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The effect of anemia on the coronary microcirculation as measured by vasodilator stress Positron Emission Tomography

Introduction: The relationship between anemia and coronary artery disease (CAD) in general population is not well defined. While some studies demonstrated increased association between iron stores and CAD as evident with increasing rate of CAD in postmenopausal women, data regarding the effect of anemia on coronary microcirculation is limited. Therefore, we examined the effect of anemia on coronary microvascular function measured by hyperemic myocardial blood flow (MBF) and non-invasive coronary flow reserve (CFR) measured by Positron Emission Tomography (PET).

Methods: All consecutive patients referred for clinically indicated PET between May 2011 and December 2017 who had hemoglobin (Hb) on the day of the test were included in the analysis. Patients with prior CAD, ischemia (sum difference score > 1), scar (sum stress score >3), transient ischemic dilatation and abnormal resting left ventricular function were excluded. MBF was measured by single compartment method and CFR is calculated as stress MBF/rest MBF.

Results: A total of 320 patients (mean age 60 ± 10 yrs, 50% female) were included of which 117 patients had Hb <11 mg/dl. There were no differences in the prevalence of hypertension or diabetes between anemic and normal Hb patients. Using spearman correlation, there was a weak, but statistically significant correlation between Hb and CFR ($r=0.3589$, $p<0.0011$) and peak MBF ($r=0.1247$, $p=0.0258$). Using multivariate linear regression, the correlations between Hb and CFR (Beta=6.03, $p<<0.0001$) and peak MBF (Beta=3.02, $p=0.010$) remained significant after adjusting for confounders.

Conclusions: Our analysis suggests that anemia is associated with microvascular dysfunction measured by PET derived CFR. The therapeutic implications of these findings require further testing in therapeutic studies.

Biography

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