Coronary atherosclerosis and cardiovascular risk in masters male marathon runners. Rationale and design of the “marathon study”.

BACKGROUND: Regular physical exercise is recommended to reduce cardiovascular mortality. And yet, atherosclerosis is the main cause of exercise-associated death in persons beyond age 35. The need for risk stratification in marathon runners is under discussion. The predictive value of modern imaging- and non-imaging-based markers of risk that can be used for risk stratification in masters endurance athletes still deserves exploration. METHODS: Male runners > 50 years who have completed at least five marathon races during the preceding 3 years and do not suffer from coronary artery disease, angina or diabetes mellitus are studied to assess the predictive value of established and modern imaging- based and biochemical cardiovascular risk factors. Laboratory parameters including clinical chemistry, hematology and hormone measurements are determined. Lifestyle-related risk factors, psychosocial and socioeconomic variables are explored using standardized questionnaires. Coronary, carotid, femoral and aortic atherosclerosis is measured using electronbeam computed tomography and ultrasound. In addition, a resting ECG, a bicycle stress test and heart
rate variability are performed. Myocardial morphology and function are assessed using echocardiography and magnetic resonance imaging. Participants are invited to compete in a marathon race to quantify the association of coronary atherosclerosis with marathon-related changes of cardiac troponin levels and the extent of marathon-induced inflammation. At the cellular level, the effect on the amount of circulating progenitor cells (EPCs) is determined by FACS analysis. Changes in laboratory parameters and hormone levels are also studied. Annual long-term follow-up including hospital records and death certificates is performed. Data are compared with those from a general unselected cohort from the Heinz Nixdorf Recall Study. CONCLUSION: This study should contribute to cardiovascular risk assessment in the growing number of masters marathon runners with a focus on assessing the predictive value of modern imaging techniques and biochemical markers for comprehensive risk stratification.