Hospitalization in ICD recipients

See page 1186 for the article to which this Editorial refers

The cost of an ICD implant is still very high. Studies tackling the cost/benefit issue have so far looked at expensive devices with complicated implant techniques, such as via the abdomen[1,2]. These studies concluded that the average cost of a single life saved/year was not superior to that which could be obtained from other systems, similar to how dialysis works for renal failure. Time in hospital during follow-up is a major cost, particularly if this is a result of the device.

The published data on this topic is sparse and the paper by Korte et al.[3] in this issue on 180 consecutive patients prospectively evaluated in a relatively short (25±18 month) follow-up gives us some new and interesting data. However, before interpreting the data in this report we have to consider the following:

Population evaluated

The study by Korte et al. deals with a population whose left ventricular function is relatively good (an average EF of >40%), of a young age (57±12 years), with CAD as the main heart problem (as usual). The vast majority were implanted with a single chamber endocardial Medtronic device (139 pts), with an abdominal pocket in 41%.

This population substantially differs from the MADIT trial[4], which had a higher hospitalization rate. Those patients, however, had a lower EF, a higher mean age and in 47% an epicardial ICD system was implanted. Thus different populations, and different sites of implantation of electrodes and devices are certainly points to take into account a priori when considering follow-up costs.

Were hospitalizations strictly related to the device?

In 75% of the cases, according to the Korte paper[3] the causes of hospitalization were not related to the device per se.

Batteries lasted, on average, just over 3 years, confirming the longevity of modern devices. In 30% of cases, hospitalization was due to the type and condition of the heart disease or as a result of non-cardiac causes. Twenty-six per cent of hospitalizations were, however, secondary to appropriate shock, a primary reason for hospital referral and which frequently occurred with the first devices. We think that to-day, an appropriate shock, particularly when isolated (and not in storm) in an ambulant patient can be managed on an out of hospital basis, thus avoiding costly hospitalization.

Twenty-five per cent of hospitalizations were apparently ICD related, with 6% due to the device implants per se (infection, etc.). Such hospitalizations are now less frequent because nearly all implants are via the thorax. A thoracic implant is related to a shorter hospitalization time and is less costly because it does not need any specific surgical aid. Lead problems accounted for 8% of hospitalizations, but this number may actually be lower since leads are shorter and there are active fixed atrial leads in the most recent ICD standard implants.

Data[3] show that 12% of hospitalizations were due to atrial fibrillation or flutter with or without inappropriate shocks. While the number is remarkable, it does not exceed that of other studies[5]. This lower number may be related to the population type (younger age and better EF). Today, combination therapy devices and more sophisticated algorithms, especially those introduced with bichamber ICD devices, are trying to counteract the false detection.
problems. Combined atrial and ventricular ICDs are already on the market.

**Length of hospital stay**

Time in hospital was particularly long in patients with pocket infection (48·3 ± 11·8 days); that is a mark of the particular severity of this kind of complication, especially when it occurs in the abdominal region. The time required for generator replacement, about 2 weeks, is also long and may be related to the abdominal site of the implant; thoracic implants take no longer than a couple of days.

**Mortality**

Eleven percent of the patient population died during this relatively short follow-up — not a very favourable percentage in this relatively fit ambulant population. However, only 2% were due to sudden cardiac death, while 7% were due to CHF or acute MI. These figures are in accordance with the positive protective effect of ICDs on SCD and total cardiac mortality according to recent multicentre study results.

**Future perspectives**

ICD devices are becoming increasingly light and may include sophisticated algorithms, which not only actively treat the potentially lethal arrhythmia, but also prevent false discharges from supraventricular arrhythmias. The present study also looks at double ventricular chamber stimulating devices which, together with the ICD, may improve the contractility of the low EF patients in an attempt either to improve the quality of life to prolong it. Data is as yet insufficient but multicentre studies are ongoing.

The study of Korte et al. is thus of particular importance because it gives us some reliable and favourable numbers on the follow-up of ICD implanted patients. The reported data focuses on a specific ambulant population but are probably a little pessimistic because the implants are early versions and the batteries and catheters old. Today, thoracic implants, together with the prolonged longevity of batteries, the shorter lead systems, the introduction of atrioventricular ICDs, specific algorithms for the detection and stimulation of supraventricular rhythms should mean a decrease in the number of hospital readmissions after device implantation. Above all, one must be aware, in accordance with the International guidelines, that for the patient population reported in this study it is almost impossible to return home without an ICD implant.

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**References**


