

MACULOPATHY CAUSED BY EXPOSURE TO WELDING ARC: A CASE REPORT

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ABSTRACT

Aim: To report a binocular maculopathy induced by brief exposure to welding arc lights in patient who was not equipped with protective device. **Materials And Method:** It is a case report of a 32 year old male patient, welder by occupation with complains of bilateral acute blurring of vision. He gives history of welding inside an oil tanker without wearing protective goggles. Dilated fundus examination showed the presence of round yellow lesion at the fovea with loss of foveal reflex and chorioretinic para macular pigmentary changes OU. Patient was having scotoma on amsler grid test OU. **Results:** The high resolution OCT performed on our patient revealed disruption in the ellipsoid zone (inner segment/outer segment junction layer (IS/OS)) that correlated with decreased visual acuity. It is suggestive of bilateral macular burns with permanent partial loss of vision. **Conclusion:** Welders must be educated about photic retinal injury and should wear the proper protective device containing appropriate lenses to avoid potential retinal damage.

KEYWORDS : Welding Arc Maculopathy, Optical Coherence Tomography (oct), Best Corrected Visual Acuity (bcva)

INTRODUCTION

The light produced by welding equipment can harm a variety of eye structures. The most frequent damage primarily include keratoconjunctivitis, cataract, photophthalmia. Retinal injuries resulting from welding arc are rare.

Outer retinal layer damage can occur when excessive ultraviolet radiations generated by welding arc reaches the retina, causing "welding maculopathy"⁽¹⁾

Although the prognosis of welding-induced photic retinal injury is usually good, permanent complications are sometimes reported.⁽²⁾

Case Report

A 32 year old patient, welder by occupation came to our hospital with complaints of acute blurring of vision, central scotoma in both eyes since 15 days. Patient gives history of welding inside an oil tanker without wearing protective goggles 15 days back.

His uncorrected visual acuities were 6/60 OU. Pupils were round regular and reactive to light OU. No relative afferent pupillary defect (RAPD) was noted. Confrontation visual fields were full to finger count OU. Extraocular motility was full and extensive OU.

On slit lamp examination, anterior segment was within normal limit. Best corrected visual acuities (BCVA) were 6/18 OD and 6/24 OS after refraction.

Intraocular pressure with Goldmann applanation tonometry was 12 mmHg OD and 16 mmHg OS.

Dilated fundus examination showed the presence of round yellow lesion at the fovea with loss of foveal reflex and chorioretinic para macular pigmentary changes OU.

Scotoma was observed in central region using Amsler grid test. On OCT, a hole extending from the inner border of RPE line upto the external limiting membrane, a region consisting of the inner and outer photoreceptor segments was seen.

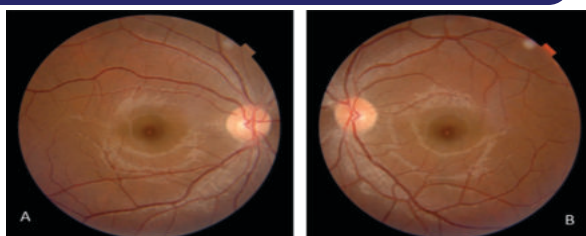


Figure 1: Round yellow lesion at the fovea with loss of foveal reflex in right (A) and left (B) eye

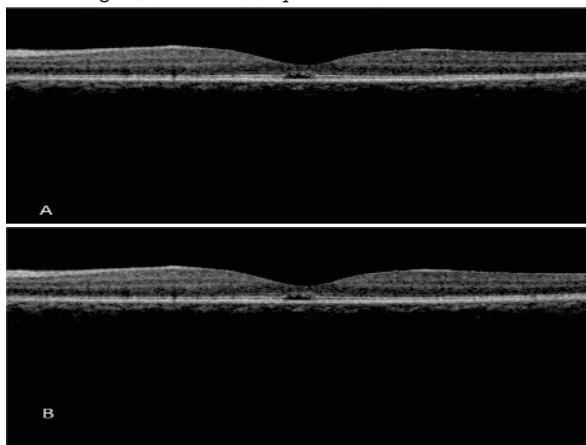


Figure 2: OCT showing a hole extending from the inner border of RPE line upto the external limiting membrane in right (A) and left (B) eye



Figure 3: Fundus autofluorescence image of right (A) and left (B) eye

DISCUSSION:

Electric welding arcs may generate radiation in a variety of wavelengths, from infrared to ultraviolet and beyond. Arc welders generate UV radiation, which is absorbed by the exposed cornea and lens, causing keratoconjunctivitis, also known as "welder's flash" or "arc-eye," an occupational hazard that, although being excruciatingly painful, is not thought to pose a long-term risk to vision. However, radiation in the visible and near infrared spectrum (400-1400 nm) penetrates through the eye and is absorbed by the retina, where, given enough intensity and time, it would likely result in thermal or photochemical damage that might be permanent and sight-threatening.^[3]

Welding-induced photic retinal injury is clinically rare and was first reported by Terrien in 1902.^[2]

Phototoxic retinal damage is multifactorial. It involves several mechanisms of action depending on the chromophore involved in the bright damage. The visual pigments, rhodopsin in particular, is the main chromophore responsible for such damage as it leads to the alteration of cellular function and cytotoxicity. Rhodopsin primarily exerts its effects in two ways: first, by a prolonged activation as meta-rhodopsin, which causes a decrease in the concentration of intracellular calcium and triggers apoptosis; and second, through the release of phototoxic chemicals.^[4]

Mild to moderate loss of central vision and foveal pigmentary changes are characteristics of macular lesions brought on by welding arc exposure. Acute phototoxic injury first manifests as depigmentation of the retinal pigment epithelium (RPE) and swelling of the outer retinal layers, and it then transmits to the inner layers of the retina. The high resolution OCT conducted on our patient indicated disruption in the ellipsoid zone i.e. inner segment/outer segment junction layer (IS/OS), which was associated with a reduced visual acuity.^[4]

In most of the cases, retinal injuries typically heal on their own without causing a visual loss. Although severe macula burns may result in a permanent loss of central vision, either completely or partially.

CONCLUSION:

Welder's Maculopathy is an established, but infrequently encountered cause of UV retinopathy. Careful occupational education should be discussed with each patient to ensure no future occurrences. Welders must be educated about photic retinal injury and should wear the proper protective device containing appropriate lenses to avoid potential retinal damage.

Acknowledgment

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Conflict of interest

There is no conflict of interest.

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