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Pathological epidemiology of chronic traumatic encephalopathy in Southeastern Minnesota, U.S.A.

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Introduction: Traumatic brain injury (TBI) is a strong environmental risk factor for the development of dementia. TBI-dementia risk has been reported to be dose-dependent based on TBI severity and number of TBI. Pathologically, single-incident TBI can lead to hypoxic-ischemic injury, inflammation, and axonal injury whereas repetitive TBI can result in a progressive neurodegenerative disorder known as chronic traumatic encephalopathy (CTE). CTE is defined by focal deposits of hyperphosphorylated tau in neurons and astroglia at the depths of cerebral sulci and surrounding penetrating blood vessels. The frequency of CTE pathology in the general population, especially former amateur contact sports athletes, is unknown. Methods: The goal of this study is to identify the known pathognomonic CTE lesions in cortical autopsied tissue from Mayo Clinic Tissue Registry cases (N=2,651) and clinically characterize individuals with and without CTE pathology to establish the relevance of contact sports participation as risk factors of CTE. Using historical obituary and yearbook records, 308 former athletes and 454 non-athletes were identified. Phospho-tau immunohistochemistry was performed on three unique neocortical sections (frontal, temporal, and parietal) from these athlete and non-athlete cases. Results: Of the 283 cases screened to date, 15 (5.3%) have pathology consistent with CTE. All 15 cases were male and 9/15 had a documented history of contact sports participation (12.2% of known male athletes with CTE). Conclusion: While additional case screening and clinical characterization remains ongoing, this preliminary data suggests CTE pathology is a common neuropathological finding, especially in individuals with prior documented participation in a contact sport.