

## ICDS FOR PREVENTING SUDDEN DEATH

**I**mplantable cardioverter defibrillators (ICDs) have a high success rate in patients who have symptomatic ventricular tachycardia (VT) or ventricular fibrillation in the absence of acute myocardial infarction (MI). The value of these devices is clear, however, their role is limited.

### Data in Symptomatic Patients

The Antiarrhythmics Versus Implantable Defibrillators (AVID) trial included patients who survived cardiac arrest, or had symptomatic VT, in the absence of acute MI.<sup>1</sup> Patients were randomized to ICD or best drug strategy. At three years, there was a 27% reduction in mortality, in favour of device therapy. Average survival was 2.6 years with the ICD and 2.4 years with the medical arm. While the per cent reduction is strong, the absolute benefit is relatively small.

The Canadian Implantable Defibrillator Study (CIDS) randomized patients to ICD and amiodarone.<sup>2</sup> There was a non-significant trend in the reduction of mortality by 35% in favour of ICD. This trial showed that the overall prolonged duration of life was 0.26 years.

The Cardiac Arrest Study Hamburg (CASH) trial randomized patients to ICD, metoprolol, and amiodarone.<sup>2</sup> The device was superior to medical therapy.

### Meta-analysis

In this group, patients were either given ICDs or amiodarone.<sup>3</sup> The average ejection fraction was 34%. There was a 27% reduction in total mortality. Meta-

analysis suggests that patients with an ejection fraction < 35% and older individuals derived most of the benefit. Those with an ejection fraction > 35% derived little benefit. This data should be viewed cautiously, as the drug therapy group showed a high mortality. Some ICD benefit may be lost over time.

### Data in Asymptomatic Patients

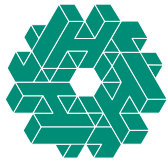
The Multicenter UnStable Tachycardia Trial (MUSTT) included electrophysiologic testing on patients who had coronary artery disease (CAD), left ventricular (LV) ejection fraction of  $\leq 40\%$ , and asymptomatic, unsustained VT.<sup>4</sup> Patients in whom sustained VTs could be induced were randomly assigned to receive either antiarrhythmics therapy guided by electrophysiologic testing or no antiarrhythmic therapy. Patients without inducible tachyarrhythmias were followed in a registry. Overall, mortality after five years was 48% among the patients with inducible tachyarrhythmias, as compared with 44% among the patients in the registry. Patients with CAD, LV dysfunction, and asymptomatic, unsustained VT had a significantly lower risk of sudden death or cardiac arrest and lower overall mortality than similar patients with inducible sustained tachyarrhythmias.

The Coronary Artery Bypass Graft (CABG) trial looked at patients undergoing bypass surgery and having a successful revascularization. The trial showed no benefit in patients with ICD compared to control.

*Dr. Gregory Curnew is an assistant clinical professor, McMaster University, staff cardiologist/internist and former director, coronary care unit, Hamilton General Division, Hamilton Health Science Corporation, and a member of our editorial board.*



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## The MADIT

The Multicenter Automatic Defibrillator Implantation Trial (MADIT) 1 is a complex trial in patients with a depressed ejection fraction, nonsustained VT clinically, and inducible VT that is nonsuppressible with the anti-arrhythmia drug, procainamide.<sup>5</sup> This trial demonstrated a survival advantage to ICDs.

The MADIT 2 is a simple four-year trial looking at patients with a history of MI and an ejection fraction < 30%. They were assigned an ICD or conventional medical therapy. The primary end point was all-cause mortality.

At followup, there was a 31% reduction in the relative risk of mortality among patients in the ICD group versus conventional medical therapy.

## Summary

It is clear that defibrillators in asymptomatic and symptomatic patients save lives. Older, sicker patients, with low ejection fractions (< 35%), appear to derive the most benefit. Recent ICD trials suggest an average prolongation of life by six months. (The trials would most likely have underestimated the survival advantage due to limited followup.)

Appropriate selection of individuals with few comorbidities, without severe heart failure is of paramount importance. In addition, ICDs do not treat the underlying disease process with activation of neural hormonal pathways and patients need to be reminded that they require further treatment. Most patients with poor LV function require somewhere between four to 10 drugs, as they have multiple comorbidities. Beta blockers, angiotensin-converting enzyme inhibitors, angiotensin I blockers, and spironolactone are all important agents used in combination and decrease mortality. Over time, antiarrhythmic agents will be used to prevent shocks to the heart, and painful decisions about turning off devices in sick patients will need to be addressed.

Current defibrillator therapy is expensive and one needs to develop multiple option ICDs. Technology can be wonderful if applied appropriately. How and who will pay for


these devices is another area of concern.

The CIDS trial uses Canadian data, demonstrating that the cost saved per year is over \$200,000. While the per cent reduction in mortalities is impressive, the actual prolongation of life is stated in months. The data clearly tell us that devices prevent arrhythmic mortality and need to be used appropriately.

How much are we willing to spend to save a month or a year of life? Physicians need to be part of the debate and

proper evaluation is crucial. Patients who have had a true syncope, with structural heart disease, need to be evaluated in specialized cardiac centres. Society and governments, physicians, patients, industry, consumer groups, and religious organizations will all have to struggle with the question of when to apply this life-threatening technology.

## Physician's Perspective

*ICD therapy is clearly superior to anti-arrhythmic drugs. I am truly grateful for the devices and will use them in my practice widely, however, patients and physicians need to think about the long-term prognosis and need for all the extra care that will ensue. I urge all ICD patients to sit down, write, and update an advance directive before they become extremely ill and unable to make choices for themselves, leaving families and health-care teams in difficult positions.* 



**For a good move  
see page 16**

## References

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