Abstract inför halvtidskontroll 2019-02-14

Thomas Lindow, doktorand, Institutionen för kliniska vetenskaper, Klinisk fysiologi

Thomas.a.lindow@gmail.com

Huvudhandledare: Henrik Engblom

**Title**: Validation of electrocardiographic methods of early detection of acute myocardial ischemia

**Background**: Current clinical ECG criteria for ST elevation myocardial infarction (STEMI) criteria have been shown to have limited diagnostic accuracy.

A novel graphical computerized ECG algorithm (ECG decision support – myocardial infarction, EDS-MI) as well as smartphone 12-lead ECG have the potential to be used as decision support in the early management of patients with suspected acute infarction. However, both methods lack clinical validation.

**Methods**: In paper I, reference values of EDS-MI were defined by applying the EDS-MI method in 53 patients with acute coronary occlusion and in 360 control patients. The reference values were then tested in a cohort consisting of 135 patients with non-ischemic ST deviation and 117 patients with acute coronary occlusion (paper II).

In paper III, agreement between smartphone 12-lead ECG and conventional 12-lead ECG amplitudes was assessed and the fulfillment of STEMI criteria was evaluated.

In project IV, EDS-MI will be applied in non-selected chest-pain patients (approximately 40000 patients from the EXPECT database) presenting at the emergency department. In the same population, different electrocardiographic characteristics of acute ischemia will be evaluated both in patients diagnosed with acute coronary occlusion and in patients with non-ischemic ST deviation (paper V).

**Preliminary results**:

Paper I: Reference values for the Olson method were defined, which showed improved sensitivity compared to STEMI criteria.

Paper II: EDS-MI showed improved specificity compared to STEMI criteria.

Paper III: In most patients, replacement of the Wilson central terminal by arm electrodes resulted in only small changes in chest lead ST-J amplitudes. In some patients with ST deviation in leads aVR or aVL, however, changes in precordial-lead ST-J amplitudes were substantial.

**Implications**: EDS-MI has been shown to have potential to serve as an automatic decision support for the assessment of patients with acute coronary syndrome. Further studies in unselected clinical chest pain populations are needed.

Smartphone 12-lead ECG may have potential in very early detection of STEMI. However, in some cases CR or CL leads result in different ST-J amplitudes and STEMI criteria may have to be adjusted for smartphone 12-lead ECG.
Published papers (I – III):

