



Pathology Biology Section – 2003

G88 Neuropathology of Abusive Head Injury

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The goals of this presentation are to 1) appreciate the differences between traumatic and hypoxic diffuse axonal injury; and 2) to understand the basis of traumatic unconsciousness.

This presentation will describe the neuropathology of a large series of abusive head injury in infants and young children as well as a group of control cases. The brains were examined by a forensic neuropathologist and subjected to a protocol for sectioning with sections from 16 sites including parasagittal white matter, 3 levels of corpus callosum, brain stem, cerebellum, distal optic nerves, and cervical spine. Sections were stained by H & E and β -amyloid precursor protein (β APP) and graded for the presence of β APP reactivity using a 4 grade classification. The abusive head injured children ranged from 3 weeks to 8 years old and the controls were of similar ages. Head injury is the most common cause of death in children dying from inflicted injuries. There is great interest in understanding the neuropathology in young children with abusive head injuries and correlating the pathology with the biomechanics of the injury. Clinically, these children most often present an immediate change in their level of conscious following injury which may consist of impact, shaking, or a combination of the two mechanisms. These mechanisms have been proposed to cause rotational or angular acceleration injuries of the brain accounting for the presence of thin layers of subdural hemorrhage, retinal hemorrhages, and brain swelling in those who survive some period. The question of whether traumatic diffuse axonal injury is the basis of the loss of consciousness (traumatic unconsciousness) and other findings in these children is an important issue. A recent study by Geddes (Geddes et al, Brain 2001, 124:1299-1306) reported that severe traumatic axonal damage is rather rare in infant abusive head injury unless there is considerable impact and that the diffuse brain damage responsible for loss of consciousness in most cases is hypoxic rather than traumatic. This presentation will demonstrate findings from a large series of abusive child head injuries which finds that traumatic diffuse axonal injury occurs more frequently than reported by Geddes. It is important to recognize hypoxic brain damage and to distinguish those changes from traumatic diffuse axonal injury as frequently the two findings occur together and these distinctions will be discussed. The study also found differences in the appearances of acute traumatic DAI and older injury as demonstrated by β APP.

Abusive Head Injury, Traumatic Diffuse Axonal Injury, Child Abuse