



AAN 76th ANNUAL MEETING ABSTRACT

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Abstract Title: Brain Iron Accumulation in Participants with Acute Post-Traumatic Headache

Press Release Title: Does Iron Accumulate in Brain After Concussions?

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Objective: To interrogate brain iron accumulation using magnetic resonance T₂* imaging in acute post-traumatic headache (PTH) due to mild traumatic brain injury (mTBI) and to examine associations between iron accumulation with headache frequency, number of mTBIs, post-concussion symptom severity, and time since TBI.

Background: We hypothesized that brain iron accumulation, a marker of neural injury, would be present in PTH and that it would correlate with measures of PTH and mTBI severity.

Design/Methods: Sixty participants with acute PTH and 60 age-matched healthy controls (HC) underwent 3T brain magnetic resonance imaging (T2* maps). T2* differences were determined using age-matched paired t-tests. For the PTH group, T2* correlations with headache frequency, number of lifetime mTBIs, time since most recent mTBI, and Sport Concussion Assessment Tool (SCAT) severity scale scores were studied using multiple linear regression.

Results: Lower T2* values in PTH participants relative to HC were observed in the right supramarginal area, left occipital, bilateral precuneus, right cuneus, right cerebellum, right temporal, bilateral caudate, genu of the corpus callosum, right anterior cingulate cortex and right rolandic operculum (p<0.001). Within PTH subjects, there were positive correlations between lifetime mTBIs and iron accumulation in the right gyrus rectus and right putamen, the time since most recent mTBI and T2* in the bilateral temporal, right hippocampus, posterior and superior corona radiata, bilateral thalamus, right precuneus and cuneus, right lingual, right cerebellum, and between headache frequency with T2* in the posterior corona radiata, bilateral temporal, right frontal, bilateral supplemental motor area, left fusiform, right hippocampus, sagittal striatum, and left cerebellum.

Conclusions: Iron accumulation is observed in brain regions of PTH participants relative to HC. Positive correlations of iron accumulation with headache frequency, number of lifetime mTBIs and time since mTBI suggest that iron accumulation is a biomarker of mTBI and PTH, potentially informing underlying pathophysiology.

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