Abstract:

Electron-beam computed tomography (EBCT) allows non-invasive imaging of coronary calcification and has been promoted as a screening tool for coronary artery disease (CAD) in asymptomatic high-risk subjects. This study assessed the relation of coronary calcifications to alterations in coronary vascular reactivity by means of positron emission tomography (PET) in asymptomatic subjects with a familial history of premature CAD. Twenty-one subjects (mean age 51 +/- 10 years) underwent EBCT imaging for coronary calcifications expressed as the coronary calcium score (CCS according to Agatston) and rest/adenosine-stress nitrogen-13 ammonia PET with quantification of myocardial blood flow (MBF) and coronary flow reserve (CFR). The mean CCS was 237 +/- 256 (median 146, range 0-915). The CCS was 100 units in 13. As defined by age-related thresholds, 15 subjects had an increased CCS (>75th percentile). Overall mean resting and stress MBF and CFR were 71 +/- 16 ml 100 g(-1) min(-1), 218 +/- 54 ml 100 g(-1) min(-1) and 3.20 +/- 0.77, respectively. Three subjects with CCS ranging from 114 to 451 units had an abnormal CFR (<2.5). There was no relation between CCS and resting or stress MBF or CFR (r = 0.17, 0.18 and 0.10, respectively). In asymptomatic subjects a pathological CCS was five times more prevalent than an
abnormal CFR. The absence of any close relationship between CCS and CFR reflects the fact that quantitative myocardial perfusion imaging with PET characterises the dynamic process of vascular reactivity while EBCT is a measure of more stable calcified lesions in the arterial wall whose presence is closely related to age.