

Meeting abstract

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I38 Relationship between coronary calcification and endothelium dependent coronary vaso-reactivity in asymptomatic diabetic patients without overt coronary artery disease

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Introduction

The relationship between coronary calcification and endothelium dependent coronary vaso-reactivity in patients with diabetes mellitus is poorly understood.

Purpose

We hypothesize that endothelium dependent coronary vaso-reactivity; in asymptomatic diabetic patients without myocardial ischemia is impaired in vascular territories with coronary calcification.

Methods

We studied 23 (mean age 63 ± 10 , 19 M, 4 F) patients with type II DM, without history, symptom or ECG evidence of CAD. The subjects underwent 1-day rest-stress adenosine nuclear stress test, assessment of coronary calcification by EBCT and absolute measurement of myocardial blood flow at rest (MBF-R), and following cold-water hand immersion for 1 minute (MBF-C). All imaging studies were performed within 24 hours. Flow measurements by CMRI was performed using saturation recovery Turbo-FLASH imaging sequence: TR/TE/TI/FA = 2.9 ms/1.3 ms/90 ms/6°, data matrix 128×70 , and usual voxel spatial resolution $3.5 \times 1.9 \times 8$ mm³. Contrast dose was 0.05 mmol/kg (Omniscan, Amersham). All scans were processed in a blinded fashion. Using Medis software (Leiden University, the Netherlands), basal, mid-cavity and apical slices were divided into 6 equal transmural sectors. After

correction for coil sensitivity variations, model independent deconvolution of myocardial signal intensity curves in the sectors, with blood pool signal intensity curves was performed. MBF-R and MBF-C in mls/g/min were determined. Endothelium dependent perfusion reserve (MPR) in these sectors were calculated as the ratios of MBF-C to MBF-R in each sector. The sectors were subsequently grouped based on standard coronary vascular distribution.

Difference between means of two groups of patients was calculated using Student's t-test while One-way ANOVA model was utilized to compare means amongst three groups. P-value of < 0.05 was considered significant

The vascular sectors were stratified into 3 groups (A, B, C) based on the Agatston calcium score of their respective coronary arteries from 0, 1–100, 101–400 respectively.

Results

MPR in groups A B and C were 1.22 ± 0.4 , 1.11 ± 0.3 and 1.01 ± 0.24 respectively ($p = 0.03$ for A vs (B and C combined)) (See Figure 1). We also compared mean differences in vaso-reactivity for Groups A, B, and C separately to assess whether a graded relationship exists between vaso-reactivity and the extent of calcification. This model was not significant ($p = 0.19$).

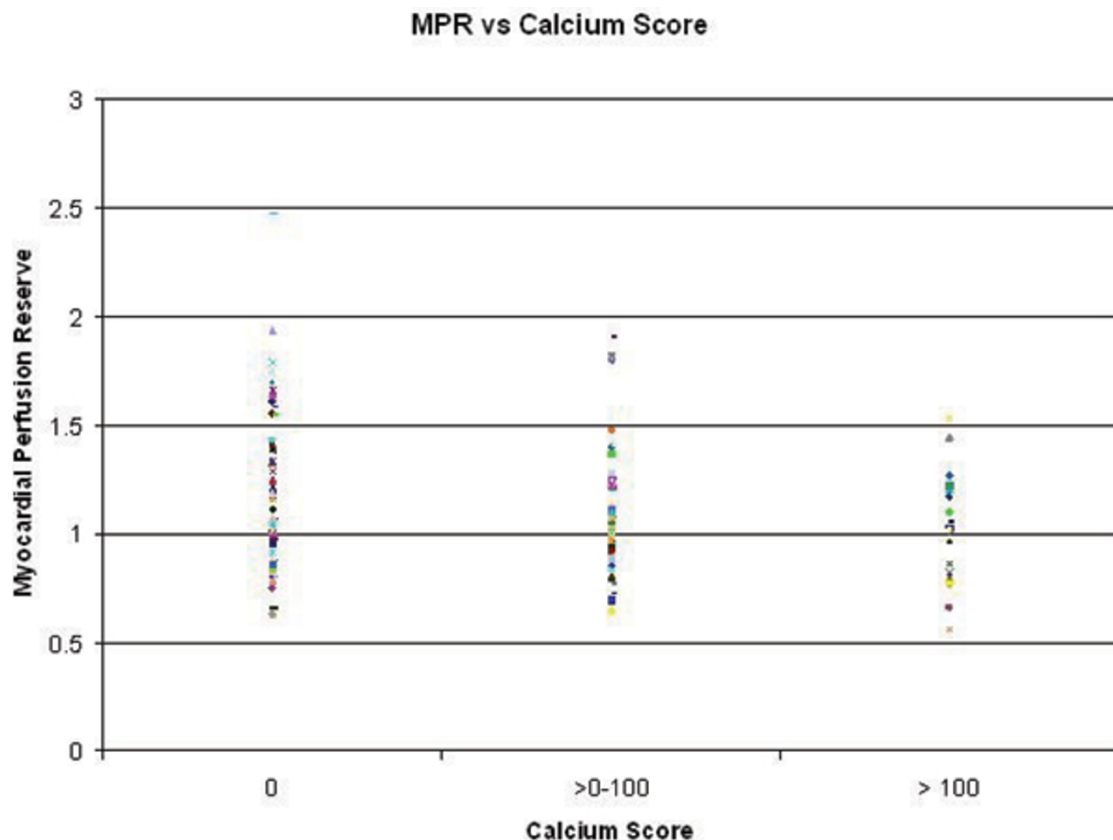


Figure 1

Endothelium-dependent perfusion reserve(MPR), as a marker for coronary vaso-reactivity, is impaired in coronary arteries with any amount of calcification. MPR was calculated by measuring myocardial blood flow during rest and during immersion for 1 minute in cold-water by Cardiac MRI.

Conclusion

Endothelium-dependent vaso-reactivity is impaired in vascular territories with any amount of calcification compared with vascular territories without calcification. We do not have evidence to support a quantitative relationship between endothelium dependent coronary vaso-reactivity and the extent of calcification.

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