ARMS: AUTOMATED RHYTHM MANAGEMENT SIMULATOR

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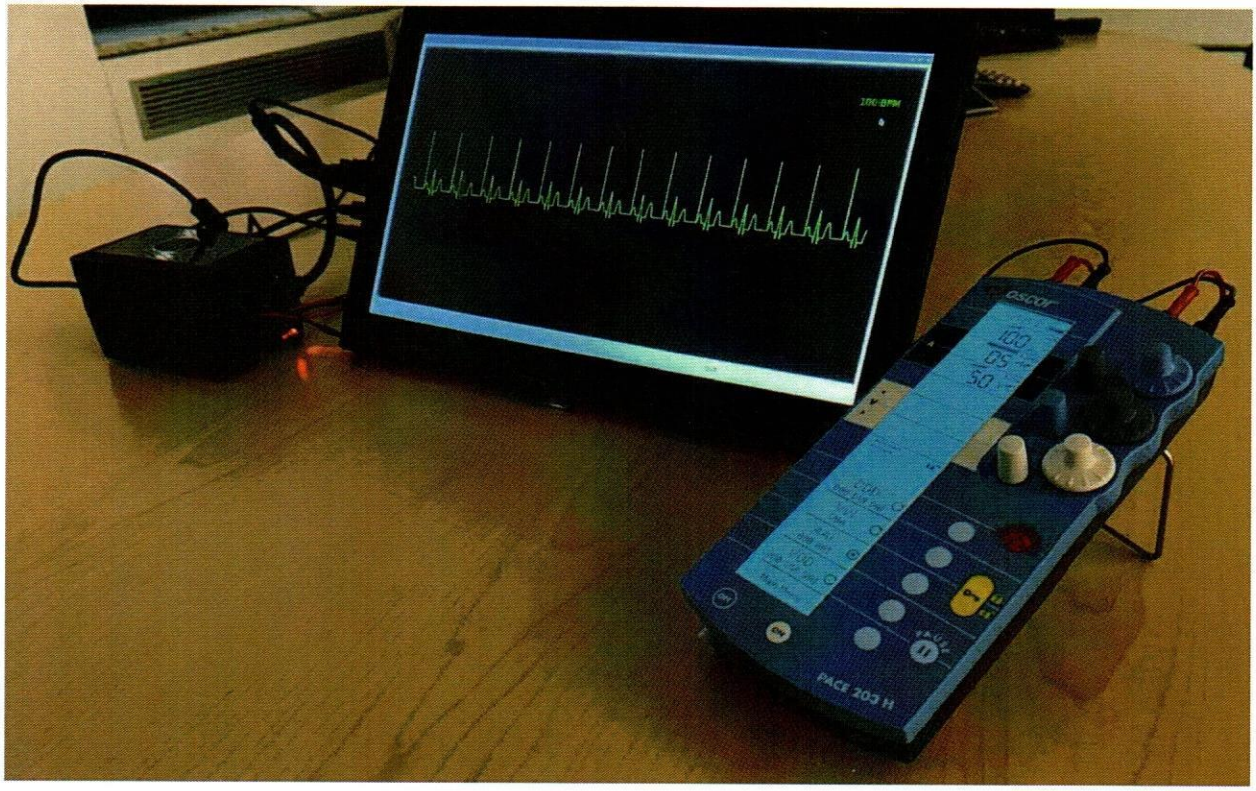
Background: Temporary pacemakers remain life-saving in post-operative management, but temporary wires are prone to poor electrical characteristics and fracture. Teaching the skills required to manage temporary pacemakers is challenging. Simulation education is a safe and effective way to teach management for patient care crises, but little attention has been focused on simulation for temporary pacemakers.

Objective: Describe a novel engineering tool and teaching curriculum for temporary pacing.

Methods: We constructed a novel dual chamber input-output device: the Automated Rhythm Management Simulator (ARMS). Adult and pediatric arrhythmias are manually or automatically programmed by setting atrial and ventricular rates, AV association, and electrogram (EGM) amplitude. Signals from programmed pacemakers (sensing, output, and mode) are received by the device to simulate appropriate pacing, pace-termination of re-entrant tachycardias, complications secondary to inappropriate pacing and device malfunctions.

Results: A working ARMS prototype replicates surface EGMs representing programmed arrhythmias on a simulation patient monitor (figure). Atrial and ventricular EGMs are correctly transmitted to temporary and permanent pacemakers. Programmable capture thresholds are reproducible. A survey after a teaching pilot program (n=15) suggests that this is a safe and effective way of teaching pacemaker management and that the device is true to life.

Conclusion: The novel ARMS devices simulates simple to complex brady- and tachyarrhythmias, simulates device and lead malfunctions, and ensures a safe environment in which to learn pacemaker management.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