THEORIES OF NEUROLOGICAL AGING AND DEMENTIA

Aging Overview

The primary care physician must advise middle-age and older patients about ways to age successfully. Dementia is a common disabling illness that afflicts 10% of people over age 65 and 47% of people over age 85. Most older people perceive their health as "good" and 2/3 of people over the age of 65 describe themselves as healthy. Over ½ of persons over the age of 85 can remain independent. The primary care physician can enhance this sense of health and self-determination by providing specific recommendations to the older patient **(1).**

No specific wellness program has been studied over a 20-30 year period to determine the effectiveness of a successful aging intervention. These studies will almost certainly never be funded or completed. The practicing clinician must assemble specific recommendations based on available scientific observations and advice to older individuals on the best ways to prevent cognitive decline. This handout includes a series of safe interventions that probably slow the onset of dementia based on the best available science. All recommendations are based on peer reviewed literature.

Theories on the Cause of Aging

Many different mechanisms are hypothesized for age-related brain changes including apoptosis, telomere loss, neuroendocrine alterations, autoimmune changes, oxidative stress and others. Age-related brain damage may be produced by dysfunction of neuronal cytoskeleton or damage to mitochondria that diminish neuronal energy. The human genome does not undergo apoptosis, i.e., programmed self-destruction, until age 120 or 130 and approximately 2/3 of human aging may be determined by life choices and environment rather than genetics. With the present human life expectancy at 79 and future life expectancies exceeding 100, our best prescription for aging is a wellness program **(2,3,4,5)**. Brain aging occurs in aged monkey, bears, and dogs that resemble human brain pathology.

Accelerated brain aging may begin after the age of 50. Senile plaques, i.e., the pathological hallmark of Alzheimer's disease, begin to appear in about 25% of individuals between the ages of 50 and 60. A successful aging program may need

to commence prior to age 50; however, available science supports the use of successful brain aging at any point in a person's adult life. Cognitive decline may represent the loss of synaptic connections produced by neuronal death, alteration of neuronal energy metabolism, or reduction of trophic factors that promote synaptic densities.. Longitudinal aging studies, such as the Nun Study, demonstrate that higher lifetime academic achievement reduces the risk for cognitive decline in late life. Other studies demonstrate that white matter damage may increase the risk for cognitive loss. Diseases that kill or disconnect neurons as well as reduce synaptic density may produce intellectual decline. The complexity of aging and disease processes supports the hypothesis that a single intervention will not slow or prevent brain aging and cognitive decline **(6,7).**

Common Causes of Dementia

The four common types of dementia in persons over the age of 65 include Alzheimer's disease, vascular dementia, diffuse Lewy body disease (dLbd), and alcohol-induced dementia. Vascular dementia results from accumulation of multiple ischemic, hypertensive or embolic pathologies of cortex and white matter. Fronto-temporal dementia is more common in persons under the age of 65; however, its molecular pathology, i.e., abnormal tau, has no specific preventive intervention. The molecular pathology of diffuse Lewy body disease is distinct from that of Alzheimer's disease, as dLbd is a disorder of synuclein metabolism versus Alzheimer's disease in which may be a disorder of amyloid processing. Many demented persons have two or three disease processes when their brains are examined at autopsy**.**

Reducing Risk Factors for Dementia

All older persons should be considered for a successful intellectual aging program **(9,10,11,12,13,14)**. The intervention should accommodate existing medical conditions. Even patients with mild dementia should have wellness interventions that sustain their physical and mental function for as long as possible. These programs constitute life-long attempts to mitigate risk for disease and compress disability until the very end of life.

Ten suggested preventive interventions for dementia prevention are included with this guide **(See Physician Executive Summaries)**. Although patients with normal blood pressure, lipids, homocysteine, etc., can develop dementia, these clinical risk factors are each documented by multiple published studies. This program suggests simple, cost-effective interventions to reduce the risk of developing dementia.

Although other interventions have received attention, this program focuses on strategies that use the best documented medical management (15).

Dementia Screening and Early Intervention

Screening helps those with dementia, individuals with borderline dysfunction, and normal individuals. All available medications for dementia work best in early stages when the brain retains some compensatory mechanisms. Cognitive decline is often overlooked by clinicians and family. Isolated amnesia often precedes dementia, i.e., mild cognitive impairment. Screening can identify patients at the best time for therapy. Individuals with normal screenings also benefit from a cognitive wellness program (16).

Role of Prevention

The retrospective identification of risk factors for dementia does not prove that reducing those factors will prevent the disease. A prospective study on the efficacy of a dementia prevention strategy will require two or three decades of research and many thousands of subjects. This study is not likely to be performed. Physicians must make judgments and propose interventions that available science suggests as safe and beneficial. Dementia prevention is ultimately the product to clinical judgment **(17).**

This site provides basic information to advise patients about protecting their brain against known risk factors for dementia. Each segment contains helpful, practical recommendations and fact sheets for your patients. **(CLICK HERE FOR MORE INFORMATION)**

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