iPad Screening for Dementia Holds Great Promise

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Delay in diagnosis is a notable problem in the treatment of dementia. The first symptoms of cognitive impairment typically precede formal dementia diagnosis by three years. Often, by the time a diagnosis is made, patients have decompensated into a moderate level of impairment and may have encountered social, medical and legal complications as a consequence of their unrecognized deterioration. The emerging professional consensus now recognizes the benefit of routine screening for cognitive impairment in the primary care office while the patient is still at the level of Mild Cognitive Impairment or early Dementia.

Because early signs of dementia may be subtle and denied or rationalized by the patient or the family, effective screening should be objective and performance based, just like other medical measures such as blood pressure or temperature. A cognitive test should yield a quantitative score whose meaning is easily understood, reliable across time, and reflective of clinical level. When used as an initial screening instrument, such a test should be able to classify patients as normal, MCI, or demented.

Because primary care provider time is limited, the test should be brief enough to fit into a typical office visit or easy enough for a lower level care professional to administer. It must be well-tolerated by older patients who are already anxious or defensive about their cognitive functioning. Its findings should lead directly to treatment suggestions based on the obtained level of functioning.

A screening test meeting these characteristics was developed in our practice and studied in large clinical patient samples, with findings reported in two peer-reviewed publications [1,2]. The Memory Orientation Screening Test (MOST®) is a 5-minute measure composed of 4 tasks reflecting memory and executive function. It yields a 0-29 point score which accurately identifies and stages the level of dementia, corresponds with the outcomes of longer neuropsychological testing, produces high inter-rater reliabilities and stability across time, and is well-accepted by patients of all cognitive levels. It is more sensitive and specific than the two most widely used office screening tests. However, this version of the MOST® and the other measures are limited by reliance on paper in an increasingly paperless medical environment, the potential for excessive variability in administration and scoring methods, and the problem of translating the obtained score into a classification of cognition, and then into a plan of treatment.

In order to improve the usability and acceptance of the MOST®, we developed an Apple iPad application (app). We believe that the iPad or a similar tablet device will make cognitive screening a more rewarding and comfortable process for the provider and increase the chances of its occurring in the Medicare Annual Wellness Visit or problem oriented visits. The iPad as a computer device is light, affordable, and intuitive for the provider. The interface is friendly for older patients because they can press or draw on the tablet screen directly and do not have to manipulate a mouse device or use a keyboard in order to make a response. The iPad is able to measure reaction times, randomize stimuli being presented, and employ decision trees to automatically modify the order or type of tasks being presented, making it valuable for many testing applications. In addition, its logic can include scoring assistance, automatic tabulation of scores, and immediate production of a clinical report which can be individualized using test scores in relation to demographics, and other patient considerations. As such, the user can go from test to score to report in one step.

In the MOST® app, the tester is presented with a series of individual pages on which to record demographic data, choose three words to be recalled later, test the patient’s orientation to date and time, draw a clock, and present 12 pictures of household items that the patient names and subsequently recalls. Each page presents contextual instructions and locks in the score for that section. Clock scoring is assisted by a series of pass/fail decisions, with drop down grids to ease the scoring for some visual decisions.

After completing the scoring process, the app automatically scores the test or compares it with an entered score from a previous MOST or an existing MMSE score that it statistically translates into a MOST equivalent. The app compares the score with any previous scores and generates a report with diagnostic classification and a series of recommendations for further evaluation or treatment. The pdf of this report is emailed to the provider for printing or attached to the EMR note. From start of testing to finished report, this 5-minute evaluation identifies patients in need of further workup, immediate intervention, or reliable reassurance of their intact cognition. When repeated some months later, any changes in MOST score greater than three points will alert the provider to change the underlying cognition of that patient.

The iPad approach, however, is not without its complications and problems. As in any brief test, it does not replace comprehensive neuropsychological and neurological evaluation. A naive user might place unwarranted confidence in a computer-generated report without consideration of false positive and negative findings. Not all health care providers currently have an iPad or would feel comfortable using this device. Some older patients require assistance when using their finger or a stylus to place numbers on a clock face, despite their ease at doing this with a pencil on paper.

For the test developer, programming an iPad app is far more technical than building and publishing your own web page and will likely require using an app developer, who could charge from $5,000 to more than $50,000 depending on programming complexity. The finished project must conform to rules established by Apple for inclusion in its iTunes store, even if there is no charge for the app.

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Apple’s adherence to specific guidelines may thwart some maverick developers, but assures consistent rules for acceptable interfaces that make it easier for users to move across applications.

Despite these concerns, I believe that the time is ripe for screening older patients routinely for cognitive decline and that an automated, computer-administered program delivered on a device like the iPad could make early cognitive screening a reality in every doctor’s office.

References
