



NT-proBNP and Echocardiographic Parameters for Prediction of Cardiovascular Outcomes in Patients with CKD Stages G2-G4

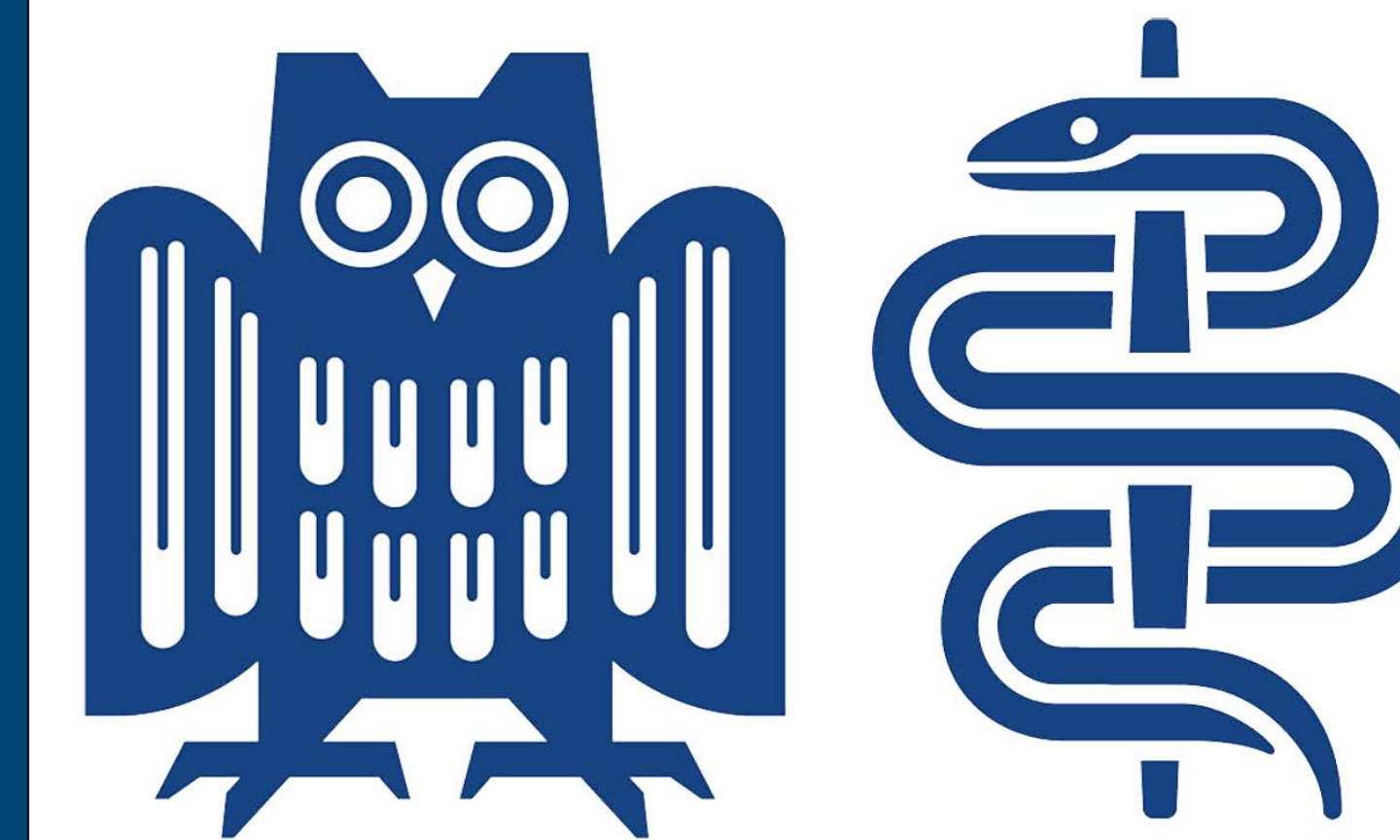
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Background

- Natriuretic peptides and echocardiographic parameters both predict cardiovascular events in patients with CKD.
- However, it is unknown whether simultaneous assessment of NT-proBNP and echocardiographic parameters provides complementary or redundant predictive information; in the latter case, one of these two might be dispensable.
- We aimed to analyze the implications of using NT-proBNP alone, echocardiographic parameters alone, or a combination of both for prediction of adverse cardiovascular outcome.

Methods

- Within the longitudinal CARE FOR HOME study, we prospectively studied 496 patients with CKD stages G2-G4, in whom we measured NT-proBNP; left ventricular mass index (LVMI), left atrial volume index (LAVI), diastolic left ventricular function (E/e'), and systolic left ventricular (LV) function were assessed echocardiographically.
- During 4.5 ± 2.0 years of follow-up, the occurrence of (1) decompensated heart failure or all-cause mortality (HF/ACM) and (2) atherosclerotic events or all-cause mortality (AE/ACM) was recorded.
- We assessed the association of NT-proBNP and echocardiographic parameters with outcome, using Kaplan-Meier analyses and Cox models.

Conclusions

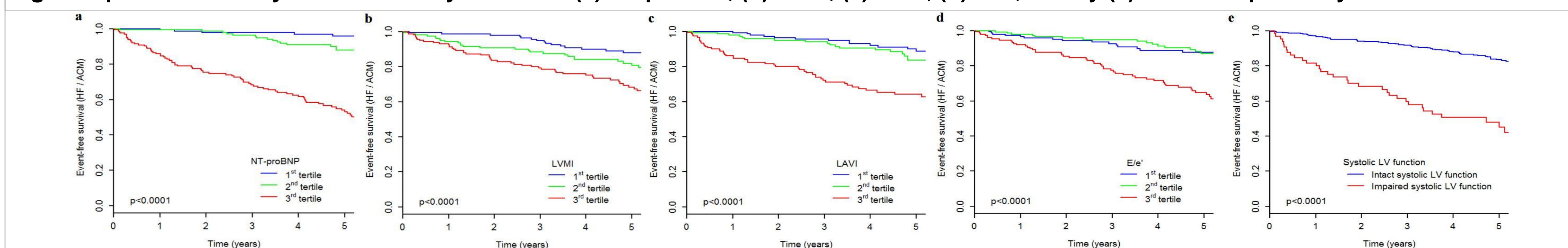
- Our data confirm NT-proBNP to predict adverse outcome in univariable and multivariable analyses.
- Compared to NT-proBNP, routine echocardiography does not provide independent prognostic information.

Results

Tab. 1 Baseline characteristics

	Total cohort n=496	No HF/ACM n=392	HF/ACM n=104	p	No AE/ACM n=369	AE/ACM n=127	p
Age, years	65.0 ± 12.4	63.0 ± 12.5	72.5 ± 8.8	<0.001	63.2 ± 12.7	70.4 ± 9.8	<0.001
Sex, women	205 (41 %)	171 (44 %)	34 (33 %)	0.04	167 (45 %)	38 (30 %)	0.002
Prevalent CVD	160 (32 %)	106 (27 %)	54 (52 %)	<0.001	86 (23 %)	74 (58 %)	<0.001
Diabetes mellitus	188 (38 %)	133 (34 %)	55 (53 %)	<0.001	122 (33 %)	66 (52 %)	<0.001
eGFR, ml/min/1.73m ²	46 ± 16	49 ± 15	35 ± 12	<0.001	49 ± 16	38 ± 14	<0.001
Systolic RR, mmHg	152 ± 24	152 ± 23	155 ± 26	0.20	152 ± 23	155 ± 26	0.16
NT-proBNP, pg/ml	211 (90 - 602)	152 (72 - 325)	964 (399 - 2353)	<0.001	146 (72 - 321)	690 (298 - 2157)	<0.001

Fig. 1 Kaplan-Meier analyses stratified by tertiles of (a) NT-proBNP, (b) LVMI, (c) LAVI, (d) E/e', and by (e) intact / impaired systolic LV function.



Tab. 2 Continuous Cox models

	HF/ACM			AE/ACM		
	Model 1 HR (CI 95 %) p	Model 2 HR (CI 95 %) p	Model 3 HR (CI 95 %) p	Model 1 HR (CI 95 %) p	Model 2 HR (CI 95 %) p	Model 3 HR (CI 95 %) p
Log NT-proBNP, pg/ml	6.63 (4.85-9.07) <0.001	4.36 (2.94-6.46) <0.001	3.61 (2.35-5.54) <0.001	4.39 (3.36-5.74) <0.001	2.88 (2.05-4.04) <0.001	2.91 (1.99-4.25) <0.001
LVMI, g/m ²	1.01 (1.01-1.02) <0.001	1.01 (1.00-1.01) 0.008	1.00 (0.99-1.00) 0.57	1.01 (1.01-1.02) <0.001	1.01 (1.00-1.01) 0.02	1.00 (1.00-1.01) 0.74
LAVI, ml/m ²	1.05 (1.04-1.07) <0.001	1.03 (1.01-1.04) <0.001	1.00 (0.99-1.02) 0.73	1.05 (1.03-1.06) <0.001	1.03 (1.01-1.04) <0.001	1.01 (0.99-1.03) 0.31
E/e'	1.15 (1.10-1.20) <0.001	1.07 (1.01-1.13) 0.02	0.99 (0.94-1.05) 0.82	1.16 (1.11-1.21) <0.001	1.12 (1.05-1.19) <0.001	1.08 (1.01-1.14) 0.02

Model 1: univariable analysis; model 2: adjusted for age, sex, eGFR, diabetes mellitus, prevalent CVD, smoking, diastolic BP, cholesterol; model 3: additional adjusted for NT-proBNP (for analyses with echocardiographic parameters) or systolic LV function (for analyses with NT-proBNP).