

Cardiac Resynchronization Therapy Follow-up Role of Remote Monitoring



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KEYWORDS

• Cardiac resynchronization therapy • Follow-up • Hospitalizations • Heart failure • Mortality

KEY POINTS

- Remote monitoring is safe and allows more rapid detection of actionable events in implantable cardioverter-defibrillator (ICD) therapy, like technical failure and arrhythmias.
- Remote monitoring reduces the number of inappropriate and appropriate shocks and prolongs battery life of cardiac resynchronization therapy devices with defibrillation capabilities (CRT-D) compared with standard follow-up.
- Monitoring of device-derived parameters such as the percentage of biventricular stimulation, atrial and ventricular arrhythmia, hours of activity, and heart rate may improve the management of patients with heart failure.
- Pressure sensors for daily monitoring and transmission of pulmonary artery pressures compared with controls are linked to reduced need for heart failure hospitalizations in patients with heart failure with and without CRT-D therapy as indicated in the CHAMPION trial.
- The EHRA survey of implementation and reimbursement of remote monitoring for implantable devices in Europe indicated that physicians perceive remote monitoring as useful but that their use implies an increased workload. The biggest obstacle for wider use is lack of reimbursement.

INTRODUCTION

The prevalence of heart failure remains high despite recent advances in drug and device therapy.^{1,2} This prevalence is largely related to increasing age in the population and better survival after myocardial infarction. The costs for heart failure care both in and out of hospital are substantial.³ Cardiac resynchronization therapy (CRT) is an important

treatment option for those patients with heart failure who have wide QRS complexes (about 30%)⁴ and who remain symptomatic despite optimal medical therapy.⁵ In clinical practice CRT devices are commonly supplied with defibrillation capabilities (CRT-D).⁶ CRT is linked to a 30% relative risk (RR) reduction in the combination of heart failure hospitalizations and mortality and in mortality per se, as indicated in a recent case-based

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meta-analysis.⁷ However, the risk for progressive deterioration, hospitalization, and death remains high even after CRT implantation because 30% of patients do not responding to CRT and because of the natural history of the underlying heart condition.

Therefore, structured follow-up with regular visits to device and heart failure specialists is mandatory to maintain stable clinical conditions. For this purpose, remote follow-up offers a valuable adjunct to in-clinic encounters. Apart from the possibility of ambulatory device checks and early notification of technical issues, CRT devices contain several features for arrhythmia detection and measurement of variables with relevance to heart failure management.⁸ Monitoring of these variables enables clinicians to detect arrhythmias and changes in heart failure status early and to take appropriate therapeutic action. Furthermore, studies with implantable hemodynamic sensors indicate that monitoring of central pressures may further enhance the benefit from device-based monitoring. This article summarizes the current role of remote monitoring in CRT follow-up.

REMOTE MONITORING OF IMPLANTABLE DEVICES

Home monitoring of implantable devices was introduced in 2000 for the remote follow-up of pacemakers and was later expanded to implantable cardiac defibrillators (ICDs). Using an

imbedded antenna, information on device function and other variables is transmitted to a local communication unit and then to a central data server that can be accessed by clinicians (Fig. 1). Early studies showed the feasibility and technical reliability of this approach.⁹ Meanwhile, the option of remote monitoring is provided by all manufacturers of CRT and ICDs. Apart from technical device interrogation to detect lead fractures, insulation defects, or premature battery depletion, these systems provide alerts on critical clinical events such as arrhythmia onset or ICD shocks. Other advantages include the option to replace in-office device checkups with home monitoring, which is convenient for patients living in remote areas and has the potential to decrease the work burden in device clinics. In the 2013 European Society of Cardiology (ESC) guidelines on cardiac pacing and CRT, remote device follow-up received a class IIa recommendation.⁵ It has been proposed that avoidance of traditional in-office visits for device monitoring translates into financial benefits for patients and health care organizations.

OBSERVATIONAL REGISTRIES

The ALTITUDE observational study¹⁰ reported survival status in patients with ICD and CRT devices from a single manufacturer and compared patients traditionally followed at device clinics with those who transmitted remote data (on average 4 times monthly). For the 69,665 patients with ICDs and

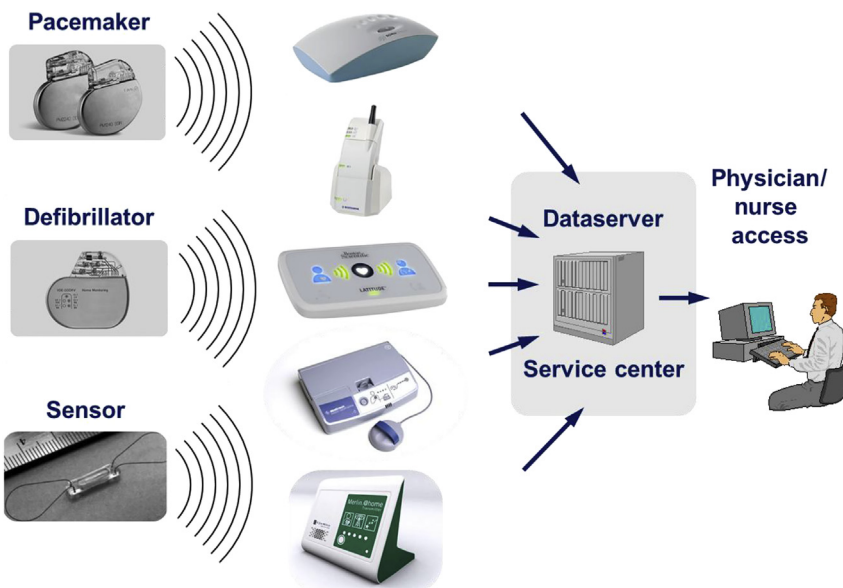


Fig. 1. Remote monitoring of implanted devices.

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