Driving and Implantable Cardioverter-Defibrillators

A Clearer View*

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The development of the implantable cardioverter-defibrillator (ICD) in the early 1980s represented a milestone in cardiovascular medicine. For the first time, lethal ventricular arrhythmias that occurred in a clinical setting could be quickly and effectively recognized and terminated by means of a surgically implanted device. Death rates attributable to ventricular arrhythmias decreased markedly in patients who received ICDs (originally sudden death survivors) and created a new population of patients in whom sudden death was now, for all intents and purposes, a chronic disease. These early devices were primitive by today’s standards; they often took up to 15 s or more to recognize, charge, and defibrillate an episode of ventricular fibrillation and lacked back-up pacing capacity. Thus, it was not uncommon for a patient to experience a syncopal or near-syncopal episode associated with an ICD discharge.

This created a dilemma for physicians caring for these patients in respect to operating a motor vehicle, for unlike pharmacotherapy (which was theoretically supposed to prevent episodes of ventricular fibrillation), the ICD could only “rescue” the patient once an episode had already occurred (1). Syncope, near syncope, or even disorientation after an ICD discharge could be disastrous while driving. It therefore seemed prudent to restrict the ICD patient’s ability to drive to avoid injury to themselves or others.

Over the last 2 decades, ICD technology has dramatically improved. Transvenous lead placement, programmability, biphasic wave forms, back-up and antitachycardic pacing, superior arrhythmias recognition, and charge times have markedly enhanced the ease of implantation as well as the efficiency of these remarkable devices. At the same time, the use of ICDs has expanded from sudden death survivors to prophylactic implantation in patients who are at an increased risk of sudden death, significantly expanding the population of individuals with ICDs. Therefore, the issue of driving with an ICD has become even more important.

Initial recommendations suggested that an individual who received an ICD as secondary prevention after an episode of sudden death or ventricular tachycardia (or individuals who had received an appropriate ICD discharge for ventricular tachycardia/ventricular fibrillation) wait 6 months before resuming driving (1,2). This recommendation was based on the fact that the risk for another event is a descending experimental curve, with the greatest chance for another arrhythmia in the period immediately after an event. After 3 months the curve flattens significantly, and at 6 months it is flat. More recently, an updated set of guidelines was issued regarding driving in patients with ICDs implanted for primary prevention. In these individuals it was recommended that driving be restricted only as long as required for the implantation wound to heal (usually about 1 week) (2).

Most of these recommendations, however, were hampered by a lack of good data regarding the actual risk of an ICD discharge during driving. In addition, many patients failed to comply with advice regarding restriction of driving. In this issue of the Journal, Albert et al. (3) provide a much-needed addition to our understanding of the relationship between driving and ICD discharges. Using data from the TOVA (Triggers of Ventricular Arrhythmias) study, they analyzed data on driving habits and ICD discharges in 1,188 patients. Of these, 80% reported driving their car at least once per week (as did 75% within 6 months after implantation); over a median follow-up period of 562 days there were 193 ICD shocks for ventricular tachycardia/ventricular fibrillation based on data from driving in relation to ICD shock. This showed that an ICD shock for ventricular tachycardia or ventricular fibrillation within 1 hour of driving was around 1 episode per 25,116 person-hours spent driving. Interestingly, among 7 patients who received an ICD shock for ventricular tachycardia or ventricular fibrillation during driving, only 1 resulted in a motor vehicle accident.

This is certainly reassuring news for both patients with ICDs and the physicians who care for them. In most areas of the U.S., the inability to drive places significant limitations on an individual, greatly reducing their employment, educational, and recreational opportunities.

The investigators noted several limitations to the study. The first was that this was an observational study that could not prove causality. More importantly, the assessment of driving was by self-reporting and was not obtained anonymously. Patients are less likely to report events when they think that their driving privileges may be limited, thus some degree of under-reporting may have occurred (1). In addition, the patients who resumed driving seemed healthier than many patients who receive ICDs.

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Despite these limitations, the work by Alpert et al. (3) provides important new insights in regard to driving by patients with ICDs. Particularly fascinating is the observation that events were more likely to occur after rather than during driving. The reasons for this association are unclear. The investigators speculate that exposure to particulate matter and possibly disturbances in autonomic nervous system regulation may play a role in this observation.

How should this new information be used? The recent updated guidelines should continue to be followed (as should all state and federal regulations) as we continue to collect further information on driving by patients with ICDs. The report by Albert et al. (3) is a welcome reassurance that driving can safely be resumed by many patients with ICDs, adding increased quality of life to the increased quantity of life these remarkable devices now provide.

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REFERENCES