Episcleral Therapy for IED-Related Ophthalmic Injury

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PUBLIC ABSTRACT

Background: Vision loss from ocular trauma and brain injury, caused by improvised explosive devices among other sources, are pressing concerns in Iraq, Afghanistan, and future engagements. Following ocular trauma, the cells in the retina that enable vision die, leading to irreversible visual loss. Similarly, death of such retinal cells leads to visual loss as a consequence or complication of other common ophthalmic conditions including glaucoma, AMD, and diabetic retinopathy. There are currently no therapeutic interventions available to prevent such retinal cell loss.

Objective/Hypothesis: The drug brimonidine and preclinical compound EC-4565 have demonstrated retinoprotective efficacy in clinical, and in the latter case, animal models. Both moderate retinal cell loss in several models, and EC-4565 also preserves a subset of retinal cells (photoreceptors). These compounds will be delivered to the retina via an episcleral device suitable for immediate placement on the battlefield by non-specialized medical personnel. The device is placed on the outer wall of the eye (much like a transdermal patch) and is non-invasive and as such has minimal side effect potential. Most importantly, the device enables delivery of high concentrations of drugs to the retina necessary to prevent retinal cell death and loss of vision.

Timelines: The aim is to develop neuroprotective treatments to slow or stop vision loss resulting from traumatic brain injury (TBI)-related ocular trauma. Once available, the device may be placed on the eye proximate to the battlefield setting, which is critical as death of retinal cells may occur quickly following trauma. The development path should enable both drugs to be in clinical investigation within 2 years.

Impact: The Blinded Veterans Association reports that 64% of those with TBI test positive for visual dysfunction and vision loss after ocular trauma. This is a consequence of death of retinal neurons and photoreceptors. There are currently no available treatments for these conditions. Similarly death of retinal cells as a consequence of glaucoma and other ocular conditions leads to progressive blindness. By combining novel retinoprotective compounds with a novel drug delivery device, we should, for the first time, be able to reduce retinal cell death and consequential visual loss.

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