

Scientific Sessions

Results: Analysis of the coronary trees showed that MZ twins RMSE values showed no significant difference compared to the DZ twins values (Median: 14.57 mm IQR: 11.71 - 21.75 mm; 19.99 mm IQR: 12.15 - 20.61 mm respectively, $p=0.57$). No significant difference was seen on a segmental basis either.

Conclusion: Our initial results suggest that, coronary geometry is similar between MZ and DZ twins, which indicate that environmental factors play an important role in the development of coronary anatomy. We intend to evaluate our results in the full cohort (105 twin pairs) with the application of more in-depth twin statistics.

B-1062 11:18

Heritability of coronary calcification and plaque burden: a classical twin study

P. Maurovich-Horvat¹, Z.D. Drobni¹, T. Horvath¹, A.L. Jermendy¹, M. Karoly¹, M. Kolossvary¹, A.D. Tamoki¹, S. Voros², B. Merkely¹, ¹Budapest/HU, ²Richmond, VA/US (maurovich.horvat@gmail.com)

Purpose: Through the comparison of monozygotic (MZ) and dizygotic (DZ) twins phenotypic similarities can be quantified, genetic and environmental factors can be determined in a unique way. Our goal was to determine the magnitude of genetic and environmental impact on coronary calcification and plaque burden.

Methods and Materials: Coronary CT-angiography was performed in 208 twin subjects, of whom 62 were MZ pairs and 42 were DZ pairs (mean age: 58.1±8.7 vs. 55.8±9.8, $p=0.218$, respectively). Calcification was assessed by Agatston-score measurement. Plaque burden was assessed by the segment involvement score (SIS: total number of segments with plaque) and segment stenosis score (SSS: sum of all stenoses, minimal=1, mild=2, moderate=3, severe=4). SSS index (SSSi) is the SSS/total segment number, whereas SIS index (SISi) is the SIS/total segment number. Concordance between MZ and DZ pairs were assessed by non-parametric correlations. Rough heritability was calculated according to the Falconer-method.

Results: Ca-score was measured in 208 subjects, whereas plaque burden scores were assessed in 104 subjects. Ca-score was more than 0 in 39.4% (82/208) of twins with a median Agatston score of 114.6 (IQR:285.3). SSSi and SISi were positive in 59.6% (62/104) of twins. In the positive cases the median of the SISi was 0.24 (IQR:0.31) and the median of SSSi was 0.29 (IQR:0.49). Relatively strong heritability was found regarding Ca-score (0.89), while the plaque burden showed a weaker genetic dependency (SSSi:0.28 and SISi:0.27).

Conclusion: This classical twin study shows that coronary calcification has a relatively strong heritability, while plaque burden is more determined by environmental factors.

B-1063 11:26

Measuring athlete's risk of cardiovascular events (MARC) study: the role of coronary CT in the cardiovascular evaluation of middle-aged sportsmen

T. Braber, B.K. Velthuis, Utrecht/NL (thijsbraber@gmail.com)

Purpose: Over 90% of exercise-related cardiac arrests occur in men, predominantly those aged > 45 years with coronary artery disease (CAD) as

B-1064 11:34

Athletes' normal left ventricular magnetic resonance parameters modified by trabeculae measurement

H. Vago, A. Toth, C. Czibalmos, F. Suhai, I. Csics, K. Kecskes, B. Merkely, Budapest/HU (vago.h@gmail.com)

Purpose: Our goal was to determine left ventricular magnetic resonance (MR) parameters for athletes and to examine how these parameters change with trabeculae measurement method.

Methods and Materials: Cardiac MR examination was performed on 128 top athletes (108 male, 20 female) and on 54 healthy volunteers (40 male, 14 female). The athletes were canoe and kayak paddlers ($n=40$), rowers ($n=10$), water-polo players ($n=24$), cyclists ($n=7$), football players ($n=7$), kick-boxers ($n=8$), handball players ($n=6$) and ultra-marathon runners ($n=6$). Left ventricular parameters were determined by using Medis QMass MR 7.6 quantification software. Left ventricular trabeculation was also analyzed quantitatively.

Results: Left ventricular volumes and myocardial mass indices (LVMI) were higher in athletes than in the control group both with and without quantifying the trabeculae mass (TrM). When TrM is included in the measurement, myocardial mass indices were higher and the volumes were lower both in athletes and in control group. Compared to the male control volunteers, TrM was higher in male athletes (43.4 ± 10 vs 38 ± 8 g, $p=0.001$). However, TrM% (trabeculae (g)/LVM (g)*100) was higher in the control group ($21.1\pm4\%$ vs $18.9\pm4\%$, $p=0.001$). This suggests a more pronounced hypertrophy in the compact myocardium caused by extensive physical training. LVMI corrected with TrM was higher in canoe and kayak paddlers (122.7 ± 15 g/m²) compared to water-polo players (108.7 ± 16 g/m²), ultra-marathon runners (100.7 ± 10 g/m²), kick-boxers (89.9 ± 12 g/m²) and football players (104.4 ± 11 g/m²) ($p < 0.05$). Moreover, canoe and kayak paddlers had higher end-diastolic (105.2 ± 14 ml/m²) and stroke volume indices (68.3 ± 8 ml/m²) than kick-boxers (88.6 ± 13 ml/m²; 58 ± 7 ml/m²) ($p < 0.05$).

Conclusion: Quantification of myocardial trabeculae could significantly modify normal left ventricular parameters

B-1065 11:42

Cardiac MRI in athletes can be a final step in the eligibility for competitive sport after suspicious ultrasonography or stress ECG?

L. Patriarca, F. Bruno, A. Mancini, F. Smaldone, E. Di Cesare, C. Masciocchi, L'Aquila/IT (lu.patriarca@gmail.com)

Purpose: To evaluate usefulness and efficacy of CMR in young athletes with suspicious or inconclusive ultrasonography or stress ECG referring for their eligibility to competitive sport.

Methods and Materials: 39 athletes (Italian football players, rugby players, volley players, athletics; age 26 ± 4 ; 33/6 men/women) were examined in 7 years. All athletes had suspicions to cardiac abnormalities according to the results of echocardiography, ECG and functional examination. CMR was performed with 1.5 T-scanner to detect/rule out LV hypertrophy, arrhythmogenic cardiomyopathy, myocarditis or congenital heart diseases.

Results: MR didn't confirm cardiac pathology or found minor non-significant abnormalities in 28 cases (71.7%). In 4 cases (10.2%) CMR demonstrated the presence of bicuspid aortic valve with non-significant retraction. In 6 cases