

resolution of their serous detachment within 2-12 weeks without any adverse sequelae.⁶ These patients require observation, and medical treatment with systemic antihypertensive drugs may be helpful. Vision loss following delivery in the setting of preeclampsia should arise suspicion for possible serous retinal detachment.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at <https://doi.org/10.1016/j.jcjo.2018.07.003>.

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Traumatic retinal dialysis resulting from Nerf foam bullet



Retinal dialysis is a common complication of blunt force ocular trauma.¹ Thirty percent of the retinal dialyses present in the inferotemporal quadrant, typically involving less than 3 clock hours of retina.^{2,3} The majority of retinal dialyses are sequelae of significant trauma to the affected eye.^{1,4-8} Here we discuss the presentation, management, and clinical course of a retinal dialysis caused by a small caliber Nerf foam bullet (Nerf N-Strike Elite dart; Hasbro, Pawtucket, R.I.) shot from a high-speed Nerf rifle (N-Strike Elite Rampage Blaster; Hasbro).

CASE PRESENTATION

A 43-year-old female presented to a group retina practice after being struck to the nasal aspect of her left eye with a Nerf foam bullet fired from a distance of approximately 6 meters (Fig. 2). The patient complained of a new onset of floaters but denied flashes or deteriorating visual acuity. There was no previous history of ocular surgery or other ocular trauma.

Upon examination, visual acuity was 20/20 in each eye. Intraocular pressures were within normal limits (14 OD, 09 OS). Anterior segment examination showed no evidence of a macroscopic hyphema, although a few cells were identified in the aqueous of the left eye. Posterior segment examination of the right eye was unremarkable. Posterior segment examination of the left eye demonstrated a retinal dialysis of approximately 3 clock hours in the temporal periphery. Adjacent commotio retinae with intraretinal hemorrhage were also identified (Fig. 1A). The patient underwent same-day

encrclage of the dialysis with indirect argon laser retinopexy. The patient was seen 2 weeks later in follow-up. At that time the retinal dialysis was found to be well demarcated with laser with no additional retinal pathologies noted (Fig. 1B).

DISCUSSION

High velocity projectile toys are relatively common in Canada. Airsoft guns and Nerf guns are 2 of the most popular such toys.

Airsoft gun pellets have been known to cause a variety of ocular injuries. In a case series of ocular trauma from airsoft gun pellets, anterior segment injuries included traumatic hyphema, corneal abrasion, lid contusion, traumatic iritis, and traumatic mydriasis. Commotio retinae has been described, although we could not find reports of retinal dialysis, tears, or detachments.⁹ Airsoft guns shoot plastic pellets. These pellets measure 6.0 mm in diameter and their mass ranges from 0.12 to 0.25 g.⁹ With speeds of 90-120 m/s, airsoft pellets can impact with a kinetic energy (KE) of anywhere from 0.5 Nm to 1.8 Nm.

There has been a single published report describing 2 cases of ocular injury caused by Nerf gun foam bullets.¹⁰ In both cases, the patient presented with reduced vision from hyphema. In one case the hyphema was associated with corneal edema, anterior uveitis, localized angle recession, and commotio retinae. Neither case described retinal dialysis, tear, or detachment.

The potential for ocular injury from Nerf projectiles is greater today than in the past due to increases in potential energy density (0.22 Nm/cm²) that approaches the 0.25 Nm/cm² standard set by the American Section of the International Association for Testing Materials (ASTM

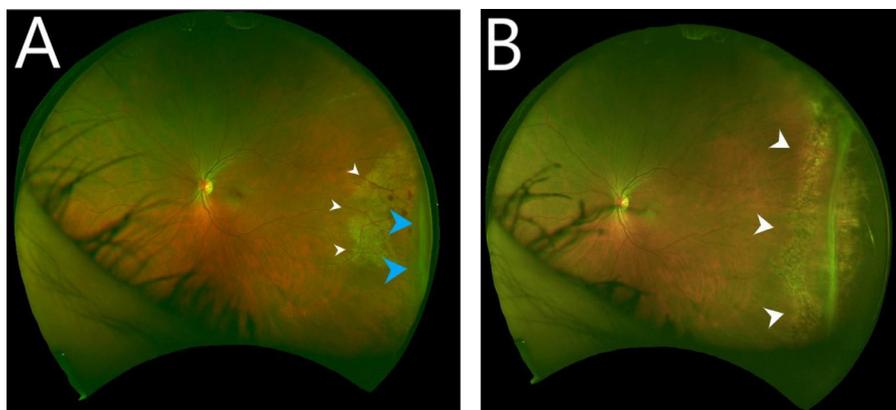


Fig. 1—A, Optos V2 Vantage Pro image of the retinal tear and detachment from 1:30 to 4:30 originating at 3:00. Note the commotio retinae and hemorrhage labeled with white arrows and the dialysis with the convex border of the fold at the leading edge labeled with blue arrows. B, Two weeks post-indirect laser retinopexy; white arrows indicate the laser treatment marks.



Fig. 2—The Nerf N-STRIKE Elite dart (Hasbro, Pawtucket, R.I.).

International) for projectile toys.¹¹ Improvements in gun spring technology, aerodynamic design, and increased weight for foam bullets (1.78 gm) and foam balls (1.94 gm) allows speeds to reach 110 kilometers per hour and 160 kilometers per hour, respectively.

Scott et al. found retinal avulsion at a KE of 1.20 Nm and retinal tear damage at 1.69 Nm in porcine eye models, illustrating the damage such energies can produce.¹² Given the weight and suggested velocity of the Nerf bullet in this case, the energy on impact was calculated at 0.4 Nm. Despite this relatively low kinetic energy a retinal dialysis with commotio occurred. This result suggests that Scott et al.'s KE porcine model may be in need of reevaluation when assessing human ocular trauma.

Interestingly, today's Nerf high velocity ball projectile technology enables projectile speeds to reach 45 m/s with a kinetic

energy of 1.92 Nm. This increase in kinetic energy is sufficient to cause both anterior and posterior segment injury. Such an injury has the potential to cause permanent vision loss.

This case highlights the importance of eye protection when playing with foam projectiles and suggests that particular caution should be exercised when playing with high velocity Nerf bullets or balls.

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Congenital neonatal herpes simplex retinitis



Neonatal herpes simplex virus (HSV) 2 infection seldom occurs with an incidence of 1 in 3000 live births in the United States.^{1,2} Most commonly the virus is acquired through the birth canal. Very rarely the infection is developed in utero, presumably transplacental via chorionic villi.^{1,3} In utero infections can cause pneumonia, myocarditis, hepatosplenomegaly, encephalitis, hemolytic anemia, cerebral palsy, and mental delay.¹ Ocular manifestations include cataracts, corneal ulceration, anterior uveitis, vitritis, chorioretinitis, and optic atrophy.^{1,3–9}

Neonatal and postnatal HSV 2 infections can cause localized cutaneous, perioral, and ocular involvement or disseminate to affect the central nervous system, adrenals, liver, and lungs.^{1,3,5} Approximately 4% of all neonatal HSV infections can result in microcephaly, hydrocephalus, chorioretinitis, and

vesicular skin lesions at birth.⁵ When the eye is involved, the most common type of ocular involvement is usually blepharconjunctivitis or keratitis,⁴ with very few cases of chorioretinitis or optic atrophy ever reported.^{3,4}

A 34-week neonate was born by C-section at University of Florida Shands Hospital to an 18-year-old southern Caucasian mother who had premature rupture of membranes at the time of birth. At birth the patient was noted to have good respirations, heart rate, colour, muscle tone, and reflexes, with a low birth weight of 1732 g. The neonate was taken to the NICU as he continued to become hypoglycaemic despite feeds. On the second day the infant was found to have vesicular lesions on his abdomen, which progressed to his oral cavity, hands, and base of feet bilaterally. The mother denied any history of oral or vaginal lesions as well as any intercourse during the pregnancy. The patient underwent a full work-up for TORCHES infection, which was negative for toxoplasma,



Fig. 1—Sagittal nuclear magnetic resonance image depicting hydranencephaly with complete cystic encephalomalacic loss of the bilateral frontal/temporal, and parietal lobes as well as diminution of the cerebellar hemispheres and brainstem with relative sparing of the occipital lobes.