



Correction to: Novel biomarkers of diabetic kidney disease: current status and potential clinical application

Federica Barutta¹ · Stefania Bellini¹ · Silvia Canepa¹ · Marilena Durazzo¹ · Gabriella Gruden¹

© Springer-Verlag Italia S.r.l., part of Springer Nature 2021

Correction to: *Acta Diabetologica*
<https://doi.org/10.1007/s00592-020-01656-9>

Authors would like to update the incorrect reference in Table 1. For instance number 8 is number 11; number 9 is 12; number 10 is 13.....

The original article has been corrected.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

The original article can be found online at <https://doi.org/10.1007/s00592-020-01656-9>.

✉ Federica Barutta
federica.barutta@unito.it

¹ Department of Medical Sciences, University of Turin, Turin, Italy

Table 1. Main studies on biomarkers and DKD

Biomarker	Type of DM	n	Baseline Characteristics	FU (yrs)	Biofluid	Outcomes	Main Results HR (95% CI),	Adjustments	Ref
TNFR1/R2	T2	410	eGFR >30 – N, Mi, Ma	12	Plasma	Progression to ESRD	TNFR1: HR 4.7 (1.3–17.0) TNFR2: HR 2.2 (0.7–6.4)	HbA1c, AER, eGFR	[11]
TNFR1/R2	T2	193	m-GFR ≥60 (89%) – N, Mi, Ma	9.5	Serum	Progression to ESRD	TNFR1: HR 1.6 (1.1–2.2) TNFR2: HR 1.7 (1.2–2.3)	Age, gender, HbA1c, BP, m-GFR, ACR	[12]
TNFR2	T1	349	eGFR >30 Ma	7	Serum	Time to ESRD	-34.6% (-39.3, -29.8)	HbA1c, AER, eGFR	[15]
TNFR1	T1	429	Ma	9.4	Plasma	Progression to ESRD	HR: 0.01 (0.00–0.01)*	eGFR, HbA1c, T1DM duration	[14]
TNFR1	T2	194 T2 259 No-DM	eGFR >15	3	Serum	≥30% eGFR decline, RRT, renal death	T2DM: 3.8 (1.1–12.8) No-DM: 0.2 (0.03–1.0)	Age, sex, eGFR, ACR	[13]
TNFR1/R2	T1	628	eGFR >60 – N and Mi	12	Serum	Stage 3 CKD	TNFR1: 2.5 (1.4–4.7) TNFR2: 3.0 (1.7–5.5)	HbA1c, AER, eGFR	[17]
TNFR1/R2	T1	534	eGFR >60 – N and Mi	8	Serum	eGFR loss ≥3.3%/year	OR: 2.9 (1.9–4.5)	Age, UA, BP HbA1c, microalbuminuria	[16]
Uric acid	T1	263	N	18.1	Serum	Ma	HR: 2.9 (1.2–6.8)	HbA1c, BP, AER, serum creatinine and cholesterol	[21]
Uric acid	T1	324	N	6	Serum	Mi or ma	OR: 1.8 (1.2–2.8)	HbA1c, AER	[22]
Uric acid	T1	355	eGFR >60 – High N and Mi	6	Serum	eGFR decline >3.3% per year	HR: 1.4 (1.1–1.8)	Sex, ACR, HbA1c, eGFR	[23]
Uric acid	T2	1449	eGFR >60 without Ma	5	Serum	Incident CKD	HR: 1.20 (1.03–1.57)	Age, sex, BMI, smoking, ΔHbA1c, eGFR, DM duration, ΔBP, AER, TxT	[24]
Uric acid	T1	13964	eGFR >60 – N	4	Serum	(1) eGFR <60 (2) eGFR <60 and Ma	(1) RRR 2.61 (1.98–3.42); (2) RRR 1.54 (1.13–2.09) 5th vs. 11th quartile	Multiple	[25]
Uric acid	T1	3895	N, Mi, and Ma	7	Serum	(1) Albuminuria progression (2) Change of CKD stage: (a) CKD 1/2 → 3/4/5; (b) 1/2/3 → 4/5; (c) 3 → 4/5	(1) NS (2) (a): 2.79 (1.75–4.46) (b): 3.04 (1.92–4.81) (c): 2.23 (1.22–4.08)	Age, sex, BP, TG, HbA1c, DM duration eGFR	[26]
Uric acid	T1	670	N, Mi, and Ma	5–6	Serum	(1) eGFR decline ≥30% (2) CV events (3) Mortality	(1) HR: 3.18 (1.71–5.93) (2) HR: 2.25 (1.20–4.21) (3) HR: 2.58 (1.12–5.90)	Sex, age, BMI, HDL cholesterol, smoking, HbA1c; BP, AER eGFR, TxT	[27]
Copeptin	T2	3101	Mi and Ma	6	Plasma	2 x sCr, ESRD	HR: 2.97 (1.56–6.14) Macro: HR 3.33 (1.37–9.96)	Age, sex, study treatment, AER eGFR	[29]

Table 1. continued

Biomarker	Type of DM	n	Baseline Characteristics	FU (yrs)	Biofluid	Outcomes	Main Results HR (95% CI),	Adjustments	Ref
Copeptin	T1	736	N, Mi, Ma GENEDIAB (n=218) GEN-5 ESIS (n=518)	10.2 5	Plasma	ESRD	HR: 1.7 (1.2–2.6)	Sex, age, DM duration, [30] eGFR, ACR, BP, BMI, HbA1c, TxT, cohort.	[30]
Copeptin	T2	756	eGFR >60 (N, Mi, Ma)	6.5	Plasma	Change in eGFR	Std β –0.09; p=0.03	Age, sex, eGFR, AER, [31] SBP, cholesterol, HbA1c, smoking, BMI, DM duration	[31]
Copeptin	T2	161	Newly diagnosed T2DM eGFR 109.1 $\pm$ 36.9	12	Plasma	CKD stage 3	1.74 (0.98–3.09)	Age, sex, smoking, BMI, SBP, HbA1c, TxT, DM duration, eGFR, CV disease	[32]
KIM-1	T1	124 107	Ma Ma CKD 1–3	10 12.5	Plasma	eGFR slope ESRD	P<0.001 in multiple regression analysis P<0.01 Cox regression for KIM-1 above and below 97 pg/ml	P<0.001 in multiple regression analysis P<0.01 Cox regression for KIM-1 above and below 97 pg/ml	[35]
KIM-1	T1	462	N, Mi eGFR >60	8	Plasma	(1) eGFR decline $\geq$ 3.3% per year (2) CKD $\geq$ 3 stage	(1) OR: 1.3 (1.2–1.5) (2) HR: 1.3 (1.1–1.4)	HbA1c, TxT, SBP, AER, eGFR, TNFR1	[36]
KIM-1 TNFR-1 EGF/MCP-1	T2	1032	N, Mi eGFR >60	7.4	Plasma Urine	eGFR decline >30% in 5 yrs	TNFR1: 1.42 (1.1–1.8) KIM-1: 1.41 (1.1–1.7) uEGF/MCP-1: 0.6 (0.5; 0.7)	HbA1c, ACR, BMI, SBP, eGFR, ACR, and other biomarkers	[39]
EGF/MCP-1	T2	83	Mi/Ma or eGFR <60	2	Urine	eGFR decline $\geq$ 25% per year	HR: 0.97 (0.94–0.99)	Age, sex, BP, GFR, ACR, TxT	[38]
EGF/MCP-1	T1/T2	208	Mi/Ma or eGFR <60	1.4	Urine	ESRD or eGFR decline >30%	uEGF/MCP-1: 0.8 (0.7–0.9)	Age, gender, BP, eGFR, ACR	[37]

*modelled as a -0.5 fractional polynomial. N: normoalbuminuria; Mi: Microalbuminuria; Ma: macroalbuminuria; sCr: serum creatinine, BP: blood pressure; ACR: albumin/creatinine ratio; AER: albumin excretion rate; BMI: body mass index; HbA1c: glycated hemoglobin; eGFR: estimated glomerular filtration rate; m-GFR: measured glomerular filtration rate; UA: uric acid; TxT: treatment; TG: total triglycerides; OD: odds ratio; HD: hazard ratio.