An update on neuroradiology of traumatic brain injury: The lsu approach

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Patients with traumatic brain injury complain of symptoms like headaches, insomnia, depression, memory loss, bursts of anger, difficult in planning, bad social relationship, loss of some praxias.We present our magnetic resonance protocol, capable to explain those symptoms and provide a better diagnosis and prognosis for these patients as well as some examples from our daily routine. Material and methods: We have a standard protocol for patients suspected to have traumatic brain injury. The sequences are 3D T1-SPGR(BRAVO), 3D FLAIR, 3D susceptibility sequence (SWAN), Tensor, magnetic resonance spectroscopy with ROIs in frontal lobe and cingulate gyrus and resting state functional magnetic resonance. The subjets are 30 patients consulting for litigation, diagnosed with post-traumatic syndrome, no less than one year after trauma. 16 men and 14 women. Mean age: 38 yo (10yo-67 yo). Results: Susceptibility sequence was positive in 37% of patients. Cortical thinning was present in all patients in a following distribution: orbitofrontal cortex 90%, dorsal medial frontal cortex 83%, occipitaltemporal cortex 70%, central cortex 50%, hippocampus 26.7%, temporal cortex 23%, parietal cortex 20%.Fractional anisotropy was decreased in cingulum 57%, genu of the corpus callosum 50%, uncinated fasciculus 43%, splenium and inferior longitudinal fasciculus 23% each, superior longitudinal fasciculus 13%.Increased fractional anisotropy was present in cingulum 20%, superior longitudinal fasciculus 17%, splenium of the corpus callosum 13%, uncinated fasciculus and inferior longitudinal fasciculus 7% each.Magnetic resonance spectroscopy was abnormal in the frontal lobes (decreased NAA) in 73% and in posterior cingulate cortex in 28%.Abnormal connectivity in resting state fMRI was found in anterior cingulum 75%, posterior cingulum 67%, hippocampus 42% , insula 37%, caudate 25%, thalamus and prefrontal cortex in 13% each. Midbrain abnormal connectivity (13%) was always present in patients with persistent headache. Conclusion: Abnormal findings in our protocol matched neuropsychological examination and explained the symptomatology in patients with normal computed tomography and standard magnetic resonance. The symptoms, started after traumatic brain injury, correlated well in these patients.