Detection of ST changes by a smartphone-based electrocardiographic monitoring system in patients with ST elevated myocardial infarction

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Background: Recent technological advances have led to several novel electrocardiographic monitoring devices appearing on the market. The pocket sized Kardia Mobile is a monitoring device that requires the patient to trigger the ECG recording through a smartphone-based application. This system is generally aimed to detect alterations in cardiac rhythm and its potential for detection of ST changes remains largely unknown.
Purpose: This study sought to assess the diagnostic sensitivity of the Kardia Mobile system for detection of ST changes in patients with ST elevated myocardial infarction (STEMI).
Methods: Patients admitted with diagnosis of STEMI according to current universal standard definition were consecutively included. Recordings with Kardia were obtained in leads I, II and anterior precordial (prec). All anonymized recordings were submitted for review to a single cardiologist blinded to the 12 leads ECG findings and to all clinical data. A Kardia recording was considered positive if any significant elevation or depression of ST segment was observed.
Results: A total of 102 consecutive patients were included (age 60.6±11.4 years, 27% females, weight 78.6±17.4 kg) admitted with diagnosis of STEMI after a median of 165 (IQR 120–367) minutes of chest pain. STEMI was anterior-lateral in 48% and inferior-posterior in 52%. Values of sensitivity for each lead and for combination of leads are shown in Table for all STEMI and separately for anterior and inferior locations. ST changes in all leads consisted mostly in depression (70–78%). Poor quality recording rates were 8% for lead I, 1% for lead II and 3% for lead prec.
Conclusions: The Kardia Mobile system with single lead use shows a modest sensitivity for detection of ST changes (mostly depression) in STEMI patients. However, the combination of two leads (particularly I+prec or II+prec) or three leads shows a very high sensitivity for both anterior and inferior STEMI.

Sensitivity for ST changes

	All	Anterior	Inferior
Lead I	58%	27%	86%
Lead II	58%	42%	77%
Lead prec.	57%	52%	65%
Leads I + II	72%	48%	99%
Leads I + prec.	88%	80%	98%
Leads II + prec.	98%	97%	99%
Leads I + II + prec.	100%	100%	100%