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1.2 Chronological Versus Vascular Age: Predictive Value for Cardiovascular Events and Identification of Patients with SUPERNOrmal Vascular Aging (SUPERNOVA)

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ABSTRACT

Background: Individuals whose arteries appears abnormally healthy in comparison to their CV risk factor burden (supernormal vascular aging, SUPERNOVA) represent an ideal model to discover novel pathways of cardiovascular protection. Purpose: 1) to introduce a novel definition of vascular age, as predicted age based on CV risk factors and PWV; 2) to test the hypothesis that individuals with the largest difference between chronological and vascular age (C-Vage) show a lower rate of CV events, and may thus be defined as SUPERNOVA.

Methods: The best fitting model for age prediction was investigated in the multicenter, European, cross-sectional Reference Values for Arterial stiffness Collaboration Database (n = 11406). A survival analysis on the longitudinal cohort of the Malmo Diet and Cancer Study (MDCS, n = 2663) was then performed. The main outcome was a composite endpoint of fatal and non-fatal major cardiac events and strokes.

Results: In the Reference Values Cohort, the model explained 59.8% of age variance, with PWV being the most relevant predictor (r^2: 0.105). The model (derived on population >61 years) was used to calculate vascular age in the MDCS Cohort. In the Cox survival analysis (follow-up 6.6 years, 286 events), C-Vage was significantly and inversely associated with CV events (Figure 1). Individuals in the highest C-Vage decile (>8.8 years) were defined as SUPERNOVA. In the competing risk analysis, SUPERNOVA had a reduced age-adjusted rate of CV events [HR 0.51 (0.34–0.76)].

Conclusion: This proof-of-concept study demonstrated that SUPERNOVA individuals have a disproportionally lower rate of CV events. Future studies are needed to explore genetic/molecular mechanisms for this phenotype.

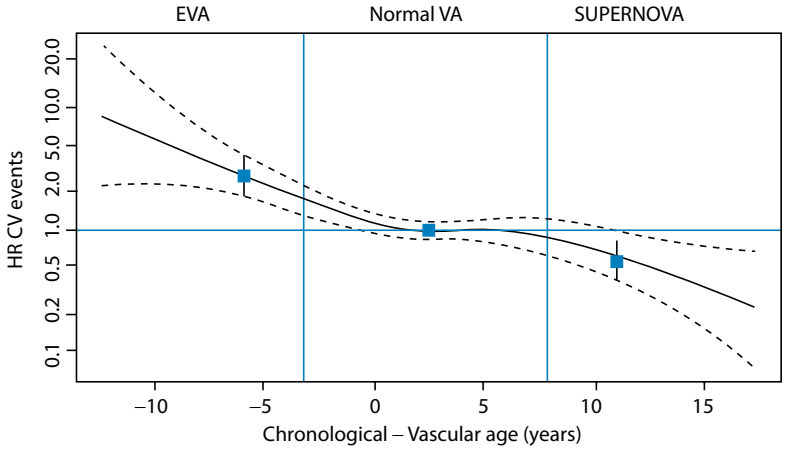

Figure 1

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