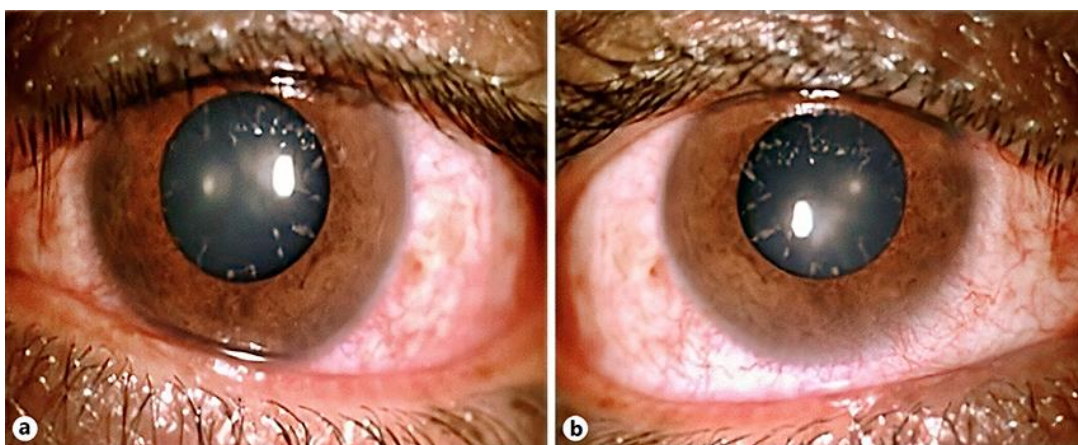


Fig. 3. a, b Anterior segment photographs of both eyes.