The ability to travel hither and yon whenever and without dependence on others has become synonymous with independence, autonomy, dignity, self-esteem and the automobile. Losing the ability to drive in today’s modern societies may have serious psychosocial ramifications with potential subsequent adverse biomedical consequences for individuals already facing many losses on the one hand, while sustained driving by the driving impaired increases the likelihood of injuries, hospitalizations and death, on the other. The number of older drivers has and will increase dramatically as populations worldwide continue to age. Family physicians are often approached by family regarding concerns of hazards posed by continued and often insistent driving of older loved ones who are felt to be too functionally impaired to drive. We have been ill equipped and trained to offer counsel, and frequently wonder as to whether this is indeed a problem that is ours to solve. While most governmental agencies deem driving licensure as a privilege and not a right, they have done little to clarify such privilege, nor have they offered guidance one might deem of use in the context of the physician–patient dyad. The purpose of this article is to review the current literature as it pertains to the pressing problem of clinician involvement. It is an attempt to facilitate the practitioner’s balance as advocate for patient, family and society in the context of biomedical, psychological and sociological variables.


This is a population-based survey of community-dwelling adults in which the authors describe the driving habits of 589 adults who were interviewed by survey. The goal was to identify clinical cues to clinicians that may signal driving difficulty in older adults. Subjects were asked about their current driving status, i.e. had they made adaptations to driving or had they experienced any adverse driving events in the prior 2 years. Additionally, driving behaviours were assessed in relation to chronic disease, sensory impairment, functional status and mental status. Survey results indicated that those who no longer drove were likely to be older, female and non-white. Those who no longer drove also had higher response rates indicating correlation with concomitant diabetes, visual impairment, functional impairment and making an error on the copy design task of the Mini-Mental State Examination (MMSE). Women were more likely to have made adaptations to driving than men. The same held for people with heart disease, arthritis, vision impairment and those who made an error on the copy design task of the MMSE. Importantly, heart disease and hearing impairment were associated with report of an adverse driving event; however, in multivariate models that included potentially influential variables, i.e. age, gender and number of miles driven, only the copy design task was associated with driving status, and only heart disease was associated with driving adaptation and adverse driving events.

Comment

The absolute number of crashes among older drivers is lower than for any other age group; however, if one adjusts for the lower average mileage of older drivers, their crash rate per mile driven rises to approach or exceed that of drivers aged 16–25 years, the highest risk age group. It is because the resultant injuries and deaths are potentially avoidable that we must make efforts to determine who is at risk. It is apparently not age alone that is the aetiological factor. The question raised by this article centres on the impact of medical conditions, particularly cardiac, on driving impairment. The article does not address the difficulties incurred in maintaining independence, mobility and activity level of older persons deemed too impaired to drive, nor how to help ease the transition to driving less or not at all.


This is a case–control study in which associations between medical and functional variables and at-fault car crashes are examined. Participants, *n* = 174, were older drivers ages 55–90 years residing in the community. Cases were drivers who had at least one at-fault crash in the previous 6 years, while controls were crash-free during the same period. The investigators measured self-reported medical conditions, reported and observed functional measures, and urinary drug screens. The occurrence of at-fault crashes in the previous 6 years represented the outcome measure. All subjects had also undergone assessments of visual and cognitive function. State-recorded crash records were utilized instead of self-report. Results found that 99 older drivers experienced between one and seven at-fault vehicle crashes, whereas 75 drivers did not. Logistic regression models indicated that the following variables were independently associated with crash involvement: a 40% or greater reduction in the useful field of view, a history of falling in the previous 2 years and not taking a β-blocking drug. Based on these findings, the authors concluded that functional assessments, such as a comprehensive test of visual processing, a falls history and a review of current medications, may be of greater relevance than specific medical conditions in the identification of older at-risk drivers.

Comment

Older literature appears to agree upon the importance of visual and cognitive impairments as contributory to unsafe driving; however, there is a lack of consensus across studies about which medical conditions and functional impairments elevate crash risk. By jointly evaluating both medical and functional associations of vehicular crashes while accounting for visual and cognitive function, the relative strengths and independence of all these factors can be estimated. In this lies the strength of this article. Its weakness is sample size and it is retrospective. In this article, failure of the UFOV test represents one of the strongest independent predictors of crash. This test utilizes several visual/cognitive processing domains, including visual sensory function, i.e. acuity and contrast, and visual sensitivity, visual processing speed, and divided and selective attention. Impairment in one or more of these visual domains impacts performance. This is a marked improvement over other visual testing in which a relatively narrow aspect of vision, i.e. visual acuity, is screened. The UFOV test can reveal problems in several different aspects of the visual processing stream as well as evaluating attention capability. Further information about this test is available to the interested reader. Another new finding that this study brings to light is the beneficial effect of being on β-adrenergic blocking agents. The literature already presents evidence for the adverse effects of several classes of drugs, i.e. benzodiazepines and antidepressants, but this class of drug reduced the odds of at-fault drivers. In contrast to the previously discussed article by Gallo, cardiac conditions were not statistically associated with crash involvement. The authors hypothesized that β-adrenergic blocking agents may decrease anxiety and, thereby, impact positively on decision making. The implication that functional problems are more highly associated with crash-prone drivers than are medical conditions and chronological age is of extreme importance to the advocacy of the patient.


This is also a cohort study in which 125 community older drivers were studied for purposes of developing a battery of tests that assess a wide range of functional abilities relevant to driving that are simple enough to be performed by practising physicians in the context of their out-patient offices. The test battery assessed visual, cognitive and physical abilities potentially relevant to driving, and was administered in participants’ homes by trained interviewers. Outcome measures included the self-report of a crash, moving violation or being stopped by police. Analysis compared performance on the elements of the test battery with participants’ histories of adverse driving events. Of the 125 drivers, 50 had reported an adverse event in a mean period of 5.76 years before the interview. The elements of the test battery independently associated with a history of events included near visual acuity worse than 20/40, limited neck rotation and poor performance on a test of visual attention.

Comment

This study intentionally chose to focus on elements of function rather than specific medical conditions, medications or poor driving history, because the latter, if present, may already alert clinicians to potential risk. Furthermore, functional impairments might be amenable to intervention, thereby permitting a possible reduction of risk and preserving driving integrity that has its own possible ripple effects. The study seeks to find a pragmatic methodology to permit the clinician to assess the older driver at home or in the office, and it is worthwhile describing the test battery employed by the interviewers in more depth.

General cognition was assessed with the MMSE. Knowledge and memory of driving information was
assessed via a traffic sign recognition test found in a state Department of Motor Vehicles driver’s manual. Verbal and visual memory were assessed with the Logical Memory and Visual Reproduction subtests of the Wechsler Memory Scale-Revised (WMS-R). Visuospatial ability was assessed with the Hooper Visual Organization Test (VOT). The Embedded Figures Test (EFT) and a test of visual imagery derived from the East-West Test. Visual attention was assessed with a number cancellation test, which involves marking all the numbers in a row that match a circled number at the far left hand side of the row within a given amount of time. Psychomotor speed was assessed with the Symbol–Digit test and a number connection task. Executive function was assessed with the Trail Making Test-Part B and a timed problem-solving task that required subjects to identify the missing card removed randomly from a deck of 52 playing cards. Corrected near visual acuity was measured using a Rosenbaum card held in the hand at 14 inches, corrected distance acuity with a Graham–Field chart placed at 10 feet, and contrast sensitivity with a Pelli–Robson chart placed at 40 inches. Central visual field was assessed using an Amsler Grid. Peripheral visual field in the horizontal plane was assessed with a device developed for in-office use: a pencil was placed at the end of a goniometer arm that was moved forward from 30° behind the midline on either side until the subject could see the pencil while centrally fixating on an object on the wall in front of them. A hand-held dynamometer measured hand grip strength. Range of motion of the neck was evaluated with the subject standing against a wall; the respondent turned to identify a number placed behind either shoulder. Mobility was assessed with self-report of the number of blocks the subject walked in an average day and the actual time to walk 10 feet and back as quickly as possible. It took a trained research assistant 90 minutes to perform a complete evaluation. This is too long for the average office visit; however, the factors within the test battery most closely associated with adverse driving events were poor near visual acuity, poor visual attention and limited neck rotation, and the clinician might do well to incorporate these as a screening tool when there is concern about an older driver’s function.


Alzheimer’s disease is a progressive disease that varies in severity and limitations at different stages of its course. Where in the spectrum of this disease do physicians recommend restrictions on driving an automobile? This is an age-matched control study that compared 29 outpatients with probable Alzheimer’s disease with 21 controls on an interactive driving simulator to determine how the two groups differed and how such differences related to mental status as determined by patient scores on the MMSE. The investigators found that patients with Alzheimer’s disease were less likely to comprehend and operate the simulator cognitively, drove off the road more often, spent more time driving considerably slower than the posted speed limit, spent less time driving faster than the speed limit, applied less brake pressure in stop zones, spent more time negotiating left turns and drove more poorly overall. Among the Alzheimer disease patients, those who were unable to drive the simulator because of confusion or disorientation differed from those who were able to drive in terms of lower MMSE scores (19.6 mean score versus 22.5). There was a wide difference in collision rate (62 versus 15%) between Alzheimer’s patients and the control group. However, there was great variation among Alzheimer’s disease drivers themselves in all aspects, with some patients being rated by their simulator performance as being safe drivers.

Comment

Though small in sample size, this is an important study for multiple reasons. Estimates are that Alzheimer’s disease affects >10% of persons aged 65 years and almost 50% of all adults older than 85 years. Additionally, patients with Alzheimer’s disease have deficits in memory, visual attention, perception, judgement and other cognitive functions. These are characteristics associated with high risk driving. Almost 60% of drivers with Alzheimer’s disease continue to drive until they are involved in an accident. In spite of this, data from this current study imply that the mere diagnosis of early-stage Alzheimer’s disease does not necessarily equate with poor driving risk as there is wide variation among drivers. It is difficult to determine by mental status alone who is at risk and who not, although patients with lower MMSEs appear to be at higher risk than those with higher scores. The article makes a good case for testing via a driving simulator. While most current literature eludes to an on-road evaluation conducted by a driver’s licensing authority as the most authoritative test to predict safe driving, an advantage of the simulator is that it can create and measure reaction to emergency conditions unlikely to occur during a typical on-road evaluation. However, simulator tests are not as readily accessible as road tests in most instances.


While a review rather than a study, this is a useful summary article that offers the practising clinician a step-by-step assessment to implement when an older patient’s driving competency is questioned. This comprehensive assessment is broken down into driving history, medication review, medical illnesses that impair driving and physiological/cognitive variables that may increase
the risk of crashing. It points out that many diseases that impair a driver’s ability can be detected and treated effectively by family physicians.

References