Cognitive Decline in Physicians and their Patients

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The average age of licensed practicing physicians in the United States has risen from 50 in 2010 to 52 in 2014; 26% are over 65 years of age.[1] Given the increased demand healthcare faces in both number and complexity of patients, it is important to consider factors that contribute to a physician's career longevity. Often focus is on strategies to prevent burnout during a practitioner's career. However, here we will discuss evidence-based steps that can be taken to prevent cognitive decline in aging practitioners, thus preserving the workforce.

Over time, examination of the aging nervous system undergoes predictable changes, such as in muscle tone, increased postural sway and postural hypotension, and decreased arm swing. This is an abbreviated list, but these peripheral and motor phenomena are irrelevant to clinical performance of those physicians that do primarily brain work. However, there are cognitive changes that can be seen in healthy aging. Physicians may wonder about these changes, and whether they are going to affect their ability to practice medicine. In healthy aging, varying degrees of reduced processing speed, free recall, multitasking ability and attention span can be expected. Fortunately, these changes, in the absence of actual disease states, are not expected to affect a physician's job performance or shorten a physician's career. Furthermore, learning strategies can be implemented that are effective in enhancing the encoding and the accessing of new and old information. Because new cognitive obstacles occur in a non-uniform manner throughout the older population, individualization of assessment and intervention is key.[2] Intervention strategies, such as mnemonics, mental hierarchies and clusters, which are used less by elders than when they were younger, give long-lasting improvements when implemented. Distractions also interfere more in elders than the young. In practice, instructions to older patients should be given directly, and in a manner than can be easily encoded to increase adherence and outcomes.

The good news is that domains which are arguably the most important to career longevity are resilient in pure aging. Short-term memory, also known as immediate recall, persists. Long-term memory is relatively spared, with very good procedural memory – e.g., biking, knots, music – and semantic memory, meaning facts. Episodic long-term memory declines with age, making remembering location, time, and memory of events difficult. Applying learned strategies discussed above can help if these changes become problematic. Pathologic cognitive decline, feared more than death by many older adults, is a different story. But here, too, is mostly good news. In observational studies, high levels of education and continuing work that demands thinking and reasoning with learned information are protective against Alzheimer's disease (AD) (the most common dementia worldwide).

It is very important to distinguish the cognitive changes of normal aging from the pathologic basket of dementia, which is defined as an acquired disorder producing a decline in memory and other cognitive domains sufficient to affect daily life in a previously normal adult. Diagnosis is made when progressive cognitive and functional decline are noticed, usually by family first, in a patient without any sensory deficits – such as need for a hearing aid or cataract surgery. Memory impairment plus one of four other cognitive deficits are required for diagnosis: *apraxia*, trouble with motor planning; *aphasia,* trouble with language; *agnosia, a* sensory processing deficit; or disturbances in *executive functioning*. Delirium, a distinct transient entity, must not be present and be ruled out by thorough medical evaluation.

The largest proportion of those diagnosed with dementia have AD, which is notable for its gradual onset and steady progression. Although recent work has indicated that the incidence of AD has been in decline, demographic shifts in the age of our population will result in continuing increases in the number of afflicted persons. The U.S. senior population is expected to grow from 43 million in 2012 to 92 million in 2060; with that growth, the prevalence of dementia is expected to rise from 4.7 million in 2010 to 13.8 million in 2050.[3] The costs associated with this change are projected to exceed $1 trillion by 2050.

Being the 5th or 6th leading cause of death in the United States, AD shortens life expectancy at time of diagnosis by 6.7 years in a 60-year-old, and 1.9 years in a 90-year-old.[4] These mortality data should be a factor in clinical decision-making. Goals of care discussions should begin early and often in patients with dementia, once the patient and family understand the course of the disease.

Early diagnosis is important for social, medical and financial decision-making, but is often hindered by the insidious presentation and course of the disease. When identified early, disease burden can be mitigated by planning for the future decline while the patient still retains decision-making capacity and can participate in the process. Complaints of elders related to normal psychomotor slowing of aging can confound the challenges of screening for cognitive status in elders, but also make it more important. A patient with memory complaints of misplacing car keys, difficulty with word and name recall, and worrying about memory should

be given reassurance and education regarding learning strategies. Family complaining a patient never remembers the correct word, loses the car keys, makes major financial mistakes, has poor insight regarding memory loss, and repetition of conversations should trigger evaluation for dementia. Occasionally, the first sign leading to a diagnosis of a pathologic cognitive impairment is failure to perform at one's job. As a physician, development of a neurodegenerative condition such as AD would indeed be career ending. Our field has a unique system judging for competence to practice, in which we are all responsible to ensure no harm is being done to our patients and are required to report when we think harm could be done. It is important to remember that this is not driven by age but by performance.

When considering protecting the physician workforce from cognitive decline, one should consider the fixed and modifiable risk factors for AD. Fixed risk factors for AD classically include age, family history, female gender, and Down Syndrome; more recently identified risk factors are apolipoprotein E4, history of herpes simplex encephalitis, and history of depression. Modifiable risk factors include risks for stroke (e.g., hypertension, smoking, atherosclerosis, dyslipidemia, obesity, and diabetes) physical inactivity, depression and low level of education. Perhaps the best first step that protects cognition that most clinicians have already completed is decades of education and the cognitive demands of clinical practice. A recent study that followed subjects for 10 years revealed those who engage in craft activities, computer use, playing games, and social activities had significantly decreased incidence of mild cognitive impairment.[5] One could suppose that those benefits are already reaped by practicing physicians, given the complexity of daily clinical activities.

But demanding brain work should not excuse ignoring other modifiable risk factors for the development of AD, given the recently identified associations of certain behaviors with prevention of cognitive decline. Healthy diet, regular frequent exercise and minimizing stroke risk factors are a great start. A study monitoring subjects based on their level of physical activity through mid- and late life showed that moderate exercise at any frequency was associated with decreased incidence of mild cognitive impairment.[6] Unfortunately, careers in medicine do not make prioritization of daily exercise easy, but we hope this association will motivate us.

A Mediterranean diet supplemented with olive oil or nuts has been shown to prevent acute myocardial infarction, stroke or death from cardiovascular events.[7] Recent analyses from the same study has shown improved cognition.[8] Guidelines of 2016 suggest a mix of vegetables, whole fruits, whole grains, fat-free dairy, a variety of protein, including nuts and unspecified oils.[9] These evidence-based recommendations targeting modifiable risk factors to protect the aging brain from cognitive impairment and the development of AD are not going to protect us all, as the non-modifiable risk factors can overcome even the healthiest among us. Given the high stakes, taking these protective steps seems worthwhile. Employers often recommend their employees consider diet and exercise as a part of maintaining a healthy, stress-reduced work force. Adding preserved cognition in aging to that list may help motivate additional healthcare providers.

In summary, there are cognitive changes associated with normal aging that are not expected to affect one's ability to practice medicine. There are learning strategies one can adopt to improve brain function during aging, and most physicians are likely to want to adopt them. Importantly, data confirm that lifestyle modification is associated with decreased incidence of developing mild cognitive impairment and subsequent AD, a diagnosis that would require retirement and end-of-life planning similar to a late stage malignancy.

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