Background: Coronary microvascular bed size is directly related to the maximal blood flow response to adenosine measured as coronary flow reserve (CFR). CFR predicts adverse events in women with suspected ischemia without coronary artery disease (CAD, <50% angiographic stenosis) in the WISE. CFR is only partially predicted by CAD risk factors and inflammatory markers ($R^2<0.20$). Understanding the relationship of microvascular bed size and conduit arteries (macrovasculature) is limited. We studied the relationship of CFR and macrovasculature IVUS measures in WISE women.

Methods: Women with suspected ischemia without CAD (n=90) underwent baseline CFR response to adenosine and IVUS of a left coronary segment. Core labs assessed CFR and IVUS studies masked to clinical and angiographic data. IVUS measures were entered into regression models to assess their prediction of CFR.

Results: Four IVUS measures correlated significantly with log CFR: luminal volume ($r$ 0.25, $p=0.018$), % atheroma volume ($r=-0.21, p=0.049$), maximal luminal cross-sectional area (CSA) ($r=0.24, p=0.020$), and minimal internal elastic lamina CSA ($r=-0.28, p=0.008$, Figure). All but % atheroma volume ($p=0.15$) remained significant after multiple covariate adjustments ($p=0.023$, 0.049, and 0.002, respectively).

Conclusions: IVUS-derived measures of conduit coronary artery size predict coronary microvasculature size. Studies are warranted to elucidate remaining factors responsible for limitations in the coronary microvasculature.