Routine cognitive screening in a neurology practice

Effect on physician behavior

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Abstract

Background: Alzheimer disease is one of the most prevalent and costly neurologic disorders. American Academy of Neurology guidelines call for diagnosis and treatment when dementia is present, but provide no specific instruction relating to cognitive screening.

Methods: Our center piloted a cognitive screening initiative using the Mini-Cog, which was administered to all neurology patients aged ≥ 70 years without a history of a cognitive disorder. **Results:** There was a 37.4% screen positive rate on the Mini-Cog. The percentage of patients with subjective memory complaints did not differ between patients screening positive vs negative on the Mini-Cog. Prospective analysis over an 18-month postscreening period showed that individuals screening positive for cognitive impairment were 10 times more likely to have follow-up cognitive assessment by the provider ($p < 0.0001$), almost 3 times more likely to be referred for neuropsychological testing ($p = 0.003$), and 3 times more likely to receive a diagnosis of cognitive impairment or dementia ($p < 0.0001$) compared to those screening negative. Diagnosis of a cognitive disorder, referral to a cognitive specialty clinician, and prescription of cognitive-enhancing medications were no more frequent than was observed in a randomized trial of screening in primary care, and evidence of neurologists' actions relevant to cognitive impairment was found in a minority of individuals screening positive. **Conclusion:** Further studies are needed to better understand factors influencing neurologist actions in the evaluation and treatment of cognitive impairment. *Neurol Clin Pract* 2016;6:16-21

Alzheimer disease (AD) affects 5.4 million individuals in the United States, with an estimated total societal cost as high as \$215 billion annually.¹ Although the number of cases will triple by 2050, cognitive impairment goes unrecognized in over half of affected patients.² Timely dementia detection provides opportunities for shared care planning, and there is evidence of improved short-term cognitive and functional outcomes with early treatment^{3,4} as well as the potential for more cost-effective care.⁵ Many large

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US health care systems have considered implementing screening for early detection of cognitive impairment (a priority of the National Alzheimer's Plan), yet evidence has been lacking that detection through screening improves patient outcomes.⁶

In the United States, diagnosing and treating dementia, including AD, traditionally has fallen within the realm of the neurologist. Guidelines from the American Academy of Neurology (AAN) call for diagnosis and treatment when dementia is present, but provide no specific instruction relating to cognitive screening within various neurology patient populations.⁷ The Mini-Cog is a brief, validated cognitive screening tool that has been successfully used to detect cognitive impairment in elderly populations.⁸ Prior studies of cognitive screening using the Mini-Cog in asymptomatic geriatric primary care patients have revealed that screen-positive rates range from 13% for more conservative and specific dementia cutoff scores⁹ to 26% using a less specific but more sensitive score for cognitive impairment (Mini-Cog < 4/5¹⁰). Similar if not higher screen-positive rates would be expected in neurology patients, since cognitive impairment is a frequent component of many primary neurologic disorders.

The Mini-Cog is a quick and effective cognitive screening tool consisting of a 3-word recall and clock-drawing task that has been validated against research diagnostic evaluations for dementia.^{8,11} Utilized most frequently in primary and geriatric care clinics, this cognitive screening test is one of the most sensitive and specific for dementia detection.¹² Scores of 0–2/5 are most effective in separating individuals with dementia from those without dementia. When a higher cutpoint (<4) is used and followed by further evaluation, many more patients are found to have dementia.¹⁰

A randomized trial of Mini-Cog in primary care clinics showed a 13% screen-positive rate among individuals without a prior diagnosis of any cognitive impairment, and found that screening increased the frequency of dementia diagnosis, specialty referral, and the prescription of a cognitive-enhancing medication.⁹ Based on the significant outcomes associated with Mini-Cog in primary care, we developed a clinical initiative using this tool to increase dementia detection in a neurology clinic. Our aim was to evaluate the effect of cognitive screening on neurologist action.

METHODS

In 2011, HealthPartners, a Minnesota-based not-for-profit Health Maintenance Organization providing care to 1 million patients within the Twin Cities metropolitan and western Wisconsin regions, started a pilot clinical initiative to screen new and follow-up neurology clinic patients for cognitive impairment. The primary target group was patients ≥ 70 years of age without a cognitive disorder diagnosis in the electronic medical record (EMR; Health Partners uses EPIC). Rooming nurses identified eligible patients on the day before a scheduled visit. On the day of the visit, they asked patients whether there were concerns about their memory and administered the Mini-Cog (scored 0–5, with a positive screen defined as a score <4). Nurses received initial and ongoing monthly refresher training in Mini-Cog administration and scoring during the first 3 months. Scripting was provided to both nursing and neurologist staff regarding communication of screen-positive results to patients. Neurology providers were expected to discuss abnormal Mini-Cog results with the patient/caregiver and initiate a formal cognitive evaluation if indicated.

At the 18-month postscreening mark, the EMR was reviewed for the following predictor (independent) variables: (1) reported memory problem (yes/no); (2) Mini-Cog score; (3) neurologic chief complaint, as well as the following outcome (dependent) variables: (1) follow-up assessment with another cognitive test (Montreal Cognitive Assessment [MoCA; cutoff <26 for failure], Mini-Mental State Examination [MMSE; cutoff <26], or Kokmen Short Test of Mental Status [STMS; cutoff <29]); (2) dementia evaluation (referrals for neuroimaging, neuropsychological evaluation, or dementia specialty clinic); (3) new cognitive impairment/dementia diagnosis; and (4) initiation of dementia-specific medication (cholinesterase inhibitors or memantine). Individual EMR review of progress notes was performed to identify cognitive measures that did not

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appear in a searchable EMR field. In addition, neuroimaging (CT or MRI) studies were reviewed to confirm that the indication was for evaluation of cognitive impairment.

Descriptive and comparative statistics were performed with SAS software (SAS Institute, Cary, NC). Comparisons were performed using Student *t* test and Fisher exact test.

RESULTS

A total of 646 patients (276 men, 370 women; average age = 78.3 ± 6.0 years, range 70–96 years) were screened between September 2011 and September 2014. The overall Mini-Cog screen-positive rate was 37.4% ($n = 242$). Individuals screening positive vs negative on the Mini-Cog did not differ in frequency of reported memory concerns (29.3% vs 23.6%, respectively). However, the presence of a memory concern increased the rate of referral to a dementia subspecialty clinic (7.4% vs 2.6%; $p < 0.05$), assignment of a dementia diagnosis (9.5% vs 4.68%; $p < 0.05$), and prescription of a dementia-specific drug (cholinesterase inhibitor or Namenda) (8.47% vs 3.80%; $p < 0.05$) regardless of Mini-Cog score.

For patients with positive Mini-Cog screens, neurologists conducted more detailed cognitive testing (e.g., MMSE, MoCA, or STMS) in 31.5% ($n = 76/242$), often with a delay (mean days since initial screen, 49 ± 92 , range 0–518). Screen-positive rates on follow-up testing varied by measure: MoCA, 81.3%; MMSE, 42.9%; and STMS, 40.0%. Additional interventions included referrals for neuropsychological testing ($n = 19$; 7.9%), neuroimaging for workup of cognitive impairment/dementia (CT or MRI; $n = 10$; 4.1%), and dementia specialty clinic referral ($n = 15$; 6.2%). A diagnosis of dementia or mild cognitive impairment was rendered in 13% ($n = 32$) of cases and $<2\%$ ($n = 4$) were prescribed cholinesterase inhibitors or memantine (table). In contrast, of patients passing the Mini-Cog, 3% ($n = 11$) underwent follow-up cognitive testing, 3% ($n = 10$) had formal neuropsychological testing, none had neuroimaging for cognitive impairment, 3% ($n = 13$) were referred to the dementia clinic, 4% ($n = 15$) received a dementia diagnosis, and 1% ($n = 5$) were prescribed dementia-specific medications.

Compared to those who passed, patients failing the Mini-Cog were 10 times more likely to have follow-up cognitive assessment by the provider ($p < 0.0001$), almost 3 times more likely to be referred for neuropsychological testing ($p = 0.003$), and 3 times more likely to receive a diagnosis of cognitive impairment or dementia ($p < 0.0001$). Rates of referral to a dementia subspecialty clinic and initiation of a cholinesterase inhibitor or memantine did not differ between those with positive and negative screens but were influenced by patient report of memory concerns.

DISCUSSION

This investigation evaluated the effect of routine cognitive screening on neurologists' responses to screen-detected cognitive impairment as reflected in the EMR. Follow-up cognitive assessment by the clinician, referrals for neuropsychological testing, neuroimaging, and diagnosis, though significantly more frequent for patients with than without a positive screen, occurred in fewer than one-third of individuals failing the screen. Diagnosis of a cognitive disorder, referral to cognitive specialty clinician, and prescription of cognitive-enhancing medications occurred in no greater a percentage of neurology patients than was observed in a randomized trial of screening in primary care.⁹

Table Outcomes in Mini-Cog screen-negatives vs screen-positives

	Mini-Cog screen- negative	Mini-Cog screen- positive	p Value
No.	404	242	
Age, y, mean (SD)	76.7 (5.7)	79.7 (6.3)	<0.0001
Female, n (%)	242 (60)	125 (52)	0.060
Subjective memory symptoms, n (%)	96 (23.8)	71 (29.3)	0.115
Follow-up cognitive assessment, n (%)			
Additional screening (e.g., MMSE/MoCA/STMS)	11 (2.7)	76 (31.5)	<0.0001
Neuropsychology testing referral	10 (2.5)	19 (7.9)	0.003
Neuroimaging order (dementia indication), n (%)	0	10 (4.1)	<0.0001
Referral to dementia subspecialty clinic, n (%)	13 (3.2)	15 (6.2)	0.075
Dementia/MCI diagnosis entered in EMR, n (%)	15 (3.7)	32 (13.2)	<0.0001
Prescription for dementia medication ordered, n (%)	5 (1.2)	4 (1.7)	0.733
Abbreviations: EMR = electronic medical record; MCI = mild cognitive impairment; MMSE = Mini-Mental State Examination; MoCA = Montreal Cognitive Assessment; STMS = Mayo Short Test of Mental Status.			
Mini-Cog screen-positive based on score <4.			

Additional findings from this study are informative. Most patients failing the screen did not endorse difficulty when asked directly about memory problems and were no more inclined to report difficulty than patients passing the screen. The presence of cognitive complaints did increase referrals to a dementia subspecialty clinic, rendering of a dementia diagnosis, and prescription of dementia-specific medications. These data suggest that patients with memory complaints will be more likely to have their workup completed by a subspecialist provider. The neurologists were influenced by both positive screening and patient complaints. Thus, it is advisable that clinicians administer cognitive screening in addition to inquiring into memory loss to optimally detect cognitive impairment.

Among the strengths of this study is its prospective examination of neurologists' actions on a positive Mini-Cog screen, but it is limited by lack of data as to why more patients with evidence of cognitive impairment on screening were not further assessed. The patients most frequently evaluated in a neurology clinic are those with stroke, traumatic brain injury, and Parkinson disease (PD), all conditions that may compromise cognitive performance. We would expect neurologists to be particularly vigilant to cognitive impairment in such patients; it is possible that they were aware of signs of impairment but chose not to document or formally act on them. Nevertheless, the confirmation and documentation of a cognitive disorder in any neurology patient—regardless of the cause of impairment—is important in alerting other providers to potential problems in management and in educating family regarding supportive services and ensuring safety in the home for individuals with evidence of cognitive impairment.

This investigation has several limitations. Our study was designed as a quality improvement measure to assess the effect of cognitive screening on dementia diagnosis within a single neurology clinic, not a randomized trial as conducted previously in primary care.⁹ Furthermore, our results, which suggest that neurologists adopt a best practice approach to a minority of subjects screening positive, raise further questions as to what factors may account for these surprising findings. For instance, it may be that neurologists may expect cognitive impairment in patients with certain diagnoses (e.g., PD, multiple sclerosis, epilepsy), and do not initiate any separate cognitive disorder evaluation or management pathway. However, such qualitative inquiry, though important, was beyond the scope of the present study. Finally, the presence of cognitive impairment may have reduced subjects' reporting of cognitive symptoms, which, in our study, increased rates of dementia clinic referral,

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cognitive disorder diagnosis, and prescribing of antedementia medication. Thus, these findings may not be applicable to other clinic populations such as in primary care.

Our investigation supports the role of cognitive screening for older adults in neurology clinic populations with the goal of improving detection of cognitive impairment that would otherwise go unseen or unremarked. While cognitive screening in this initiative had a significant effect on decision-making, neurologists acted upon abnormal Mini-Cog results in a minority of patients despite the AAN guidelines recommending early detection of dementia when it is present. In order to improve care of the growing elderly population with dementia, including AD, future studies are necessary to better understand factors influencing neurologist action in the evaluation and treatment of cognitive impairment.

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AUTHOR CONTRIBUTIONS

Michael Rosenbloom: study concept and design, data review, and manuscript preparation. Soo Borson: critical revision of manuscript for intellectual content. Terry Barclay: study concept and design. Leah Hanson: study concept and design. Ann Werner: acquisition of data. Logan Stuck: data analysis. John McCarten: critical revision of manuscript for intellectual content.

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