

High Voltage Electrical Cataract in Thai Electrician: A Case Report

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Abstract

Background: High voltage electrical cataracts have been frequently reported around the world. The incidence of electrical cataract ranged from 0.7% to 8.0%¹. Cataract formation has been reported with variable latency period² and occurs with voltage ranging from 220V to 60,000V³. The mechanism of cataract formation was decreased in permeability of the lens capsule, a direct coagulative effect on the proteins of the lens' cells⁴. In this case, the right arm burn represents the entry wound for the electrical energy, then move upward to neck and downward to right leg was represents the exit wound. In most cases were responded well to cataract surgery. This is a case report of bilateral total cataract after electrical injury in Thai young adult.

Objective: To report case of electrical cataract, presenting symptom, management and clinical outcomes

Material & Methods: Case report

Result: Phacoemulsification with foldable posterior chamber intraocular lens (PCIOL) implantation in the capsular bag were performed. The visual acuity was 20/20 in both eyes at sixth week after operation.

Conclusion: Not all high voltage electrical shock patients will lose their sight. Even though, in the mature cataract cases, some patients still preserve their visual function.

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Keywords: Electrical cataract, High voltage, Electrical shock

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Case Report

A 21 year old healthy man, an electrician came to emergency room by ambulance with high voltage (22,000V) electrical shock during electrical fixation (on duty). The patient fell from height with safety belt in head hanging upside down with loss of consciousness. Emergency management (Airway-Breathing-Circulation-Disability) was done and endotracheal tube was intubated. Vital sign was stable with blood pressure 140/90 mmHg, heart rate 90 beat per

minute, respiratory rate 18 time per minute and temperature 36.8 degree Celsius. The patient had third degree burn at neck, right shoulder and right arm and second degree burn at face and right leg. Fasiotomy was done at neck and right arm immediately on admission day due to compartment syndrome. However, right arm necrosed four days later. The patient was closed monitor in surgical intensive care unit until the endotracheal tube was extubated. The unexpected complaint by the patient after being admitted into the hospital two months later that he was experiencing a blur vision. The vision in both eyes (right eye worse than the left one), had been blurred for one week long. Visual acuity by Snellen chart was 20/200 and 20/70 with no improvement with pinhole in right

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and left eye, respectively. To evaluate the optic nerve function, color vision, pupillary reaction, RAPD (Relative afferent pupillary defect) and confrontation test were normal. Anterior segment was examined and mature cataracts (opaque lens) were found on slit lamp examination (Fig.1). Posterior segment was evaluated by ultrasound because the fundus was obscured due to lens opacity. The ultrasound result has shown the normal echogenicity in vitreous (acoustically empty on B-scan) and no membrane-like lesion (flat baseline on standardized A-scan) (Fig.2). Intraoperation, the methylene blue was used to stained the anterior capsule for better visualization. Phacoemulsification with

foldable posterior chamber intraocular lens (PCIOL) implantation in the capsular bag were performed under local anesthesia (Tetracaine HCl 0.5% eye drop) in both eyes by one consecutive week. On the first postoperative day, his visual acuity was 20/30 and 20/20 in right and left eye, respectively. The patient was given routine post-operative systemic antibiotics for 7 days, topical antibiotic for 4 weeks and topical steroid for 6 weeks with reducing frequency. The regular post-operative follow up was done at 1st and 6th week. The visual acuity in right and left eyes on 6th week were 20/20 and 20/20, respectively (Fig.3). The fundus was evaluated and shown the normal structure as figure 4.

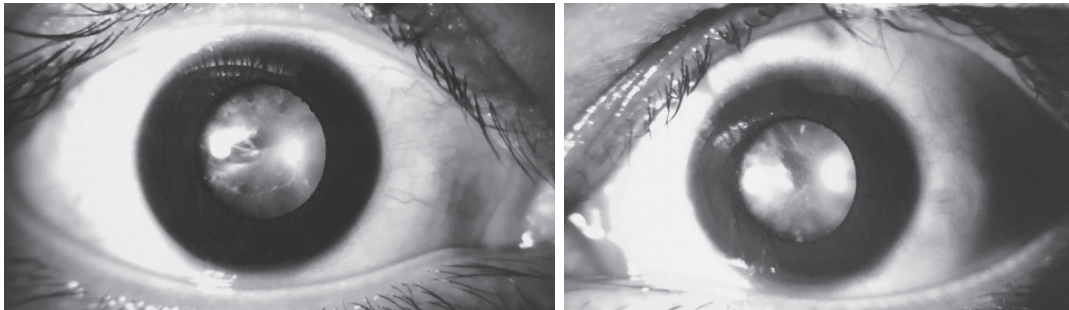


Figure 1 Electrical cataract in right and left eye.

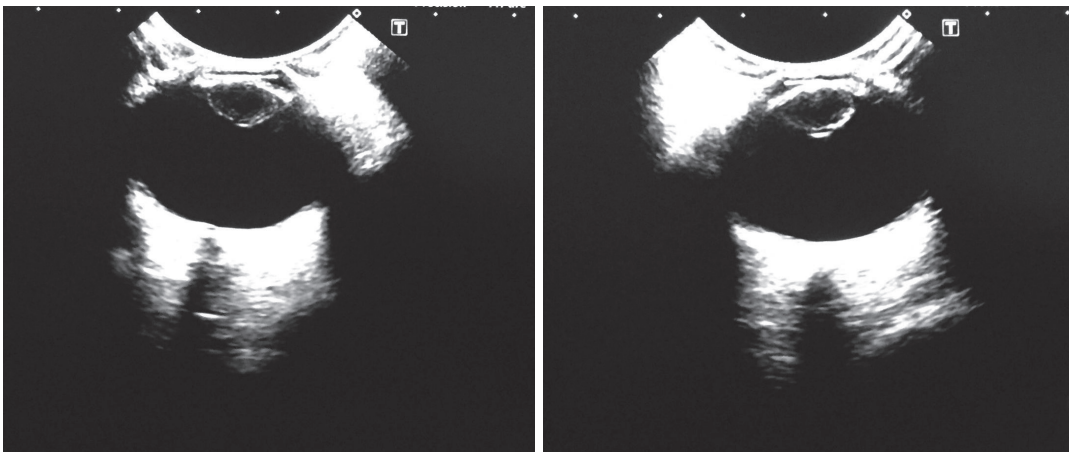


Figure 2 Ultrasonography in right and left eye.

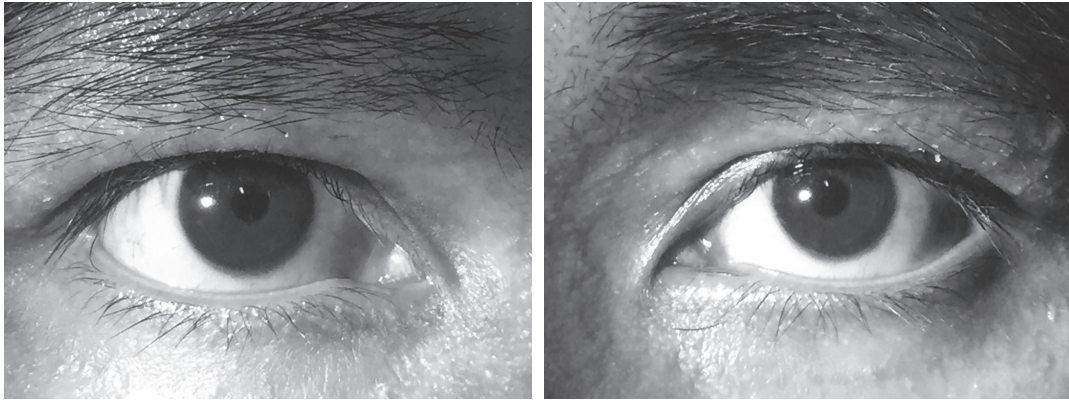


Figure 3 Post-Operative PCIOL in right and left eye.

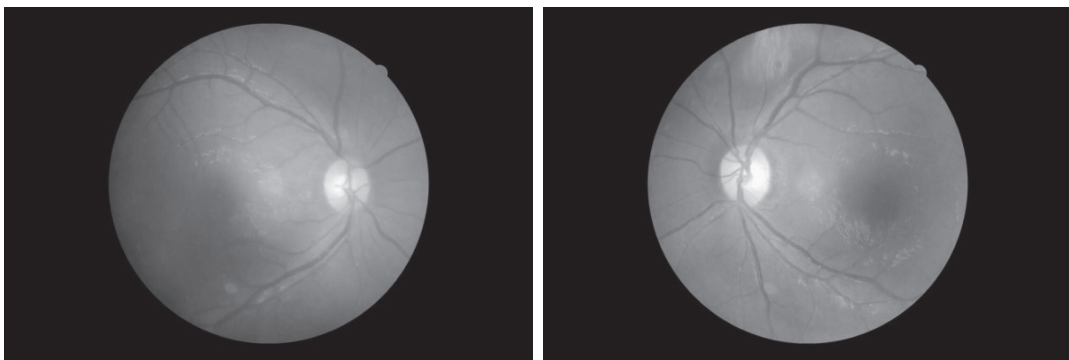


Figure 4 Fundus examination of right and left eye.

Discussion

Electrical cataracts are mostly found unilateral but uncommon in bilateral⁵. There are some theories of the cataract formation, first, the scar formation over the basement membrane of the capsule fibroblast and hyaloid production may disturb lens nutrition⁶. Second, the direct coagulation of lens protein and osmotic changes of the lens^{7,8}. The final visual acuity may be decrease due to retinal, optic nerve injury⁹ or other ocular damage^{10,11}. Other ocular lesions included conjunctival hyperemia, corneal opacity, uveitis, necrosis of retina and choroid, optic nerve coagulation and optic atrophy can be occurred¹²⁻¹⁵. To evaluate the optic nerve function, visual evoked potential had not performed in this study due to the lack of equipment. However, the surgical result of visual acuity was good in both eyes, these implied that the retina function and other ocular part were not damaged^{16,17}.

Conclusion

In electrical mature cataract case with obscure retina examination by slit lamp. The ultrasonography is important to evaluate the posterior segment to investigate for retinal detachment. If optic nerve, retina, choroid and visual pathway are not affected, the visual acuity should be good. Furthermore, this study explains well that electrical cataracts by themselves rarely lead to vision loss, and usually post-operative results are rewarding.

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