H42 Neurodegeneration in the Forensic Setting: General Principals and Diagnostic Applications

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Learning Overview: After attending this presentation, attendees will learn how to diagnose Alzheimer Disease (AD), Lewy Body Disease (LBD), and Frontotemporal Degeneration (FTD) by performing a cost-effective dementia workup on decedents who were reported to be cognitively impaired before death and will see several examples of these practical workups.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demystifying the diagnostic criteria for the most common neurodegenerative diseases and by providing a way to reasonably diagnose these conditions with minimal tissue sampling and immunohistochemical workup.

The incidence of neurodegenerative conditions is continuing to increase as the population ages. The most common of these disorders is AD, followed by LBD and FTD. The prevalence of these conditions is projected to exponentially increase over the next several decades and, without effective treatments, the costs to society will be catastrophic. Neurodegenerative disorders frequently contribute to non-natural deaths in the elderly by increasing the likelihood of devastating falls, choking, and wandering activity, which can lead to lethal environmental exposures and other injuries. As such, an ever-increasing number of elderly deaths are falling under medical examiner/coroner jurisdiction. These degenerative disorders can only be definitely diagnosed at autopsy and many forensic pathologists find these assessments difficult. Additionally, the postmortem workup of these disorders can be expensive, and many offices cannot afford to routinely perform the comprehensive assessment recommended by the National Institute of Aging-Alzheimer's Association (NIA-AA) guidelines.

To help combat this problem and empower forensic pathologists to more confidently perform their own assessments, this study proposes a condensed workup that includes sampling the hippocampus, frontal lobe, occipital lobe, basal ganglia, and midbrain that can be performed using 2–3 tissue cassettes. Immunohistochemical staining of these blocks with β-amyloid, tau, and α-synuclein should be sufficient to accurately diagnose most causes of neurodegeneration in the cognitively impaired elderly. Even without these immunostains, a great deal of information can still be obtained by looking for neuritic plaques, neurofibrillary tangles, and Lewy bodies with routine hematoxylin and eosin staining. Herein, several autopsy cases of individuals with cognitive impairment are reviewed utilizing this postmortem protocol with final diagnoses, including AD, LBD, and FTD. The accurate pathologic diagnosis of dementing disorders can have a significant impact on a decedent's family and help resolve certain medicolegal issues surrounding the death. Additionally, more accurate data about the prevalence of these diseases is required to understand their contribution to deaths, especially in the forensic setting.

Neurodegeneration, Dementia, Alzheimer Disease

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