DEVICE THERAPY

Remote monitoring—the benefits of keeping in touch

Technological developments now enable wireless, automated data collection and transmission from cardiovascular implantable electronic devices (CIEDs), reducing the need for intrusive in-person evaluations (IPEs). Communication of information relating to device function and cardiovascular parameters can potentially enable more-effective interventions by health-care providers. However, these benefits are much more likely to be seen in observational studies than in clinical trials. Support for remote monitoring of CIEDs has come from three new publications, describing a large observational study, a meta-analysis of data from randomized, controlled trials, and an expert consensus statement.

The latest systematic review and meta-analysis of randomized, controlled trials involving patients with implantable cardioverter-defibrillators (ICDs) has identified clinical benefits with remote monitoring, compared with IPE. In nine trials, including 6,469 patients, no differences were seen in overall mortality and hospitalization. However, in the three trials involving the most frequent (daily) information transmission technology, monitoring was associated with lower all-cause mortality than IPE (OR 0.65, 95% CI 0.45–0.94, $P=0.021$). In three trials reporting the occurrence of inappropriate shocks, fewer were seen with remote monitoring (OR 0.55, 95% CI 0.38–0.80, $P=0.002$), and in four trials reporting time to clinical decision and/or event detection,

it was lower with remote monitoring than IPE (mean difference –27.1 days, 95% CI –40.1 to –13.3 days, $P<0.001$).

Researchers who conducted an observational study analysed data from 269,471 consecutive US patients implanted with a range of CIEDs comprising pacemakers (43%), ICDs (32%), and cardiac resynchronization therapy with pacing capability (3%) or with defibrillation capability (23%). All CIEDs were capable of wireless monitoring, but only 47% of patients used it. The percentage of time in remote monitoring (%TRM) was associated with survival, which was better in patients with high use ($\geq 75\%$ TRM) than no use (HR 2.10, 95% CI 2.04–2.16, $P<0.001$), in patients with low use ($<75\%$ TRM) than no use (HR 1.58, 95% CI 1.54–1.62, $P<0.001$), and in patients with high use than low use (HR 1.32, 95% CI 1.27–1.36, $P<0.001$). This association was seen with all CIEDs, even pacemakers in ‘lower risk’ patients.

Publication of these studies coincides with that of an Expert Consensus Statement from the Heart Rhythm Society, which contains recommendations to combine remote monitoring with IPEs, to educate patients about monitoring, and to begin it within 2 weeks of CIED implantation. Monitoring is recommended for surveillance of CIED function, to reduce inappropriate shocks, and for early detection of atrial fibrillation.

The randomized trial results suggest that remote monitoring is not merely a surrogate for general health care. Rather,

Kim Steele/Photodisc/Thinkstock

the identification of arrhythmias and other irregularities is likely to enable clinical intervention to improve outcomes, which will be facilitated by sustained, high-intensity use of the available remote monitoring functionality.

Robert Phillips

Original articles Parthiban, N. *et al.* Remote monitoring of implantable cardioverter-defibrillators: a systematic review and meta-analysis of clinical outcomes. *J. Am. Coll. Cardiol.* doi:10.1016/j.jacc.2015.04.029 | Varma, N. *et al.* Relationship between level of adherence to automatic wireless remote monitoring and survival in pacemaker and defibrillator patients. *J. Am. Coll. Cardiol.* doi:10.1016/j.jacc.2015.04.033 | Slotwimer, D. *et al.* HRS expert consensus statement on remote interrogation and monitoring for cardiovascular electronic implantable devices. *Heart Rhythm* doi:10.1016/j.hrthm.2015.05.008