

## Recent Findings about Combat-Sustained TBI: Including Some Good News

By David Durham, M.D., M.P.H.

It is well-known that traumatic brain injury (TBI) results in a high mortality rate among its victims and is the leading cause of disability in war zones. What is less known is that the majority of combat-sustained TBIs are proving to be moderate in their severity.

Recent findings show that TBI sustained during combat via either blunt or sonic (blast wave) trauma has risen to be the most common category by a factor of 20:1. Sonic trauma has grown epidemically, with most injuries amplified by the metal armor lining all military vehicles. Many combat troop transports are nearly air tight if all their hatches are sealed. A closed system increases sonic wave amplitude and decreases its wavelength, thereby intensifying the blast affecting troops riding inside.

New research in effective pharmaceuticals – now in human trials – point one way towards the solution here: a drug that can allow injured members of the armed forces to walk away from a TBI injury *in many cases without any permanent deficits*.

Being able to recognize basic symptoms caused by TBI is a valuable step until effective treatments are available. Some common symptoms of early phase trauma include:

- Lack of normal ‘sponginess’ upon palpation of closed eyes, indicating increased intracranial pressure
- Subconjunctival hemorrhages (when a tiny blood vessel breaks just underneath the clear surface of your eye)
- Tinnitus (ringing in the ears)
- Nausea/vomiting
- Slurred speech
- Stupor
- Decreased hearing acuity

Some common late phase symptoms include:

- Deficits in memory and span of attention
- Disinhibition/Impulsivity
- Sleep Disturbances (from insomnia to excessive sleepiness)
- Word-finding difficulty, occasional language perseveration (e.g. repetition of words or phrases)
- Paranoia/aggression in social settings
- Commonly misreading conventional social cues (e.g. believing there is a ‘threat’ when there is not)
- Difficulty with language expression and understanding

The majority of combat veterans seek treatment for a TBI for the first time *one to two years after sustaining the injury*. Many combat veterans are opting to seek treatment at private, non-

VA, facilities and with non-VA physicians because of the growing frustration regarding stifling 'intake and assessment' procedures that has been mounting among veterans for years.

There is a promising new treatment for TBI being reviewed by the FDA now. It utilizes perflouorocarbons (PFCs) to rapidly transport oxygen to the brain when it needs it most: minutes or a few hours within injury. Because oxygen is dissolved into PFCs, and not tightly bound as it is in hemoglobin, PFCs can deliver oxygen at twice the rate of our own hemoglobin, and in larger amounts specifically to injured areas due to principles of diffusion.

The new medicine is called Oxycyte. It serves as a blood substitute that speeds the delivery of oxygen to the brain. If reason prevails, combat zones will have access to it in coming months. And so will emergency rooms...including those at V/A hospitals.

\*\*

Dr. David Durham is a neuropsychiatrist specializing in traumatic brain injury. He is Managing Partner and Director of Brain Injury and Neurocognitive Rehabilitation for The Mosaic Neuroscience Group in Santa Fe and Roswell New Mexico, the former director of the Neuroscience Research Institute, a former medical consultant to the Fox Ten O'clock News in Roanoke, Virginia and a consulting physician with New Mexico Psychiatric Services and Redpoint Research in Arizona. Dr. Durham receives no compensation from pharmaceutical companies. He served with the US Army in the early 1990s and was in Iraq in 2007 with the 2<sup>nd</sup> ID, 1/23, 3<sup>rd</sup> Combat Stryker Brigade completing his documentary film "First Platoon: an uncommon brotherhood". He is the proud son of a US Marine former scout/sniper and drill instructor.