
SHORT COMMUNICATION

Bilateral cataract following lightning injury

A. GUPTA, S. KALIAPERUMAL, S. SENGUPTA, R. BABU

Department of Ophthalmology, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry - India

PURPOSE. *To report a case of bilateral cataract with posterior vitreous detachment induced by lightning injury.*

METHODS. *A case report of 30 year old man injured by lightning.*

RESULTS. *The patient developed visually significant bilateral cataract after four years of the initial insult on the scalp. The exit wound was noted on the right foot. Fundus evaluation after cataract extraction revealed posterior vitreous detachment.*

CONCLUSIONS. *Lightning can induce various ocular complications. Decrease in vision due to cataract is usually seen years after the initial lightning injury as the initial changes are in the mid-periphery and often missed in the acute setting. Posterior vitreous detachment induced by lightning can rarely lead to retinal tear formation and subsequently retinal detachment. The severity of entry and exit may not give a true picture of the internal organ damage. (Eur J Ophthalmol 2006; 16: 624-6)*

KEY WORDS. *Anterior subcapsular, Posterior subcapsular, Bilateral cataract, Lightning, Posterior vitreous detachment*

Accepted: February 5, 2006

INTRODUCTION

Lightning can induce bilateral cataract with posterior vitreous detachment, especially if the site of injury is on the scalp region of face (1). Vision may be normal at the time of initial injury and decrease in vision may be encountered few years after the original insult when central visual axis is involved (2). Posterior vitreous detachment may occur due to sudden vitreous contraction. Lightning induces both anterior and posterior subcapsular cataract with clear nucleus. The severity of entry wound may not give a true picture of internal injury. Hereby we present a case of lightning injury with bilateral cataract and posterior vitreous detachment where the entry wound was apparently severe but there were no systemic problems.

Case report

A 30-year-old healthy man was struck by lightning on the scalp while he was walking on a street. He sustained a second-degree burn on the scalp (entry wound, Fig. 1a) and right foot (exit wound, Fig. 1b). The patient was un-

conscious for 2 days, during which he was hospitalized in the emergency department. Physical examination was unremarkable other than entry wound and exit wound. He had a normal head computed tomographic scan, electrocardiogram, urine analysis, and complete blood count and serum electrolytes. Ophthalmic examination was unremarkable at that time.

Four years later, the patient presented to us with rapidly decreasing vision over the previous 3 months. No history of ocular trauma or any other ocular disease was present. Vision in both eyes had dropped to 20/400. Slit lamp examination after full dilatation revealed dense anterior subcapsular and posterior subcapsular cataract (Fig. 1c). The former had radial spoke like pattern starting from a point near the visual axis and reaching almost the equator (Fig. 1d). Posterior subcapsular cataract had a faint polychromatic luster. Phacoemulsification with posterior chamber intraocular lens implantation was performed for both eyes. The postoperative period was uneventful. Fundus examination revealed bilateral posterior vitreous detachment and normal macula with no evidence of any peripheral retinal break (3).

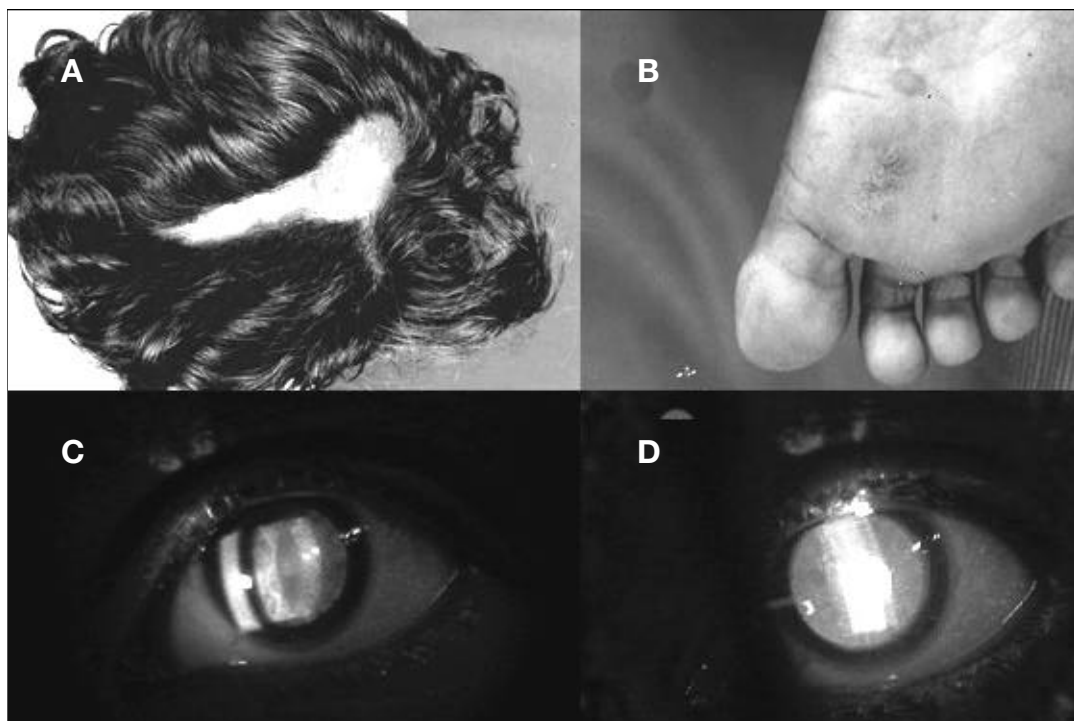


Fig. 1 - (A) Alopecia corresponding to entry wound. **(B)** Scar corresponding to exit wound. **(C, D)** Anterior and posterior subcapsular cataract with clear nucleus in optical section and retroillumination.

DISCUSSION

Lightning can cause cataract, punctate keratitis, uveitis, cystoid macular edema, vitreous hemorrhage, retinal detachment, chorioretinal rupture, and macular hole (2-7). Lightning can affect the normal human crystalline lens in various ways like causing lightning cataract, traumatic cataract, or dislocation of lens (7). The most common permanent ophthalmic sequelae is lightning-induced cataract. Bilateral lens opacities occur especially if the area of contact is on forehead or scalp (1). Lightning injury causes characteristically both anterior and posterior subcapsular cataract while cataract due to industrial electrical injury characteristically is only anterior subcapsular cataract (7).

The lens of the human eye is very sensitive to electric current or the resultant induced heat (7). In lightning injury, the melanin granules of the pigment epithelium of iris and choroid would constitute the main obstacle to the current flow (6). A superficial electrical injury to the eye would therefore heat the pigmented portion of iris, causing protein denaturation and cataract formation (6). The earliest lenticular changes are subcapsular vacuoles located in the midperiphery of anterior subcapsular area (2, 7). Thus the initial changes may be missed if the eye is not examined after full dilatation of pupil. The initial vacuoles are

slowly replaced by snowflake or arrowhead anterior subcapsular opacities, which progressively migrate toward visual axis (2). The vision drops when the lenticular opacities involve the visual axis, which is seen a few years after the initial insult. This may explain the drop in visual acuity seen in this patient 4 years after the lightning strike. Heating of the retinal surface and the concussive forces on the eye may cause a sudden contraction of vitreous leading to posterior vitreous detachment and rarely peripheral retinal break, which may lead to retinal detachment (3).

During the acute stage of lightning injury, the systemic features usually predominate and the ophthalmic examination is usually delayed. If the ocular examination is carried out without full dilatation of pupil the early lenticular changes may be missed, like in this case. Lightning exhibits flashover phenomenon, in which the majority of electricity travels along the outer surface of the body without disrupting the functioning of internal vital organs. Wet clothing may enhance the flashover phenomenon (7). This may also account for the relatively severe entry wound with preservation of normal functioning of internal organs.

The severity of entry wound may not give a true picture of the disruption of the functions of internal vital organs. Decrease in vision in patients struck by lightning may not be at the time of initial injury but more commonly occurs a

few years later. While acute drop in vision may be related to retinal detachment, vitreous hemorrhage, macular holes, or cystoid macular edema, cataracts cause decrease in vision a few years later.

None of the authors has any proprietary interest.

Reprint requests to:
Arvind Gupta, MBBS
C/o Mr. Ashok Kumar Gupta
FD-315, Salt Lake City, Sector- 3
Kolkata -700106, West Bengal
arvind_ophthal@yahoo.co.in

REFERENCES

1. Long JC. Electric cataract. *Am J Ophthalmol* 1963; 56: 108-33.
2. Fraunfelder FT, Hanna C. Electric cataracts. I: Sequential changes, unusual and prognostic findings. *Arch Ophthalmol* 1972; 87: 179-83.
3. Espaillat A, Janigian R, To K. Cataracts, bilateral macular holes and rhegmatogenous retinal detachment induced by lightning. *Am J Ophthalmol* 1999; 127: 216-7.
4. Noel LP, Clarke WN, Addison D. Ocular complication of lightning. *J Pediatr Ophthalmol Strabismus* 1980; 17: 245-6.
5. Compo RV, Lewis RS. Lightning induced macular hole. *Am J Ophthalmol* 1984; 97: 792-4.
6. Jaffe GT, Handa JT. Lightning maculopathy. *Retina* 1994; 14: 169-72.
7. Norman ME, Albertson D, Younge BR. Major review. Ophthalmic manifestation of lightning strike. *Surv Ophthalmol* 2001; 46: 19-24.