



### W15 Dementia Workup for Forensic Pathologists Following a Condensed National Institute on Aging-Alzheimer's Association (NIA-AA) Protocol

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**Learning Overview:** After attending this presentations, attendees will: (1) become familiar with the diagnostic workup and grading schemes for common classes of dementia; (2) be able to accurately identify and sample appropriate regions of the brain according to the Condensed Protocol for dementia workup; and (3) understand the benefits and limitations of the Condensed and NIA-AA Protocols for dementia workup.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by presenting a method that reduces the cost of histopathologic dementia workup while maintaining diagnostic performance.

Alzheimer's Disease (AD) is the fifth most common cause of death for Americans ages 65 and older.<sup>1</sup> In the United States, the number of people affected by AD and related dementias is projected to increase substantially, rising from an estimated 5.4 million in 2015 to 11–16 million by 2050.<sup>2</sup> Individuals who die with dementia may be susceptible to non-natural factors such as neglect, abuse, or accidental injury, and investigation into potential dementia cases will likely be increasingly common in the forensic autopsy setting. Definitive diagnosis of a specific type of dementia necessitates neuropathological examination, which if performed according to the Original NIA-AA guidelines (20 blocks and 13 special stains from key brain regions), may be cost-prohibitive in a forensic setting.<sup>3,4</sup> In response, a Condensed Protocol was developed that consolidates the sampling and staining proscribed by the Original NIA-AA Protocol into five cassettes for a single round of histochemical or immunohistochemical staining, resulting in approximately 75% lower cost (institution specific) while maintaining diagnostic performance.<sup>5,6</sup> The Condensed Protocol has been studied for use in a forensic setting and was found to be a useful tool in diagnosing a wide range of neurodegenerative diseases.<sup>6</sup> One drawback of the Condensed Protocol is decreased sensitivity for detecting Microvascular Lesions (MVL), which can be remedied by submitting additional Hematoxylin-Eosin (H&E) sections when MVL represents a strong consideration. While not intended as a replacement for the original NIA-AA guidelines, the Condensed Protocol serves to make the guidelines accessible to forensic practices, maintaining reasonable diagnostic performance for various types of dementia while conserving precious resources.

This workshop will walk attendees through specific considerations for dementia evaluation in the forensic setting. There will be an overview of the Original NIA-AA guidelines for the diagnosis of AD and related neurodegenerative disorders and the creation of the Condensed Protocol. The application and performance of the Condensed Protocol at a large urban medical examiner's office will be highlighted and compared to that observed at an academic medical center clinical autopsy service. Finally, there will be a practical demonstration of the use of the Condensed Protocol with an interactive session.

#### Reference(s):

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6. Priemer, D., R. Folkerth. Dementia in the Forensic Setting: A Survey of Diagnoses Using a Condensed Protocol at a Resource-Limited Large Urban Medical Examiner's Office. *Journal of Neuropathology & Experimental Neurology*. Volume 78, Issue 6, June 2019, Pages 520–579.

#### Dementia, Neuropathology, Cost-Effective