Insights into the relationship between coronary calcification and atherosclerosis risk factors

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Akademisk avhandling

som med vederbörligt tillstånd av Rektor vid Umeå universitet för avläggande av medicine doktorsexamen framläggs till offentligt förvar i Hörsal D, UnodT9, Norrlands universitets sjukhus. Torsdag den 22 September 2016, kl. 09:00 Avhandlingen kommer att förvaras på engelska.

Abstract

Introduction: Coronary artery calcification (CAC) is known as sub-clinical atherosclerosis and its detection is a marker for coronary artery disease (CAD). The conventional cardiovascular risk factors used to quantify the estimated 10-year coronary event risk comprise dyslipidaemia, hypertension, diabetes mellitus, obesity, smoking and family history of CAD. Their relationship with significant (>50%) stenosis, interaction with the CAC score and their predictive ability for CAC has not been fully determined in symptomatic patients.

Methods: For Papers 1-4 we took data from the Euro-CCAD international cohort, which gave us the CAC score and the risk factor profile in 6309 patients, plus angiography results for 5515 patients. In paper 5 we carried out a systematic review and meta-analysis of all studies of the risk factor predictors of CAC presence, extent and progression in 15,769 symptomatic patients.

Results: Our investigation cohort showed that the CAC score is far more predictive of significant stenosis than risk factors alone, followed by male gender and diabetes, and there was little benefit to risk factor assessment over and above the CAC score for >50% stenosis prediction. Intercontinental and European regional variations made little difference to this result. Independent predictors of CAC presence were dyslipidaemia and diabetes in males and diabetes followed by smoking in females. The risk factor predictors alter significantly at age 70. The most important risk factor predictors of CAC extent were male gender and diabetes; when analysed by gender, diabetes was the most important in both males and females. The meta-analysis found that hypertension followed by male gender, diabetes and age were predictive of CAC presence, while for CAC extent mild-moderate CAC was predicted by hypertension alone, whereas severe CAC was predicted by hypertension followed by diabetes.

Conclusion: Our studies have consistently shown the strong predictive ability of male gender in the total cohort and diabetes in males and females.

Keywords
Coronary artery calcification; stenosis; risk factors