Mechanisms of Injury

Preliminary Findings of Cortical Thickness Abnormalities in Blast Injured Service Members and Their Relationship to Clinical Findings

Researchers at DVBIC and the SAMMC are using magnetic resonance imaging (MRI) to explore the effect of blast-related TBI on cortical thickness. A recent study included Service Members with blast-related TBI (n = 12) and neurologically healthy controls (n = 11). Anatomic 3 Tesla (3T) MRI scans of all participants were analyzed to produce cortical thickness maps and correlate cortical areas to functional roles. Between-group comparison demonstrated atrophy in several cortical regions of interest in brains exposed to blast TBI, including the superior temporal gyrus and superior frontal gyrus, which are associated with audition and language function, respectively. These results are the first to demonstrate anatomical differences between neurologically healthy brains and those exposed to blast-related TBI. While cortical abnormalities have been observed in patients with moderate and severe TBI, no one has demonstrated such abnormalities in blast-related mTBI. Further work in larger sample sizes is required, but this research establishes the plausibility of using anatomical analysis to explore the effects of blast TBI. This result informs future studies seeking a more comprehensive understanding of the neurological effects of blast TBI and presents a potential methodology that could inform diagnostic development.