Abstract: P3436

T-wave inversion in middle age is associated with higher mortality risk compared to occurrence of a new T-wave inversion later in life

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Background: Minor ECG abnormalities, such as T-wave inversions, are frequently seen in clinical practice in asymptomatic patients. Its prognostic role is incompletely studied. We have previously reported an association between T-wave inversion, and all-cause mortality during lifetime.

Purpose: To study the prognostic prediction of new-onset of T-wave inversion in ECG recorded at various ages, in a male random population-based cohort in lifetime follow up.

Methods: Subjects from a random longitudinal, prospective, population-based study: "The study of men born in 1913" (n=854) were examined at 50-years of age and re-examined at 60, 67, 75 and 80 years, including a 12-lead ECG recording, classified according to the Minnesota code. Participants were followed until death or year 2015 (48 years follow-up), and data were obtained through the Cause of Death Register. Unadjusted and adjusted Cox proportional hazards models, producing an overall hazard ratio (HR), and flexible parametric models for survival data by Royston and Parmar, producing continuous HR over studied time, were applied for prediction of time to all-cause death and cardiovascular disease (CVD) death by the incident negative T-wave.

Results: An increased risk of all-cause and CVD death associated with negative T-waves was evident at the majority of observational ages in unadjusted analyses. After adjustment for other conditions (smoking, physical activity level, BMI, systolic blood pressure (BP), hypertension, BP medication, s-cholesterol, hematocrit, Q/QS patterns, and ST-junction/segment depression), a negative T-wave at 50 years of age was significantly associated with all-cause and CVD death, [HR 1.46 (95% CI 1.06-2.01), p=0.021, and HR 1.58 (95% CI 1.06-2.36), p=0.025], respectively. However, the HR of 1.58 for CVD death interacted significantly with time (p=0.034), with greater risk in the years adjacent to observation than for later follow-up (Figure, right panel). The corresponding adjusted analyses of a newly diagnosed negative T-wave appearing at 60, 67 and 75 years were not statistically significant for either of the two outcomes. However, an incident negative T-wave at 80 years of age was shown to have numerically higher overall impact, but not statistically significant for all-cause death [HR 1.52 (95% CI 0.80-2.86), p=0.20], but for CVD death [HR 2.41 (95% CI 1.03-5.66), p=0.043], with no significant interaction with time.

Conclusion: In this population cohort, a first time registered negative T-wave at 50 years carried a considerably increased risk of mortality, specifically CVD mortality, which cannot be explained by other cardiovascular risk factors. The risk was greatest in middle age, and weakened with increasing age. Our findings warrant verification in other cohorts. If an independent risk indication of negative T-wave at middle age is confirmed it could be a valuable adjunct in screening and cardiovascular risk assessment.
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Figure: Proportional HR over time (days in study) for adjusted negative T-wave registered at 50 years. The increased risk for CVD death was significantly associated with time (P for interaction with time=0.034), being highest during the adjacent time after start of observation and declining over time.