Is the implantable cardioverter-defibrillator cost-effective?

See page 1565 for the article to which this Editorial refers

The implantable cardioverter-defibrillator has gained acceptance and widespread use in the management of patients with life-threatening ventricular arrhythmias. However, although this device has been found to decrease the incidence of sudden death related to ventricular tachyarrhythmias, there is no direct evidence than it decreases total mortality. Furthermore, there are no available controlled studies demonstrating the benefit of the device over other forms of therapy for ventricular arrhythmias, i.e. antiarrhythmic agents, antiarrhythmic or/and revascularization surgery (when appropriate) or radiofrequency ablation.

The price of the device, at a time when cost-containment is a real concern in most countries, makes evaluation of cost-effectiveness highly desirable. Most reports on the value of implantable cardioverter-defibrillator therapy have focused on providing data suggesting that the device is associated with prolonged survival. However, these data are not derived from controlled, randomized trials and should therefore be regarded with caution. Another approach is based on the assumption that an appropriate discharge in a patient with an implantable cardioverter-defibrillator would have resulted in sudden death, had the device not been implanted. Using such an approach, Fogoros et al. found a 3 year survival of 67 ± 12% in patients with a left ventricular ejection fraction <0·30 and a projected survival of 6 ± 15%, whereas in patients with left ventricular ejection fraction ≥0·30, the figures were 96 ± 3% and 46 ± 8%, respectively. The limitations of this approach are obvious. Some episodes of ventricular arrhythmias may be self-terminating and supraventricular arrhythmias may trigger implantable cardioverter-defibrillators. The latter may be detected by the newer implantable cardioverter-defibrillators, which include a Holter function. Using such a function, Bocker et al. assumed that tachycardia over 240 beats min~¹ may have been fatal and found no sudden death in their series with an 18-month follow-up.

There is no evidence to show that a reduction in sudden death is associated with a reduction in total mortality. The population treated with an implantable cardioverter-defibrillator may be at high risk of death from heart failure, ischaemic events and non-cardiac causes, making it difficult to show a benefit over the period of observation. This controversy was discussed by Sweeney and Ruskin in a recent editorial. Another approach is to demonstrate that implantable cardioverter-defibrillators improve quality of life and are cost-effective. Using this approach Saksena et al. evaluated the cost per life per year. The cost with recent strategies and improvements in technology was reduced from 19 800 US dollars to 8000 US dollars using new devices and the pectoral approach. This cost should be compared to the cost of alternative therapeutic strategies.

The interesting report of Valenti et al in this issue uses a novel approach. They compared cost related to hospitalization before implantable cardioverter-defibrillator implantation to the cost generated by hospitalizations after implantable cardioverter-defibrillator implantation. They found that the device reduces frequency and duration of hospital stays, resulting in a payback of the cost over a 9 month period. Although such an approach seems appealing, it raises a number of comments. In the
patient with cardiac arrest, as initial presentation of the underlying cardiac disease, who receives an implantable cardioverter-defibrillator, cost cannot be evaluated, unless the first line therapeutic option for these patients is not an implantable cardioverter-defibrillator. Another approach could be to randomize these patients to an implantable cardioverter-defibrillator or to other forms of therapies (drugs, surgery) an approach similar to that used by Wever and Hauer\(^{161}\). Randomization is not easy to undertake in patients with malignant ventricular arrhythmias as a therapy may be of particular benefit for a given patient.

The German CASH trial comparing implantable cardioverter-defibrillator to antiarrhythmic therapy, is ongoing. The AVID trial, comparing the implantable cardioverter-defibrillator to treatment with amiodarone or sotalol, is expected to answer to a number of questions related to the use of implantable cardioverter-defibrillators. Whatever the results of these trials may be, they will limit but not prevent the use of implantable cardioverter-defibrillators. The latter have been shown to be effective in their objective of terminating ventricular arrhythmias and may be the only appropriate therapy in a selected group of patients. Cost-effectiveness therefore becomes particularly important. The other limitations of Valenti et al.\(^{[5]}\) concern the retrospective nature of the information collected during the 2 years preceding implantable cardioverter-defibrillator implantation and the 2 years following the implantation. Despite the limitations of this approach, their attempt to evaluate the impact of implantable cardioverter-defibrillators on rehospitalization and cost represents a useful addition to the literature on this important therapeutic modality. The results of the MADIT trial which were presented recently at NASPE concern the prophylactic use of an implantable cardioverter-defibrillator in patients who suffered a myocardial infarction and who were at high risk of sudden cardiac death.

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References


European Heart Journal (1996) 17, 1459-1461

Cardiac imaging in syndrome X: the problem of 'reverse redistribution'

See page 1482 for the article to which this Editorial refers

The condition that we have come to know as 'syndrome X' (exertional chest pain, positive response to stress testing and normal coronary arteriograms) continues to capture the imagination of cardiologists and general physicians alike. Syndrome X is an ill-defined entity that most probably encompasses multiple diagnostic categories. These, however, have in common a clinical presentation with typical exertional chest pain in the presence of normal coronary arteriograms. Syndrome X is an ever-challenging dilemma. Although to most clinicians syndrome X represents a relatively uncommon and benign condition, the management of angina with normal coronary arteriograms is often a frustrating experience. Mortality and serious cardiac events in patients with chest pain and normal coronary arteriograms are quite low but patients are frequently disabled by chest pain and return to work is poor\(^{[1]}\). The lack of an appropriate experimental model for syndrome X has made it extremely difficult for research groups to make significant progress regarding the true nature of the