

## Chapter 4

# The Use of Mobile ECG Monitoring Devices in Embolic Stroke Associated With Atrial Fibrillation

**Nikita Maniar**

*University of Missouri – Kansas City School of Medicine, USA*

**Charles Donohoe**

*University of Missouri – Kansas City School of Medicine, USA*

**Ellen Lau Troudt**

*University of Missouri – Kansas City School of Medicine, USA*

### ABSTRACT

*Stroke prevention is a primary aim in clinical neurology. Atrial fibrillation (AF), the most common cardiac arrhythmia affecting 35 million people worldwide, carries a 5x risk of devastating stroke largely preventable with anticoagulation. The AliveCor Kardia™ mobile application for iPhones and Kardia Band™, a wristband for the Apple Watch, are approved by the Food and Drug Administration (FDA). These clinically validated mobile electrocardiograms (ECGs) utilize an artificial intelligence algorithm to provide instant analysis for detecting AF. The preliminary experience using this novel technology at a safety net, teaching hospital was very positive. AliveCor's™ was easy to use by neurologists, residents, medical students and nursing personnel and, in combination with pulse palpation, consistently detected AF that was confirmed by a cardiologist with standard ECG. With this new technology, the identification of AF that previously went unrecognized and often asymptomatic has*

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*prompted significant changes in patient therapy (additional cardiology evaluation and administration of anticonvulsants). AliveCor™ improved the ability to identify AF in elderly patients with and without a prior history of stroke. Although detection of paroxysmal, persistent and chronic AF was achieved, stratification of the risk versus benefit of anticoagulation therapy in individual patients became more difficult. The anticipated epidemic of AF will be easier to detect with technological advances like AliveCor™, which provides accurate analysis compared to current anticoagulation risk population-based assessment tools. One assessment tool, the CHA2DS2-VASc, depicts a predictive value for stroke in patients with AF with a P value equal to 0.58, making it merely significant. More precise physiologic biomarkers of thrombus formation using blood or cardiac imaging are needed to segregate subgroups of this expanding population of patients found to be in AF.*

## **INTRODUCTION**

The AliveCor Kardia™ is a portable ECG (iECG) for the iPhone, Android and iPad that incorporates electrodes for wireless cardiac telemetry monitoring. It was approved by the FDA in 2013 (AliveCor® KardiaMobile EKG Monitor, 2018). It provides a 30 second single (lead 1) rhythm strip when held in the right and left hands. A real-time display of the electrocardiogram is created by conversion of an electrical signal into ultrasound which is captured by the smartphone microphone. Approved automated algorithms provide immediate rhythm analysis of suspected atrial fibrillation (Figures 1 and 2).

*Figure 1. AliveCor KardiaMobile for cellphone*

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