'Smart' devices help reduce adverse outcomes of common heart condition

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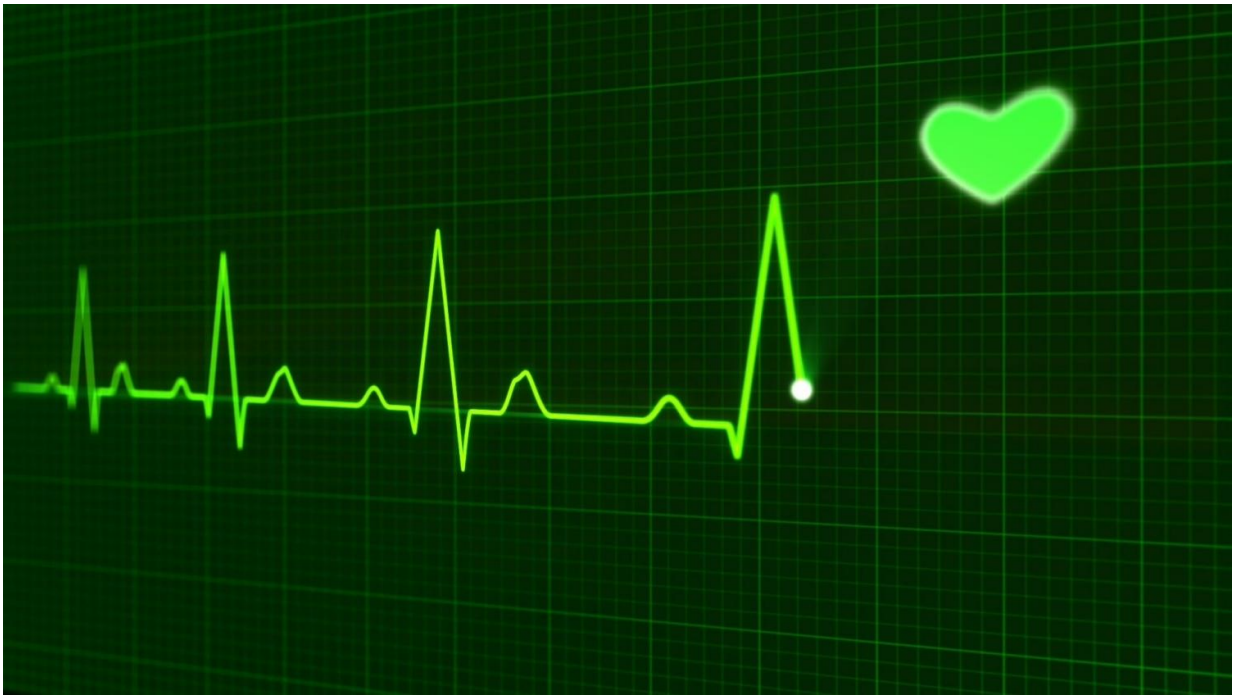

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A new study, published in the *Journal of the American College of Cardiology*, highlights the feasible use of mobile health (mHealth) devices to help with the screening and detection of a common heart condition.

Atrial fibrillation (AF) is a heart rhythm condition that causes an

irregular and sometimes, abnormally fast heart rate. In AF, the heart's upper chambers (atria) contract randomly and sometimes so fast that the heart muscle cannot relax properly between contractions. This reduces the heart's efficiency and performance—but also leads to a higher risk of blood clots.

AF is the most common heart rhythm disturbance, affecting around one million people in the UK. People with AF are at increased risk of having a stroke and dying, as well as heart failure and dementia. Currently, low detection due to lack of visible symptoms and non-adherence are major problems in current management approaches for patients with suspected AF.

Photoplethysmography technology

mHealth devices, such as fitness trackers, smart watches and mobile phones, may enable earlier AF detection, and improved AF management through the use of photoplethysmography (PPG) technology.

PPG is a simple and low-cost optical technique that can be used to detect blood volume changes in the microvascular bed of tissue. It is often used non-invasively to make measurements at the skin surface.

To help determine whether a mHealth technology-supported AF integrated management strategy would reduce AF-related adverse events, compared to usual care, an international team of researchers, led by Associate Professor Guo from Chinese PLA General Hospital in Beijing, and Professor Gregory Lip, Lead for the Liverpool Centre for Cardiovascular Science (LCCC)/Price-Evans Chair of Cardiovascular Medicine at University of Liverpool, conducted a randomised trial.

Central to the study was mobile health technologies developed by leading global technology companies, with a focus on using wearable smart

devices such as those from Huawei, working in conjunction with a specially developed mobile app. These pieces of equipment and software can monitor a person's vital signs with great detail and, most importantly for this study, 24 hours a day.

The specially designed mobile app not only charted the patient's biometrics, it afforded clinicians the ability to offer integrated care throughout the duration of the trial. Doctors were able to periodically assess the patient's updated statistics and contact them through the app to offer advice via the ABC care pathway. The ABC pathway, developed in part by the LCCS' Professor Gregory Lip, is a set of guidance for patients and clinicians, which aims to promote a streamlined holistic approach to the management of AF, and ensure that the danger of complications is minimised.

The researchers enrolled a cluster of 3,324 AF patients aged over 18 years from 40 cities across China. The patients were randomized with 1678 receiving usual care and 1646 receiving integrated care based on a mobile AF Application (mAFA) incorporating the ABC Pathway: 'A' Avoid stroke; 'B' Better symptom management; 'C' Cardiovascular and other comorbidity risk reduction. All patients were followed up in outpatient clinics at 6 and 12 months.

Results

Upon completion of the study, the researchers were able to show that occurrences of stroke, systemic thromboembolism, death and rehospitalisation were significantly lower with those patients in the mHealth intervention group compared to those undergoing usual care (1.9% compared with 6%). Rehospitalisation rates were also notably reduced, with only 1.2% of patients in the intervention group needing to be readmitted to hospital, in comparison to 4.5% of patients in the control group.

In addition to these positive figures, subgroup analyses by gender, age, type of condition, risk score and comorbidities, demonstrated consistently lower risks for the composite outcome for patients receiving the mAFA intervention compared to usual care.

These results show an undeniable benefit for the adoption of an integrated approach to monitoring and treating cardiac conditions such as AF.

With smart technologies such as phones, watches and integrated smart home systems becoming increasingly accessible and affordable, the ability for clinicians and researchers to adopt this technology to passively and unobtrusively gather a seemingly unlimited amount of data and information on the global health population is offering boundless opportunity for assessing and treating all manner of diseases and conditions.

Integrated care approach

Associate Professor Guo, said: "Our study clearly highlights the need for an integrated care approach to holistic AF care, supported by mobile health technology, as it help to reduce the risks of rehospitalisation and clinical adverse events."

Professor Lip, said: "Improved AF care requires early detection which enables the implementation of the priorities of AF management, which is as 'easy as ABC': Avoid stroke; Better symptom optimisation; Cardiovascular and risk factor management. Our clinical trial shows how the mAFA App and smart devices can improve detection of AF and the holistic management of AF patients, improving outcomes in this common heart rhythm disorder."

More information: Yutao Guo et al. Mobile Health Technology to

Improve Care for Patients With Atrial Fibrillation, *Journal of the American College of Cardiology* (2020). DOI: 10.1016/j.jacc.2020.01.052