



Pathology Biology Section – 2007

G96 Use of Beta-APP Stain in a Case of Fatal Dog Attack

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After attending this presentation, attendees will understand the use of beta-APP histopathological stain to diagnose early central nervous system injuries.

Documentation of earliest stages of CNS injury is problematical. This presentation will impact the forensic community and/or humanity by making forensic pathologists aware of the use of beta-APP stain to document mechanism of death in cases where traditional autopsy techniques may be inadequate, and illustrate the use of this technique in a specific case with relatively short survival time.

β -APP is a protein that accumulates in damaged neurons and has been used to identify certain types of central nervous system injury. This study presents a fatal case of a dog attacking a two and one half-year-old child who was found unconscious by her mother in the dog's mouth with the dog "shaking the child back and forth." The child's shirt was described as soaked with blood, and there was an undetermined, but "small," amount of blood at the scene. There was no active bleeding from wounds upon the arrival of first responders. The child survived unconscious, tachycardic and hypotensive, with minimal bleeding from the wounds, for about 90 minutes during transport to hospital in the ambulance.

Autopsy confirmed soft tissue injuries (bite marks) to the neck, including ligamentous injuries in the posterior nuchal region, a small defect in the left jugular vein and a small epidural hemorrhage at the level of the fifth cervical vertebra. There was no subdural or subarachnoid hemorrhage. Likewise, there were no obvious gross or microscopic injuries to the brain, spinal cord or other internal organs to document the mechanism of death. Positive β -APP staining of axons in the corpus callosum and cerebral white matter was found, often in a perivascular distribution, and there was rather diffuse positive staining of many neuronal bodies. Although axons stained positively in the corpus callosum, the predominantly perivascular pattern of positive β -APP staining suggested diffuse hypoxic injury to the central nervous system resulting from shock and hypotension.

The β -APP stain documented potentially lethal injury to the central nervous system in the absence of other specific anatomic findings, and gives some indication of the mechanism of death. Generally, it is considered that β -APP stain is positive as early as approximately two hours survival time. The documented survival time of one and a half hours is consistent with this, although it is somewhat earlier than often reported. This case illustrates the use of β -APP stain as an early marker of central nervous system injury before more traditional markers of injury may be obvious at autopsy.

Beta-APP, CNS Injury, Dog Attack