Prediction of subclinical atherosclerosis using an ultra-sensitive cardiac troponin I assay: Data from the Akershus Cardiac Examination (ACE) 1950 Study

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Declaration of interest
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Purpose
• Assess the association between concentrations of cardiac troponin I measured with a novel ultra-sensitive assay and subclinical stages of atherosclerosis in men and women from the general population.

Methods
• We measured cardiac troponin I with a novel ultra-sensitive assay (us-cTnI) on the Singulex Clarity System in 1745 women and 1666 men participating in the prospective observational Akershus Cardiac Examination (ACE) 1950 Study, which invited all subjects born in 1950 residing in Akershus county, Norway.
• All study participants were free from known coronary heart disease and underwent carotid ultrasound (common-, external-, and internal carotid artery and bifurcation on both sides) at baseline. Plaques were assessed in each segment and given a point score of 1 to 3, resulting in a total score from 0 to 24 points.
• Subclinical atherosclerosis was defined as being in the upper sex specific decile of quantitative plaque burden (≥4 for women and ≥6 for men).
• Associations between concentrations of us-cTnI and carotid plaque burden were assessed by logistic regression. The diagnostic accuracy and incremental diagnostic value of us-cTnI to established cardiovascular risk factors was assessed by C-statistics and reclassification analysis.

Results
• Concentrations of us-cTnI were above the limit of detection (0.08 ng/L) in 99.8% of study participants.
• Participants with subclinical atherosclerosis were more frequently male with prevalent hypertension, diabetes mellitus, and COPD, and more frequently current smokers without higher education.
• us-cTnI concentrations were also higher in this patient group (1.24 [0.79-1.94] vs. 1.01 [0.69-1.57] ng/L; p<0.001). This discrepancy was also evident in analyses according to sex (Figure).
• Concentrations of us-cTnI were significantly associated with subclinical atherosclerosis in men, no such association was found for women (Table).
• The addition of us-cTnI to clinical risk factors improved diagnostic accuracy (C-index 0.671 [0.648-0.694] vs. 0.682 [0.659-0.704]; p=0.030) and reclassification (NRI 0.213 [0.089-0.336]) for subclinical atherosclerosis in women. No such improvement was observed for men (C-index 0.696 [0.673-0.718] vs. 0.707 [0.685-0.729]; p=0.08; NRI 0.132 [-0.025-0.290]).

Conclusions
Cardiac troponin I measured with the us-cTnI assay is independently associated with subclinical atherosclerosis in men, but not in women. The incremental diagnostic value of us-cTnI on subclinical atherosclerosis does however seem stronger in women.