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MYOCARDIAL VASCULAR FUNCTION, BUT NOT METABOLISM RESPOND DIFFERENTLY INTO HIGH-INTENSITY INTERVAL AND AEROBIC TRAINING

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Objective

We compared the effects of short-term high-intensity interval training (HIT) and aerobic exercise training (AET) on cardiac function and myocardial perfusion and metabolism in healthy previously sedentary middle-aged men.

Methods

Twenty-six healthy middle-aged men were randomly assigned into the HIT and AET groups (n=13 in both) and underwent training intervention of two weeks. Both groups performed 6 training sessions with cycle ergometer (HIT session: 4-6 x 30 s all-out cycling / 4min, AET session 40 – 60 min at 60 % VO₂max). MRI was used to measure cardiac function and positron emission tomography to measure myocardial blood flow (MBF) at baseline and during adenosine stimulation, insulin-stimulated glucose uptake (GU), and fasting free fatty acid uptake (FFAU).

Results

VO₂max (HIT: +5.7 %, AET +3.2 %): improved (p=0.0003) similarly in both groups. End-diastolic and end-systolic volumes increased with both training modes, but no other cardiac functional changes were observed. GU decreased by training (p=0.004) and similarly between the groups (p=0.135), but FFAU remained unchanged. Also basal MBF remained unchanged, but adenosine stimulated MBF responded differently into the training modes (HIT -19 %, AET +9 %, p=0.033 for interaction).

Conclusion

This data shows that HIT and AET induce similar metabolic and functional changes in the heart, but myocardial vascular reactivity to adenosine is impaired after HIT. This is most probably a transient finding, but suggests that we should be somewhat cautious when prescribing very intense HIT for previously untrained subjects.