

Preface



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Editors

During the past 40 years, we have witnessed a substantial transformation of the dementia landscape. Once thought to be largely a consequence of “cerebrovascular insufficiency,” the dementias later became recognized as a group of disorders predominantly characterized as neurodegenerative in nature, with Alzheimer disease (AD) being the leading cause. In the 1990s, fueled by Decade of the Brain legislation in the United States, there was a concerted effort to better understand AD and its key underlying neuropathologic manifestations: neuronal death, neurofibrillary tangles, and amyloid plaques. The domination of the research field by AD studies during this time period led some pundits to claim the field had been “Alzheimerized.” However, by the late 1990s and early 2000s, it was becoming apparent based on epidemiologic studies that vascular risks (e.g. hypertension, diabetes mellitus, and other factors) were possible risks not only for cognitive impairment associated with stroke but also for AD. A renewed emphasis on vascular risks as precursors of cognitive impairment and dementia led to an evolution and refinement of diagnostic terminology used to categorize vascular forms of cognitive impairment. The term multi-infarct dementia, coined in the 1970s, was replaced by vascular dementia, which was later superseded by vascular cognitive impairment or vascular cognitive disorders. The latter two terms are now commonly used by clinical experts to refer to dementia or cognitive impairment associated with stroke. Parenthetically, and more recently, there has been a movement to replace the time-honored term “dementia.” In fact, the *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition) now refers to “major or mild neurocognitive disorder” rather than using the term “dementia.”

Initially, there was hesitancy by the AD research community to embrace the possible role of vascular risks as precursor factors for the dementias. Over time, however, the concept of prevention of the dementias through modification of vascular risks gained traction in clinical practice. Whereas AD has played a dominant role in the clinical landscape of the dementias, research breakthroughs in regards to the potential importance of vascular risks as precursors to age-related cognitively impairing disorders, and community necropsy studies showing the importance of “mixed” neuropathologic

changes (e.g. cooccurrence of stroke and AD brain changes) in more than 50% of the patients, provide support for the importance of vascular risk factors and cerebrovascular disease in the genesis of the dementias. Vascular risks provide an important opportunity for prevention of the dementias, as traditional vascular risk factors are preventable and modifiable.

Our understanding of neurocognitive disorders has substantially advanced largely in part due to an evolution in neuroimaging. Springboarded by the *Human Connectome Project*, our knowledge of brain structure and function has been greatly enhanced by the following neuroimaging techniques: diffusion tensor imaging, functional MRI, cerebral blood flow, and neuroreceptor density elucidation. Such techniques have been complemented by advanced genetic and blood and cerebrospinal fluid biomarker discovery. Furthermore, the estimated 100 billion neurons of the brain are now conceptualized as a network of key neuronal hubs with local and more far-reaching connections. The strength of connectivity within and between the brain networks helps to determine brain function and potential for resilience and resistance to cerebral injury. In addition, the white matter of the brain, an important highway connecting various regions of the brain, now serves as a target for prevention and treatment efforts to preserve cerebral structure and function, and thus, cognition.

In this issue of *Clinics in Geriatric Medicine*, we provide six sections geared to the primary care geriatrician, other primary care clinicians, allied health care workers in the field, and researchers on practical aspects of cognitive impairment and the dementias. Section 1 is devoted to the epidemiology of neurocognitive disorders and the dementias, and how common these disorders are worldwide. Section 2 discusses how to establish a diagnosis and includes information on selection and interpretation of cognitive screening tests and formal neuropsychologic tests, neuroimaging aspects from a clinician's perspective, the role of blood and cerebrospinal fluid biomarkers, and a case-based approach to establishing a diagnosis of cognitive impairment and dementia by underlying subtype. Section 3 emphasizes neuropathologic findings and underlying mechanisms of cognitively impairing disorders. Section 4 reviews the role of vascular risk factors and treatment and introduces the concepts of brain resistance and resilience and how cognitive reserve may determine risk and outcome. Section 5 discusses the diagnosis of neuropsychiatric and behavioral aspects of the dementias, and Section 6 provides a research perspective on data harmonization as we work globally to end the scourge of neurocognitive disorders and the dementias.

Geriatricians and other primary health care providers frequently encounter patients in practice in need of cognitive assessment and comprehensive management. The articles compiled in this issue of *Clinics in Geriatric Medicine* provide guidance in these areas. In addition, with the recognition of vascular risks as targets for prevention of cognitive impairment and dementia, geriatricians and other primary health care providers are now in a lead position to manage such factors. The *American Heart Association* (AHA) previously identified three vascular health behaviors (diet, physical activity, nicotine exposure/smoking) and four vascular health factors (body weight, blood lipids, blood glucose, and blood pressure), referred to as *Life's Simple 7* (LS7), as targets for preservation of brain health. Recently, AHA added an eighth factor, sleep health (7 to <9 hours per day of sleep), to the list of target factors, and re-named LS7, *Life's Essential 8*. By prevention and treatment of vascular risks, we hope to prevent or delay neurocognitive disorders that affect millions of persons worldwide. As scientific discovery advances, it is hoped we will soon be able to utilize

biomarkers to provide individualized and targeted preventatives and treatments for those at risk of or who have neurocognitive disorders.

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