Cardiac Electrophysiology Review 2003;7:77–79

Driving and Arrhythmias: Implications of New Data

Jeffrey F. Bleakley and Toshio Akiyama
Cardiology Unit, Department of Medicine, University of Rochester Medical Center, Rochester, New York, USA

Abstract. **Patients with ventricular arrhythmias are often restricted from driving by their physicians for several months. These recommendations are based more on convention than evidence, due to the paucity of data previously available on the safety of driving in these patients. Over the past few years, however, more data have become available that suggests that it is safe to drive within three months of their ventricular tachyarrhythmia. In this paper, we look at this more recent data and make the suggestion that patients with well maintained cardiac function, no recurrent ventricular arrhythmias (i.e. electrical storm) and no persistent medical condition predisposing them to ventricular arrhythmias should be allowed to resume driving soon after their ventricular tachyarrhythmia.**

Key Words. **automobile driving, legislation, medical, defibrillators, implantable, practice guidelines, syncope, heart arrest, tachycardia, ventricular, arrhythmia, ventricular fibrillation**

*D*riving an automobile has evolved into a basic need for most people in the United States. It has become essential for social, economic, recreational, and educational activities in modern society. Pursuits as simple as going to the grocery store or running a basic errand usually require an automobile. For most of us, the privilege to drive a car is thought of more as a fundamental right than a privilege. Most people will never have to experience the isolation and lack of independence that accompanies the suspension or restriction of a drivers license. The majority of patients who are told to refrain from driving due to cardiac arrhythmias continue to drive despite the potential consequences, presumably because they are accustomed to doing so [1–3]. We as a society have accepted the risk of driving a car (7.1% annual risk of a motor vehicle accident) without hesitation [4]. However, if there is a group that has been shown to have a higher risk of motor vehicle accidents, then it is our job as a society and more specifically as physicians to minimize that risk by imposing restrictions on those individuals who have been shown to be at higher risk of causing automobile accidents based on established evidence.

Ever since automobiles have been in operation, some medical conditions have been recognized as posing risks of motor vehicle accidents. Epilepsy, diabetes, and arrhythmias are the ailments that come to mind with regard to sudden incapacitation [5–7]. Even though these medical causes of sudden incapacitation account for only one percent of motor vehicle accidents, they are potentially preventable by enforcing restrictions of driving privileges [6]. As treatment modalities have evolved over the past several years, so too have the guidelines for driving restrictions. For example, diabetics are allowed to drive despite the fact that their risk of hypoglycemia may actually be higher now than in the past with more modern, intensive treatment [5]. Driving restrictions on patients with an epileptic seizure disorder differ from state to state, but most states do have some formal guidelines. Both of these conditions have been associated with slightly increased risks of traffic accidents, so the restrictions would seem appropriate [5].

As for arrhythmias, in 1991, only eight of the 50 states had specific guidelines for granting driving privileges to patients with cardiac arrhythmias, and these were quite variable [8]. Furthermore, a study by Dicarlo et al. revealed that only half of the cardiologists surveyed knew the specifics of the state law [9]. The restrictions vary from zero months (those states without guidelines) to eighteen months [8]. Because of the lack of guidelines, and possibly due to the threat of legal responsibility, the recommendation by most physicians has been suspension of driving privileges altogether, at least for several months. A study by Curtis et al. suggested most physicians recommended driving cessation for an average of 7.3 months, based more on convention than actual data [10]. Despite these recommendations, most patients nonetheless continued to drive and it is these patients that have been used in recent studies to determine the risk of driving in patients with cardiac arrhythmias.

The Canadian Cardiovascular Society established a set of guidelines in 1992 (revised in 1996) which restricts driving in patients with incapacitating arrhythmias from three to twelve months, depending on symptoms and treatment modalities [11]. Other organizations including the American Heart Association, the North American Society of Pacing and

Address correspondence to: Jeffrey F. Bleakley, M.D., Cardiology Unit, Department of Medicine, University of Rochester Medical Center, 601 Elmwood Avenue, Rochester, NY 14642. E-mail: jeff_bleakley@urmc.rochester.edu or toshio_akiyama@urmc.rochester.edu

Electrophysiology, and the European Society of Cardiology have also addressed the issue of driving with arrhythmias [11–13]. These guidelines are conservative, largely due to the paucity of data at the time they were established concerning the risk that an arrhythmia will cause a motor vehicle accident. For example, the AHA/NASPE scientific statement from 1996 recommends cessation of driving for six months following the initial ventricular tachyarrythmia [13]. However, the treatment of arrhythmias has changed dramatically over the past few years and the data available today suggests that these previously published guidelines may be too strict and patients with arrhythmias may be able to enjoy the freedom of driving as they did prior to their diagnosis.

In the largest of the more recent studies, Akiyama et al. prospectively and anonymously studied 627 patients from the Antiarrhythmics versus Implantable Defibrillators (AVID) trial which compared antiarrhythmic therapy with the implantation of defibrillators in patients resuscitated from near-fatal ventricular arrhythmias. Of these patients, 57 percent resumed driving within 3 months, 78 percent within 6 months and 88 percent resumed driving within twelve months of their arrhythmic episode [1]. Although many patients had symptoms suggestive of tachyarrhythmias while driving, these symptoms were unlikely to cause a motor vehicle accident. In fact, the annual rate of motor vehicle accidents in this group was 3.4 percent which was less than the national average of 7.1 percent [1]. Furthermore, this study found no evidence of a relation between the duration of abstinence from driving after a tachyarrhythmia and the risk of a motor vehicle accident. This study supports an earlier study by Curtis et al. who studied patient with defibrillators and found them to have a significantly lower fatality and injury rate from motor vehicle accidents [10]. Finally, Trappe et al. studied 241 patients following AICD implantation and found that none of the eleven accidents that occurred in the subsequent 36 months were caused by ICD discharge [14].

Driving is a privilege that is not only enjoyed by most of us, but one that is so important in our lives that we depend on it daily to function independently in society. While it is necessary to assure that driving remains safe for everyone, the data from the studies mentioned above suggests that patients with tachyarrhythmias are at no higher risk than the general population when it comes to motor vehicle accidents. Furthermore, Kim et al. compared the clinical characteristics of randomized AVID patients with nonrandomized eligible patients and found them to have very similar characteristics. This would imply that the data available can be generalized to all patients that would have been eligible for the AVID trial [15]. Exner et al. studied the prognostic significance of "electrical storm" i.e. multiple temporally related episodes of ventricular tachycardia or ventricular fibrillation and found that it is a significant prognostic indicator of subsequent death, particularly in the first three months after its occurrence, but infrequent VT/VF was not significant [16]. With this data in mind, patients with well maintained cardiac function, no recurrent ventricular arrhythmias (i.e. electrical storm) and no persistent medical condition predisposing them to ventricular arrhythmias should be allowed to resume driving soon after their ventricular tachyarrhythmia.

With better understanding of ventricular tachyarrhythmias and more data available regarding the risk of motor vehicle accidents in these patients, it is time to revise the guidelines once again. As mentioned earlier, many patients are returning to driving shortly after their arrhythmia, frequently against the advice of their physician. Other patients are living in isolation for up to a year, complying with the advice of their cardiologist. By decreasing the time of driving restriction to three months and making these recommendations widely available, patients can return to driving with the approval of their doctor and with the knowledge that this time period is based on significant recent evidence.

References

1. Akiyama T, Powell JL, Mitchell LB, Ehlert FA, Baessler C. Resumption of driving after life-threatening ventricular tachyarrhythmia. *N Eng J Med* 2001;345:391–397.
2. The Antiarrhythmiacs versus Implantable Defibrillators (AVID) Investigators. A comparison of anti-arrhythmic drug therapy with implantable defibrillators in patients resuscitated from near-fatal ventricular arrhythmias. *N Eng J Med* 1997;337:1576–1583.
3. Smith TW. Driving after ventricular arrhythmias. *N Eng J Med* 2001;345:451–452.
4. Traffic Safety Facts 1997. Washington, D.C.: National Highway Traffic Safety Administration, 1998:98. (Accessed July 18, 2001, at http://www.nhtsa.dot.gov/people/ncsa/pdf/TSF97.pdf.).
5. Hansotia P, Broste SK. The effect of epilepsy or diabetes mellitus on the risk of automobile accidents. *N Eng J Med* 1991;324:22–26.
6. Waller JA. Chronic medical conditions and traffic safety: Revies of the California experience. *N Engl J Med* 1965; 273:1413–1420.
7. Dhala A, Bremner S, Blanck Z, Sra J, Deshpande S, Jazayeri MR, Akhtar M. Impairment of driving abilities in patients with supraventricular tachycardias. *Am J Cardiol* 1995;75:516–518.
8. Strickberger SA, Cantillon CO, Friedman PL. When should patients with lethal ventricular arrhythmias resume driving? An analysis of state regulations and physician practices. *Ann Intern Med* 1991;115:560–563.
9. Dicarlo LA, Winston SA, Honoway S, Reed P. Driving restrictions advised by midwestern cardiologists implanting cardioverter defibrillators: Present practices criteria utilized, and compatibility with existing state laws. *Pacing Clin Electrophysiol* 1992;15:1131–1136.

10. Curtis AB, Conti JB, Tucker KJ, Kubulis PS, Reilly RE, Woodward DA. Motor vehicle accidents in patients with an implantable cardioverter-defibrillator. *J Am Coll Cardiol* 1995;26:180–184.
11. Assessment of the cardiac patient for fitness to drive: 1996 update. *Can J Cardiol* 1996;12:1164–1170, 1175–1182.
12. Jung W, Anderson M, Camm AJ, Jordaens L, Petch MC, Rosenqvist M, Santini M, Luderitz B. Recommendations for driving of patients with implantable cardioverter defibrillators. *Eur Heart J* 1997;18:1210–1219.
13. Epstein AE, Miles WM, Benditt DG, Camm AJ, Darling EJ, Friedman PL, Garson A, Harvey JC, Kidwell GA, Klein GJ, Levine PA, Marchlinski FE, Prystowsky EN, Wilkoff BL. Personal and public safety issues related to arrhythmias that may affect consciousness: Implications for regulation and physician recommendations. *Circulation* 1996;94:1147–1166.
14. Trappe HJ, Wenzlaff P, Grellman G. Should patients with implantable cardioverter-defibrillators be allowed to drive? Observations in 291 patients from a single center over an 11-year period. *J Interventional Cardiac Electrophysiol* 1998;2:193–201.
15. Kim SG, Hallstrom A, Love JC, Rosenberg Y, Powell J, Roth J, Brodsky M, Moore R, Wilkoff B. Comparison of clinical characteristics and frequency of implantable defibrillator use between randomized patients in the antiarrythmics vs implantable defibrillator (AVID) trial and nonrandomized registry patients. *Am J Cardiol* 1997;80:454–457.
16. Exner DV, Pinski SL, Wyse G, Renfroe EG, Follman D, Gold M, Beckman KJ, Coromilas J, Lancaster S, Hallstrom AP. Electrical storm presages nonsudden death; the antiarrhythmics versus implantable defibrillators (AVID) trial. *Circulation* 2001;103:2066–2071.