ORIGINAL ARTICLE

Non-organic Vision Loss in the Afghanistan and Iraq Conflicts

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ABSTRACT

Non-organic visual loss (NOVL), defined as a decrease in visual acuity or field without an identifiable organic cause, can be challenging to diagnose, especially in patients whose NOVL is superimposed on some component of true organic pathology. Exposure to combat puts soldiers at risk of emotional distress and physical trauma, which can contribute to the development of NOVL with conversion disorder or malingering. This case series describes six patients with NOVL who sustained ocular or non-ocular injuries while serving in combat operations in Iraq and Afghanistan, and highlights diagnostic pearls and components of inter-disciplinary management in the unique military context.

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Introduction

Functional or non-organic visual loss (NOVL) is defined as a loss or decrease in visual acuity (VA) or visual field range with no identifiable organic cause.¹ It is a condition that can be found in both children and adults, with several reports citing an incidence of approximately 1.75% in children and 5.25% in adults presenting to the outpatient ophthalmology clinic.² NOVL can be a difficult diagnosis to make and requires a high index of suspicion. NOVL is time-consuming. This can be especially difficult in the setting of true organic pathology, as was the experience with several patients presenting to the Walter Reed Army Medical Center and Walter Reed National Military Medical Center Ophthalmology Department after sustaining either ocular or non-ocular injuries during operations in Iraq or Afghanistan. Much like in prior military conflicts, NOVL is not an uncommon occurrence, with patients falling in the spectrum of malingering for secondary gain, to those patients with true underlying psychological disorders.

Regardless of the aetiology, the identification of NOVL can be a tedious and potentially

frustrating process for the ophthalmologist, especially in the setting of patients with true pathology that can be difficult to associate with the patient's ocular or visual complaint. Additionally, several series have reported an incidence of up to 53% of NOVL in adults in the setting of concomitant organic disease.^{3–5} Fortunately for the ophthalmologist, there are several practical approaches to elucidate such a diagnosis, which can potentially save a considerable amount of time, energy, and money for both the ophthalmologist and patient and expedite more appropriate care for the patient.

This case series examines several such patients with NOVL who either were injured or developed an ocular condition while serving in Iraq or Afghanistan and were subsequently evaluated and followed at either Walter Reed Army Medical Center or Walter Reed National Military Medical Center between 2007 and 2014. The aim of this series is to provide a review of several possible presentations of NOVL and the various modalities that the ophthalmologist can use to arrive at a diagnosis of NOVL in the setting of concomitant injury.

Case description

Case 1

The first case involves a 40-year-old female who sustained a traumatic brain injury (TBI) during a vehicle roll-over secondary to an improvised explosive device (IED) blast. Her injuries were otherwise non-life-threatening, and she showed continued recovery over the subsequent months. Several months after her initial injury, she developed complaints of poor depth perception and difficulty navigating her environment. She told her primary rehabilitation team that she would need to re-position her head to see objects in different positions of her visual field. She presented to the ophthalmology clinic with a chief complaint at that time of blurry vision right greater than left at far and near, horizontal diplopia right eye (OD), eye fatigue, and extreme dryness in both eyes (OU). Her past ocular history was non-contributory except for mild myopia, and her past medical history was significant for the above as well as migraines and asthma. On examination, her VA was 20/20 OD; 20/25 left eye (OS); intraocular pressure within normal limits (IOP WNL); no relative afferent pupillary defect (RAPD); vestibulo-ocular reflex (VOR) normal with normal head-thrust; VOR suppression normal; no nystagmus; no internuclear ophthalmoplegia (INO). Otherwise, the remainder of her ophthalmologic examination was completely normal, including normal cover-uncover and cross-cover testing with distance and near targets. Several findings on her neurologic examination, however, suggested a functional overlay, including mild astasia-abasia on tandem gait, and touching her mouth with her finger instead of her nose on finger-to-nose (FTN) eye closed testing (both sides). Her cranial nerve examination and motor, sensory, and reflexes were all normal.

Case 2

The second case involves a 22-year-old male involved in an IED blast while riding in a vehicle in Afghanistan. The soldier did not sustain any direct trauma from the blast and did not meet the diagnostic criteria for a traumatic

brain injury (TBI). After returning from his deployment, he developed a central corneal ulcer OD, likely secondary from an abrasion. He was followed by a cornea specialist at that time and was left with a central, anterior stromal scar OD, with the worst recorded VA being 20/40 OD in late 2007. During the following year, he developed a complex headache syndrome that was followed closely by his primary care physician and his neurologist. He was referred to the Walter Reed ophthalmology clinic early in 2009 with complaints of complete vision loss in his right eye. On initial presentation, his VA OD was count-fingers vision at 2 feet and near-total visual field loss on visual field testing despite a largely normal ocular examination. His faint anterior stromal opacity from his prior corneal scar was not consistent with his significant degree of visual impairment. Binocular visual field testing revealed loss of right hemifield, consistent with a functional syndrome. Reassurance was given to the patient who was subsequently lost to follow-up.

Case 3

The third case involves a 22-year-old female injured in an IED blast in Afghanistan resulting in multiple intraorbital foreign bodies and a choroidal rupture in her right eye, as well as multiple extremity fractures. She was followed closely by ophthalmology with close observation of her foreign bodies and the choroidal rupture. After several months of close follow-up, her examination remained stable with a VA of 20/20 OU. In August of that same year, she returned for routine follow-up with a new complaint of a temporal visual field defect. Her examination had remained largely unchanged from previous; however, a visual field test revealed a large temporal field cut in the right eye, with a normal examination on the left. Based on her changing description of the defect, the ophthalmologist ordered a binocular visual field that showed the same defect, which is consistent with non-physiologic field loss (Figure 1a–c). After reassurance, the patient's visual field loss improved spontaneously.

Figure 1. Case 3. Binocular visual fields.

HVF 24-2 showed a cloverleaf pattern OU, and on binocular HVF testing he had a normal result. A tangent screen examination performed the next day showed a significant restriction in his HVF OU, which was inconsistent with his HVF results, and a Goldmann visual field revealed a spiraling pattern OU, suggestive of a functional component (Figure 2).

Case 6

The sixth case involves a 22-year-old female who developed symptoms of decreased vision, tinnitus, stiff neck, ataxia, vertigo, and headaches in Afghanistan shortly after being peripherally involved in a blast that did not result in any other injuries. She was evacuated from Afghanistan for symptoms that were felt to be consistent with Vogt-Koyanagi-Harada (VKH) syndrome. On initial examination, her VA was 20/50 OD and 20/40 OS and she was noted to have patches of retinal oedema in the temporal macula OU, thickened choroid OU, as well as trace optic nerve head hyperaemia and oedema OU. There was no evidence of active anterior or posterior inflammation. OCT examination showed loss of photoreceptors in the temporal macula OU, and she was noted to have binasal hemianopia that did not completely respect the midline. A broad laboratory work-up, including a lumbar puncture (LP), were all within normal limits. Despite initiation of treatment on high-dose oral prednisone, her condition failed to improve. She was subsequently started on cyclosporine and then mycophenolate mofetil, and by August 2012, her vision was reduced to

counting fingers. Fluorescein angiogram showed no leakage, no vasculitis, and some stippled hyperfluorescence inferotemporal to the fovea OU. Indocyanine green angiography (ICG) testing was within normal limits. A family member was flown in to escort the soldier everywhere and to assist with the activities of daily living. She was referred to other facilities for further evaluation, by which point she had hand-motion vision. On their respective evaluations, they did not believe that her examination and symptoms were consistent with a diagnosis of VKH because of lack of characteristic eye examination, OCT examination, angiography, or LP findings. She had a normal ERG, normal VEP, and normal-appearing fovea on OCT. Her ocular examination did not explain the degree of vision loss, and there were several inconsistencies noted during these encounters. First, she failed to perform the finger-to-finger test, with her own fingers, which is a marker of cerebellar function, as opposed to visual function. Second, she was able to see an OKN drum despite having light-perception vision during a follow-up visit at another facility. Although she has clear ocular pathology, her visual complaints are not explainable by any obvious pathology. She was vigorously followed by the medical-psychiatric team in hospital.

Discussion

Patients with functional visual loss are encountered frequently, with some series reporting an incidence of functional vision loss of 0.5–5%.^{1,2,6,7} The clinician must have a high index of suspicion, which can

Figure 2. Case 4. Goldmann visual field.

be challenging in the setting of true ophthalmic pathology, and must not assume a diagnosis of NOVL until other organic diagnoses have been ruled out. The patients we describe underwent thorough evaluations, often by multiple providers on separate occasions as they progressed through the aeromedical evacuation system back to tertiary care facilities. The diagnosis was initially elusive, but a detailed history, close follow-up, and several important examination techniques assisted the multi-disciplinary team in correctly diagnosing the patient.

Techniques for evaluating NOVL

Techniques for evaluating suspected NOVL have been well described in the literature.^{6–11} The binocular visual field test proved useful in the evaluation of several of this series' patients complaining of monocular visual field deficits. With a true, organic monocular field loss, the patient's fellow eye will compensate for all or a portion of the defective field from the eye with the complaint on binocular visual field testing.⁶ In the functional patient, as seen in our series, the field defect often carries over to some degree on binocular field testing. If the results from binocular visual field testing are not as clear-cut, repeat field testing can often reveal significant variability in patient responses over time. In patients complaining of peripheral concentric loss, automated perimetry may actually not be useful given the variability of responses and testing patterns that make it difficult to confirm a functional overlay. In these patients, kinetic visual fields with Goldmann visual field administered by a well-trained certified ophthalmic assistant (COA) or a certified ophthalmic medical technologist (COMT) may be a more reliable technique and can be repeated to assess for inter-test variability in patient response.¹¹

Testing for monocular blindness includes red-green glasses, OKN drum with unaffected eye occluded, mirror test with unaffected eye occluded, 4-PD (prism dioptres) prism test, refractive fogging of the unaffected eye, and stereoacuity testing (fly test, Worth 4 dot).¹² Although Sitko et al. found an association between stereoacuity and VA, they also noted that commonly used VA estimates based on stereoacuity overestimated VA.¹³ In their study, they established a minimum

predicted VA from stereoacuity testing that can suggest, but not confirm, a diagnosis of NOVL.¹³ We found this testing strategy most useful when a significant discrepancy existed between VA and stereoacuity. Although not definitive, it was a useful adjunct to other testing strategies.

Examination of feigned binocular blindness should include simple observation of the patient (i.e., navigating around obstacles in clinic), finger-tip touching (testing proprioception as opposed to visual pathways), pupillary response, and sudden intense illumination test. For those complaining of decreased vision, additional strategies include using unfamiliar chart types, variable testing distances, and a tangent screen test.¹² As patients with NOVL may have severe photophobia limiting compliance with such examination manoeuvres, the OCT (as described in case 5) may serve as a useful tool in excluding various anatomical pathology as the aetiology of the patient's symptoms.

NOVL in the military

When a diagnosis of NOVL is made, the subsequent management of the patient requires an understanding of potential aetiologies or underlying motivation.¹ Some patients with NOVL require psychiatric evaluation and management, as conversion disorder subsequent to a traumatic experience can often manifest as a visual loss or field cut.⁸ Conversion disorders comprise one or more altered voluntary motor or sensory functions that are not intentionally produced, not explained by other disorders, and are associated with stress or trauma; manifestations include "special sensory symptoms", including visual symptoms.¹⁴ Case reports of conversion disorder, often likely classified as "hysteria" or "shell shock", date at least to World Wars I and II, with functional blindness described amongst its manifestations in military populations.¹⁵ Other military case reports describe non-organic hearing loss, stuttering or dysfluency, as well as psychogenic vision loss.^{16–20} Such patients should be reassured of the good prognosis for visual recovery, and they may benefit from psychiatric referral, behavioural therapies, or visual exercise activities.

One therapeutic technique that has been used in the military population is “retinal rest”. First described in 1913 for treatment of NOVL caused by conversion disorders or malingering, this technique involved bandaging the eyes to limit visual input for a set period of time. Subsequent variations of the therapy were adapted and utilised at Walter Reed Army Medical Center during the Vietnam conflict and during the Gulf War at Fitzsimons Army Medical Center.¹²

Malingering should be considered in cases of secondary gain as motivation, as is likely the case with the patient in case 5, whose progressive visual complaints could have been influenced by his upcoming military retention boards. The *Diagnostic and Statistical Manual of Mental Health Disorders* defines malingering as the “intentional production of false or grossly exaggerated physical or psychological symptoms motivated by external incentives such as avoiding military duty, avoiding work, obtaining financial compensation, evading criminal prosecution or obtaining drugs.”¹⁴ Those with factitious disorder, on the other hand, are motivated by the desire to simply assume the role of the sick patient. Patients with access to online medical references containing detailed descriptions of presenting signs and symptoms for common disease processes may easily be able to feign “textbook” visual symptoms.

Estimations of the occurrence of malingering in the military vary, and the occurrence may, in fact, be under-reported. An Armed Forces Health Surveillance Branch report notes 5311 service members over a 15-year period with at least one visit where malingering or factitious disorder was recorded as a diagnosis. Of these, over 80% were due to malingering. The report suggests higher rates of malingering in recruit trainees, junior enlisted personnel, and those under age 20.²¹ Other studies report that the prevalence of malingering in the military is around 5%.²² A 2013 study published in *Military Medicine* examining Northern Regional Medical Command database from 2006 to 2011 found that of over 28 million visits, 1074 individuals were diagnosed with malingering (91.7%) or factitious disorder (7.8%). These patients tended to be young, male, non-married, and enlisted.²³

Identifying and treating suspected malingerers should involve a multidisciplinary team in a non-

judgmental setting.²⁴ Clinicians suspecting malingering as a source of NOVL must be careful in considering this diagnosis in military settings, as false diagnoses of malingering not only may undermine the therapeutic relationship or cause a critical diagnosis to be missed but also may expose the patient to military prosecution.

In summary, the process of diagnosing NOVL begins with a detailed history and a high index of suspicion. The examination and work-up must thoroughly exclude any organic aetiologies. Once NOVL is suspected, ophthalmologists have several simple examination techniques at their disposal to properly identify these patients. In caring for military patients suspected to have NOVL, especially those with a history of experiencing a traumatic event, special attention must be given to understanding and addressing the circumstances and broader context that may have contributed to the development of NOVL. The intense demands placed on military members during times of conflict and deployment, including separation from family and the ever-present risk of injury or death, may make this population prone to NOVL. Early recognition of NOVL may lead to timely access to appropriate psychiatric care and support for such patients, as well as prevention of over-utilisation of unnecessary, costly, and time-consuming testing.

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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