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Poster presentation

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Effects of caffeine abstinence on adenosine induced coronary flow reserve quantified on phase contrast velocity encoded MRI of the coronary sinus

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Introduction

Adenosine is a common pharmacological vasodilator agent used in first pass perfusion MRI as well as nuclear cardiology and echocardiography. Coronary flow reserve (CFR) by adenosine is inhibited by caffeine and therefore caffeine abstinence is routinely proscribed in patients. However, the guidelines differ regarding how long abstinence is needed from 12 to 24 hours.

Purpose

This study was performed to investigate if 12 h caffeine abstinence is enough to provide maximal coronary flow reserve (CFR).

Methods

12 healthy individuals (5 females, 39 ± 14 years) were imaged using a 1.5 T Philips Intera CV at rest and during adenosine infusion (140 μg/kg/min) at two occasions, after 12 and 24 h caffeine abstinence respectively. Coronary sinus flow was measured during breath hold with a phase contrast velocity encoded (PC) TFE sequence with 20 phases per cardiac cycle. Typical imaging parameters were: SENSE factor 2, TE/TR/flip: 3.1/4.8 ms/15°, turbo factor 5, spatial resolution 1.2 × 1.2 × 7 mm and VENC 80 cm/s. CFR was calculated as the ratio between coronary sinus flow/min at adenosine and rest. Cardiac output was measured using PC-MRI of the ascending aorta.

Results

CFR was higher (5.4 ± 1.0) at 24 h caffeine abstinence compared to 12 h (4.6 ± 0.8, p = 0.03). In most patients the difference was minimal but in three patients (25%) the increase in CFR at 12 h was less than 30% of that at 24 h caffeine abstinence. The increase in HR did not differ at 24 h (40 ± 7%) and 12 h abstinence (39 ± 5%, p = 0.62) nor did the increase in cardiac output (55 ± 8% vs. 48 ± 8%, p = 0.68). Reported symptoms and the blood pressure reaction did not differ between 24 h and 12 h abstinence, Figure 1.

Conclusion

Twelve hours caffeine abstinence results in a lower coronary flow reserve compared to 24 hours and there is a large inter-individual difference to caffeine abstinence. This needs to be taken into consideration when performing adenosine perfusion imaging studies.

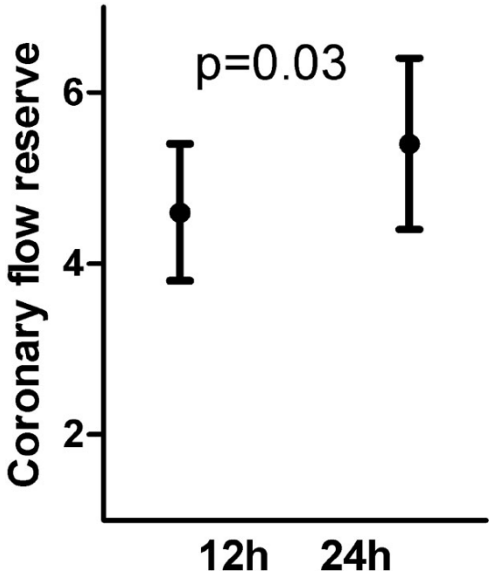

Figure 1