Macro-albuminuria as marker for worsening arterial stiffness in CKD stage 1-2 hypertensive non-diabetic patients

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Objetives:

Albuminuria is recognized as a marker of vascular dysfunction. Pulse wave velocity (PWV) and augmentation index (AIx) are early markers of atherosclerotic vascular changes and aortic stiffness (AS) in chronic kidney disease (CKD). We aimed to access the association between albuminuria levels and arterial stiffness in CKD stages 1-2 non-diabetic patients with hypertension treated with renin angiotensin blockade (RAS) agents plus other hypertensives when needed

Patients and Methods:

One hundred fifteen patients with median age 52 years, (68% males) were consequently enrolled in the study. For each patient, we recorded: gender, age, BMI, peripheral systolic blood pressure (pSBP), peripheral diastolic blood pressure (pDBP), peripheral pulse pressure (pPP), central systolic blood pressure (cSBP), central diastolic blood pressure (cDBP), central pulse pressure (cPP), hematocrit, hemoglobin, CRP, lipids, calcium, phosphorus, parathormone, serum albumin, and 24 h urine albumin excretion.
According to 24-hour urine albumin collection, patients were classified as those with micro (≤300 mg/d) and those with macro (>300 mg/d) albuminuria(Macro-Alb). We considered AS indices (PWV c-f and AIx) as outcomes. We explored potential correlation between macro-albuminuria and AS indices using a multiple linear regression model

Table 1: Characteristics of hypertensive CKD stage 1-2 non diabetic patients

Patients (n=115)	Microalbuminuria	Macroalbuminuria	p value
Age(years),mean±SD	51.5±17	53±12	NS
Sex(M/F) (n)	39/19	37/20	NS
BMI(Kg/m^2) , mean±SD	27.5±9	30±11	<0.03
pSBP (mmHg)	140±12	135±14	NS
pDBP (mmHg)	84±13	81±10	NS
pPP (mmHg)	55±10	59±16	NS
cSBP (mmHg)	131±15	124±18	NS
cDBP (mmHg)	85±7	84±10	NS
cPP (mmHg)	46±12	43±17	NS
AIx (%)	15.5±8.8	26±13.2	<0.006
PWVc-f (m/sec)	7.9±2.1	9±1.7	<0.02

Table 2: Multiple linear regression analysis for PWV

	β	t	p
Macro-Alb	0.822	2.055	<0.04
Age	0.842	1.359	NS
BMI	0,545	0.829	NS
pSBP	0.40	2.931	<0.004
pDBP	0.150	1.330	NS
pPP	0.132	1.309	NS
cSBP	0.789	0.395	NS
cDBP	0.190	1.767	NS
cPP	0.302	0.270	NS

Table 3: Multiple linear regression analysis for AIx

	β	t	p
Macro-alb	0.822	2.055	<0.04
Age	0.096	1.060	NS
BMI	0.060	0.739	NS
pSBP	0.171	0.987	NS
pDBP	0.297	2.781	<0.007
pPP	0.104	1.289	NS
cSBP	0.362	2.065	<0.04
cDBP	0.255	1.673	NS
cPP	0.143	1.263	NS

Results:

− Fifty-eight patients were included in the micro group and 57 in the macro. Blood pressure measurements of the patients were 138±14/82±1.3 mmHg (systolic /diastolic). There were no significant differences in age, sex, and BP measurements between the two groups.
− Patients with macro-albuminuria had higher BMI (p<0.03), CRP (p<0.001), and fibrinogen levels (p<0.02) than patients with micro-albuminuria *(Table 1)*
− In multivariate linear regression analysis, macro-albuminuria (β=0.822, p<0.04) and pSBP (β=0.40, p<0.004), remained independent determinants of increased PWV c-f *(Table 2)*
− In addition, macro-albuminuria (0.822, <0.04), pDBP (0.297, p<0.007) and cSBP (0.362, <0.04), remained independent determinants of increased AIx *(Table 3)*. No other variables were significantly correlated to AS indices

Conclusions:

These findings demonstrate an independent association between AS indices and macroalbuminuria in non-diabetic, hypertensive patients with CKD stages 1-2 treated with RAS blockers

References:

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