CRIB Cardiovascular Research Institute Basel

University Hospital Basel

Relationships of QT interval with cardiac biomarkers in young adults

Thomas Kofler[1], Matthias Bossard[1,2], Stefanie Aeschbacher[1], Anna Maseli[1], Steffen Blum[1], John Todd[3], Joel Estis[3], Martin Risch[4, 5], Lorenz Risch[4], David Conen [1]

[1] Department of Medicine, University Hospital Basel, Basel, Switzerland; [2] Cardiology Division, University Hospital Basel; [3]Singulex, Inc., 1701 Harbor Bay Parkway Suite 200, Alameda, CA 94502, USA [4]Labormedizinisches Zentrum Dr Risch, Schaan, Principality of Liechtenstein

Purpose

- Prolonged QT-interval is a key predictor of sudden cardiac death and other adverse cardiovascular outcomes.
- It is currently unclear whether subclinical cardiac alterations are involved in QT interval determination among young and healthy adults.

Methods

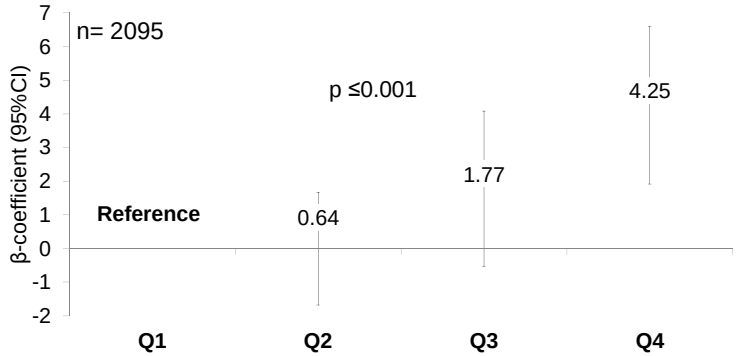
- Healthy adults aged 25-41 years were enrolled in a prospective population based cohort study in the Principality of Liechtenstein.
- Main exclusion criteria: Diabetes, overt cardiovascular disease or a body mass index ≥35 kg/m2.
- Resting 12-lead electrocardiograms were recorded in all participants under standardized conditions.
- QRS onset and the T endpoint were used to calculate the QT interval from which the QTc was determined using Bazett's formula.
- N-terminal pro B-type natriuretic peptide (NT-proBNP) and high–sensitivity cardiac troponin I (hs-cTnI) were analyzed using Roche and Singulex assays, respectively.
- Multivariable regression models adjusting for potential confounders were constructed to assess the relationships of QTc interval with NT-proBNP and hs-cTnI

Table Baseline characteristics across quartiles of NT-proBNP

	Q1	Q2	Q3	Q4
n= 2095	*n=510*	*n=546*	*n=521*	*n=536*
NT-proBNP range	*<18 pg/ml*	*18-35pg/ml*	*35-59pg/ml*	*>59pg/ml*
Age (years)	35.9	35.9	37.0	37.0
Sex (male %) *	85.7	58.2	29.6	12.5
Systolic BP (mmHg) *	127	120	117	114
BMI (kg/m$^{2)}$ *	25.6	24.3	23.5	22.7
QTc interval (msec) *	393	399	405	409

Data are medians or percentages. BP = Blood pressure; BMI = Body mass index.
* = p ≤ 0.0001.

Figure Multivariable linear regression analysis for the association between QTc interval and quartiles of NT-proBNP



Data are β-coefficients and 95% CIs adjusted for sex, age, BMI, systolic BP, diastolic BP, HbA1c, GFR, education, alcohol consumption, fruit/vegetable consumption, HDL-C, LDL-C, physical activity, smoking, potassium, calcium and sodium.

Results

- Our analyses consisted of 2095 participants (53.6 % females) with a median age of 36.7 years.
- Baseline characteristics are shown in **Table**.
- Median plasma levels of hs-cTnI and NT-proBNP were 0.69pg/ml and 34pg/ml, respectively. Median QTc interval was 402msec.
- Results of the multivariable regression analysis for QTc interval across quartiles of NT-proBNP are shown in the **Figure**.
- No significant association were identified for QTc interval across quartiles of hs-cTnI (data not shown).
- When NT-proBNP and hs-cTnI were used as continuous parameters, the beta coefficients (95% CI) were 2.48 (1.34, 3.62), p<0.0001 per 1-unit increase in NT-proBNP, and -0.08 (-1.15; 1.00), p=0.89 per 1-unit increase in hs-cTnI.

Conclusion

- There is a strong continuous relationship between NT-proBNP and QTc interval in young and healthy adults, an association not seen for hs-cTnI levels.
- These results may suggest that intravascular volume but not subclinical myocardial injury are related to QTc prolongation.

GAPP studie www.blutdruck.li

Disclosures: J.T. and J.E. are employees of Singulex

ESC Congress – The European Society of Cardiology 2015, London, England

Contact: thomas.kofler@usb.ch