



Carotid plaque is strongly associated with coronary artery calcium and predicts incident coronary heart disease in a population-based cohort

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ABSTRACT

Background and aims: Coronary artery calcium (CAC) and carotid plaque are markers of atherosclerosis and predict future coronary heart disease (CHD) events. The aim of this study was to investigate associations between CAC and carotid plaque in asymptomatic individuals, also in relation to predicted CHD-risk and incident events. A secondary aim was to compare predictive value between CAC, carotid plaque, and total carotid plaque area (TPA) as predictors for future CHD-events.

Methods: The REFINE-Reykjavik study is prospective and population-based with CAC-scoring and carotid plaque ultrasound assessment, both presence and area. A total of 948 individuals without clinical CHD were included in the study. CAC scores were categorized into 0, 1–100, 101–300 and > 300, and carotid plaque into none, minimal and significant. Three models were applied adjusted for age, sex, and each of the Framingham risk score (FRS), local CHD risk score and established CHD risk factors.

Results: Combined carotid plaque- and CAC-presence was highly prevalent, 69.5% for males and 41.7% for females (54.5% overall). TPA outperformed base models in CHD prediction, resulting in statistically significant area under the receiver operator characteristic curve (AUC) increase ranging from 0.02 to 0.05. Most CHD-events in females occurred in individuals classified as low-risk with respect to traditional risk factors but with a gradient in observed risk across carotid plaque categories.

Conclusions: Carotid plaque was strongly associated with the presence and extent of CAC in asymptomatic individuals in a population-based cohort. Carotid plaque predicts incident CHD events over risk scores and may be useful for refined risk prediction in females.

1. Introduction

Coronary artery calcium (CAC) is a sign of advanced atherosclerosis and a risk factor for incident coronary heart disease (CHD) [1–4]. Carotid artery plaque is also a known predictor of CHD. Results on the association between CAC and carotid plaque have been based on relatively few population based studies or studies on selected patient groups with prevalent CHD or other important co-morbidities [5–8]. This paper reports on the strengths of associations between carotid artery plaques and the presence and extent of CAC in a well-defined population-based cohort, free of symptomatic CHD at entry and with an extended follow-up. Associations were also investigated in relation to incident

CHD events in context with predicted 10-year CHD risk at entry.

The primary aim was to investigate associations between carotid plaque and CAC in a population-based cohort free of clinical CHD, addressing the need for more data [5]. A secondary aim was to investigate associations between CAC and carotid plaque in relation to incident CHD events and a 10 year CHD risk score to see if carotid plaque in combination with a risk score identifies individuals who progress to incident CHD [4].

2. Patients and methods

The REFINE (Risk Evaluation For Infarct Estimates)-Reykjavik study,

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