CSN Annual Meeting 2014
April 23-27th, 2014
Vancouver, British Columbia

51st ERA-EDTA Congress 2014
May 31st – June 3rd 2014
Amsterdam, Netherlands

NEWER BIOMARKERS IMPROVE PREDICTION OF CARDIOVASCULAR EVENTS IN CKD PATIENTS - CANPREDDICT STUDY OUTCOMES

Adeera Levin[1], Claudio Rigatto[2], Francois Madore[3], Brendan J. Barrett[4], Norman Muirhead[5], Daniel Holmes[6], Catherine Clase[7], Mila Tang[8], Ognjenka Djurdjev[8]
on behalf of Canadian Investigators

[1]University of British Columbia, Vancouver, BC, Canada, [2]University of Manitoba, Winnipeg, MB, Canada, [3]Université de Montréal, Montréal, QC, Canada, [4]Memorial University of Newfoundland, St. John's, NL, Canada, [5]Western University, London, ON, Canada, [6]St. Paul's Hospital, Vancouver, BC, Canada, [7]McMaster University, Hamilton, ON, Canada [8]BC Renal Agency, Vancouver, BC, Canada

BACKGROUND: Cardiovascular risk stratification/prediction tools for chronic kidney disease (CKD) population have poor performance. Better prediction models are needed.

OBJECTIVE: To assess if the inclusion of newer biomarkers (NBM) improves risk prediction of cardiovascular events in the CKD cohort, over and above conventional clinical, demographic and laboratory predictors.

METHODS: Pan-Canadian multicentre prospective cohort study of 2544 referred CKD patients in nephrology centres. NBM tests at baseline included asymmetric dimethylarginine, high sensitivity C-reactive protein (hsCRP), interleukin-6, pro-brain natriuretic peptide (NT-proBNP), troponin I, transforming growth factor beta-1, cystatin C and fibroblast growth factor-23 (FGF-23). Main Outcome: Adjudicated ischemic and congestive cardiovascular events within 3-years. We compared discrimination and classification of proportional hazards models based on conventional predictors (base model) vs. models based on combination of conventional and NBM predictors.

RESULTS: Mean age of the cohort is 68yrs; median eGFR was 28 ml/min/1.73m^2 (20%<20ml/min, 38% 20-29ml/min and 41% 30-45mil/min); 62% were male. There were 409 cardiovascular events during 3-yr follow up, resulting in the rate of 63.9 events per 1000-person years (95%CI:58.0-70.4). Base model, base+NBM models and model based on 'best' predictors are presented in table, including the associated measures of discrimination (*C*-statistic) and net reclassification index (NRI). After adjusting for conventional predictors, NT-proBNP yields the highest improvement in cardiovascular events prediction (NRI=13.8;95%CI: 5.1-2.1), followed by Troponin I (NRI=11.8; 95%CI:1.7-19.4) and Cystatin C (NRI=4.5;95%CI: 0.5-11.0).

CONCLUSIONS: Inclusion of NBMs in risk prediction models significantly improves precision of cardiovascular outcomes prediction. The NBM-based risk prediction models need to be validated in similar cohorts.

Variables	Base Model	Base + NBM	'Best' Model
Age (per 5 yrs.)	1.17 (1.11-1.23)	1.10 (1.04-1.16)	1.11 (1.05-1.16)
Male Sex	1.16 (0.93-1.44)	1.03 (0.83-1.29)	
Diabetes	1.41 (1.14-1.74)	1.35 (1.09-1.66)	1.35 (1.10-1.66)
History of CVD			
Ischemic HD	1.91 (1.45-2.51)	1.40 (1.05-1.85)	1.40 (1.05-1.85)
Congestive HF	1.59 (1.13-2.23)	0.93 (0.65-1.33)	0.92 (0.64-1.31)
Both IHD & CHF	3.18 (2.46-4.10)	1.64 (1.24-2.18)	1.62 (1.23-2.15)
eGFR (per 5 mL/min/1.73m^2)	0.89 (0.84-0.95)	1.01 (0.93-1.09)	
log ACR	1.06 (1.01-1.12)	0.99 (0.94-1.05)	
Albumin (per 1 g/L)	0.93 (0.91-0.95)	0.95 (0.93-0.97)	0.95 (0.93-0.97)
Hemoglobin (per 5 g/L)	0.95 (0.91-0.98)	0.97 (0.93-1.01)	0.97 (0.94-1.00)
Phosphate (per 0.1 mmol/L)	1.04 (1.02-1.10)	1.03 (0.99-1.08)	
Bicarbonate (per 3g/L)	1.15 (1.05-1.26)	1.10 (1.01-1.20)	1.09 (1.00-1.19)
Cystatin C (per 1SD)		1.16 (1.03-1.32)	1.13 (1.01-1.26)
log NT-ProBNP		1.41 (1.27-1.56)	1.39 (1.26-1.54)
Troponin I (> LLD)		1.70 (1.34-2.16)	1.68 (1.33-2.13)
log hsCRP		1.10 (1.01-1.19)	1.09 (1.01-1.18)
log FGF-23			1.14 (0.99 -1.32)
C statistic	76.1 (74.0-78.7)	80.2 (78.6-82.9)	80.1 (78.5-82.7)
NRI, %		19.6 (14.4-25.9)	19.8 (6.7-25.7)