Screening for Early Dementia in Primary Care

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We have developed and validated a cost-effective case finding tool for early dementia in primary care that consists of two stages: a rapid dementia screening test administered to all patients over the age of 65 and a second stage to identify memory impairment administered to patients who fail the first stage. The Alzheimer’s Disease Screen for Primary Care (ADS-PC) had high sensitivity and specificity for early dementia and higher sensitivity for AD, and distinguished AD from non-AD dementias. The ADS-PC outperformed the MMSE and worked equally well in African-American and Caucasian primary care patients and in patients that differed in educational level.

Key words: Alzheimer’s disease, early dementia, mass screening, primary health care, neuropsychological tests

Introduction

As new treatments and preventive approaches for Alzheimer’s disease (AD) emerge, they will be implemented in primary care settings, where the majority of older adults receive their care. Unfortunately, primary care physicians detect only a small proportion of the AD present in the patients they see,1–3 in large part because they lack effective and efficient methods to identify early dementia and to distinguish AD from non-Alzheimer’s (non-AD) dementias in the ethnically and educationally diverse cohorts treated in primary care settings. Efficient and cost-effective identification of early dementia could have a major public health impact once progression can be delayed.4

The Alzheimer’s Disease Screen for Primary Care

There are several approaches to dementia screening in primary care (Table 1). The operating characteristics of popular dementia screening methods have been reviewed elsewhere.

Building on the Einstein Aging Study’s success in developing dementia screening tools,6–12 we developed and validated an efficient and sensitive two-stage strategy for identifying early AD in primary care patients with comorbid medical conditions; we call this strategy the Alzheimer’s Disease Screen for Primary Care (ADS-PC).13–15 A brief, high-sensitivity rapid screen (takes 5 minutes) consisting of a Memory Impairment Screen (MIS) and Animal Fluency is applied to all patients in the first stage, and only the patients who fail the rapid screen undergo the more time-consuming second stage (10–12 minutes) to diagnose memory impairment using the Free and Cued Selective Reminding Test (FCSRT), thereby maximizing efficiency. Unlike other memory tests, MIS and FCSRT begin with a study phase that controls attention and cognitive processing to identify memory impairment that is not secondary to other cognitive deficits.10,11,16,17 Memory testing is critical to dementia screening because memory is the one cognitive domain that must be impaired to diagnose dementia18,19 and impaired memory is one of the earliest manifestations of dementia and AD.20–22

The ADS-PC demonstrated good concurrent criterion validity in 262 nondemented older Caucasian and African American primary care patients and 56 patients, most with very mild dementia (Clinical Dementia Rating [CDR] 0.5), from an urban academic primary care practice staffed by geriatricians at Montefiore Medical Center in the Bronx, New York. Using clinical diagnosis as the independent gold standard, the ADS-PC had high sensitivity (.75) and specificity (.90) for identifying early dementia (CDR 0.5) and higher sensitivity (.85) in identifying AD.13 The strategy worked equally well in African-American and Caucasian patients, and in patients whose education levels differed. The ADS-PC was very efficient because only 30% of the patients screened positively in the first stage and underwent second-stage testing with the FCSRT. Moreover, only 10% of noncases were misidentified as having dementia (i.e., false-positives) using the ADS-PC, an advantage over other sensitive screens that misidentify 50% of noncases as having dementia.23

Comparison with Mini-Mental State Examination

The ADS-PC was validated by comparing its sensitivity and specificity to those of the Mini-Mental State Examination (MMSE),24 the most widely used screening test for dementia. In these comparisons,14 the cut scores on the ADS-PC were fixed, whereas the cut scores on the MMSE were adjusted to achieve the same level of sensitivity or specificity as the ADS-PC depending upon whether classification accuracy for cases or noncases was being compared. Once the sensitivities or specificities were equated, differences in the sensitivities or specificities of the two strategies were evaluated with conditional odds ratios and the McNemar test.

When using the standard cut score of 24 on the MMSE, the specificity of both

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tests was the same (.90) but the sensitivities differed significantly (.75 for the ADS-PC and .53 for the MMSE). When the sensitivities of both tests were equated (.73), the specificities differed significantly (.90 for the ADS-PC and .74 for the MMSE). When classification by the two tests diverged, the ADS-PC was five times more likely to classify a case as demented than was the MMSE and five times more likely to classify noncases accurately (p < .01). This pattern of significantly higher sensitivity and specificity for the ADS-PC compared with the MMSE was repeated in the results by race and education.

Distinguishing Alzheimer’s Disease from Non-Alzheimer’s Dementias

The study phase in FCSRT, which controls the conditions of learning, appears to benefit patients with non-AD dementias more than patients with AD. In the study phase, patients are asked to search a card containing four pictures (e.g., one of which shows grapes) for an item that goes with a unique category cue (e.g., fruit). After all four items are identified, immediate cued recall of just those four items is tested to ensure proper encoding and provide retrieval practice before the test phase. The search procedure is continued until four cards with a total of 16 items have been identified and retrieved in immediate cued recall. The study phase is followed by three trials of recall, each consisting of free recall followed by cued recall for items not retrieved by free recall. The sum of free and cued recalls is called total recall. Controlled learning induces specific semantic processing to minimize inattention and inefficient information processing, and it provides for maximum cued recall. While all patients with dementia display impaired free recall, only patients with non-AD dementias should display intact total recall. This is because the memory deficit in non-AD dementias is usually secondary to executive dysfunctions that can be ameliorated with controlled learning procedures in contrast to the primary memory deficit of AD, which cannot be ameliorated. A previously established cut score of ≤44 was used to indicate total recall impairment. Conventional two-by-two contingency tables compared patients without dementia with patients with any dementia, AD, vascular dementia, and other dementias.

Specificity of total recall was excellent; only 6% of patients without dementia had impaired total recall (16/283). As predicted, sensitivity of total recall varied as a function of dementia subtype. Seventy-two percent (26/36) of patients with AD had impaired total recall, whereas 79% (11/14) of patients with vascular dementia and 67% (8/12) of patients with other dementias had intact total recall. This differentiation was not due to differences in severity of dementia between patient groups as measured by the sum of CDR box scores. A logistic regression model was fit to the data with impairment on total recall as the outcome. Alzheimer’s disease versus non-AD dementia was a significant predictor: AD cases were 8.33 (95% CI 2.41, 28.8) times more likely to have impaired total recall than were non-AD cases.

Free recall from the FCSRT predicts future dementia and distinguishes individuals at an early stage of AD from those with mild cognitive impairment (MCI) who do not convert to dementia. Many Canadian doctors use the Montreal Cognitive Assessment (MOCA) to identify patients with MCI. Its effectiveness in distinguishing MCI converters from nonconverters is not known at this time, though a comparison of its operating characteristics with the ADS-PC would be beneficial.

Systematic Screening in Primary Care

The ADS-PC eliminates two obstacles to systematic screening in primary care. First, dementia case-finding is done seamlessly in one 20-minute session, thereby eliminating the need for a separate diagnostic visit. This is critical because one study showed that 47% of primary care patients who screened positive for dementia did not agree to a separate diagnostic visit. Second, the ADS-PC has the high specificity needed to establish a valid diagnosis of dementia, unlike other screening methods that misclassify 50% of noncases as having dementia. Only 10% of noncases were misidentified as dementia by the ADS-PC, thereby limiting the potential harms of disclosing a dementia diagnosis. The ADS-PC has other advantages as well: ease of administration and unambiguous scoring that can be mastered by clinic staff with minimal training.

Past experience with efforts to improve the detection of traditionally underdetected conditions in primary care has demonstrated that diagnosis and treatment improve when responsibility for screening is built into the delivery system independent of physician initiation. When routine cognitive screening was performed by clinic staff in a primary care network, small but significant increases in new dementia diagnoses, referrals, and medication prescriptions were observed, particularly for patients with more advanced dementia. However, simply changing...
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Key Points

Primary care physicians need effective and efficient case finding methods for identifying early AD and distinguishing it from non-AD dementias as new AD treatments emerge.

The Alzheimer’s Disease Screen for Primary Care (ADS-PC) is an efficient, sensitive, and specific two-stage strategy for identifying early AD in primary care patients.

The ADS-PC outperformed the Mini Mental State Exam (MMSE) in identifying early dementia.

The Free and Cued Selective Reminding Test (FCSRT), the second stage of the ADS-PC, distinguishes patients at an early stage of AD from patients with mild cognitive impairment who do not convert to dementia.

The ADS-PC should improve diagnosis and treatment of early AD when responsibility for administering it is built into the delivery system independent of physician initiation.

Clinical practice (e.g., introducing guidelines to detect and manage dementia) fails to change doctors’ practices. There must be an educational intervention to bring about change and improve rates of detecting dementia. Primary care physicians must learn to be comfortable making and disclosing a dementia diagnosis and managing cases to improve treatment persistence—skills that are well within the scope and philosophy of primary care practice.

Conclusion

Efficient, sensitive, and specific behavioural procedures such as the ADS-PC will improve the diagnosis of early dementia. This will provide a foundation for treatment studies that will include emerging diagnostic technologies and, ultimately, permit disease management programs for dementia. As new treatments and preventive approaches for AD emerge, they will be implemented in primary care settings. Tools such as the ADS-PC will be essential to implementing the next generation of symptomatic and preventive treatments in primary care so that all seniors can benefit.

This study was supported by National Institute on Aging Grant AG017854. Dr. Grober receives a small royalty for commercial use of the FCSRT with Immediate Recall.

Acknowledgements

Two of the tests that comprise the ADS-PC—the MIS and the FCSRT with Immediate Recall—are copyrighted by the Albert Einstein College of Medicine (AECOM). Both tests are made freely available from AECOM for teaching and academic research purposes. For more information or to request use of the ADS-PC, please contact reagents@aecom.yu.edu.

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