QRS width, during from 50 to 60 years of age predicted cardiovascular disease during a further 11 years of follow-up.

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**P4423**

**Non-contact heart beat monitoring using impulse-radio ultra-wide band radar technology**


**Background:** The impulse-radio ultra-wide band (IR-UWB) radar can recognize motion of internal organs in a distance, which may be utilized to monitor cardiac motions without contact. The purpose of the study is to assess heart rates (HRs) and rhythms using IR-UWB radar technology and to evaluate the validity and reliability of the method, compared to electrocardiography.

**Method:** Heart beats were recorded in 8 healthy volunteers (16 samples) with normal sinus rhythm and 16 patients (36 samples) with atrial fibrillation using both IR-UWB radar and electrocardiography simultaneously. To minimize the motion of the chest, the participants were told to breath-hold for 20 seconds during the data acquisition. HRs, R-R intervals and rhythm were automatically recognized by a software algorithm in both methods.

**Results:** In subject with normal sinus rhythm, there were excellent agreements of HRs (intraclass correlation coefficients R [ICCR] 0.856 [0.641–0.963]), average R-R intervals (ICCR 0.979 [0.893–0.993]) and individual R-R intervals (ICCR 0.837 [0.744–0.889]) between the two methods. In subjects with atrial fibrillation, HRs (ICCR 0.871 [0.763–0.932]) and average R-R intervals (ICCR 0.925 [0.859–0.961]) from IR-UWB radar showed excellent agreements with those from electrocardiography while there was a slightly lower level of agreement of individual R-R intervals between the two measurement methods (ICCR 0.697 [0.641–0.747]). The rhythms automatically recognized by an algorithm agreed well between the two methods (Cohen’s Kappa 0.922 [0.817–1.000]).

**Conclusion:** IR-UWB radar is a precise and accurate method for the assessment of HRs and rhythms. The assessment of HRs and rhythms was more accurate in subjects with normal sinus rhythm than in subjects with atrial fibrillation.

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**P4424**

**Comparison between computational electrocardiographic diagnostic algorithms and ECG expert evaluation**

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**Background and purpose:** The electrocardiogram (ECG) has grown to become one of the most commonly used diagnostic tools in Medicine. Modern electrocardiographs frequently provide computational diagnostic algorithms that may help in automatic disease diagnosis and patient stratification. Our aim was to compare the diagnostic performance of computational ECG analysis with a gold standard ECG diagnosis by senior cardiologists with experience in electrocardiography.

**Methods:** We analyzed the ECG of 250 consecutive patients that were evaluated in a tertiary care centre. Two senior cardiologists with experience in electrocardiography blindly reviewed the 250 ECGs, no clinical information or computational ECG analysis was provided. The two experts first graded the ECG as normal, subtle abnormalities that do not require treatment or findings that require specific treatment. In addition, another categorization was performed to further classify the ECGs as normal, conduction abnormalities without bradycardia, significant bradycardhythmias, supraventricular tachyarrhythmia (SVT), acute myocardial ischemia, signs of chronic myocardial infarction, normally functioning pacemaker, pacemaker malfunction, or repolarization abnormalities compatible with chamber dilation/hypertrophy. Kappa index was performed between the two experts. In cases with disagreement, the gold standard diagnosis was reached by consensus. Computational diagnosis was compared with the cardiologist final diagnosis by means of a Kappa index.

**Results:** Agreement between the two electrocardiography experts was excellent, both in the first ECG stratification (96% agreement, Kappa 0.86) and in ECG categorization (98% agreement, Kappa 0.86). Computational diagnosis was able to categorize 245 out of 250 ECGs. Agreement between the computational diagnosis and the gold standard was moderate for the first ECG stratification (Kappa 0.59), and good for the ECG categorization (Kappa index 0.68). Computational diagnosis was accurate in identifying SVT, and induction abnormality (Kappa 0.70), but failed in correctly recognizing signs of acute or chronic myocardial infarction or significant bradycardythmias (Kappa < 0.40).

**Conclusions:** Computational ECG diagnosis has a good agreement with the considered ECG gold standard. However, the computational method was not reliable in correctly identify potentially severe conditions, mainly acute and chronic ischemia, and bradyarrhythmias. Thus, computational ECG analysis should be used with caution, particularly in this scenario.

**BEST POSTERS IN SYNCOPE**

**P4425**

**Evaluation of serum level changes of syndecan-1 in response to orthostatic stress during head-up tilt test in patients with vasovagal syncope**


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Syndecans are single transmembrane domain proteins which to act as coreceptors specifically for G protein-coupled receptors. These coreceptors play a key role in cellular processes such as cell adhesion, migration, and signal transduction. Syndecan-1 is a marker of high endothelial glycocalyx degradation that may be useful in the evaluation of endothelial function in a variety of clinical conditions.

The aim of our study was evaluation of the Syndecan-1 serum changes during head-up tilt-test in patients with vasovagal syncope (VVS).

**Study population:** 25pts (11 men, 14 women) aged 18–42 years (median of age: 21yrs) with VVS referred to HUTT. Cardio- and neurological causes of syncope were previously excluded in all studied pts.

**Methods:** In all pts HUTT was done according to Westminster protocol with sublingual nitroglycerine (NTG) provocation, in case of negative result of passive tilt test the active phase was started. During HUTT continuous, noninvasive beat-to-beat monitoring of heart rate and blood pressure was performed. Blood samples were taken before the test, after completion of both – passive and active phases (after NTG provocation) and 15 minutes after finishing the test (syncpe induction or protocol completion) to evaluate the serum concentration of Syndecan-1.

**Results:** HUTT was positive in 21 pts (84%) – in 5 pts there was cardioinhibitory response, in 14 pts. – mixed and in 2 - vasodepressive. Mean serum concentration rises during passive standing (6 993,9 pg/ml before HUTT, 10 486,9 pg/ml after passive tilt) then falls to 7 808,7 pg/ml after NTG provocation and finally reaches 7194,4 after the test; p<0,03. Pts with vasodepressive response during HUTT presented higher values of Syndecan-1 concentration in relation to pts with cardioinhibitory response (5455,3 vs 3984,1 pg/ml; 8778,0 vs 5773,9 pg/ml; 4415,6 vs 2682,8 pg/ml and 4317,7 vs 3548,1 pg/ml respectively). Pts with negative HUTT presented lower values of Syndecan-1 concentration than HUTT-positive ones. After NTG provocation there was decrease of Syndecan-1 serum concentration (4115,0 vs 7808,9 pg/ml; p<0,05) in HUTT-positive pts in contrast to pts with negative HUTT in whom the level increased (5861,6 vs 3786,6 pg/ml p<0,01).

**Conclusions:**

1. Orthostatic stress during Head-Up Tilt Test with nitroglycerine provocation leads to different serum changes of Syndecan-1.

2. Syncpe induction during HUTT results in higher expression of Syndecan-1 concentration, compared to the HUTT-negatives. Moreover vasodepressive response to HUTT was connected with significantly higher increase of Syndecan-1 concentration in relation to cardioinhibitory response.

3. Changes of serum concentrations of Syndecan-1 seem to be an important indicator of impact of endothelium on the pathomechanism of vasovagal response to orthostatic stress in patients with vasovagal syncope.

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