Case Report

Bilateral ocular injuries with globe perforation and retinitis sclopetaria from birdshot shotgun: A case report and review of the literature

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Introduction

Ocular damage sustained from gunshot injuries may present in several ways. Most commonly, patients present with a globe perforation with or without a retained intraocular foreign body. Alternately, a unique condition known as chorioretinitis sclopetaria may occur, with damage to the choroid and retina from shock waves produced by high velocity projectiles that pass between the globe and orbital wall [1]. This type of injury may be suspected with findings of orbital air, metal, and/or bone fragments on imaging and is confirmed by ophthalmic examination. The visual prognosis of chorioretinitis sclopetaria is generally poor and warrants full ophthalmic examination if suspected. This case report describes a patient with multiple ocular injuries sustained from a birdshot gunshot, including a globe perforation in one eye and chorioretinitis sclopetaria in the other eye.

Case report

A 13-year-old sustained birdshot shotgun injuries with numerous metal pellets in the chest, neck, brain, and face (Fig. 1A, B) in a non-accidental, non-self-inflicted incident. Computed tomography of the face and orbit (Fig. 1C) showed right globe perforation with severe pre- and post-septal inflammation, and orbital floor and roof fractures from ballistic injury. The left globe appeared intact on imaging albeit with orbital roof and floor fractures, and metal fragments and air (Fig. 1C). Exam under anesthesia showed multiple, deep, right eyelid lacerations involving the canaliculus and margin. Globe exploration showed the right globe with a central corneoscleral laceration and exit wound adjacent to the optic nerve (Fig. 1C, D). All intraocular contents including the lens, retina, and...
vitreous, were expelled, therefore evisceration of the right eye was performed followed by eyelid laceration repair with canalicular stenting. Dilated exam of the left eye at that time was deferred given significant acute neurologic issues and need for pupillary response monitoring. Following neurologic stability 9 days after injury, dilated exam of the left eye showed dense pre-retinal hemorrhage nasally and moderate pre-retinal hemorrhage inferiorly and superiorly. Repeat dilated exam on day 12 revealed the characteristic appearance of chorioretinitis sclopetaria with choroidal and retinal rupture nasally, consistent with metal fragments and air along the medial orbit (Fig. 2A, B, white arrowhead). At 1.5 month follow-up, the patient had a best corrected visual acuity (BCVA) of 20/30 in the left eye, with resolving subretinal hemorrhage, chorioretinitis sclopetaria with proliferative changes, and mild retinal elevation in the nasal periphery (Fig. 2C). At 2.5 year follow-up, the patient had developed a very large, fibrotic membrane over the area of previous sclopetaria in the nasal quadrant (Fig. 2D) and chorioretinal atrophy extending from the peripapillary region to the nasal parafovea (Fig. 2E).

Discussion

This case report describes a patient with multiple ocular injuries sustained from a birdshot gunshot, including a globe perforation in one eye and chorioretinitis sclopetaria in the other eye. Chorioretinitis sclopetaria is a rare clinical presentation that results from trauma caused by a high-velocity projectile striking or passing adjacent to, but not penetrating, the globe [1]. It is characterized by rapid deformation of the globe with immediate rise of tensile stresses, causing rupture of the choroid and retina and exposure of the underlying sclera typically at the ora serrata and equator [2]. This is often accompanied by vitreous, pre-retinal, subretinal and/or choroidal hemorrhages. Furthermore, indirect contrecoup forces transmitted in a posterior-anterior direction behind the globe can result in a macular hole, foveal detachment, commotio retinae and traumatic maculopathy with photoreceptor loss [1–4]. A late dramatic pre-retinal fibrogliotic proliferation with pigmentary disturbance frequently occurs [1]. Interestingly, this is believed to cause firm adherence of the retina and choroid to the sclera to actually lower the risk of retinal detachment and subretinal neovascular membrane formation [5]. Further lowering risk of detachment is a formed vitreous and intact posterior hyaloid in young patients who are the most frequently implicated population in chorioretinitis sclopetaria.

Cases of chorioretinitis sclopetaria are relatively rare. A comprehensive literature review by Ludwig et al. examined all case reports of chorioretinitis sclopetaria in 71 eyes in 67 patients occurring between 1980 and 2018 [6]. The majority of these cases of sclopetaria were caused by indirect trauma to the globe with a BB (38.3%) or bullet (26.7%) [6]. Other less common mechanisms of injury included air-gun pellets, paintballs, and miscellaneous objects such as a nozzle, rod, nail, sinker, wine cork, and tree branch [6]. The prognosis for visual acuity in cases of chorioretinitis sclopetaria are typically poor, with reported final BCVA of No Light Perception (NLP) to 20/1000 in 49.2% of patients, 20/800 to 20/200 in 19.7% of patients, 20/100 to 20/25 in 14.8% of patients, and...
20/20 in only 16.4% of patients [6]. Visual prognosis is typically dependent on location of chorioretinitis sclopetaria, as well as severity of maculopathy and fibrovascular proliferation.

Vision may be additionally impaired secondary to macular holes. Ludwig et al. found that 7 out of 61 eyes that sustained chorioretinitis sclopetaria had a macular hole [6]. Management for these patients remains unclear given its low prevalence and differing outcomes. Grosso and Panico documented one case where repair of the macular hole resulted in an improvement of BCVA from 20/100 to 20/26 [3]. Kunjukunju et al. reported initial hole closure following surgical repair, which re-opened 1 month later with a final visual acuity of 20/200 [4].

Rare cases of retinal detachments have been reported and their unusual findings further demonstrate the low risk of detachments occurring with chorioretinitis sclopetaria. Ahmadabadi et al. reported 1 out of 13 patients who developed retinal detachment noted in an area with overlying posterior vitreous detachment but otherwise healthy retina [5]. In a series of 7 patients referred specifically for concern of retinal detachment or giant retinal tear, none were found to have detachments in short-term follow-up. Two of the 7 patients developed delayed retinal detachment at 1–2 years, which appeared to be iatrogenic in the first case following incomplete vitrectomy for a non-clearing vitreous hemorrhage from posterior vitreous detachment. In the second case, the patient was found to have a macula off retinal detachment however, no peripheral retinal tears were noted intraoperatively [7]. Initial management for patients with chorioretinitis sclopetaria is observation rather than surgery. This is corroborated by Ludwig et al. who showed no
statistically significant benefit of immediate surgery as compared to observation alone [6].

Our patient had macular sparing and a visual acuity of 20/40 at last follow-up. As noted previously, the sclopeteria area nasally had mostly been replaced with a large fibrotic membrane that extended from the far retinal periphery to the retinal mid-periphery, and then transitioned to an area of chorioretinal atrophy. The patient had developed some mild myopia, and was given spectacles for the dual purpose of monocular protection as well as improvement in visual acuity.

Declaration of competing interest

No funding was received for this manuscript. The authors declare no conflict of interest.

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