"The Growing Threat of Laser-Induced Retinal Injuries: A Case Series in Adolescents"

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Abstract

Laser-related retinopathy is an emerging concern due to the misuse of handheld laser devices. This case series highlights two instances of retinal injury from laser exposure, illustrating clinical features and OCT findings such as RPE disruption and secondary CNV. Emphasis is placed on diagnosis, limited treatment options, and the importance of public education and regulation to prevent these preventable vision-threatening injuries.

Introduction

Laser light retinopathy is increasingly reported due to the easy online access to handheld lasers, many of which are mislabeled and marketed as toys, posing risks particularly to children and adolescents[1]. Directed exposure to these devices can lead to retinal damage, with symptoms such as blurry vision or scotomas[2–5]. Injuries vary from retinal hemorrhages and retinal pigment epithelium (RPE) scarring to more severe outcomes like macular holes or choroidal neovascularization[6–8]. Optical coherence tomography (OCT) is essential for diagnosis, though treatment options are limited; most cases are managed conservatively[3,4]. Corticosteroids and anti-VEGF injections have been explored in some instances[9]. Young individuals are particularly vulnerable, with 80% of UK cases involving those under 20[9,10]. The risk depends on laser wavelength, power, exposure duration, and beam size[3]. Even class 3R lasers — commonly used in pointers — can cause immediate injury, sometimes worsened by inaccurate labeling[11]. This case series presents two cases of laser-induced retinal injury, highlighting clinical features, imaging, and management.

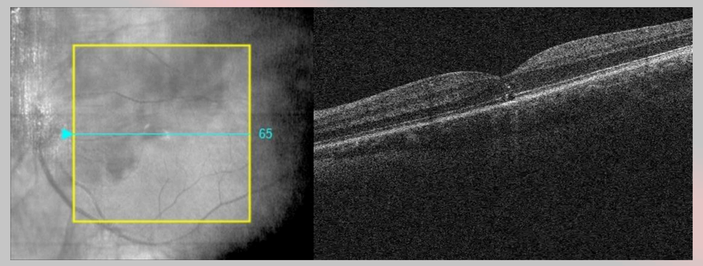
Case series

Case 1

A 17-year-old male presented to the casualty clinic with a history of reduced visual acuity in his left eye. He was initially seen by an optometrist, who had referred him for further evaluation. The unaided visual acuity was -0.10 logMAR in the right eye and 0.50 in the left eye. Upon further history, the patient reported that a laser pointer had been aimed at his left eye by a friend for approximately 2 minutes one year ago. The patient had no other medical conditions or previous ocular issues.



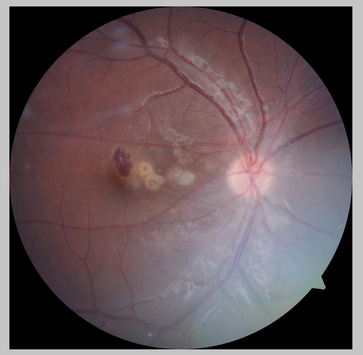
On clinical examination, the anterior segment findings were unremarkable, with a clear cornea, deep and quiet anterior chambers, and clear crystalline lenses bilaterally. Fundoscopy revealed a normal optic disc in both eyes, with a healthy macula in the right eye. However, RPE changes were noted in the left eye. OCT revealed photoreceptor and RPE damage in the left eye, which was consistent with laser-induced maculopathy. The patient was subsequently referred to the medical retina clinic for further management., where he has been listed for monitoring and follow-up.



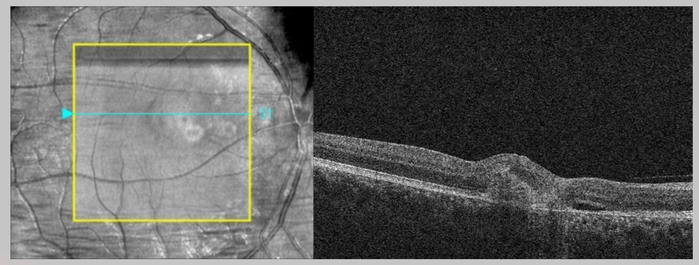
Case 2

A 13-year-old male presented to the retina clinic with sudden decrease in vision. His unaided visual acuity was 0.12 logMAR in the right eye and -0.06 in the left eye. On clinical examination, the anterior segment showed deep and quiet chambers, with clear crystalline lenses bilaterally.

Regarding the posterior segment, fundoscopy revealed a submacular haemorrhage and scarring in the right eye. OCT findings showed a pigment epithelial detachment (PED), subretinal fluid (SRF), and breaks in the Bruch's membrane. A fundus photo confirmed these findings.



A targeted history taking with these findings revealed previous history of an incident in which a laser pointer was aimed directly at his right eye a year before his presentation to the clinic. These features were consistent with photic retinopathy and secondary CNV. The patient was advised fluorescein angiography (FFA) for further evaluation and management, but refused, and he was referred to Moorfields for further treatment.



Discussion

Laser-induced retinal injuries are increasingly reported due to the easy availability of handheld lasers, often marketed as toys and accessible to children[1]. Shenoy et al. (2015) documented similar cases of retinal damage among military personnel, highlighting the serious risk of misuse[12]. This case series further demonstrates that even low-powered lasers can cause permanent retinal injury, particularly in young individuals[6]. The varied presentations — such as subretinal haemorrhage and RPE changes — reflect the complexity of these injuries. OCT was critical in confirming diagnosis and guiding management in both cases[4]. Although treatment is often limited to observation, patient education and close follow-up are essential. Regulatory actions, including sales restrictions and public education, are needed to reduce such preventable harm[13].

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