

FACTORS ASSOCIATED WITH ANNUAL CHANGE IN PULSE WAVE VELOCITY IN DIALYSIS PATIENTS: RESULTS OF 1 YEAR FOLLOW-UP

Zeynep Kendi Çelebi¹, Sim Kutlay¹, Sule Sengul¹, Gokhan Nergizoglu¹, Sehsuvar Erturk¹, Kenan Ates¹
Ankara University School of Medicine Nephrology Department¹,



INTRODUCTION:

Pulse wave velocity (PWV) is a non-invasive, simple method to evaluate the arterial stiffness. Both peritoneal and hemodialysis patients have increased risk for cardiovascular diseases and many studies are showing that increased arterial stiffness is associated with increased cardiovascular risk.

In this study, we aimed to evaluate the relationship of biochemical parameters and demographic characteristics between annual change of PWV.

METHOD:

Eighty-one patients (46 hemodialysis (HD) - 35 peritoneal dialysis (PD)) included to the study. Baseline and first year measurement of central blood pressures and PWV was made with SphygmoCor system (Atcor Medical, Sydney Australia). Hydration status was determined with Body Composition Monitor (BCM, Fresenius Medical Care, Germany). One year average of biochemical parameters were obtained and compared in baseline and first year, then the annual change in PWV is calculated and correlations between clinical and biochemical parameters are examined.

RESULTS

The baseline demographic features, clinical and biochemical parameters are presented in Table 1 and Table 2.

Table 1: Demographic features of patients

Parameters	
Age (years, mean±SD)	53±13
Gender (F/M)	44/37
Diabetes Mellitus (+/-)	15/66 (18%)
Hypertension (+/-)	63/18 (87%)
Cardiovascular Disease (+/-)	26/55 (32%)
Cerebrovascular Disease (+/-)	7/74 (9%)
Smoking History (+/-)	28/53 (34%)
Dialysis Vintage (months, mean±SD)	67±65
Antihypertensive use (+/-)	55/26 (67%)
Phosphate binder use (Ca containing or not)	58/23 (71%)

Baseline PWV was higher in diabetic patients, than glomerular diseases ($p=0,04$) and chronic tubulointerstitial nephritis ($p<0,001$) and was correlated with baseline BUN ($p=0,001$, $r=0,378$), triglycerides ($p=0,011$, $r=0,280$), VLDL cholesterol ($p=0,007$, $r=0,303$) positively and with calcium ($p<0,001$, $r=-0,420$), PTH ($p=0,006$, $r=-0,302$) HDL cholesterol ($p=0,030$, $r=-0,242$), Kt/v ($p<0,001$, $r=-0,399$) negatively. We can not show any relationship between PWV and hydration status at follow up.

In peritoneal dialysis patients PWV was correlated positively with BUN at baseline ($p=0,003$, $r=0,482$). In hemodialysis patients PWV was correlated with BUN ($p=0,039$, $r=0,305$) and total cholesterol ($p=0,039$, $r=0,306$) positively and with calcium ($p<0,001$, $r=-0,519$), PTH ($p=0,036$, $r=-0,310$) and Kt/v ($p=0,007$, $r=-0,391$) negatively.

At follow-up 53% patients in HD ($n=24$) and 44% patients in PD ($n=15$) had an increase in PWV. In total population 49% of patients ($n=39$) had an increase in PWV and hypertension ($p=0,048$) and calcium containing phosphate binder use ($p=0,038$) were associated with an annual increase in PWV. Increase in PTH was an independent risk factor for patients taking renal replacement therapy ($p=0,01$, OR=1,002, CI 95%=1,001-1,004). Longer dialysis vintage ($p=0,03$ OR=1,029 CI 95%=1,003-1,056) and higher LDL cholesterol ($p=0,01$ OR=1,053 CI 95%=1,012-1,094) were independent risk factors for peritoneal dialysis patients that increase PWV, but higher albumine levels were protective from increasing PWV in this group ($p=0,017$ OR=0,006 CI 95%=0,000-0,398). After logistic regression we show that increase in PTH is the only independent risk factor for hemodialysis patients increasing PWV ($p=0,016$, OR=1,004, CI 95%=1,001-1,008).

CONCLUSION:

We can not show the expected increase in PWV, this could be explained that our dialysis population is younger than usual, but we show that especially patients with higher PTH levels or using calcium containing phosphate binders are under increased risk for cardiovascular diseases and these patient's treatment should be cautiously regulated.

Table 2: Baseline and first year PWV and biochemical parameters.

Parameters	Baseline	First Year	P
PWV (m/s)	9,59±3,56	9,54±3,25	0,798
OH (L)	0,18±1,7	0,04±1,7	0,775
BUN (mg/dL)	55±14	58±14	0,009*
Albumine (g/dL)	3,8±0,38	3,8±0,34	0,651
CRP (mg/dL)	9,6±9	10±10	0,273
Kt/V	1,94±0,40	1,95±0,46	0,782
Hb (G/DL)	10,9±1,5	11,2±1,3	0,004*
Calcium (mg/dL)	8,6±0,5	8,8±1,1	0,01*
Phosphorus (mg/dL)	5,1±0,9	5,3±0,9	0,065
PTH	429±293	491±437	0,035*
LDL	113±41	104±38	0,016*

* Statistically significant.

