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Functional and structural imaging in pediatric anoxic brain injury**Peter T Fox**

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Drowning is a leading cause of accidental injury and death in young children. Anoxic brain injury (ABI) is a common consequence of drowning and can cause severe neurological morbidity in survivors. Assessment of functional status and prognostication in drowning victims can be extremely challenging, both acutely and chronically. Structural neuroimaging modalities (CT and MRI) have been of limited clinical value. Here, we tested the utility of resting-state functional MRI (RS-fMRI) for assessing brain functional integrity in this population. Eleven children with chronic, spastic quadriplegia due to drowning-induced ABI were investigated. All were comatose immediately after the injury and gradually regained consciousness, but with varying ability to communicate their cognitive state. Eleven neurotypical children matched for age and gender formed the control group. Resting-state fMRI and co-registered T1-weighted anatomical MRI were acquired at night during drug-aided sleep. Network integrity was quantified by independent components analysis (ICA), at both group- and per-subject levels. Functional-status assessments based on in-home observations were provided by families and caregivers. Motor ICNs were grossly compromised in ABI patients both group-wise and individually, concordant with their prominent motor deficits. Striking preservations of perceptual and cognitive ICNs were observed, and the degree of network preservation correlated ($\rho=0.74$) with the per-subject functional status assessments. Collectively, our findings indicate that RS-fMRI has promise for assessing brain functional integrity in ABI and, potentially, in other disorders. Further, our observations suggest that the severe motor deficits observed in this population can mask relatively intact perceptual and cognitive capabilities.

Biography

Peter T Fox, earned his Medical Degree from Georgetown University School of Medicine, interned at the Duke University School of Medicine and completed his residency and fellowship at Washington University in St. Louis. He was a Senior Staff Scientist at Johns Hopkins University's Mind/Brain Institute before joining the Health Science Center in 1991 to create the RIC. He has appointments in Radiology, Neurology, Psychiatry and Physiology.

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