Lightning Maculopathy: A Case Report

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ABSTRACT

Lightning induced maculopathy is a very rare condition and there are barely any published reports on lightning induced maculopathy in our country. Here we present a case of twenty three years female who presented with lightning induced burns on the neck, chest and abdomen. She had unconsciousness for 3 days after lightening injury for which she was treated in intensive care unit. She presented with complain of diminution of vision in both eyes after 2 weeks. Optical Coherence tomography revealed cystic changes in fovea in right eye and a macular hole in left eye. Lightning injury is a life threatening condition. Lightning maculopathy should always be ruled out which can be best detected on optical coherence tomography.

Keywords: *foveal cyst; lightning injury; maculopathy; optical coherence tomography.*

INTRODUCTION

Ocular trauma is the most common cause of visual impairment and blindness.[1] Blindness due to ocular trauma was 2.4% according to Nepal Blindness Survey, 1981.[2] Lightning strikes are not frequent. The secondary injuries caused by lightning are rare. However they have important sequel in organs and tissues.3 Although, ocular involvement is less frequent for victims of low voltage electrical burns, it can reach up to 50%.[4]

Lightning retinal injuries are rare; the most frequent are macular edema and dotted pigmentary degeneration, which generally persist as pigmentary atrophy.[5] The visual loss caused by lightning maculopathy may vary according to the nature of involvement. Lesions described include macular edema, macular hole, cyst, or a solar retinopathy-like picture, cataract, retinal detachment, retinal artery occlusions, and relative afferent pupillary defect. Visual recovery often occurs over time, even with severe maculopathy.[6] Lightning injury maculopathies are rare and there are rarely any published reports on lightning maculopathy. Here we present a rare case of lightning injury with lightning maculopathy in both the eyes.

CASE REPORT

A 23–years-old female came with complains of painless diminution of vision and redness in both eyes, followed by lightning injury since 2 weeks. She had history of sudden loss of consciousness while cooking food followed by lightning injury 2 weeks back. She was then admitted in intensive care unit for 3 days and regained consciousness. She was then admitted in the burn unit for 1 week. She had lightning burns on back of left ear, neck, chest and abdomen (Figure 1).

Figure 1. Lightning induced burns on neck, chest and abdomen.

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Her best corrected visual acuity at presentation was 6/12 in RE and 6/18. On slit lamp examination, she had marked congestion in left eye more than right eye. Cornea was clear, pupil in left eye was mid dilated with sphincter tear at 3 clock hour. Anterior chamber was quiet and lens was clear . The media was clear. On dilated fundus examination, the optic disc was normal but the macula in right eye had pigmentation and macular hole in left eye. The Watzke Allen test was negative in right eye and positive in left eye. The intraocular pressure was 12 mmHg in both eyes. Her blood pressure was 100/70 mm Hg.

Optical coherence tomography (OCT) was done in both eyes to confirm the maculopathy. OCT showed macular foveal cyst in right eye and full thickness macular hole in left eye (Figure 2, 3).

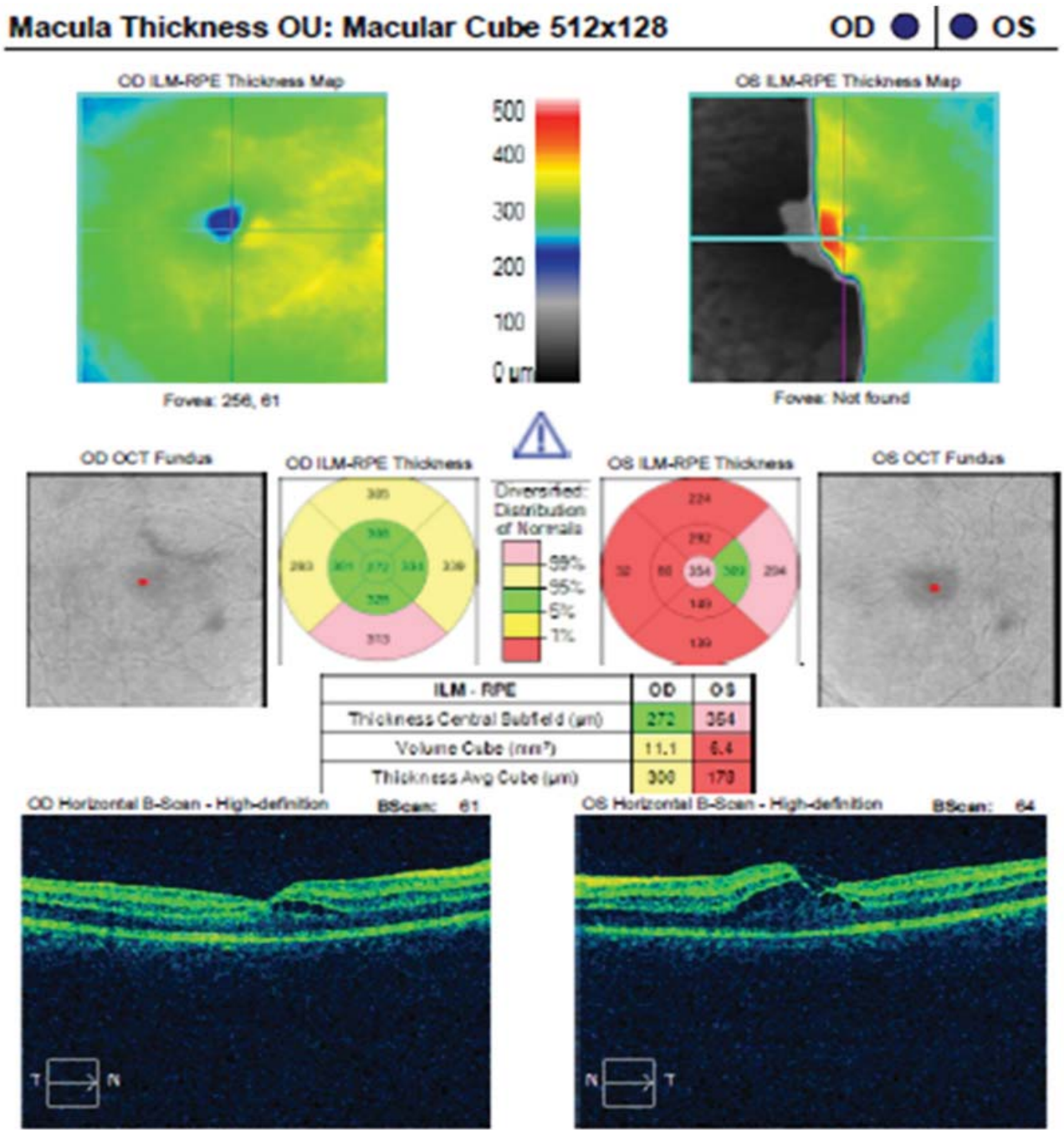

Figure 2. OCT Macula Of Both The Eyes Showing Maculopathy.

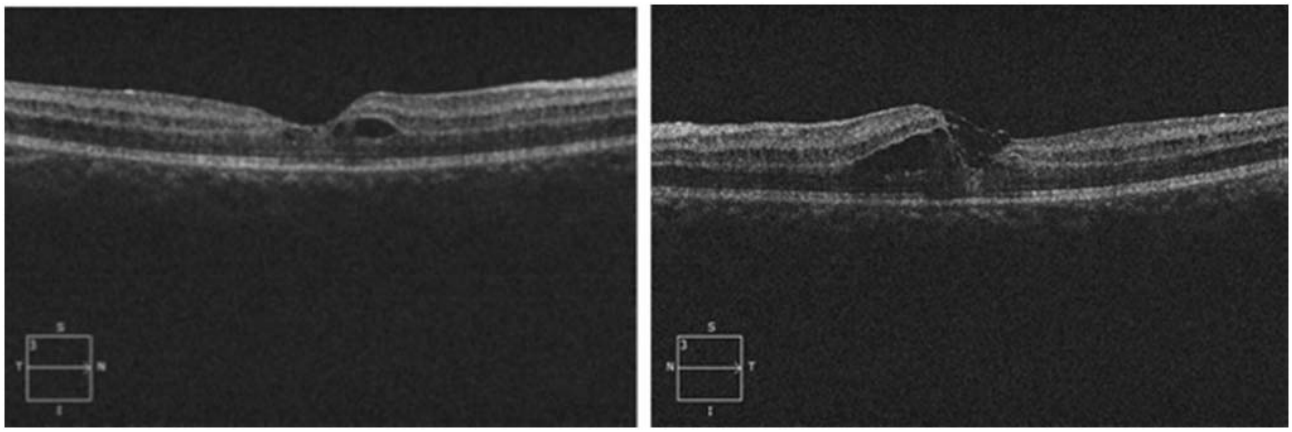

Figure 3. OCT macula right eye showing cyst formation and left eye showing macular hole.

Lightning injury of eye with lightning maculopathy was confirmed from the history of lightning strike, detection of lightening burns on the skin and presence of foveal cyst and macular hole. She was kept on antibiotics and anti-inflammatory drugs. Her systemic examination was normal at the time of discharge from the general hospital. She was advised for left eye macular hole surgery but the patient denied and lost follow up.

DISCUSSION

Lightning induced posterior segment injuries are rare and posterior segment involvement may be in the form of vitreous hemorrhage, retinal hemorrhage, retinal edema, cystoid macular edema, macular holes, chorioretinal rupture, central retinal vein and artery occlusions.[7,8.]

Lee et al reported four routes of lightning strike: [9]

- **Direct strike:** when the current flows directly through the victim and is facilitated by metal objects
- **Splash:** when lightning strikes an object and then arcs through the path of least resistance.
- **Contact:** when lightning strikes an object the victim is in contact with such as while talking over the phone or in the bathtub by current flowing through the wires or pipes.
- **Ground current:** when lightning strikes the ground and travels along the surface towards the victim.

Our patient was struck probably by the first mechanism as she was cooking food in a metallic utensil. The macula is particularly sensitive to the thermal damage because of its high concentration of melanocytic granules that lead to major dissipation of the heat when it is injured by the electrical current. The elevated temperature found in the retinal pigment epithelium and choroidal ischemia caused by focal vascular changes can explain macular injuries. Edema can be a temporary reaction or it may be followed by the formation of cysts or holes.[5] This explains the development of pseudocyst and macular hole in our patient as demonstrated in OCT of macula. Handa et al, also reported a case of lightning maculopathy which initially presented as retinal cysts with surrounding edema and later evolved to simulate a full thickness hole.[8]

OCT is the best method to demonstrate maculopathy. Rivas et al reported a case similar to ours, of bilateral macular lesions resembling macular holes in which the OCT demonstrated small cyst formation at the fovea suggesting the importance of OCT in evaluating a case of lightning maculopathy.[10]

It is important to differentiate between lightning induced macular cyst and full-thickness macular hole, as cystic changes may resolve spontaneously but for full thickness

macular hole surgery may be required.[11] Patient was advised for macular hole surgery in left eye but she denied and lost follow up.

Our patient had loss of consciousness after lightning injury and was admitted in intensive care unit for 3 days till she regained the consciousness before she presented to our eye clinic. The immediate (pre-hospital) resuscitation is the most important factor with respect to outcome. At the scene of the lightning strike medical attention should be directed towards those apparently dead as the living will almost always survive. This is in contrast to the normal triage of a disaster scene where attention is focused on the living.[12] Hence, in a case of lightning injury immediate resuscitation should be done.

Lightning injury is a life threatening condition which can be cured with immediate resuscitation. Lightning associated maculopathy is a rare condition but a complete dilated ocular examination should always be done. OCT macula is the best method to rule out lightning associated maculopathy.

CONSENT: Informed and written consent was taken from the patient.

CONFLICT OF INTEREST: None.

REFERENCES

1. Godar ST, Kaini KR, Amatya P, Joshi K, Singh L. Magnitude of ocular trauma in a tertiary care hospital of western Nepal. Nepal Journal of Medical Sciences. 2013;2(2):140-3.
2. Brilliant LB, Pokhrel RP, Grasset NC, et al. Epidemiology of blindness in Nepal. Bulletin of the World Health Organization. 1985;63:375-86.
3. Osorio TJ, Goyeneche HFG. Eye and lightning strikes. Vis. Pan-Am. 2016; 15(3): 84-86.
4. Datta H, Sarkar K, Chatterjee PR, Datta S, Mukherjee U. An unusual case of late ocular changes after lightning injury. Indian J Ophthalmol. 2002;50(3):224–5.
5. Ouyang P, Karapetyan A, Cui J, Duan X. Bilateral impending macular holes after a high-voltage electrical shock injury and its surgical outcome: A Case Report. J Med Case Rep. 2014;8:399.
6. Bindu. K .Appukuttan, Mahesh G. Lightening maculopathy: A rare case report. Kerala Journal of Ophthalmology. 2011 Sep;23(3).
7. Norman ME, Albertson D, Younge BR. Ophthalmic manifestations of lightning strike. Survey of Ophthalmology. 2001;46:19-24.
8. Handa JT, Jaffe GJ. Lightning maculopathy. Retina. 1994;14:164-72.
9. Lee MS, Gunton KB, Fischer DH, Brucker AJ. Ocular manifestations of remote lightning strike. Retina. 2002;22:808-10.
10. Rivas Aguino PJ, Garcia RA, Arevalo JF. Bilateral macular cyst after lightning visualized with optical coherence tomography. Clinical Experimental Ophthalmology 2006;34(9):893-4.
11. Moon SJ, Kim JE, Han DP. Photo Essay on lightning induced maculopathy. Retina. 2005;25:380–2.
12. Taussig HB. "Death" from lightning and the possibility of living again. Ann Intern Med. 1968;68:1345-53.