Driving Cessation in Older Adults With Dementia of the Alzheimer's Type

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The psychometric profile of 143 drivers with dementia who stopped driving did not differ from that of 58 individuals with dementia of similar severity who still drove. The reasons given for driving cessation by drivers with dementia as reported by a collateral source are reported.

Key Words: Alzheimer’s disease, Cognition, Neuropsychology, Older drivers

There are 23 million licensed drivers older than 65 years of age in the United States, and this number is expected to increase in the next few decades (Fain, 2003). At age 70, older adults have 11 years of driving life expectancy (Foley, Heimovitz, Guralnik, & Brock, 2002), and they are increasing the number of miles driven per year (Eberhard, 1996).

Dementia is common in older adults. A mental status screening of older adults during driver’s license renewal revealed a significant number of older adults with some cognitive impairment (Stutts, Stewart, & Martell, 1998). Foley, Masaki, Ross, and White (2000) estimated that 4% of male drivers older than age 75 are demented. As many as 20% of older adults with dementia who are referred to memory clinics are actively driving (O’Neill & Dobbs, 2004). It can be anticipated that the number of drivers with dementia on our roadways will increase in coming years.

Research to date has focused on driving safety, with recommendations on how and where to assess older drivers (Staplin & Hunt, 2004). Little attention has been paid to the process of driving cessation by older adults with dementia. It is important to understand the timing, reasons, and methods that families use in the achievement of driving cessation so that physicians, families, and caregivers can develop strategies to address this difficult problem.

We examined a sample of community-dwelling older adults with dementia of the Alzheimer’s type who had a current or past history of driving. Specifically, we wanted to characterize the cognitive profile of drivers with dementia who had recently stopped driving and compare it with drivers with dementia who were still driving. We hypothesized that drivers with dementia who recently discontinued driving would have mild dementia and might have poorer performance on some psychometric tests, specifically those involving speed of processing time and visuospatial abilities. We also were interested in the reasons for driving cessation as reported by a collateral source.

Methods

Participants

The archival database for the Washington University Alzheimer’s Disease Research Center contained 143 cases of people aged 51 to 99 years with dementia of the Alzheimer’s type who were driving at initial assessment between 1981 and 2000 but who stopped driving according to collateral source report at a subsequent evaluation. Some of these people were first seen when they were nondemented, and then they became demented while they were followed longitudinally. For example, 8 people (6%) who stopped driving were not demented the year prior to the assessment at which the collateral source reported driving cessation, which was also the first time they received a diagnosis of dementia. As described in the next section, the psychometric data used in the analyses were from the year prior to when the collateral source reported driving cessation; thus the psychometric data used for these 8 people were from a time period when they were nondemented.
Table 1. Description of Sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Still Driving (n = 58)</th>
<th>Stopped Driving (n = 143)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>79.52 (6.64)</td>
<td>78.28 (7.85)</td>
</tr>
<tr>
<td>Education (years)</td>
<td>13.12 (2.99)</td>
<td>13.72 (3.45)</td>
</tr>
<tr>
<td>Medications (number)</td>
<td>2.93 (2.30)</td>
<td>2.83 (1.99)</td>
</tr>
<tr>
<td>Short Blessed</td>
<td>9.00 (6.64)</td>
<td>9.10 (5.87)</td>
</tr>
<tr>
<td>Visual acuity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>20/38 (35)</td>
<td>20/35 (38)</td>
</tr>
<tr>
<td>Left</td>
<td>20/31 (12)</td>
<td>20/45 (85)</td>
</tr>
<tr>
<td>Clinical Dementia Rating (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>9 (6)</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>60 (33)</td>
<td></td>
</tr>
<tr>
<td>1+</td>
<td>31 (41)</td>
<td></td>
</tr>
<tr>
<td>Gender (% men)</td>
<td>50 (38)</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Age for those still driving was at last assessment; age for those who ceased driving was at the time of the evaluation just prior to cessation. One person who stopped driving had a CDR of 2.

The archival database included 58 people of approximately comparable age (range = 63–96 years), dementia status, and length of longitudinal follow-up who were still driving at their last assessment. To make the two groups comparable with respect to dementia status for the analyses of the psychometric measures, we included 5 people (9%) without dementia in the group that was still driving at their last assessment. See Table 1 for a description of the characteristics of the two groups.

Using $t$ tests for quantitative measures and chi-square tests of association for categorical measures, we found that the two groups did not differ in age, education, gender, ethnicity, degree of dementia severity, number of prescription medications, scores on the Short Blessed Test (Katzman et al., 1983), or assessment of visual acuity (all $p$s > .05). Most participants were White; there were 2 African Americans in the group that was still driving and 11 in the group that had stopped. Data from many of these participants have been included in previous publications from the center.

**Diagnosis and Staging of Dementia of the Alzheimer’s Type**

At entry and annual follow-up, experienced clinicians assessed each participant for the presence and severity of dementia by using the Clinical Dementia Rating (CDR; Morris, 1993). This was based on a 90-min semistructured interview with the research participant and a knowledgeable collateral source (usually a spouse or adult child), followed by a neurological examination of the participant. The clinician was unaware of the results of previous clinical evaluations or of psychometric test results.

The diagnosis of dementia of the Alzheimer’s type was based on a history of gradual onset and progressive cognitive impairment and was comparable with that specified in the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1994). Diagnostic accuracy for Alzheimer’s disease as verified by postmortem examination in 207 individuals is 93% (Berg et al., 1998).

**Measures**

**Cognitive Assessment.**—Psychometricians administered a 1.5-hr psychometric battery annually to all participants a few weeks after the clinical assessment (Storandt & Hill, 1989). The battery (see Table 2) includes measures of episodic memory: Logical Memory, Digit Span, and Associate Learning from the Wechsler Memory Scale (WMS; Wechsler, 1995), and Information from the Wechsler Adult Intelligence Scale (WAIS; Wechsler, 1955) assess semantic memory. Four speeded measures address psychomotor, visuospatial, and executive functions: WAIS Block Design and Digit Symbol, Trailmaking A (Armitage, 1946), and Crossing-Off (Botwinick & Storandt, 1973). An attention measure (WMS Mental Control) and an untimed visuospatial measure (Visual Retention Test, copying; Benton) complete the battery. Scores were from the last assessment for those people who were still driving and from the assessment immediately prior to the time when driving cessation was first reported for those who had stopped driving.
**Reasons for Cessation.**—The only formal questions about driving in the semistructured interview of the collateral source are as follows: Did the person in question ever drive a car? Does she or he drive a car now? If no, is this because of memory or thinking problems? We reviewed the responses to these questions and the initial open-ended portion of the evaluation that was provided by the collateral source and recorded by the clinician. Responses were recorded for the year in which the collateral source first reported that the participant stopped driving and for the prior year. We recorded all reasons for driving cessation and then grouped them into the categories shown in Table 3. Using the same categories, a second rater reviewed and categorized 25 randomly selected cases. Interrater reliability was good; kappas ranged from \( \kappa = 0.74 \) to \( \kappa = 1.00 \).

**Results**

The two groups did not differ on any of the measures from the psychometric battery (\( t \) tests for independent groups, all \( ps > .05 \)). Means and standard deviations are shown in Table 2. Table 3 shows the reasons for driving cessation provided by the collateral source. Recall that the only formal questions about reasons for driving cessation were about memory and thinking problems. The other reasons were recorded in the open-ended responses.

**Discussion**

We were surprised that there was no difference in the psychometric profiles of current and past drivers with dementia of the Alzheimer’s type. We predicted that those drivers who stopped driving would have more impairment in speeded and visuospatial tasks. In addition, we found no differences in tests of executive function. Thus, other factors (e.g., psychosocial issues) may play a more important role in driving cessation than the degree of the cognitive impairment.

A recent review article suggested that mild impairment (CDR = 1) should preclude driving (Dubinsky, Stein, & Lyons, 2000), yet many of our participants who had recently stopped driving were still at the very mild (CDR = 0.5) stage. Thus, unsafe driving behaviors or general concern about driving with cognitive impairment appear to play a role in driving cessation, even when a person is in the very early stages of the disease. Performance-based road testing at our center would indicate that the majority of older adults with very mild dementia are still safe drivers (Hunt et al., 1997). This suggests that some older adults with dementia may cease driving prematurely.

There is little information about the reasons for driving cessation in people with dementia of the Alzheimer’s type. Adler and Kuskowski (2003) reported that increasing age, lower mental status scores, and female gender were associated with driving cessation in drivers with dementia of the Alzheimer’s type. We did not administer a systematic questionnaire about comorbidities as they contributed to driving cessation, but other medical conditions were noted by 10% of the collateral sources. Thus, medical illnesses also may play a role in reducing a person’s ability to drive (e.g., Forrest, Bunker, Songer, Coben, & Cauley, 1997).

We also did not study who played significant roles in the decision to stop driving. Trobe, Waller, Cook-Flanagan, Teshima, and Bielauskas (1996) reported that most drivers with dementia of the Alzheimer’s type stopped driving at the request of a family member, but frequently physicians and patients themselves also were involved. Older drivers with dementia and their families may accept a physician’s advice (Adler & Kuskowski, 2003; O’Neill & Dobbs, 2004).

Former drivers often obtain rides through an informal support system such as families and friends, but many cite difficulty in reaching social and recreational destinations despite having a licensed driver at home (Taylor & Tripodes, 2001). Individualized transportation options are sorely needed for people who lack the informal network of family or friends that can meet these needs (Freund, 2000), but it is unlikely that a person with even mild dementia could negotiate public transportation.

Unfortunately, older adults do not plan for driving cessation, even in the face of a perceived likelihood of having future medical illnesses that could impair their mobility (Kostyniuk & Shope, 2003). Counseling regarding driving retirement and the identification of alternate sources of transportation should probably be considered before cessation occurs (Staplin & Hunt, 2004). There are adaptive strategies for maintaining mobility for older adults, many of which could be helpful to older adults with dementing illnesses (Sterns, Burkhardt, & Eberhard, 2003). A recent study of focus groups found heavy use of community support groups such as the Alzheimer’s Association for assistance with driving-retirement issues (Sterns & Sterns, 2000).

### Table 3. Reasons for Driving Cessation

<table>
<thead>
<tr>
<th>Reason</th>
<th>% of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory and thinking problems</td>
<td>76</td>
</tr>
<tr>
<td>Disorientation</td>
<td>32</td>
</tr>
<tr>
<td>Unsafe driver</td>
<td>22</td>
</tr>
<tr>
<td>Accident</td>
<td>15</td>
</tr>
<tr>
<td>Physical problems</td>
<td>10</td>
</tr>
<tr>
<td>Lost license</td>
<td>4</td>
</tr>
<tr>
<td>Too old</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
</tr>
</tbody>
</table>

Note: Percentages sum to more than 100 because multiple reasons were sometimes given.
The effectiveness of these educational efforts in achieving driving cessation or maintaining mobility is an important area for future research.

References


Fain, M. (2003). Should older drivers have to prove that they are able to drive? *Archives of Internal Medicine*, 163, 2126–2128.


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