Evaluation of the accuracy of a single lead adhesive ECG patch monitoring device (S-Patch) in patients post myocardial infarction

Tony Li
Toon Wei Lim

Introduction: With technological advances and promulgation of smart devices, remote cardiac rhythm monitoring has garnered increasing interest. One population that stands to benefit are patients with a recent acute coronary syndrome (ACS) event and are at heightened risk of arrhythmias and sudden cardiac arrest. Till now, they can only be reasonably monitored for short periods with ward based systems. With an accurate yet portable system, monitoring may be done remotely and safely.

Methods: This is a proof of concept study that aims to assess if a single-lead adhesive ECG patch monitoring device (S-Patch) can reliably detect arrhythmias in patients soon after an ACS event and become a potential tool for extended post-discharge monitoring. We recruited 42 patients [mean age: 59.8 (40-82), 29 male (69.0%)] post myocardial infarction who were admitted with telemetry beyond 24 hours. This included patients with STEMI post coronary angiogram and patients with NSTEMI on monitoring. Subjects were concurrently placed on conventional and S-patch monitoring for 48 hours or till telemetry was discontinued. An in-house machine-learning algorithm was applied to identify notable arrhythmias on S-patch recordings. Results were compared to conventional telemetry.

Result: S-patch performed favourably in identifying critical arrhythmias but was more sensitive to baseline noise. 17 VT and 15 SVT episodes were identified by S-patch while conventional telemetry noted 2 VT and 1 SVT episodes. The SVT episode was correctly identified by both systems. For VT episodes on telemetry, one was correctly identified as noise by S-patch whilst the other occurred after S-patch had been terminated and was missed. Rest of events picked up by S-patch were due to baseline noise.

Conclusion: S-patch demonstrated reasonable accuracy in detection of arrhythmias in patients post myocardial infarction. With further development and validation in broader populations, it could become an economical yet effective tool for diagnoses of arrhythmias and improve preventive healthcare.