

The relationship between systolic blood pressure and risk of cardiovascular disease or all-cause of mortality in patients with type 2 diabetes and renal impairment in the presence or absence of albuminuria

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Aim

To evaluate the relationship between systolic blood pressure and risk of cardiovascular disease and all-cause mortality in patients with type 2 diabetes and renal impairment in presence or absence of albuminuria.

Patients and methods

17 945 patients with type 2 diabetes and renal impairment (eGFR < 60ml/min/1.73m² according to MDRD), were included. 5917 patients with albuminuria and 12 028 without were followed for mean 5.3 years.

Blood pressure values were the mean of all reported values from baseline to the first event or end of study.

Time-dependent cox models adjusting for CV risk factors and ongoing medication were used to assess the relationship between BP level and CVEs or all-cause mortality.

Table 1. Baseline clinical and biochemical characteristics in patients with type 2 diabetes and renal impairment with and without albuminuria. (n=17 945).

Variables	Normoalbuminuria (n = 12 028)	Albuminuria (n = 5917)
Age (yrs)	75±9	75±9
Diabetes duration (yrs)	9±8	12±8
HbA1c (mmol/mol)	52±11	56±13
SBP (mmHg)	140±18	143 ± 20
DBP (mmHg)	74±10	75 ± 10
eGFR (ml/min/1.73m ²)	49±8	45±11
Male (%)	36	59
Smokers (%)	7	10
Any retinopathy (%)	28	48
History of CVE (%)	29	37
History of CHF (%)	13	18
Antihypertensive (%)	86	89
Microalbuminuria (%)	-	60
Macroalbuminuria (%)	-	40

Means±SD or frequencies (%) are given. SBP; systolic blood pressure, DBP; diastolic blood pressure, eGFR; estimated glomerular filtration rate, according to MDRD, CVEs; cardiovascular disease (a composite of coronary heart disease and/or stroke), CHF; chronic heart failure, Microalbuminuria; urinary albumin excretion rate 20–200 mg/min. Macroalbuminuria; albumin excretion rate > 200 mg/min. eGFR

Table 2. Hazard ratios of CVEs and all-cause mortality by deciles of mean systolic blood pressure in patients with T2D and renal impairment with and without albuminuria.

SBP interval (mmHg)	CVE (n=6185) HR 95% CI		All-cause mortality (n=5326) HR 95% CI	
	Normo Albuminuria (n=3650)	Albuminuria (n=2535)	Normo Albuminuria (n=2984)	Albuminuria (n=2342)
Mean ±SD				
80-120 (114±7)	2.43 (2.08, 2.83)	2.15 (1.77, 2.62)	2.50 (2.10, 2.94)	2.27 (1.86, 2.77)
120-127 (124±2)	1.36 (1.15, 1.60)	1.39 (1.13, 1.71)	1.48 (1.23, 1.78)	1.32 (1.06, 1.63)
128-131 (130±1)	1.53 (1.30, 1.80)	1.80 (1.47, 2.19)	1.57 (1.32, 1.89)	1.47 (1.19, 1.82)
131-135 (134±1)	1.45 (1.23, 1.71)	1.23 (1.00, 1.52)	1.27 (1.06, 1.53)	0.95 (1.06, 1.46)
135-139 (137±1)	1 (ref group)	1 (ref group)	1 (ref group)	1 (ref group)
139-142 (140±1)	1.74 (1.48, 2.05)	1.84 (1.50, 2.25)	1.60 (1.34, 1.91)	1.63 (1.33, 2.00)
142-146 (144±1)	1.50 (1.27, 1.77)	1.26 (1.02, 1.56)	1.26 (1.05, 1.53)	1.20 (0.97, 1.50)
146-151 (149±2)	2.43 (2.08, 2.83)	1.85 (1.52, 2.26)	1.33 (1.11, 1.61)	1.26 (1.02, 1.55)
151-160 (155±3)	1.36 (1.15, 1.60)	1.46 (1.19, 1.80)	1.27 (1.05, 1.52)	1.27 (1.03, 1.57)
160-230 (169±10)	1.53 (1.30, 1.80)	2.91 (2.41, 3.51)	2.13 (1.79, 2.54)	1.90 (1.56, 2.30)

SBP; systolic blood pressure, blood pressures are means±SD; *Hazard ratios (HR) with 95% confidence interval adjusted for age, diabetes duration, gender, HbA1c, BMI, smoking, LDL-cholesterol, triglycerides/HDL, history of cardiovascular disease (CVD), previous history of congestive heart failure (CHF), antihypertensive and lipid-lowering treatment. ^bsystolic blood pressure 135-139 mmHg was defined as the reference group.

Results

Patients with albuminuria had a significantly longer diabetes duration, worse glycemic control, higher mean SBP but lower mean DBP,

Patients with albuminuria were more often men, smokers and more often had more often history of CVD, CHF and retinopathy at baseline.

Patients in the lowest (80-120 mmHg) and the highest SBP (160-230 mmHg) interval had the highest risk of CVEs and all-cause mortality.

In the lowest SBP interval (80-120 mmHg) no major difference in HRs were found between patients with and without albuminuria.

In the highest blood pressure interval (160-230 mmHg) patients with albuminuria had a higher HR for CVEs and patients with normoalbuminuria a slightly higher HR for all-cause mortality.

Conclusions

- A U-shaped relationship was found between systolic blood pressure and risk of cardiovascular events and all cause of mortality in patients with type 2 diabetes and renal impairment with and without albuminuria.
- Both in presence or absence of albuminuria a systolic blood pressure level of 135-139 mm Hg confined the lowest risk of cardiovascular events and all-cause of mortality.

For further details see also Afghahi H et al Blood pressure level and risk of major cardiovascular events and all-cause of mortality in patients with type 2 diabetes and renal impairment: an observational study from the Swedish National Diabetes Register. Diabetologia. 2015 Mar 14. [Epub ahead of print]. For additional information, please contact Hanri Afghahi henri.afghahi@vgregion.se