Electric cataract: a report of two cases and a review of the literature

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We report two cases of electrical cataract developing after a high-voltage electric shock. Both patients had undergone cataract extraction and posterior chamber intraocular lens implantation, both of them achieved visual acuity of 6/6. Most of the times outcomes after the cataract surgeries are excellent provided that other ocular structures are undamaged. Anterior subcapsular opacity may hamper the lens nutrition and lead to cataract formation.

Keywords:
electrical injury, phacoemulsification, traumatic cataract

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Introduction

Electric shock to the human body can cause a wide range of injuries. Although infrequent, it can also cause ocular injuries and complications [1–3]. Electric cataract can occur after a latent period and then progress rapidly [4]. During an electric shock, the current flows through the body between 2 contact points. The clinical picture of electrical injury is influenced by numerous factors including voltage, tissue sensitivity, type of current (direct or alternating), length of contact, place and area of contact, and route traveled in the body [5]. Here we report two cases of electric cataract along with a review of the literature on the clinical features and pathogenesis of this condition.

Case reports

Case 1

A 24-year-old man came to our eye department with painless progressive diminution of vision in both eyes. Three months earlier he had accidently received an electric shock from a live wire of 11 000 volts. He was unconscious for a short period and sustained skin burns on the hands and inner thighs. On the day of presentation visual acuity in the right eye was 6/18 and that in the left eye was 6/24. The lids, conjunctiva, cornea, iris, pupil, and ocular movements were normal in both eyes. Slit-lamp examination revealed anterior subcapsular cataract in both eyes (Figs 1 and 2). The remaining slit-lamp findings did not show any abnormality. Intraocular pressure was 18 mmHg in both eyes as measured with a Goldman applanation tonometer. Phacoemulsification with foldable hydrophobic posterior chamber intraocular lens (PCIOL) implantation in the capsular bag was performed under peribulbar anesthesia in the left eye. The anterior capsule was inelastic and difficult to tear, especially when the capsulorrhexis crossed over the subcapsular precipitates. Postoperative recovery was uneventful and the patient regained visual acuity of 6/6 in his left eye. Postoperative fundus examination did not reveal any abnormality. Informed consent was obtained from all individual participants included in the case-report.

Case 2

A 27-year-old old man came to our out-patient department with diminution of vision in his left eye, which had been painless since 4 months. This patient had also received an electric shock of 11 000 volts similar to the previous case. Visual acuity on the day of presentation was 6/6 in the right eye and 6/60 in the left eye. On examination, rosette-shaped cataract was found in his left eye (Fig. 3). Intraocular pressure was 16 mmHg in both eyes, as measured with a Goldman applanation tonometer. The rest of the examination was within normal limits. Phacoemulsification with foldable hydrophobic PCIOL implantation in the capsular bag was performed under peribulbar anesthesia in the left eye. Postoperative recovery was uneventful and the patient regained visual acuity of 6/6 in his left eye. Postoperative fundus examination did not reveal any abnormality.

Discussion

The cataract may develop immediately after an electric injury or may develop after a few days; latency varies from 1 to 18 months [6]. A latent period of 11 years has also been reported in the literature [7]. The incidence of electrical cataract varies from 0.7 to 8.0% [8]. Only a few cases of electrical cataract have been reported in the

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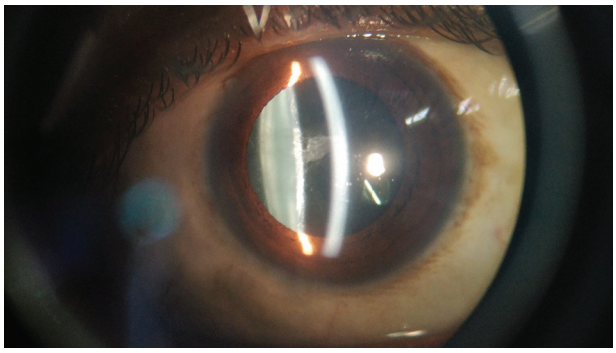
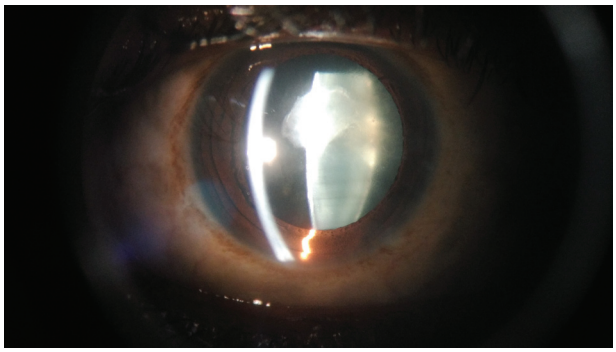
Figure 1



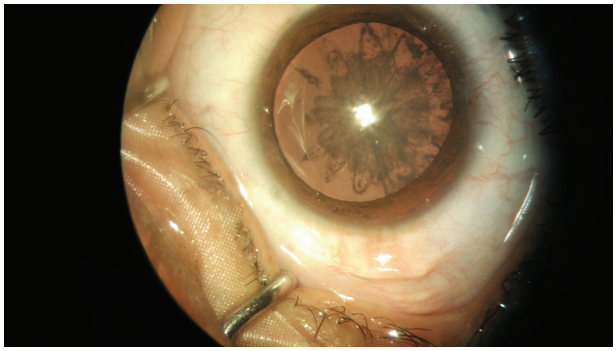
Anterior subcapsular cataract

Figure 2



Anterior subcapsular cataract

Figure 3



Rosette shaped cataract

literature, probably because only few patients survive the high voltage of electric current that induces cataract formation. However, the degree of lenticular changes does not bear a definite relation to the degree of strength of the current [9]. Electrical injuries can manifest in the form of corneal opacities, conjunctival hyperemia, uveitis, ciliary spasm, retinal edema, cataract, choroidal rupture, and optic atrophy [1–3,10,11]. The earliest recognizable change in the lens is appearance of multiple fine vacuoles just beneath the anterior capsule. These vacuoles are located in the midperiphery of the lens and hence can be missed if the pupil is not dilated [12]. Within a few days to weeks, the vacuoles are replaced by fine irregular or mossy anterior subcapsular opacities [12]. The onset of symptoms ranges from 3 weeks to 2 years. The exact pathogenesis of cataract development is unknown. Direct coagulation of lens proteins and the osmotic changes following damage to the subcapsular epithelium are thought to be responsible [13]. Scale-like gray opacities may form in the capsule and more characteristically in the subcapsular layers of the cortex, usually the anterior cortex, although the posterior cortex may also be affected. Present-day cataract surgery involving phacoemulsification followed by foldable hydrophobic PCIOL implantation in the bag results in stable and good visual acuity. Thus, proper surgical management of electric cataract will result in good visual rehabilitation if the eye has no additional damage as in our cases.

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Conflicts of interest
There are no conflicts of interest.

References

1 Boozalis GT, Purdu GF. Ocular changes from electric burn injuries: a literature review and report of cases. J Burn Care Rehabil 1991; 12:458.

2 Archer DM. Injuries of posterior segment of eye. Trans Ophthalmol Soc UK 1985; 104:597.

3 Albert D, Jakobiec F. Principles and practice of ophthalmology, posterior segment trauma. Philadelphia: Paul Dieckert, B Saunders Company; 1994. p. 3419.

4 Stephen V, John SR, Chakraborty A, Chakrabarti M. Bilateral cataract following electrical injury. Kerala J Ophthalmol 2006; 18: 252–254.

5 Solem L, Fischer RP, Strate RG. The natural history of electrical injury. J Trauma 1977; 17:487–491. Discussion 491-492.

6 Duke-Elder S, MacFaul PA. Injuries: non-mechanical injuries. In: Duke-Elder S, editor. System of ophthalmology Vol. XIV, Part 2. London: Henry Kimpton; 1972. pp. 813–835.

7 Skoog T. Electrical injuries. J Trauma 1970; 10:816–830.

8 Saffle JR, Crandall A. Cataracts a long term complication of electrical injury. J Trauma 1985; 25:17–21.

9 Elder SD, Macfaul PA. System of ophthalmology, Vol XIV-2, non-mechanical injuries. St. Louis: The CV Mosby Company; 1972. pp. 815–835.

10 Grewal DS, Jain R, Brar GS, Grewal SPS. Unilateral electric cataract: Scheimpflug imaging and review of the literature. J Cataract Refract Surg 2007; 33:1116–1119.

11 Riaz Khan M, El Faki HMA. Acute cataract and optic atrophy after high-voltage electrical injury. Eur J Plast Surg 2008; 31:73–74.

12 Long JC. A clinical and experimental study of electric cataract. Trans Am Ophthalmol Soc 1962; 60:471–516.

13 Batiles M, Magno BV. Duane's clinical ophthalmology, Vol I, Chapter 73, Cataract-clinical types. Philadelphia, NY: Lippincott-Raven Publishers; 1996. p. 22.