Retinal Atrophy, Cataract; Presumably Due to Electrical Injury: A Case report

Emine Çiloğlu[1], *Emre Özdemir*[1]

ABSTRACT

Twenty-nine years old male applied to our clinic with complaints of loss of vision in both eyes, more often in the left eye. The patient had trauma with electrical shock 15 years ago, and his visual acuity gradually decreased in these fifteen years. Biomicroscopic examination revealed bilateral posterior subcapsular and cortical lens opacities. In the left eye, the optic disc was pale, common chorioretinal atrophies, and hyperpigmented lesions were observed. There was approximately 5 cm scar at the temporal side of the left eyebrow, which the patient expressed as an electrical burn.

Based on the patient's history and eye examination findings, it was considered as cataract, and retinal atrophy due to electrical injury, and the patient was followed up.

Keywords: electrical injury, cataract, retinal atrophy, trauma.

INTRODUCTION

Various eye and systemic findings may occur after exposure to electric current. Eye-affected electrical injuries often occur due to accidents affecting the head and orbital area. Ocular findings have been reported in previous case reports that chemosis, hyphema, cataracts, retinal pigment epithelium damage, macular edema, macular hole, retinal detachment, optic neuritis and chorioretinal atrophy may develop. [1-3]

In this article, a case with cataract in both eyes and chorioretinal atrophy in the left eye is presented after electrical injury.

CASE REPORT

A twenty-nine-year-old male patient was admitted to our clinic due to vision loss in both eyes, more in his left eye. Written informed consent for patient information and images to be published was provided by the patient. The patient's history revealed that he had multiple injuries as a result of 240 volts of electrical current at work 15 years ago. It was learned that the patient was exposed to electrical current from the lower limbs for 10 minutes, then he experienced loss of consciousness and that he was treated in intensive care for 1 month from multiple organ injuries and burns. On physical examination, there were extensive scars at the temporal side of the left eyebrow approximately 5 cm (Figure 1a), on the right eyebrow and four extremities.

In the ophthalmological examination; visual acuity was 8/10 according to the snellen chart in the right eye and finger counting in the left eye. Intraocular pressure was 18 mmHgAppl in the right eye and 17 mmHgAppl in the left eye. There were bilateral posterior subcapsular cataracts and opacities in the lens. (Figure 1b) The optic disc and macula were normal, atrophic area was observed in the upper nasal region of the optic disc in the right eye. (Figure 2a) In the left eye; optic disk was pale, and there were atrophy in the macula, thinning in the vascular vessels, extensive chorioretinal atrophy areas, and diffuse hyperpigmented lesions in the midperifer. (Figure 2b)

In fundus fluorescein angiography; In the right eye, there

1- Assoc. Prof. Dr., Adana City Training and Research Hospital, Department of Ophthalmology, Adana, Turkey

2- Dr., Adana City Training and Research Hospital, Department of Ophthalmology, Adana, Turkey

Received: 04.12.2020
Accepted: 23.05.2021
Ret-Vit 2021; 405-407
DOİ: 10.37845/ret.vit.2021.30.70

Correspondence Adress:
Emine Çiloğlu
Adana City Training and Research Hospital, Department of Ophthalmology, Adana, Turkey
Phone:
E-mail: drciloglu@gmail.com

Figure 1(A): *The scar formation of the temporal side of the left eyebrow. 1(B). The cataract formation.*

was peripapillary atrophy and hyperfluorescence in the region that fit the atrophic area at the upper nasal of the optic disc,(Figure 2c) whereas in the left eye, the optic disc was pale, and hyperfluorescence due to diffuse atrophic lesions were present. (Figure 2d) Optical coherence tomography; while there was no pathology in the right eye, (Figure 3a) retinal atrophy, thinning in the retinal tissues, and foveal contour distortion were observed in the left eye. (Figure 3b)

CONCLUSION

Eye complications due to electrical injuries are extremely rare. Eye complications due to electric shock usually develop after the electric current contacts an area close to the orbit or head area. In many cases, complications develop at high voltage currents and often result in burns in the contact areas.[4]

The formation of cataracts was thought to be caused by

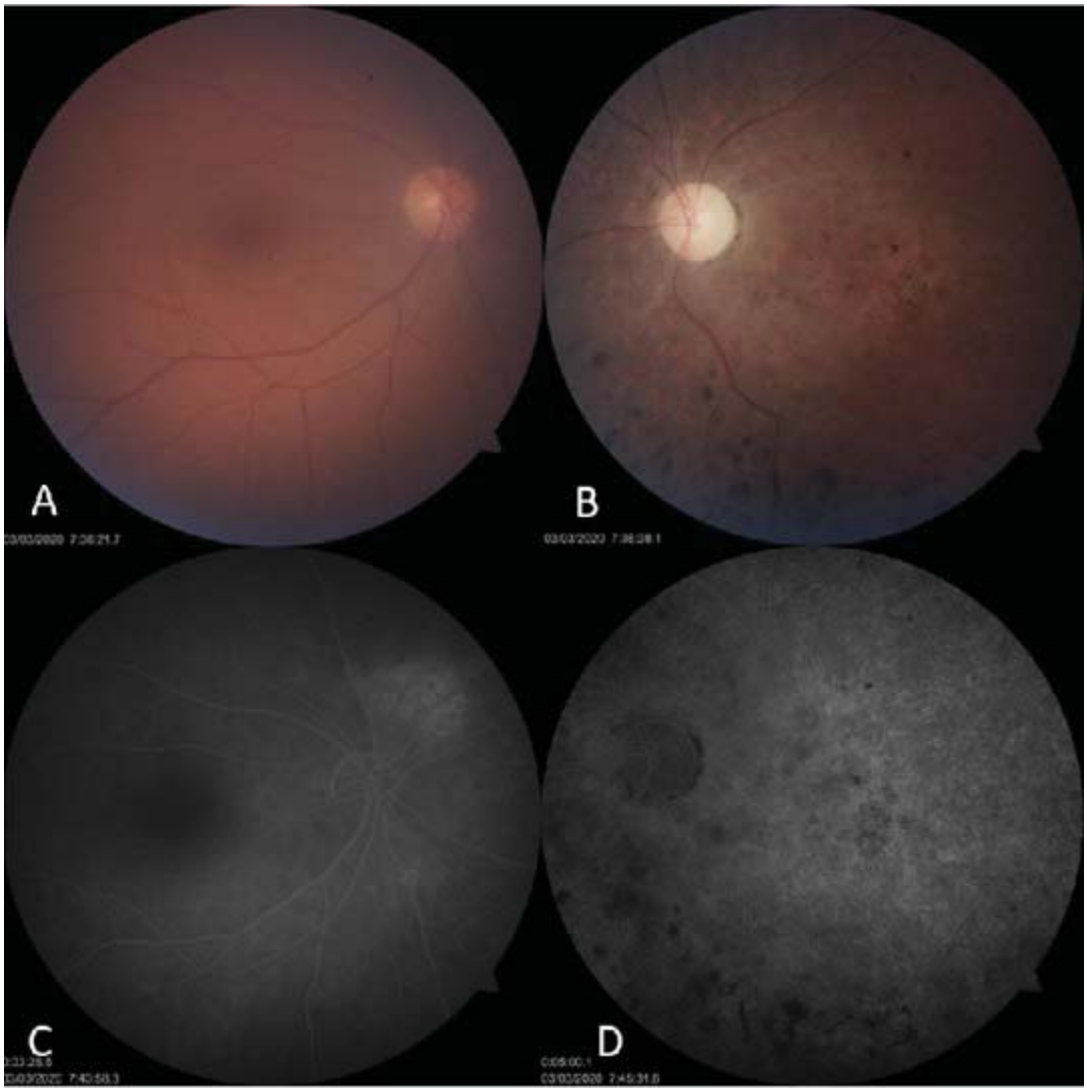

Figure 2: *Color fundus images and fundus fluorescein angiography images of the eyes, A. Fundus photography of the right eye, B. Left eye showing diffuse fibrosis and atrophy of the retina surrounding the optic disc. C. Fundus fluorescein angiography of the right eye, D. Left eye, Hyperfluorescence due to diffuse atrophic lesions, hypofluorescence due to hyperpigmented lesions.*

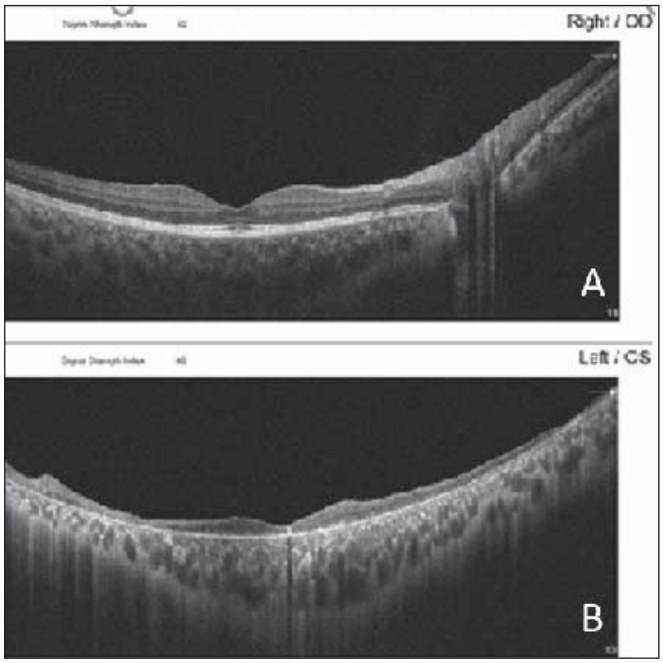

Figure 3: *The Optic coherence tomography images A. Right eye, B. Left eye, retinal thinning, atrophy.*

direct effects on the lens' proteins from the present or by contraction of the ciliary muscle causing injury, changes in capsular permeability or thermal disruption.[5]

Sharma documented a case of Purtscher-like retinopathy caused by electric shock.[6] They believe that the electrical current is transmitted from the point of contact through the neurons to the optic nerve. Being a good conductor of electricity, the neural tissue is spared from thermal damage.The current then disperses through the sclera, retinal pigment epithelium (RPE)–Bruch's complex, and the neural retina. Increased resistance at the level of RPE–Bruch's complex may be responsible for thermal damage, which may explain chorioretinal atrophy in our case.

The optic nerve and retina have low resistance, which can easily lead to their injury, which is caused by ischemia resulting from coagulation and necrosis. Coagulative necrosis is the suspected cause for retinal damage due to loss of choroidal and retinal vasculature and probably electroporation.[7,8]

In our case, which was exposed to high voltage electric shock, retinal complications may develop even if the trauma occurred away from the head region. Electrical injuries can be mortal due to cardiac and respiratory arrest. In such injuries, fatal complications such as myocardial ischemia, myocardial necrosis, arrhythmia and hemorrhagic pericarditis may develop. However, the eye findings that may occur in patients who are not lost due to post-event mortal complications and access to health centers should not be forgotten.

Conflict of Interest: The Author(s) declare(s) that there is no conflict of interest

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

1. Beken Z, Eltutar K. Elektrik kataraktları ve elektrik yanıklarında oluşan göz lezyonları. T Oft Gaz. 1990;20:299-302.
2. Boozalis GT, Purdue GF, Hunt JL, et al. Ocular changes from electrical burn injuries. A literature review and report of cases. J Burn Care Rehabil. 1991;12:458-462.
3. Miller B, Goldstein M, Monshizadeh R, et al. Ocular manifestations of electrical injury: a case report and review of the literature. CLAO J. 2002;28:224-227.
4. Saffle JR, Crandall A, Warden GD. Cataracts: a long-term complication of electrical injury. J Trauma. 1985;25:17-21.
5. Chun-Ju L, Chang-Hao Y, Chung-May Y, et al. Abnormal Electroretinogram and abnormal electrooculogram after lightninginduced ocular injury. Am J Ophthalmol. 2002;133:578-579.
6. Sharma A, Reddy YC, Shetty AP, et al. Electric shock induced Purtscher-like retinopathy. Indian J Ophthalmol. 2019;67(9):1497-1500.
7. Zablocki GJ, Hagedorn CL. Chorioretinal atrophy after electrical injury. Dig J Ophthalmol. 2011;17:40-42.
8. Jain S, Bandi V. Electrical and lightning injuries. Crit Care Clin. 1999;15:319-331.