THE ASSOCIATION OF ALBUMINURIA WITH ARTERIAL STIFFNESS IN A RURAL CHINESE POPULATION

Zhang Guojuan[1], Liang Qiaojing[1], Liang Yuanbo[2], Huang Wen[1], Wang Ningli[2]
[1]Department of Nephrology,Beijing Tongren Hospital,Capital Medical University,China
[2]Department of Ophthalmology,Beijing Tongren Hospital,Capital Medical University,China

INTRODUCTION AND AIMS: Several studies indicate that microalbuminuria is associated with increased arterial stiffness, but these studies are relatively small. And data concerning Chinese population are absent. So we investigated the association of microalbuminuria with arterial stiffness in a population in Northern China.

METHODS: The data come from Handan Eye Study(HES).A total of 3694 individuals living in rural area of Northern China were included. They were divided into those with or without albuminuria according to albumin/creatinin ratio (ACR≥30mg/gcr is considered as albuminuria). Brachial-ankle pulse wave velocity (baPWV) and other 19 factors were compared between the two groups. Then the population were divided into four groups according to baPWV values (baPWV < 1400,1400≤baPWV < 1800,1800≤baPWV < 2200 , baPWV≥2200), urine albumin and other 19 factors were compared within the four groups. Finally, multiple logistic regression were used to evaluate the association of albuminuria with baPWV.

RESULTS: A total of 610 individuals had albuminuria more than 30mg/gcr (16.5%). The baPWV in albuminuria group was significantly higher than those without albuminuria. Other factors such as age, gender, blood pressure, BMI, CRP, blood lipid, uric acid were also differed significantly between the two groups. More people had hypertension or diabetes in the albuninuria group(table 1). As the value of baPWV increased, the ACR increased and eGFR decreased. Other factors also differed significantly within the four groups of baPWV(table 2).Multiple logistic regression indicated that age, diabetes, serum creatinin, hypertension and baPWV might be the risk factors of increased ACR, the OR(95%CI) was1.018 (1.008~1.028) ,1.348 (1.094~1.660) ,1.548 (1.137~2.107) , 0.986(0.978~0.004), and1.0004(1.000~1.001) separately.

CONCLUSIONS: Microalbuminuria was associated with baPWV in our study population. But the association was fairly weak.

Table 1.Characteristic of individuals with normal or elevated ACR

	Control group	*Albuminuria group*	*P value*
N	3070	610	
Age(y)	50.96 ± 10.80	54.56 ± 10.49	0.000
Female(N,%)	1638(53.4%)	367(60.2%)	0.001
SBP (mmHg)	137.99±20.98	146.61±24.10	0.000
DBP (mmHg)	77.37±11.89	80.28±12.93	0.000
MAP (mmHg)	97.58±13.61	102.39±15.07	0.000
PP	60.62±15.85	66.34±18.72	0.000
BMI	24.73±3.70	24.96±3.85	0.228
WHR	0.90±0.05	0.91±0.05	0.004
Serum creatinine(umol/L)	71.62±10.52	70.74±11.73	0.048
HDL-C (mmol/L)	1.27 ± 0.29	1.29 ± 0.30	0.197
LDL-C(mmol/L)	2.70±0.65	2.84±0.66	0.000
TC(mmol/L)	4.59±0.94	4.80±1.01	0.000
TG(mmol/L)	1.50±1.04	1.65±1.26	0.002
HCRP	0.82(0.37,2.13)	1.05(0.41,2.63)	0.002
URIC	256.03±64.70	251.16±64.17	0.120
eGFR-MDRD(ml/min*1.73 m^2)	92.51(84.06,101.53)	90.95(81.37,99.54)	0.002
PWV	1556.49± 347.48	1689.44±430.60	0.000
Hypertension	1444(47.0%)	379(62.1%)	0.000
Diabetes Mellitus	172(5.6%)	65(10.7%)	0.000
Stroke	76(2.5%)	11(1.8%)	0.199

Table 2.Characteristic of individuals with different baPWV categories

	baPWV < 1400	1400≤ baPWV < 1800	1800≤ baPWV < 2200	baPWV≥ 2200	P value
N	1268	1603	599	224	
Age(y)	44.86±8.97	52.18±9.16	59.73±9.16	64.14±8.55	0.000
Female(N,%)	725(57.2%)	831(51.8%)	324(54.1%)	135(60.3%)	0.010
SBP (mmHg)	123.92±13.64	140.86±17.03	157.07±19.22	171.08±23.36	0.000
DBP (mmHg)	72.18±9.63	79.35±11.38	82.74±12.94	86.19±14.55	0.000
MAP (mmHg)	89.43±10.05	99.86±11.87	107.51±13.23	114.49±15.65	0.000
PP	51.74±10.16	61.51±13.76	74.33±16.40	84.89±18.75	0.000
BMI	24.41±3.55	25.00±3.78	24.82±3.73	24.78±4.23	0.000
WHR	0.89±0.05	0.91±0.05	0.92±0.06	0.91±0.04	0.000
Serum creatinine(umol/L)	69.95±10.00	72.03±10.64	73.01±12.84	73.99±11.33	0.000-
HDL-C (mmol/L)	1.29±0.30	1.27±0.28	1.25±0.28	1.32±0.36	0.009
LDL-C(mmol/L)	2.52±0.61	2.78±0.64	2.88±0.64	3.02±0.69	0.000
TC(mmol/L)	4.34±0.90	4.72±0.93	4.82±0.95	5.08±1.03	0.000
TG(mmol/L)	1.33±0.90	1.61±1.19	1.67±1.08	1.73±1.12	0.000
HCRP	0.58(0.28 , 1.42)	0.93 (0.41,2.41)	1.30(0.59,2.74)	1.59(0.77 , 3.50)	0.000
URIC	245.94±63.49	259.41±62.70	261.50±67.14	264.52±72.34	0.000
ACR	7.42 (3.82 , 15.74)	9.15 (4.13,19.53)	10.27(4.51,26.24)	16.35 (6.97 , 35.44)	0.000
eGFR-MDRD (ml/min*1.73 m^2)	96.50(88.35,105.05)	91.48 (83.26,99.95)	87.81(79.63,97.20)	82.50(74.95,92.84)	0.000
Hypertension	202(15.9%)	906(56.5%)	512(85.5%)	214(95.5%)	0.000
Diabetes Mellitus	29(2.3%)	105(6.6%)	67(11.2%)	40(17.9%)	0.000
Stroke	6(0.5%)	38(2.4%)	24(4.0%)	20(8.9%)	0.000

Table 3.Multiple logistic regression of risk factors of elevated ACR

Risk factor	β	S.E.	WaldX^2	P value	OR (95%CI)
Age	0.018	0.005	12.655	0.000	1.018(1.008~1.028)
Diabetic mellitus	0.437	0.157	7.723	0.005	1.348(1.094~1.660)
Serum creatinine	-0.014	0.004	10.919	0.001	1.548(1.137~2.107)
hypertension	0.298	0.106	7.870	0.005	0.986(0.978~0.004)
baPWV	0.0004	0.0001	6.881	0.009	1.0004(1.000~1.001)
constant	-2.426	0.358	45.937	0.000	

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