

Determinants of cardiac troponin levels in healthy adults

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PURPOSE

- Modern high-sensitive cardiac troponin (cTnI) assays enable detection of cTnI levels and quantification of subclinical myocardial injury in the general population.
- However, little is known about factors that determine cTnI levels in healthy individuals.
- Thus, we assessed determinants of cTnI in a large cohort of young and healthy adults from the general population.

METHODS

- ‘Genetic and Phenotypic Determinants of Blood Pressure and Other Cardiovascular Risk Factors’ (GAPP) is a population based study of healthy individuals aged 25-41 years and living in the Principality of Liechtenstein.
- Exclusion criteria were prevalent cardiovascular disease, known diabetes or a body mass index (BMI) >35kg/m².
- Overall, we included 1608 participants in our analysis.
- cTnI-levels were measured using a high-sensitive assay with a limit of detection of 0.04 ng/L (Singulex Inc. Alameda, USA).
- Backward linear regression analyses including a broad set of covariates were performed to identify variables significantly associated with cTnI levels.

RESULTS

- Baseline characteristics are presented in the **Table**.
- cTnI was quantifiable in all but 5 participants (99.7%).
- The median cTnI level was 0.68 (interquartile range 0.43; 1.18) ng/L.
- A large number of covariates was significantly associated with cTnI in multivariable models, as shown in the **Figure**.

Table Baseline characteristics

Total n = 1608	Males n = 749	Females n = 859	p-Value
Age (y)	38 (33; 41)	37.9 (32.8; 40.6)	0.47
BMI (kg/m ²)	25.8 (23.7; 27.9)	22.7 (20.7; 25.4)	<0.0001
Curr. smoking (%)	174 (23.2)	160 (18.6)	0.02
Hypertension (%)	184 (24.6)	45 (5.2)	<0.0001
LDL-C (mmol/L)	3.24 (2.69; 3.89)	2.64 (2.23; 3.19)	<0.0001
HbA _{1c} (%)	5.5 (5.2; 5.7)	5.4 (5.2; 5.6)	0.005
hs-CRP (mg/L)	0.9 (0.5; 1.7)	0.9 (0.5; 2.0)	0.56
pro-BNP (pg/mL)	20 (11; 34)	50 (34; 79)	<0.0001
Hs-TnI (ng/L)	0.99 (0.71; 1.69)	0.47 (0.33; 0.70)	<0.0001

Data are numbers (percentage) or medians (IQ range).

- The strongest associations were observed for male gender, age, systolic blood pressure, heart rate, left ventricular mass, NT-proBNP and creatinase (all p<0.0001).
- The R² of the multivariable model was 0.38, meaning that it explained 38% of the overall cTnI variability in our sample.

CONCLUSION

- Age and sex are strong and independent factors associated with cTnI levels in the community.
- In addition, cTnI levels in the general population are associated with many covariates representing a large number of pathogenic mechanisms.
- These factors should be taken into account when the clinical utility of cTnI is evaluated.

Figure Independent determinants of troponin-I

