A 12-Year-Old Male with Acute Decreased Vision after Direct Viewing of a Laser

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Introduction:

A 12-year-old boy presented to our clinic with acute decreased vision in his left eye after direct viewing of a laser pointer three days prior. The patient described a central scotoma immediately after the injury, which has been slowly improving since the incident. He had no significant past ocular or medical history.

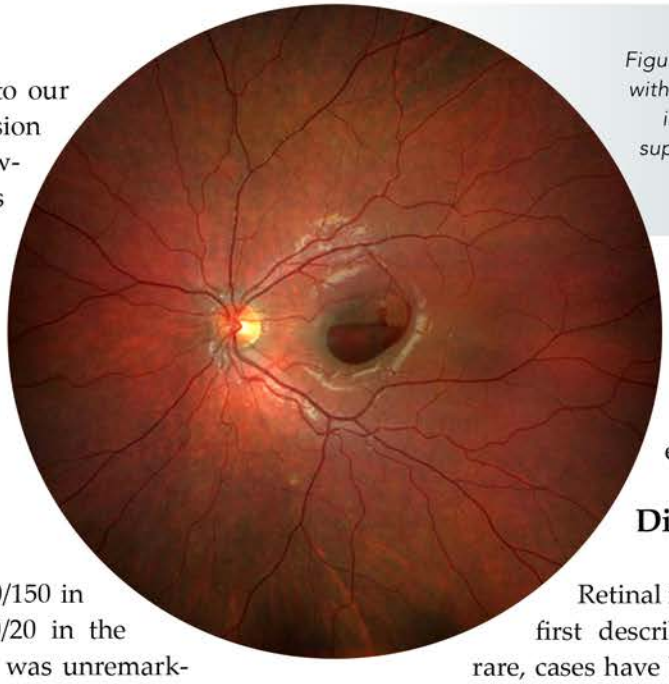

Figure 1. Fundus photo of the left eye with sub-ILM hemorrhage. Suspected impact site from laser noted to be superotemporal to fovea and source of hemorrhage.

Examination:

On exam visual acuity was 20/150 in the left eye, compared to 20/20 in the right. Anterior segment exam was unremarkable. Posterior examination of the left eye was notable for sub-ILM hemorrhage overlying the fovea. The hemorrhage was layered inferiorly, with the likely impact site noted to be superotemporal to the fovea (Image 1). OCT showed a large area of pre-retinal hyper-reflectivity with shadowing, representing the sub-ILM hemorrhage. Focal outer retina and RPE disruption was noted just temporal to the fovea at the suspected point of contact with the retina. Details regarding power and of laser pointer were unknown.

Initial management considerations were observation versus going to the operating room for vitrectomy and ILM peel to release the hemorrhage. Given the clinical situation, recommendation was made for conservative management, minimizing activity and refraining from contact sports, allowing time for sub-ILM hemorrhage to clear. We discussed with the patient and family about the possibility of a permanent scotoma at the laser impact site. The patient was seen in clinic one month later and vision had improved to 20/90 and the pre-ILM hemorrhage had improved significantly (Image 2). At his subsequent visit four months after the initial injury, the patient had full visual recovery to 20/20.

Discussion:

Retinal injury from laser pointers was first described in 1999.[1] Although still rare, cases have been on the rise with increasing availability of high-powered handheld lasers. 89 total cases were reported in the literature as of 2018.[2] The FDA regulates lasers to be <5mW (Class IIIa) to be advertised as a laser pointer, however more powerful laser pointers are readily available online and pose serious threats to retinal injury.[3] Clinicians should be aware of the hazards of laser pointers and should report injuries to the FDA.

Patients may present with yellow/gray spots within the macula, subretinal/intraretinal fluid, disruptions of RPE, hemorrhage or even full thickness macular hole.[4,5] Often the presentation may mimic solar retinopathy with yellow lesions on fundus examination, focal outer retinal disruption, and corresponding scotomas. Taking a thorough history plays a critical role in the evaluation, especially in children who may not have reported or sought medical care after a previous injury.

Extent of retinal injury depends on the power, wavelength, and duration of exposure. Red lasers typically

cause thermal photocoagulation injury due to the longer wavelength. Green lasers are typically higher powered than most red lasers and therefore can cause damage with shorter exposure time. Green lasers often result in damage to outer retinal layers, as its 532-nm wavelength is absorbed by melanin in the RPE. This can result in scarring, permanent scotoma, and possible CNVM formation.[4] Blue lasers are also often high powered, and its shorter wavelength focuses more anteriorly on the retina, resulting in prehyaloid hemorrhage or occasionally full thickness macular holes.[6]

Treatment is variable based on the extent and type of retinal injury sustained. No therapeutic intervention has been shown to be beneficial in laser pointer injuries to the retina although short courses of oral steroids have been tried with variable success.[7] There is a lifetime risk of choroidal neovascularization, which can be managed with anti-VEGF agents.[8] Long term prognosis is variable depending on the extent of the injury, with worse prognosis for those with RPE atrophy or macular hole.

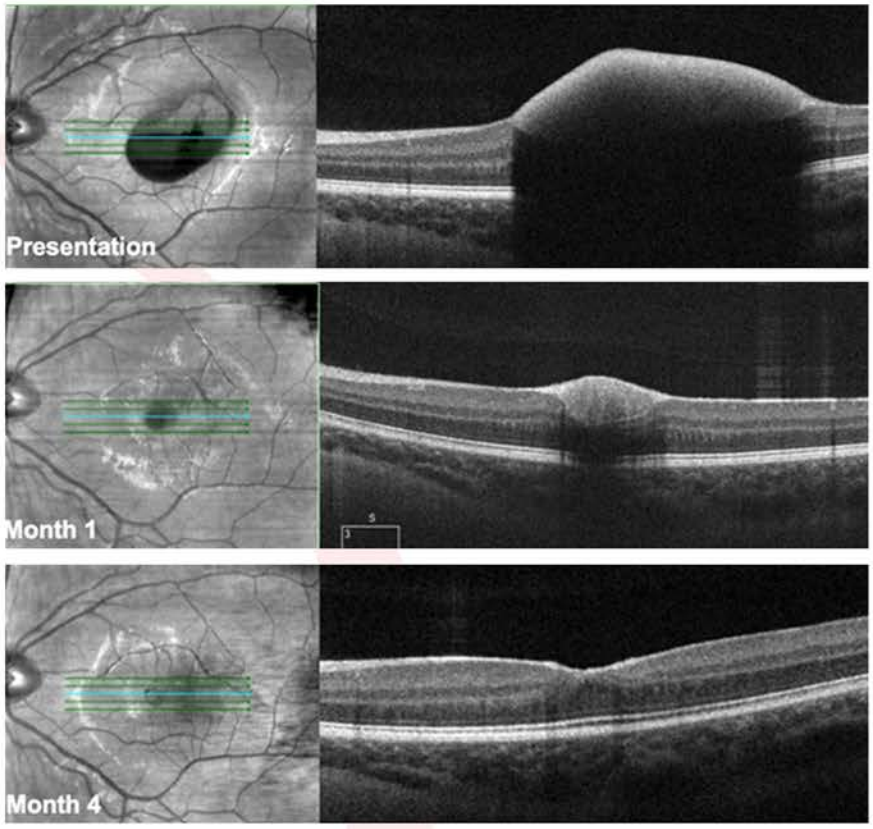

Figure 2. A large pre-retinal dense hyper-reflective lesion with shadowing consistent with sub-ILM hemorrhage was noted on presentation. This lesion resolved over four months of follow-up.

References:

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