

PULSE WAVE VELOCITY PREDICTS CARDIOVASCULAR DISEASE IN OLDER PATIENTS WITH CHRONIC KIDNEY DISEASE.

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Age and systolic blood pressure (SBP) are powerful predictors of incident and prevalent cardiovascular disease. Additionally, chronic kidney disease (CKD) has been recognized to confer additional CVD risk, though the mechanisms are unclear. Recent findings from the AASK trial indicate that kidney disease continues to progress and that incident CVD continues to occur despite good SBP control. In light of recent findings that aortic stiffness (measured as aortic pulse wave velocity [PWV]) is a powerful predictor of mortality independent of SBP in end-stage renal disease (ESRD) we hypothesized that that PWV may be an important independent indicator of vascular disease when compared with SBP in CKD before ESRD.

The University of Pennsylvania along with 11 other clinical centers in the USA has recruited a cohort of CKD patients with co-morbidities similar to those seen in ESRD (“CRIC study”; www.cricstudy.org) in whom we measured SBP and aortic PWV and gathered medical history pertinent to any CVD (Stroke, MI or reperfusion intervention, heart failure, or peripheral arterial disease) at the two year follow up visit.

1604 subjects with CKD (mean estimated GFR 43 mL/min/1.73m²) had a prevalence of CVD of 40%. When divided into the prespecified targeted enrollment age ranges of 21-44, 45-64, and 65-74 years at entry, increasing PWV tertiles within these ranges were consistently associated with an increasing prevalence of any CVD with stronger associations in the older groups (45-64, $p < 0.001$; 65-74 $p < 0.001$) compared with the younger (21-44; $p = 0.04$) group. In a multivariable logistic regression we found that age and PWV but not SBP were independently predictive of prevalent CVD (Table). The prevalence of hypertension (by self report or by medication history consistent with hypertension) was 86%, with virtually all CKD patients aware of their diagnosis (98%) and on treatment for it (mean SBP in the CRIC cohort was 128 ± 22 mm Hg (S.D.))

Multivariable Logistic Regression: Outcome measure <i>Any Cardiovascular Disease</i>					
Parameter	Degrees Freedom	Estimate	Standard Err	Wald Chi-Square	Chi Sq - p
Intercept	1	-4.5007	0.4719	90.9568	<0.0001
Age	1	0.0474	0.00611	60.1553	<0.0001
Systolic BP	1	-0/00057	0.00264	0.0463	0.8297
Aortic PWV	1	0.0954	0.0173	30.2710	<0.0001

Summary: Our data suggests that despite excellent SBP control on antihypertensive medication, aortic PWV remains strongly and independently predictive of prevalent CVD. Aortic PWV could be an important means to identify CKD patients with good SBP control who remain at high residual CVD risk.