War-Related PTSD, Blast Injury, and Anosognosia

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With the end of Operation Iraqi Freedom (known by most as the “War on Terror”), deployed soldiers and other personnel of the United States armed services and National Guard are returning home. Operation Enduring Freedom in Afghanistan continues. More than 4,000 individuals have died in these war-related operations, and a far greater number endure lingering harm. In addition to physical devastation of lost limbs, vision, hearing, and mobility, injury often manifests in the form of neuropsychological and neuropsychiatric impairment. Perhaps the most commonly acknowledged of these maladies is Post-Traumatic Stress Disorder (PTSD), a potentially life-altering hazard of war-related events. In tribute to all armed forces and other wartime personnel for their untold bravery and selflessness, this issue of *Neuropsychology Review* presents a special section on PTSD in Operation Iraqi Freedom coupled with considerations of blast-induced traumatic brain injury.

In introduction to this section edited by Maxine Krengel, Ph.D., I am taking editorial liberty to provide thoughts on the history of PTSD in wartime and an hypothesis regarding PTSD, likely concomitants (notably, blast injury), and the problems of *self*-identification of PTSD or blast sequelae, signs, and symptoms.

Precursors to war-related PTSD date back to ancient warriors (the compelling history of PTSD written by Steve Bentley for *The VVA Veteran* should be on our list of required reading: http://www.vva.org/archive/TheVeteran/2005_03/feature_HistoryPTSD.htm). Similar problems permeate the

history of wartime exposure and were clearly documented in the Civil War. Traumatized soldiers were deemed to have “Soldier’s Heart,” were considered to be weak and flawed, were mistreated, and even executed as cowards or deserters. A recent accounting of the psychiatric and other medical burden of Civil War soldiers noted that enlistment age was as young as 9 years (Pizarro, et al. 2006). Not surprisingly, younger soldiers sustained the greatest psychological and physical insult.

Modestly more humane considerations were given to the afflicted of The Great War, WWI, said to have “shell shock.” Some were sent to “war neurosis hospitals” for treatment, such as experimental therapies based on electroshock or thermal baths. A careful accounting published in *The Lancet* (Myers 1915) by a medical officer of the British Royal Army described three cases of shell shock. Each soldier suffered blast injuries resulting in a similar constellation of neuropsychological signs and symptoms, including varying degrees of loss of memory, vision, smell, and taste. Despite the detailed histories and quantitative assessment of sensory, motor, and cognitive status, the conclusion proffered was perplexing: “The close relation of these cases to those of ‘hysteria’ appears fairly certain.” One might speculate that in the lexicon of his time he used the now pejorative term of hysteria to explain the concept that psychological processes can lead to physiological manifestations.

The “shell shock” of WWI became “battle fatigue” in WWII, and in the Korean Conflict it evolved to “operational exhaustion.” By the Vietnam War, the term traumatic stress disorder was introduced and later evolved to PTSD (also see George Carlin’s “PTSD Euphemisms:” <http://www.youtube.com/watch?v=jeGKuTZtkpg>). Despite earlier mention (Myers 1915), it has only been recently with the “War on Terror” that blast-related head injury, even without obvious bodily lesions, is recognized as a significant concomitant of

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PTSD. The Zeitgeist might have enabled observation of this connection because of the multiple deployments of individuals, thereby increasing the chances of blast injury, repeated exposures, and accruing psychological and neural trauma.

For the first time, neuroimaging studies of blast-exposed soldiers reveal CNS injury in the form of disruption of brain white matter microstructure, detectable with Magnetic Resonance Diffusion Tensor Imaging (MR DTI) (Mac Donald et al. 2011; Sponheim et al. 2011; but see Levin et al. 2010), and of functional connectivity, detectable with phase synchrony analysis of scalp recorded EEG (Sponheim et al. 2011). In November 2011 (http://www.pbs.org/newshour/updates/military/July-dec11/stress_11-04.html), General Peter Chiarelli, the Army vice chief of Staff, recommended changing PTSD to PTSI, for Post Traumatic Stress Injury. The reasoning was to minimize the stigma of regarding the condition as a psychiatric disorder and recognizing it as a physiological as well as psychological injury. The hope was to encourage more soldiers to come forth declaring their war-incurred injury, given estimations that fewer than half of those with significant symptoms of PTSD report it for fear of lifelong stigma and job loss.

I would like to pose an hypothesis as an additional reason for under-reporting PTSD. The afflicted need to recognize that they have symptoms PTSD before seeking treatment. This ability requires personal insight to recognize associated neuropsychological and neuropsychiatric compromise. Why should we expect that soldiers of traumatic war experiences, especially when coupled with blast exposure, would be immune to neural insult contributing to dampened insight? In neuropsychology, we recognize an entire category of neurological signs that go undetected by the affected and are not considered hysterical or psychotic in nature. These are the agnosias, and perhaps most appropriately in these cases, anosognosia, the impaired awareness of one's own disability.

Ironically, it was Freud who introduced the term agnosia to describe the inability to recognize a common object despite ability to use the object. Agnosia expanded to include other perceptual impairments, for example, in face recognition

(prosopagnosia), voice recognition (phonagnosia), and identification of simultaneously presented objects (simultanagnosia). Localizing neural network substrates of these agnosias has been facilitated by functional neuroimaging, thereby giving a physical substrate to these behaviors previously considered bizarre and even deemed hysterical.

Perhaps we need to overcome our diagnostic agnosia and consider the possibility that a subset of deployed men and women returning from the battlefield are anosognosic for their functional compromise. Recognizing that psychological experiences change our perceptions, the emergent symptoms of PTSD might even be considered psychologically accommodating to the rupture of normal perceptions and expectations caused by repeated and severe—unimaginable—combat experiences incongruent with life until that time.

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