



Solar Eclipse Induced Retinopathy: A Case Report

Shally Biswas^{1*}, Umme Salma Akbar¹ and Wahid Alam²

¹Chittagong eye infirmary and training complex, Bangladesh

²Chevron eye hospital, Bangladesh

*Corresponding author: Shally Biswas, Senior Assistant Surgeon, Chittagong Eye Infirmary and Training complex, Bangladesh

Case Report

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Abstract

Purpose: To report a case of solar eclipse induced retinopathy.

Case Report: A 19 years old male presented to Chittagong Eye Infirmary and Training Complex with a 4-day history of bilateral central scotoma following 10-15 minutes of direct sun-gazing during the solar eclipse on 26th December 2019. On general examination, he was of normal built and height for his age. Upon ocular examination, his BCVA was 6/9 in both eyes. Slit-lamp microscopic examination showed clear cornea in both eyes. Pupils of both eyes were round, regular and reacting. Lens was clear in both eyes. Fundus examination revealed discrete yellow lesions at the fovea of both eyes. Optical coherence tomography scanning showed corresponding retinal pigment epithelial defects in both eyes. The patient was managed conservatively with regular follow-up and counseling was done regarding guarded visual prognosis.

Conclusion: Observing a solar eclipse directly can cause permanent eye damage hence public awareness of the dangers should be encouraged.

Keywords: Retinopathy; Scotoma; Optical Coherence Tomography; Ultraviolet; Photoreceptor Layers

Abbreviations: OCT: Optical Coherence Tomography; RPE: Retinal Pigment Epithelium.

Introduction

The human eye is exposed to ultraviolet B (280-315 nm), ultraviolet A(315-380 nm) and visible light(380-780 nm) [1]. With a meiosis of 2mm, a 30-second exposure to sunlight leads to the production of heat at a rate of 70 calories/sq.cm/minute, which is more than enough to produce a severe retinopathy experimentally. Patients with solar retinopathy classically have a history of sun exposure through religious ritual participation [2], solar eclipse viewing without proper precautions [3,4], sunbathing [5] or from mental disturbances via drug intoxication or schizophrenia [6]. It occurs primarily through a photo-oxidative pathway rather than by direct thermal injury [7].

Case Presentation

A 19 years old male presented to Chittagong eye infirmary and Training complex with a 4-day history of bilateral central scotoma following 10-15 minutes of direct sun-gazing during the solar eclipse on 26th December 2019. On general examination, he was of normal built and height for his age. Upon ocular examination, his BCVA was 6/9 in both eyes. Slit-lamp microscopic examination showed clear cornea in both eyes. Pupils of both eyes were round, regular and reacting. Lens was clear in both eyes. Fundus examination revealed discrete yellow lesions at the fovea of both eyes. Optical coherence tomography (OCT) scanning showed corresponding retinal pigment epithelial defects in both eyes. Based on the clinical and OCT findings, a diagnosis of solar eclipse induced retinopathy was confirmed. The patient was managed conservatively and was advised regular follow-up every 3 months and counseling was done

regarding guarded visual prognosis. The patient's vision did not improve over the next 2 follow ups with conservative management and central RPE defects persisted. He was then lost to follow-up (Figures 1 & 2).

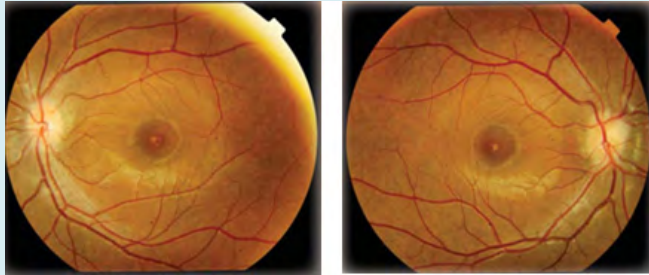


Figure 1: Fundus photograph showed discrete yellow lesions at the fovea of both eyes.

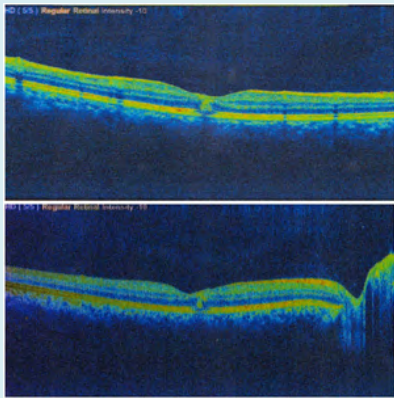


Figure 2: OCT showed retinal pigment epithelial defects in both eyes and disruption of the inner and outer segments of the photoreceptor layers.

Discussion

The classic solar retinopathy is caused by the photochemical and thermal effects of ultraviolet radiation on retinal cells, especially in the outer retina and retinal pigment epithelium (RPE). Symptoms can start a few hours after direct observation of the sun, and in most cases a bilateral involvement, although asymmetrically with variable visual acuity. This pathology is caused by direct or indirect solar observation, mainly during the occurrence of a solar eclipse [8-11].

The extent of retinal damage is dependent upon the intensity and duration of solar exposure. Solar observation more than 90 seconds exceeds threshold of retinal damage [12]. The common presenting symptoms of solar retinopathy include decreased visual acuity, metamorphopsia, micropsia, photophobia, after image, scotoma, and headache [13,14].

In our case report, the patient presented with retinal damage after exposure to solar eclipse, which is bilateral and with permanent reduction in visual acuity. Das T, et al. [2] reported cases among Punjabis who look at the sun for religious reasons. Pittar (1943) reported one case in an anti-aircraft gunner firing at an enemy plane flying out of the sun, and fighter pilots performing the same maneuver have suffered similar consequences. Irvine (1945) has recalled the case of a seaman "steering into the sun's eye." Bates (1920) advocated prolonged sun-gazing as the treatment of myopia, with disastrous results.

The warnings made by Knudtson (1948) need repeating, especially as they bear on the false sense of protection afforded by dark glasses, red glass filters, smoked glass and overexposed negative films. The only safe way of observing the sun, the method used by astronomers, is to project the sun's image on to a screen. For the amateur a pin-hole and sheet of matt paper held in the shade behind it would be adequate.

Conclusion

Solar eclipse induced retinopathy is a rare form of eye damage that is a result of toxicity caused by light waves including the excess short-wavelength visible light along with heat damage that comes from near-infrared radiation. Youngsters are particularly vulnerable and they should be aware about the dangers of sun-gazing directly without specific eye gear and protection.

Conflict of Interest: None

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