Females have higher myocardial perfusion compared to males in patients with suspected chronic coronary syndrome – a positron emission tomography study

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Background

The diagnosis and treatment of chronic coronary syndrome (CCS) is determined by the degree of coronary artery stenosis assessed by coronary angiography and the myocardial perfusion assessed by functional imaging methods. In addition to degree of coronary stenosis, myocardial perfusion might be affected by other factors such as sex and age. The aim of this study was to investigate how the degree of coronary artery stenosis, sex and age affect myocardial perfusion in patients with suspected CCS.

Method

Eighty-six patients (24 females, 68±7 years) planned for elective coronary angiography due to suspected CCS were included in the study. All patients underwent 13N-NH3 Positron Emission Tomography (PET) at rest and during adenosine stress for perfusion and cardiac magnetic resonance to detect fibrotic tissue 3.5±3.5 weeks before coronary angiography. Myocardial perfusion reserve (MPR) was calculated by dividing perfusion at stress and rest. A perfusion at stress <2.0 ml/min/g or a MPR <2.0 were considered pathological. The minimum perfusion was assessed per vessel territory (LAD, LCX and RCA) and related to maximal degree of stenosis in the corresponding vessel. Vessel territories with fibrosis were excluded.

Results

Females had significantly higher myocardial perfusion at stress (P<0.001) and MPR (P=0.038) compared to males in vessel territories with non-significant coronary stenosis (Figure 1). Higher degree of coronary artery stenosis (>50%) indicated lower myocardial perfusion at stress and MPR with no gender differences. There was no clear association between perfusion at stress and age (p=0.156). However, MPR showed a slight decline with increased age (p=0.011) (Figure 2).

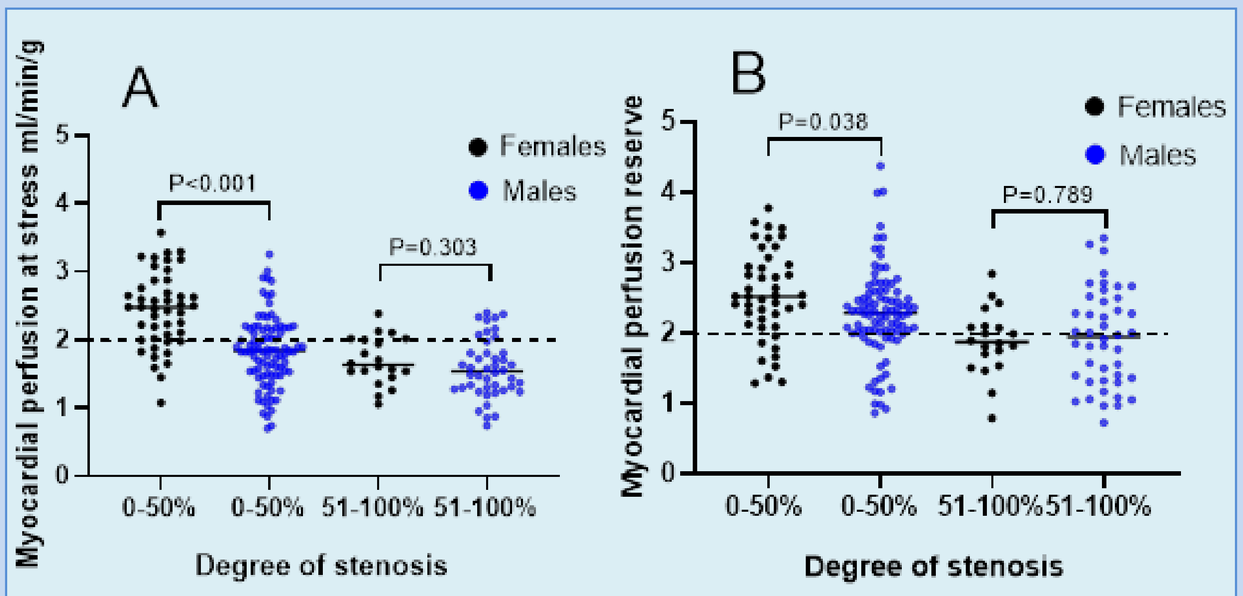

Figure 1. Myocardial perfusion at stress (A) and myocardial perfusion reserve (B) in females and males with clinically nonsignificant and significant stenosis on a vessel-territory basis. Minimum perfusion per vessel territory is plotted.

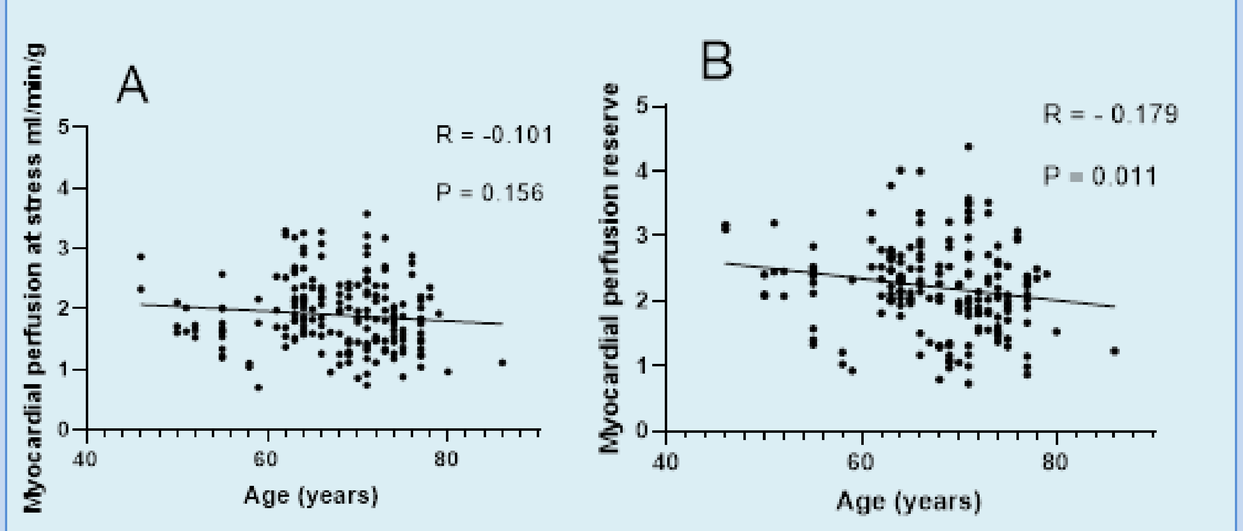

Figure 2. Myocardial perfusion at stress (A) and myocardial perfusion reserve (B) correlated to age. Minimum perfusion per vessel territory is plotted.

Conclusion

In patients with suspected CCS, male sex is associated with lower myocardial perfusion. Age does not seem to have a significant effect on myocardial perfusion. Future studies are needed to investigate to what extent sex-specific reference values for myocardial perfusion can improve management of patients with suspected CCS.