Neurobehavioral and Psychological Health Outcomes

Compromised Neurocircuitry in Chronic Blast-related Mild Traumatic Brain Injury (mTBI)

Researchers at the Defense and Veterans Brain Injury Center (DVBIC) and the National Intrepid Center of Excellence (NICoE) used diffusion tensor imaging (DTI) techniques to investigate architectural changes in the brain following blast injury. A number of projection fibers are vulnerable to blast injury, which could significantly impact communication and information exchange between regions of the brain. However, the published results thus far in this field are not conclusive. This study attempted to assess architectural changes in blast-injured brains, evaluate the effect of time on those changes, and evaluate the relationship with numbers of injuries. Participants included a total of 242 active duty male Service Members, which included a healthy control group (n = 40) and a group (n = 202) that reported persistent post-concussion symptoms for more than six months after a blast-induced mTBI. The primary measure was DTI. However, neuropsychological assessments were also performed, including the Brief Visuospatial Memory Test-Revised, Conners Continuous Performance Test, California Verbal Learning Test, Dells-Kaplan Executive Function System, Rey Osterrieth Complex Figure, and Wechsler Adult Intelligence Scale. The results of this study show that the number of blast events and the time since injury are associated with white matter microstructural injury.[1] However, it should be noted that post-concussive and posttraumatic stress disorder (PTSD) symptoms are also associated with compromised neurocircuitry and disruption of the communication and information exchange between regions of the brain.

1 Yeh, P.-H., Guan Koay, C., Wang, B., Morissette, J., Sham, E., Senseney, J., … Ollinger, J. (2016). Neurocircuitry in Chronic Blast-Related Mild Traumatic Brain Injury. Human Brain Mapping. https://doi.org/10.1002/hbm.23365