

WAYNE STATE UNIVERSITY

The WSU Program for Traumatic Brain Injury Research

presents a Special Topic Seminar

David L. Brody, MD, PhD.

“Advanced MRI Detection of Blast-Related Traumatic Brain Injury in US Military Personnel”

Abstract: Blast-related traumatic brain injury (TBI) has been common in the wars in Iraq and Afghanistan, but fundamental questions about these injuries remain unanswered. We tested the hypothesis that blast-related TBI causes traumatic axonal injury using Diffusion Tensor Imaging (DTI), an advanced MRI method sensitive to axonal injury. Participants were 63 US military personnel evacuated to Landstuhl Regional Medical Center, clinically diagnosed with mild uncomplicated TBI, and scanned 1-90 days after injury. All had primary blast exposure plus another blast-related mechanism of injury (e.g. struck by a blunt object, fall, motor vehicle crash). Controls were 21 similar personnel with blast exposure and other injuries but no clinical diagnosis of TBI. DTI revealed abnormalities consistent with traumatic axonal injury in many TBI subjects. None had detectible intracranial injury on CT. DTI was markedly abnormal in the middle cerebellar peduncles ($p < 0.001$), cingulum bundles ($p = 0.002$), and right orbitofrontal white matter ($p = 0.007$). In 18/63 individual TBI subjects, there were significantly more DTI abnormalities than expected by chance ($p < 0.001$). Follow-up scans performed 6-12 months later in 47 TBI subjects demonstrated persistent DTI abnormalities consistent with evolving injuries. In 3 of 4 additional subjects with isolated primary blast-related TBI, there were abnormalities in the middle cerebellar peduncles but all other white matter tracts examined appeared normal. In summary, DTI findings in US military personnel support the hypothesis that blast-related mild TBI can involve axonal injury. However, many TBI subjects did not have DTI abnormalities, and TBI remains a clinical diagnosis.

Date: Thursday March 22nd, 2012

Time: 12:00pm – 1:00 pm

Location: Scott Hall – Green Hall

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