SUPPLEMENTAL MATERIAL

Table S1. Studies of clinical outcomes related to increased repolarization heterogeneity

Authors	Population	Size	Metric	Results
Okin et al, 2002[1]	American Indians	1839	QTD and PCA	PCA ratio was an independent predictor of CV mortality in men and women. QTD was a significant predictor in women only
Okin et al, 2005[2]	American Indians	1729	PCA, TWR	Increased PCA ratio and TWR were significant predictors of CV mortality and TWR of all-cause mortality
Okin et al, 2004[3]	American Indians with DM	994	PCA	PCA ratio was an independent predictor of CV and all cause mortality
Ducceschi et al, 1998[4]	Aortic stenosis	70	QTD, QTcD	QTD and QTcD both linearly correlated with severity of aortic stenosis
Castro Hevia et al, 2006[5]	Brugada	58	TpTe	TpTe was prolonged in patients with recurrent VT/VF
Letsas et al, 2010[6]	Brugada	23	TpTe and TpTe/QT	TpTe and TpTe/QT were increased in patients with inducible VT/VF
Morin et al 2012[7]	Decreased EF	327	TpTe	TpTe predicted of ICD therapy, all-cause mortality, and the composite endpoint of ICD therapy or death
Lin et al, 2007[8]	ESRD	325	TWR	TWR was an independent predictor of CV and arrhythmia-related mortality
Tun et al, 1999[9]	ESRD	188	QTcD, TpTe	QTcD and TpTe were significantly higher in the ESRD group compared to controls
Shimizu et al, 2002[10]	HCM	47	TpTe/QT, QTD	QTD increased in HCM. TpTe/QT was increased in HCM patients with SCD/VT
Yetman et al, 1998[11]	HCM	99	QTcD	QTcD was associated with reduced time to death or resuscitated SCD

Yi et al, 1998[12]	HCM	83	QTD	QTD was increased in patients with symptomatic HCM and worse NYHA class
Kardys et al, 2003 [13]	Healthy	6134	QRST angle	Abnormal QRST angle was associated with cardiac death, non-fatal cardiac events, sudden death, and total mortality
Porthan et al, 2009[14]	Healthy	5917	PCA, TCRT, TWR	PCA ratio was independent predictor of all-cause and CV mortality in men. In women, independent mortality predictors were total TCRT (CV mortality) and TWR (all-cause and CV mortality)
Ferrucci et al, 2015[15]	HTN	40	TpTe	TpTe was higher in hypertensive than in normotensive individuals
Saba et al, 2005[16]	LVH	300	TpTe	TpTe increased in patients with LVH compared to controls
Smetana, et al 2011[17]	Male CV patients	813	TpTe, TWR	TpTe was shorter in non-survivors
Zabel et al, 2002[18]	Male CV patients	813	TWR	TWR was an independent predictor of all-cause mortality
Tieleman et al, 1995 [19]	MVP	64	QTD	QTD was increased in patients with MVP and ventricular arrhythmias
Watanabe et al, 2004[20]	NSVT, VT, VF, syncope, SVT	130	TpTe	TpTe was greatest in the VT inducible and VT spontaneous groups
de Bruyne MC, 1998[21]	Patients age >55	5812	QTD	Highest tertile relative to the lowest tertile had a twofold risk for cardiac death and sudden cardiac death, and 40% increased risk for total mortality
Batchvarov et al, 2004[22]	Post MI	334	TCRT	TCRT was an independent predictor of cardiac and arrhythmic mortality

Bonnemeier et al, 2001 [22]	Post MI	97	QTV	PCI was associated with decrease in QTV. Failure of QTV to decrease following reperfusion was associated with subsequent arrhythmic events
Erikssen et al, 2012[23]	Post MI	1359	TpTe	TpTe was a predictor of death and fatal cardiac arrhythmia
Eslami et al, 2013[24]	Post MI	80	TpTe, QTD	QTD and TpTe were reduced following PCI
Haarmark et al, 2009[25]	Post MI	101	TpTe	Pre-PCI TpTe interval predicted subsequent all-cause mortality
Lubinski et al, 2000[26]	Post MI	34	TpTe	TpTe increased in patients with inducible VT
Oikarinen et al, 2001 [27]	Post MI	73	TpTe	TpTe was increased in patients with inducible VT
Perkiomakl et al, 2006[28]	Post MI	437	TWLD, TCRT	TWLD was an independent predictor of cardiac mortality, TCRT was not
Shenthar et al, 2015[29]	Post MI	100	TpTe	TpTe and TpTe/QT were prolonged in patients post MI compared with healthy individuals, and predicted acute ventricular arrhythmias
Tatlisu et al, 2014[30]	Post MI	488	TpTe	TpTe interval was associated with in-hospital VT/VF, target vessel revascularization, death, as well as long-term target vessel revascularization and death
Zabel et al, 1998[31]	Post MI	280	TpTe, QTD	TpTe and QTD did not predict VT/VF or death in post MI patients
Zabel et al, 2000[32]	Post MI	280	TCRT, TWLD	TCRT but not TWLD, yielded independent predictive value of numerous CV outcomes
Savelieva et al, 1998[33]	Post MI, HCM	156	TpTe, QTD	TpTe was increased in HCM but not MI

				patients. QTD was significantly greater in both, compared to controls
Sarubbi et al, 1999[34]	Repaired TOF	74	QTD, TpTe	TOF patients have increase QTD and TpTe interval
Panikkath et al, 2011[35]	SCD	695	TpTe	TpTe was increased in patients with SCD than in controls. Odds of SCD increased stepwise with increase in TpTe
Pye et al, 1994[36]	VT	109	QTD	QTD increased in patients with sustained ventricular arrhythmias compared with controls

CV, cardiovascular; DM, diabetes mellitus; EF, ejection fraction; ESRD, end stage renal disease; HCM, hypertrophic cardiomyopathy; HTN, hypertension; ICD, implantable cardiac defibrillator; LVH, left ventricular hypertrophy; MI, myocardial infarction; MVP, mitral valve prolapse; NSVT, non sustained ventricular tachycardia; NYHA, New York Heart Association; PCA, principal component analysis; PCI percutaneous coronary intervention; QTcD, QTc dispersion; QTD, QT dispersion; QTV, QT variability; SCD, sudden cardiac death; SVT, supraventricular tachycardia; TCRT, total cosine R to T; TOF, tetralogy of fallot; TpTe, T peak T end; TWLD, T wave loop dispersion; TWR, T wave residuum; VF, ventricular fibrillation; VT, ventricular tachycardia

Table S2. Echocardiographic parameters associated with repolarization heterogeneity

Author	Parameter	Definition	Echo mode
Nador et al, 1991[37]	Thl/2	Time to reach half of maximal systolic thickening	MM
Nador et al, 1991[37]	TSTh	Slow movement in the late thickening phase	MM
Nakayama et al, 1998[38]	Wall thickening time (ThT)	Period in which the instantaneous wall thickness exceeds 90% of the maximum wall thickness	MM
Mayet et al, 1996[39]	E/A ratio	Ratio of early and late mitral inflow velocities	PWD
Sauer et al, 2012[40]	Diastolic dysfunction grade	Composite score using mitral inflow patters, TD velocity, and left atrial size	PWD, TD
Sauer et al, 2012[40]	E/E’	Ratio of early mitral valve inflow velocity to TD velocity	PWD, TD
Haugaa at al, 2010[41]	Delta contraction duration	Time difference between the longest and shortest contraction durations	Strain
Haugaa et al, 2010[41]	Mean contraction duration	Time from ECG onset of the R wave to maximum myocardial shortening	Strain
Haugaa et al, 2010[41]	Mechanical dispersion	Time difference in longitudinal and circumferential contraction duration in the 6 basal LV segments	Strain
Haugaa, et al 2009[42]	E'	Peak E' velocity	TD
Haugaa, et al 2009[42]	Post ejection velocity	Upstroke of the biphasic spike after	TD

		ejection.	
Haugaa, et al 2009[42]	Onset E' wave	Time from start of R wave to onset of E'	TD
Haugaa, et al 2009[42]	Contraction duration by velocity	Time from start of R wave to end of post ejection velocity	TD
Savoye et al, 2003[43]	Isovolumic relaxation time	Time between closure of the aortic valve and the opening of the mitral valve	TD
Savoye et al, 2003[43]	VHT	Deceleration time to reach half of maximal systolic velocity	TD
Savoye et al, 2003[43]	Peak systolic and diastolic velocity	Systolic and diastolic peak velocity	TD

MM, m-mode; TD, tissue doppler; PWD, pulsed wave doppler

Supplemental References

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