



Prevention of Sudden Cardiac Death

Dr Bill Petrellis MBBS FRACP FCSANZ

Cardiologist / Electrophysiologist

Heart Disease is the leading cause of death in Australia, most commonly due to ischaemic and non-ischaemic cardiomyopathy. Sudden cardiac death (SCD) accounts for two-thirds of fatal cardiac events and is defined as cardiac death occurring abruptly without symptoms or within 1 hour of chest pain or dyspnoea. It is due to ventricular tachycardia or ventricular fibrillation (VT/VF) in 80-90% of cases and heart block or asystolic arrest in the remaining 10-20%.

Implantable cardioverter defibrillators (ICDs) have been well established as a safe and effective means to reduce death rate among survivors of cardiac arrest (*secondary prevention*) and among people at risk for ventricular arrhythmias (*primary prevention*). ICDs terminate spontaneous ventricular arrhythmias (VT/VF) in 98.8% of episodes. Consequently, there has been a dramatic rise in the number of ICDs in use and an associated expansion in the indications for primary prevention ICD therapy. The recently published Australian Experience of 2005 confirms an increased uptake of defibrillator implantation, 2864 compared to 956 in 2001, which equates to 142 new ICD implants per million population (49 in 2001).

Epidemiological studies first identified a 30-50% rate of recurrence of life threatening arrhythmias among patients who had survived ventricular arrhythmias within 2 years. This finding triggered a number of secondary prevention studies to assess ICD therapy in SCD survivors. Meta-analysis of these studies demonstrated a significant 28% reduction in risk of death with an ICD.

Later studies identified a high risk of life threatening arrhythmia in patients with left ventricular (LV) dysfunction. For example, documented non-sustained VT in patients with LV dysfunction following myocardial infarction was associated with a 2 year mortality of 30%, half of which was due to SCD. Furthermore, a significantly higher risk of arrhythmia was found in patients with *asymptomatic* LV dysfunction. Consequently, these findings led to a series of major prospective randomized controlled trials to evaluate the role of ICD therapy as primary prevention in high risk cardiac patients. Meta-analysis of 10 major primary prevention trials confirmed an all cause mortality of 26.4% in 3723 patients randomised to non ICD therapy versus 18.5% in 3530 patients randomised to ICD therapy. This represents a 25% relative reduction in all-cause mortality.

The American College of Cardiology and American Heart Association have published consensus statements and practice guidelines which are readily accessible via the ACC website such as "Device-Based Therapy of Cardiac Rhythm Abnormalities" and "Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death" amongst many others.

The AHA/ACC Management Guidelines for ICD Prevention of Sudden Cardiac Death can be briefly summarized as follows:

Primary Prevention ICD therapy.

Class I recommendation for primary prevention ICD therapy in:

- Ischaemic (>40 days post MI) and non-ischaemic patients with an EF of $\leq 30\%$ who have NYHA class II to III heart failure symptoms.

Class IIa/IIb recommendation for primary prevention ICD therapy in:

- Asymptomatic (NYHA class I) ischaemic and non-ischaemic patients with an EF of $\leq 30\%$

Secondary Prevention ICD therapy

Class I recommendation for ICD therapy in patients who experience:

- Cardiac arrest in patients surviving VT/VF arrest without reversible cause;
- Spontaneous sustained VT in association with structural heart disease;
- Syncope of unknown cause with inducible VT or VF at diagnostic electrophysiology study (EPS);
- Spontaneous VT in patients without heart disease which is not amenable to other treatment.

The complete practice guidelines are an invaluable resource and can be found at the following web address:

<http://www.acc.org/qualityandscience/clinical/topic/topic.htm#guidelines>

In addition to the executive summaries, pocket guidelines are available for quick reference by busy practitioners. In addition, many guidelines are already available for download to an electronic PDA for convenient access and others are continually being added.

If you are concerned that your patient may be a candidate for implantable defibrillator therapy, we would encourage you to refer your patient for cardiac evaluation and discussion of this potentially lifesaving and frequently underutilized technology.