Invited Commentary

Distracted Driving With Attention-Deficit/Hyperactivity Disorder

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While driving is a ubiquitous functionality and an important activity of independent daily living, it also represents a complex neurobehavioral task involving an interplay of cognitive, motor, perceptual, and visuospatial skills.[1] As a result, patients with neurodevelopmental disorders often have limitations in such skills. Although there has been a recent interest in understanding driving concerns in individuals with other neurdevelopmental disorders such as autism spectrum disorders, substantial research has reviewed the influence of attention-deficit/hyperactivity disorder (ADHD) on driving safety, especially given how pharmacotherapy may affect inattention, impulsivity, and executive dysfunction.[2] In fact, individuals with ADHD have been clearly shown to have significantly more driving lapses, driving violations, and motor vehicle crashes (MVCs) compared with those without ADHD.[3] These results have been replicated in different settings with driving self-reports, observational findings, and driving simulators, as well as the MVC data.

Related article

Initial pharmacotherapeutic studies[4,5] in drivers with ADHD involved a double-blind, placebo-controlled trial, which highlighted that methylphenidate use improves driving and that the efficacy of stimulant medications is similar for both male and female individuals. A crossover design using drivers with clinically diagnosed ADHD compared long-acting methylphenidate medication use with no medication use and demonstrated that there were fewer driving accidents during months when the drivers were medicated compared with months when they were nonmedicated.[6] In this design, routine driving mishaps were videotaped for 6 months.

The findings in the study by Chang et al[7] in this issue of *JAMA Psychiatry* confirm and extend existing experimental studies and have impressive implications for judicious use of ADHD medication. Using an innovative study design, the authors identified a large cohort of individuals with ADHD from a commercial insurance database over a decade who were seen in the emergency department (ED) for MVCs. They noted that both men and women with ADHD may have a lower risk of MVCs when medicated. In addition, the study extends the literature by reporting that stimulant medication use is beneficial across the age span. The methods in the article rely on two somewhat loosely defined metrics of medication effects and driving safety. Defining medication effects in terms of months that the medications were prescribed may have little bearing on whether the medication was active in the driver's body at the time of the driving mishap. Considering the inherent inattention and executive dysfunction in ADHD, it is not uncommon for drivers to miss out on or forget to take their prescribed medications. On the day of the crash, they may have forgotten their medication, or the medication may not have been physiologically active in their body at the time of the accident. Furthermore, the use of short-acting methylphenidate hydrochloride 3 times a day may not be as effective in improving driving performance late in the evening compared with long-acting methylphenidate.[8] In addition, the article by Chang et al[7] presumes that all stimulant medications are effective in improving driving safety. A double-blind, placebo-controlled study[9] demonstrated that the use of long-acting amphetamine sulfate has been associated with a rebound effect for some drivers: compared with placebo, driving was worse at midnight when medication was taken at 8:00 AM. As a result, there are presumptions that the driver with ADHD—if taking the medication on the day of the driving mishap and if the medication was active at the time of the accident—was optimally chosen and dosed.

Furthermore, describing driving mishaps in terms of ED visits has a significant limitation: many (possibly most) vehicular collisions do not result in an ED visit. Therefore, the study by Chang et al[7] probably underreports the benefits of optimal stimulant medication and the influence of ADHD on driving safety.

Given the reported findings, the unique data set and analyses in their study represent another endorsement of the use of ADHD medications for medication-responsive drivers. However, clinicians should not presume that all ADHD medications at any dosage will be effective for every patient. Health care professionals should ensure that both the medication and dosage are optimal for a particular patient-driver, that the medication coverage is adequate for the particular patient's driving routine, and that the medication prescribed is not responsible for worse driving as its effects wear off (rebound effect).

In addition, there are several clinical pearls that the clinician can garner from the research on distracted driving in patients with ADHD. First, it is important to keep in mind that the natural course of ADHD often results in a decrease in hyperactivity, while inattention and impulsivity may persist as the patients become adults.[10] Therefore, the developmental trajectory of this disorder must be kept in perspective to ensure that teen drivers and their older counterparts continue to benefit from treatment approaches that work for them. In fact, recent evidence indicates that adults with ADHD have more diverse deficits than children in higher-level executive functioning and emotional control.[11] Second, management of ADHD is not limited to one's school, college, or workplace: it extends to several other aspects of life, such as driving, which may be ignored to the clinician's and patient's peril. Third, health care professionals should be aware that MVCs in indi-

viduals with ADHD often happen later in the evening when their medications may have worn off. Individualizing and optimizing ADHD pharmacotherapy, while being mindful of adverse effects and the potential for abuse, is the most prudent way forward. Additional clinical guidelines are available online.[12]

ARTICLE INFORMATION

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