



CARDIAC REMOTE MONITORING

THE NEW STANDARD OF CARE

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Cardiac Remote Monitoring

Standard care since 2015

Cardiac electronic implantable devices (CIEDs) have evolved significantly in the past few years. Novel embedded technologies have created the ability for devices to monitor their own function, record arrhythmias and other physiological parameters and communicate to health care providers without active participation of the patient. CIEDs with wireless remote monitoring capabilities stand at the forefront of a new class of medical devices.

2015 HRS Expert Consensus Statement on Remote Interrogation and Monitoring for Cardiovascular Electronic Implantable Devices

This document focuses on implantable devices for management of heart rhythm disorders and outlines recommended monitoring strategies.

It is based on key clinical trials highlighting the superiority of remote monitoring and presents the new paradigm for managing CIED patients with continuous remote monitoring and event-triggered in-person evaluations.

1 A

**Class of recommendation 1
Level of evidence A**

endorsing the need to maintain consistent follow-up, and outlining the limitations of strictly in-person methods.

HRS Remote Monitoring Consensus Statement Recommendations

Device Follow-Up Paradigm	Class of Recommendation	Level of Evidence
A strategy of remote CIED monitoring and interrogation, combined with at least annual IPE, is recommended over a calendar-based schedule of in-person CIED evaluation alone (when technically feasible).	I	A
All patients with CIEDs should be offered RM as part of the standard follow-up management strategy.	I	A
Before implementing RM, it is recommended that each patient be educated about the nature of RM, their responsibilities and expectations, potential benefits, and limitations. The occurrence of this discussion should be documented in the medical record.	I	E

Cardiac Remote Monitoring

The revelation of the Covid-19 crisis

Minimizing unnecessary exposure to reduce the risk of COVID-19 contamination for patients and healthcare providers was the key concern during the past months. Most of international scientific associations or non-profit organizations provided EP Practice Guidance and bolstered that remote cardiac monitoring (RM) is the key solution to provide a follow-up to patients at risk.

GUIDANCE & RECOMMENDATIONS



“In patients with a cardiac implantable electronic device (CIED), remote monitoring is a powerful tool for assessing patients without requiring an office visit. For patients who are already followed by remote monitoring who have no other active ongoing conditions or drug therapies that require in-person evaluation, healthcare providers should strongly consider replacing routine office visits with a remote visit (video, telephone, remote monitoring of CIED, etc.). For patients who are not currently enrolled in remote monitoring, new enrollment should be considered. For patients without implanted devices, ambulatory monitors can also be requested remotely and mailed to the patient; smartphone or smart watch acquired ECGs can be considered.

The Heart Rhythm Society COVID-19 Task Force



“Remote interrogation (patient-initiated or automatic prescheduled transmissions) or remote monitoring (i.e. automatic daily or alert-triggered transmissions) should be utilized as much as possible to replace routine device interrogation visits to hospitals, clinics and practices. In-person office visits should be replaced by remote contact by telephone or internet by the treating physician, using the device information obtained through remote interrogation or monitoring.

ESC Guidance for the Diagnosis and Management of CV Disease during the COVID-19 Pandemic



“The majority of high-power devices are already remotely managed, this may vary from centre to centre. It is predicted the largest demand for additional remote follow up will be for Bradycardia and CRT-P patients. Leading EPs suggest the following recommendations to help with patient prioritisation. Patients who fall into the following two criteria should be considered priority for remote monitoring: 1. Devices at RRT/EOL with no underlying rhythm; 2. Patients on an increased follow up schedule e.g. more than one follow up scheduled per year (as this would indicate there is reason to more closely monitor them without increasing their risk of COVID-19 by bringing them into the hospital environment).

Arrhythmia Alliance Recommendations

Cardiac Remote Monitoring

Latest findings 2020

Cardiac Remote Monitoring (RM) is a popular topic in 2020 with new peer-reviewed, published studies issued from January to June. Cardiac electronic implantable devices evolve and so do the recommended Remote Monitoring strategies.

During this first part of the year RM publications were focused on 3 types of topics :

- Guidance for Cardiac Electrophysiology during the Coronavirus (COVID-19) ;
- New RM technology linked to new devices ;
- Focus on specific benefits of remote monitoring.

[HRS/EHRA/APHRS/LAQRS/ACC/AHA worldwide practice update for telehealth and arrhythmia monitoring during and after a pandemic, Niraj Varma & al, J Am Coll Cardiol. 2020 Jun 10](#)

During the pandemic communication with CIEDS has grown exponentially

This document discusses how digital health may facilitate electrophysiology practice for patients with arrhythmia, whether hospitalized for COVID-19 or not(...)

Remote CIED monitoring has existed for decades. It is strongly endorsed by professional societies, but in practice only a fraction of its diagnostic and therapeutic capabilities has been utilized—until now. Since the start of the pandemic, utilization of wireless communication with CIEDs has grown exponentially, permanently altering the future of device follow-up. Patient outcomes may be improved with intensive device-based monitoring compared with traditional in-clinic evaluations at regular intervals. Recent data indicate that in-person CIED evaluation can be extended safely to at least biennially when daily digital connectivity is maintained. Remote monitoring has the potential advantage of detecting and alerting caregivers (and in the future—patients directly) about important parameter changes, enabling earlier patient hospitalization, even during a presymptomatic phase. (...)

The pandemic experience should serve as an impetus to expedite the resolution of persistent challenges, such as validation of digital technologies, infrastructure for data management (mechanism for relay to patient and caregiver), interoperability with EMR, application of predictive analytics, cybersecurity (with it the capability for limited forms of remote CIED programming), and reimbursement. (...)

In summary, the crisis precipitated by the pandemic has catalyzed the adoption of remote patient management across many specialties and for heart rhythm professionals, in particular. This practice is here to stay, it will persist even if other less arrhythmogenic treatment strategies evolve for COVID-19 and after the pandemic has passed. This is an opportunity to embed and grow remote services in everyday medical practice worldwide.

(extract from the published abstract)

Medtronic announced results from late-breaking clinical trials evaluating the MyCareLink Heart™ mobile app and the Micra® Transcatheter Pacing System (TPS), products that provide needed care for patients and optimal management of their symptoms – while reducing potential exposure between patients and their clinicians (...)

The study found that patients using the MCLH technology successfully completed 94.6% of scheduled transmissions, which was superior to all three Medtronic bedside monitor control groups (whose results ranged from 56.3% to 87.1%). Higher patient adherence to scheduled transmissions of remote monitoring suggests that patients who use the MCLH app are more likely to benefit from remote monitoring than those with low or no adherence to remote monitoring.

(extract from the published abstract)

94.6% of scheduled transmissions completed with App-based RM

[Data Unveiled at Heart Rhythm 2020 Demonstrate Effectiveness of App-Based Remote Monitoring of Medtronic Cardiac Devices, Significant Reduction in Complications with Micra Leadless Pacemaker, Medtronic](#)

Cardiac Remote Monitoring

Latest findings 2020

Lower hospitalization if RM strategy

Remote Supervision to Decrease Hospitalization Rate (RESULT) study in patients with implanted cardioverter-defibrillator,
Mateusz Tajstra & al., EP Europace, Volume 22, Issue 5, May 2020, Pages 769-776,

-14 136 €/ QALY in favour of RM, over 5 years

Cost-effectiveness of remote monitoring of implantable cardioverter-defibrillators in France: a meta-analysis and an integrated economic model derived from randomized controlled trials,
Saanya Sequeira & al., EP Europace, 19 May 2020

The purpose of the RESULT study was to analyse the impact of remote monitoring on clinical outcomes in HF patients with implantable cardioverter-defibrillator [ICD/cardiac resynchronization therapy-defibrillator (CRT-D)] in real-life conditions.

Conclusion

Remote monitoring of HF patients with implanted ICD or CRT-D significantly reduced the primary endpoint rate, mostly as a result of a lower hospitalization rate in the RC arm.

(extract from the published abstract)

Aims

Cost-effectiveness data on the remote monitoring (RM) of implantable cardioverter-defibrillators (ICDs) compared to the current standard of care (SC) remains limited. This meta-analysis was performed to assess the economic burden, and to develop an integrated economic model evaluating the efficiency of the RM strategy vs. SC in the context of French healthcare.

Conclusion

Our economic model demonstrates that once implemented, RM of ICD ± CRT-D patients would result in increased effectiveness for lower costs over a 5-year period, compared to the current SC in France.

(extract from the published abstract)

Share RM data with patients

Involving patients as key stakeholders in the design of cardiovascular implantable electronic device data dashboards: Implications for patient care, Carly Daley & al., May 11, 2020

RM for pacemaker increased by 60% *

Trends in Utilization and Spending on Remote Monitoring of Pacemakers and Implantable Cardioverter-Defibrillators among Medicare Beneficiaries,
J.N. Holtzman & al., Heart Rhythm Journal June 07, 2020

Background

Data from remote monitoring (RM) of cardiovascular implantable electronic devices (CIEDs) currently are not accessible to patients despite demand.

Objective

The purpose of this study was to understand which RM data elements are important to patients and to gain design insights for displaying meaningful data in a digital dashboard.

(extract from the published abstract)

Objectives

To evaluate utilization and Medicare spending for remote monitoring and in-office interrogations for pacemakers and ICDs.

Results

Small annual savings at the per-beneficiary level for overall interrogations (\$2/year for pacemakers, \$5/year for ICDs)

Conclusions

Remote monitoring utilization increased substantially from 2012 - 2015, while annual costs per beneficiary decreased.

(extract from the published abstract)

*Between 2012 and 2015

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No doubt - RM empower patient care

Remote Monitoring is the convenient solution for patients and clinicians. It avoids frequent in-person evaluations of devices, difficult and expensive travel, especially when increasingly frequent follow-ups are needed, e.g., near the end of a device's battery life. Remote follow-ups save you and your staff time without lowering patient satisfaction, even if the number of patients with devices increases.^{7,8}

Clinical studies show that remote monitoring

- Increases the probability of survival (1, 2)
- Improves clinical outcomes (3)
- Reduces hospitalizations (4)
- Reduces time to detect clinical events (5)
- Increases the quality of patient care
- Increase patient acceptance and satisfaction (6)
- Improves clinical efficiency and substantially reduces health care costs (7,8)

KEY FIGURES



reduction in
relative risk
of death (3)



reduction in
hospitalizations
for atrial
arrhythmia and
related stroke (5)



in time to
detection of
clinical events (5)



reduction in all-cause
mortality over 3
years for ICD/CRT-D
patients (4)



reduction in all-cause
mortality over 3 years for
pacemaker patients (4)



in-hospital
device follow-up
visits (8)



the overall mean
annual cost per
patient (8)

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