Abstract 21 Table 1 Association with CV risk

	Univariate		Multivariate	
	HR (95% CI)	p	HR (95% CI)	p
Clinical Variables				
Age [per 1 SD]	2.01 (1.9-2.1)	**<2x10-16**	1.83 (1.72-1.95)	**<2x10-16**
Sex (male)	2.56 (2.3-2.8)	**<2x10-16**	2.44 (2.19-2.72)	**<2x10-16**
Diabetes (yes)	2.28 (1.9-2.7)	**<2x10-16**	1.28 (1.07-1.54)	**7.2x10-3**
High cholesterol (yes)	1.86 (1.6-2.1)	**<2x10-16**	1.01 (0.89-1.15)	0.602
BMI [per 1 SD]	1.28 (1.2-1.3)	**<2x10-16**	1.20 (1.14-1.26)	**1.1x10-12**
SBP [per 1 SD]	1.45 (1.4-1.5)	**<2x10-16**	1.11 (1.05-1.17)	**9.5x10-5**
ECG variables				
Resting heart rate [per 1 SD]	1.07 (1.0-1.1)	**1.7x10-3**	0.93 (0.87-0.99)	**1.6x10-2**
Heart rate response to exercise [per 1 SD]	0.79 (0.77-0.82)	**<2x10-16**	1.01 (0.93-1.09)	0.683
Heart rate response to recovery [per 1 SD]	0.80 (0.78-0.82)	**<2x10-16**	0.97 (0.89-1.07)	0.481
Corrected QT [per 1 SD]	1.15 (1.12-1.18)	**<2x10-16**	1.14 (1.10-1.18)	**2.5x10-12**
TMR during exercise [per 1 SD]	1.18 (1.14-1.22)	**<2x10-16**	1.04 (0.98-1.10)	0.147
TMR during recovery [per 1 SD]	1.23 (1.19-1.28)	**<2x10-16**	1.13 (1.08-1.18)	**5.7x10-8**

* Abbreviations: CI = Confidence interval; HR = Hazard ratio; SD = Standard Deviation; TMR = T-wave morphology restitution

QTc, and resting and recovery heart rate. Despite relatively low heritability (~5%), we identified 12 genetic loci associated with TMRex and TMRrec, of which nine had been previously associated with other ECG markers. Individuals meeting the primary and secondary endpoints in FULL-UKB (21,328, 5.3% and 28,536, 7.1%, respectively) had higher GRS for TMRrec than unaffected individuals (P=0.026 for both endpoints). No association was found between TMRex or TMRrec and the tertiary endpoint. Individuals in the top 20% of the GRS had significantly higher risk of meeting the primary and secondary endpoints than those in the bottom 20% (HR 1.04, P=0.048, HR 1.04, P=0.024, respectively).

Conclusion TMR and TMR GRSs are significantly associated with CV events and all-cause mortality, supporting the hypothesis that increased spatio-temporal heterogeneity of ventricular repolarization identifies a high-risk substrate for CV events. This work provides support for inclusion of clinical variables, non-invasive markers and GRSs to improve personalised treatment decisions.

Conflict of Interest None

22 CARDIAC REPOLARIZATION DURING EXERCISE REVEALS INDEPENDENT PROGNOSTIC INFORMATION FOR CARDIOVASCULAR RISK PREDICTION

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Background Reduced heart rate (HR) changes during exercise and recovery post-exercise are strong predictors of

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Association with CV risk	Cox Multivariate Analysis	
Clinical variables	**HR (95% CI)**	**p**
Age (per 1 SD)	1.752 (1.638 - 1.874)	<2x10-16
Sex (male)	2.399 (2.132-2.699)	<2x10-16
Diabetes (yes)	1.378 (1.148-1.654)	5.7x10-4
BMI (per 1 SD)	1.149 (1.088-1.213)	5.8x10-7
SBP (per 1 SD)	1.121 (1.060-1.185)	5.8x10-5
ECG variables		
Heart rate response to recovery (per 1 SD)	1.145 (1.077 - 1.217)	1.5x10-5
RTc rest (per 1 SD)	1.099 (1.029 - 1.173)	4.8x10-3
RTc exercise (per 1 SD)	1.068 (1.002 - 1.137)	4.2x10-2

SD: Standard Deviation, BMI: Body mass index, SBP: Systolic Blood Pressure, HR: Hazzard

cardiovascular (CV) death, suggesting that abnormalities in autonomic balance may precede manifestations of malignant CV events. Cardiac repolarisation is a critical component in modulating the risk of CV death. We therefore hypothesised that assessment of autonomic effects on cardiac repolarisation during exercise may help to improve CV risk prediction in the general population as it is more specific for cardiac ventricular pathophysiology compared to the autonomic effects on the sinus node.

Methods A total of 54,203 healthy individuals aged 40–69 years old without prior CV disease who had an exercise stress test from the UK Biobank study were included. HR corrected repolarisation time intervals RTc (an approximation of the QT interval) were measured from the ECG recording at rest (pre-exercise; RTc_rest), peak-exercise (RTc_ex), and 50s post-exercise recovery (RTc_rec) using a custom build algorithm. We also computed the difference between RTc_ex and RTc_rec (dRTc) as a marker of exercise associated repolarization. We finally performed a follow-up analysis to evaluate the prognostic value of these biomarkers. The endpoints studied were CV death or CV hospitalisation. Associations were tested with the Mann-Whitney and multivariate cox analysis. We then evaluated using multivariate Cox analysis whether individuals in the top 20% for were significantly more likely to suffer a CV event than those in the bottom 20%.

Results During a median follow-up time of 56 months, 1,460 (2.7%) individuals reached the endpoint. RTc_ex, RTc_rec, and dRTc were all significantly associated with the endpoint (p=4.1E-9, p<2.2E-16, and p=5.6E-5, respectively). RTc_ex, remained significantly associated with the endpoint after adjusting for age, diabetes, systolic blood pressure, body mass index, heart rate changes during exercise and recovery, and RTc_rest in the cox proportional hazards model (table 1) with a HR of 1.07 (confidence interval: 1.002–1.137. p=0.04).

Conclusion Assessment of repolarisation time during recovery improves prediction of cardiovascular death and hospitalisation in the general population independently from heart-rate changes. This work supports inclusion of clinical variables to improve personalised diagnostics and demonstrates the importance of evaluating repolarisation during exercise stress testing.

Conflict of Interest None

23 PREDICTING LEFT VENTRICULAR DYSFUNCTION IN A COMMUNITY-BASED COHORT PRESENTING TO HOSPITAL USING CLINICAL CHARACTERISTICS, ECG PARAMETERS AND BIOMARKERS

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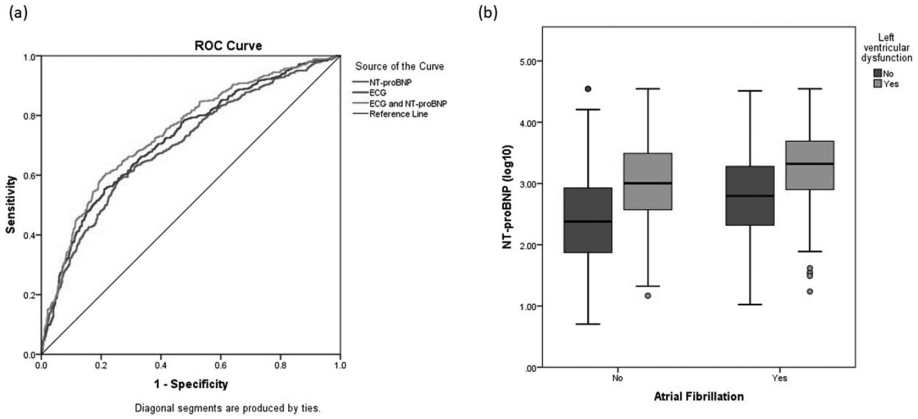
Background/Introduction Identifying patients with left ventricular dysfunction (LVDys) remains challenging outside of specialist settings. Abnormalities on the electrocardiogram (ECG) and elevated natriuretic peptides (BNP, NT-proBNP) have been associated with a diagnosis of LVDys or heart failure. As these characteristics will be affected by atrial fibrillation (AF), understanding the behaviour of these predictors in LVDys patients



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