Repeated Concussions: Time to Spur Action Among Vulnerable Veterans

The Secretary of the United States Department of Veterans Affairs (VA) Honorable Robert McDonald recently pledged to donate his brain for chronic traumatic encephalopathy (CTE) research. Citing exposures to football, rugby, boxing, and paratrooper escapades as an army ranger, Secretary McDonald suggested that his brain could add to the body of knowledge on the effect of repeated concussions. In the meantime, work is under way to make the connections between the CTE postmortem diagnosis and the clinical findings while people are alive. Such knowledge is expected to positively impact medical management for people at risk and inform necessary policies, preventive actions, and health equity issues.

Even though recent CTE discussions have focused on the definitive findings among football players and other sport athletes, the root cause of the pathology—repeated concussion—is prevalent among veterans in the form of traumatic brain injury (TBI). Veterans tend to have a higher incidence of TBI than comparable counterparts in the general public as a result of military service exposures. Since 2000, there have been 344 030 medical diagnoses of TBIs in the United States Armed Forces and more than 80% of these injuries are considered mild in nature. Brain injuries are a major concern in the United States. Annually, approximately 1.7 million people experience a TBI. These injuries contribute to a third of all injury deaths.

Traumatic brain injury is an alteration in brain function or other evidence of brain pathology caused by an external force leading to temporary or permanent impairment of cognitive, physical or psychosocial functions—the polytrauma triad. Mild TBIs (mTBIs) or concussions present with an initial impairment in sensorium (unconscious or altered consciousness) for 30 minutes or less and can result in longstanding deficits in all spheres of functioning in a small percentage of individuals.

As a result of an increased use of improvised explosive devices, mTBIs were deemed the “signature injury” of the recent Gulf War occurring in up to 20% of all deployed US service members. Importantly, persistent symptoms and functional difficulties from these combat-associated concussions, which generally last more than three months after injury, have been seen in approximately 40% of these concussed individuals and 8% of all veterans seen in the Veterans Affairs clinics from the conflicts. The long-term effects of single or multiple mTBIs in later life are poorly understood, but recent research suggests a possible connection between multiple concussions and neurodegeneration.

Chronic traumatic encephalopathy is a progressive neurodegenerative syndrome caused by single, episodic, or repetitive blunt force impacts to the head and transfer of acceleration–deceleration forces to the brain. The condition presents clinically after a prolonged latent period as a composite syndrome of mood disorders, and neuropsychiatric and cognitive impairment. It usually presents with a prolonged latency period; however, some patients with CTE may not exhibit the classic prolonged latency period before clinical symptoms begin. Definitive CTE diagnosis remains in direct brain tissue analysis after death; however, a presumptive clinical diagnosis of CTE can be made based on a constellation of pathognomonic symptoms.

Chronic traumatic encephalopathy belongs to the spectrum of chronic TBI and is a direct, long-term, and permanent consequence of TBI. Military veterans who are exposed to all types of TBI, including acceleration–deceleration injuries of the brain from exposure to ordinances, stand a reasonable risk of developing CTE.

Research is beginning to show that some of the posttraumatic stress disorder cases diagnosed in veterans are CTE, which raises concerns for increased rates of CTE in vulnerable Veteran populations. Recent evidence suggests racial/ethnic differences in mortality among veterans with TBI. In a nationally representative study of veterans with TBI, Hispanic veterans had almost twofold increased hazard ratio of death compared with non-Hispanic White veterans (1.6; 95% confidence interval (CI) = 1.0, 2.6) after adjusting for relevant covariates. A recent study used nationally representative VA data to examine the association between TBI severity and combat by race/ethnicity.

The study found that 26% of veterans with TBI served in a combat zone between 2004 and 2010; mTBI increased from 12% to 40%, whereas moderate or severe TBI decreased from 89% to 60%. Moderate or severe TBI was higher in non-Hispanic veterans who are exposed to all types of TBI, including acceleration–deceleration injuries of the brain from exposure to ordinances, stand a reasonable risk of developing CTE.

ABOUT THE AUTHORS
Uchenna S. Uchendu is with the United States Department of Veterans Affairs, Washington, DC. Bennett J. Omalu is with the Department of Pathology, University of California, Davis. David X. Cifisi is with the Virginia Commonwealth University School of Medicine, Richmond, and the United States Department of Veterans Affairs Medical Center, Richmond. Leonard E. Egede is with the Medical University of South Carolina, Charleston, and the United States Department of Veterans Affairs Medical Center, Charleston.

Correspondence should be sent to Uchenna S. Uchendu, MD Chief Officer, Office of Health Equity, United States Department of Veterans Affairs, 810 Vermont Avenue NW., Washington, DC 20420 (e-mail: Uchenna.Uchendu2@va.gov). Reprints can be ordered at http://www.ajph.org by clicking the “Reprints” link.

This editorial was accepted May 27, 2016.

Note. The opinions expressed in this editorial are those of the authors and do not necessarily represent the United States Department of Veterans Affairs or any of the institutions/organizations affiliated with any of the authors.

doi: 10.2105/AJPH.2016.303293
Uchenna S. Uchendu, MD
Bennet I. Omalu, MD, MBA, MPH, CPE
David X. Cifu, MD
Leonard E. Egede, MD, MS

CONTRIBUTORS
All authors contributed equally to this editorial.

ACKNOWLEDGMENTS
Many thanks to Kenneth T. Jones, PhD, and Clara E. Dismuke, PhD, for the literature and document review that facilitated our ability to meet the tight timeline for this editorial.

REFERENCES