Remote monitoring of implantable cardioverter-defibrillators: financial impact for providers and benefits to patients

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This editorial refers to ‘EuroEco (European Health Economic Trial on Home Monitoring in ICD Patients): a provider perspective in five European countries on costs and net financial impact of follow-up with or without remote monitoring’1, by H. Heidbüchel et al., on page 158

Over several decades, electrically active devices have been implanted and later checked on a regular basis in an outpatient clinic, mainly for three purposes: (i) to ensure the technical integrity of the lead and device, (ii) to check device-detected biological events, which may or may not have gone unnoticed by the patient but which can be of major relevance to the patient’s outcome, such as silent atrial fibrillation in combination with a high risk score for embolism and (iii) to gain an overall impression, from the patient’s visits, of his or her cardiac status, symptom score, any medical event, and compliance to drug regimen. In comparison with ‘traditional’ pacemaker outpatients, remotely monitored patients require a clinical setup that allows the remote supervision of electrocardiogram (ECG) data, including urgent contact or intervention.

From my point of view, remote monitoring of electrically active devices has not only been gaining significant momentum but actually has the potential to improve the safety of device-therapy, quality of life, and substantial outcome parameters such as the mortality and morbidity of patients who receive such devices.

Despite this potential—and the fact that home monitoring has been available as a commercial product in Europe for over 12 years—the benefits of this technology have not so far been adequately demonstrated. This may be for various reasons, such as insufficient clinical studies with significant statistical power; additionally, collected data has not so far been sufficiently convincing or clinically meaningful to trigger a significant change in practice or in official guidelines; lastly, difficulties in assessing and comparing the net financial impact of follow-up with or without remote monitoring, with mortality as the primary endpoint, has not yet been systematically demonstrated, the IN-TIME trial provides a perspective-changing data set. Additionally, it has been demonstrated that early device-based detection is able to reduce the number of adverse effects of remotely monitored ICD’s need also to be collected and scientifically analysed.

Using the best currently available model to calculate follow-up costs for healthcare providers on a multinational level, Heidbüchel and co-authors demonstrate in their report that these costs are the same in the group using remote monitoring for implantable cardioverter-defibrillator (ICD) patients and the group using standard of care treatment (mean costs of €204 vs. €213). This result may not have been expected by many, and should be brought to the attention of all participants in the healthcare system, including those who pay into it. In addition, the information should encourage wider clinical use of remote monitoring, not only because the reorganisation of device care and investment in home monitoring logistics does not increase costs, but because it is likely to result in relevant benefits for the patient. The IN-TIME trial, designed to demonstrate an improvement in the Packer heart failure score by remote monitoring using a specialized call-centre, was the first study to demonstrate a benefit in terms of all-cause mortality.1 At a time when no clinical trial using remote monitoring, with mortality as the primary endpoint, has been either initiated or completed, the IN-TIME trial provides a perspective-changing data set. Additionally, it has been demonstrated that early device-based detection is able to reduce the number of
inappropriate shocks and length of hospital stay, and helps to speed up the clinical decision-making process.\textsuperscript{2–4} While these studies are now available, it is very important to obtain additional information and ‘data power’ from prospective evaluation of benefits in such areas as reduced mortality (as a study’s primary endpoint), lower related morbidity (e.g. stroke prevention, resulting from early detection of atrial fibrillation), or reduction in heart failure-related events. Remote monitoring appears not to reduce costs, but is able to make an increase in ‘quality of device care’ and benefits to patients at a comparable level of cost!

For committees planning the designs of future remote monitoring trials, the secondary outcome parameters of the EuroEco trial are of particular interest: follow-up visits could be significantly reduced by the use of remote monitoring [3.79 ± 1.67 visits vs. 5.53 ± 2.32 visits without remote monitoring (\(P < 0.001\)]). However, the time thus saved is spent on the telephone or in the internet: for example, internet sessions were carried out 11 times more frequently in the remote monitoring group. There is also a very interesting—although non-significant—trend reported by Heidbüchel, demonstrating fewer hospitalizations and a shorter length of stay in the remotely monitored ICD cohort. This metric could be a very meaningful primary endpoint in a future large trial.

The study by Heidbüchel and colleagues provides evidence and substantial data to show—possibly contrary to expectations—that investment in remote monitoring and the associated reorganization does not increase costs to healthcare providers. Together with the demonstrated benefits to patients, such as reductions in inadequate shock delivery or reduced rehospitalization, the EuroEco Trial should help the motivated physician to encourage hospital administrations, healthcare providers and contributors—as well as less-motivated colleagues—to use remote monitoring as a cost-neutral tool to deliver optimal care to their patients.

References

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\includegraphics[width=\textwidth]{Figure1.png}
\caption{Stakeholders in RM: their input and responsibilities (RM = remote monitoring).}
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