

AGE-DEPENDENT IMPACT OF PULSE WAVE VELOCITY AS A PREDICTOR FOR MORTALITY IN PATIENTS UNDERGOING HEMODIALYSIS



Julia Kerschbaum¹, Clemens P. Schwarz², Michael Rudnicki¹, Gert Mayer¹

¹Medical University Innsbruck, Department for Internal Medicine IV – Nephrology and Hypertension, Innsbruck, Austria

²Praxis Dr. Schwarz, Eggelsberg, Austria



BACKGROUND

The incidence of cardiovascular events is increased even in patients with early stages of renal disease and excessive mortality and morbidity has been reported after the initiation of renal replacement therapy. Aortic media calcification is a major determinant of arterial stiffness, which can be assessed reliably by the noninvasive measurement of aortic pulse wave velocity (aPWV). aPWV is recognized as a strong and independent predictor for all-cause and cardiovascular mortality in patients with end-stage renal disease (ESRD) undergoing hemodialysis.

METHODS

aPWV was measured in 75 patients treated in two dialysis units in Austria in 2008. Laboratory and clinical data were collected at this time. Follow-up of 72 patients could be assessed 7.5 years later.

Statistical analysis included two-tailed Mann-Whitney U-test for metric variables and Chi-Square-Test for nominal variables, respectively. Kaplan-Meier curves, univariate and multivariate Cox regression (using the forward Wald method) were performed to identify risk factors for all-cause death and the association of aPWV with age and the risk for all-cause death.

RESULTS

After 7.5 years, 47 out of 72 patients (65.3 %) had died.

Log-rank test revealed a significantly higher risk for mortality in patients with aPWV > 11.3 m/s (Figure 1).

However, after adjusting for several known risk factors, only previous cerebral event (HR 2.8; 95 % CI 1.5-5.2; p<0.001) was significantly associated with the risk for all-cause death. Detailed analysis showed that aPWV in fact was associated with a significant risk of death in patients ≤ 65 years (HR 2.6; 95 % CI 1.1-6.2; p=0.038) whereas in patients > 65 years, previous cerebral event, but not aPWV, was significantly associated with the risk of death (HR 2.5; 95 % CI 1.1-5.7; p=0.038).

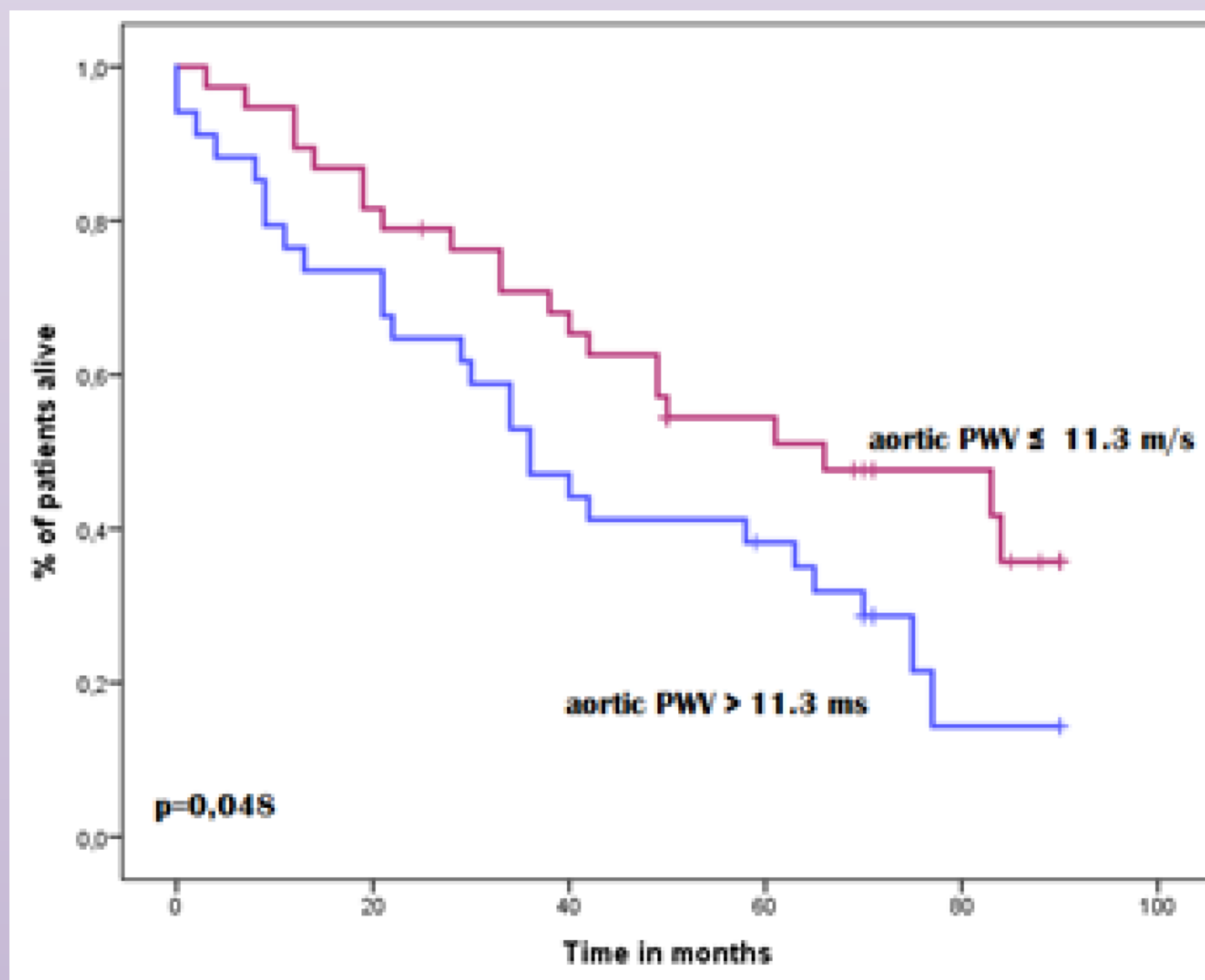


Figure 1: aPWV and the risk for all-cause mortality

DISCUSSION

Stiffening of the central arteries begins to increase in early renal dysfunction and progresses through all stages of CKD as glomerular filtration deteriorates. Associations between measures of increased central arterial stiffness and comorbid conditions in ESRD populations have previously been reported. In a former study by our group, patient age was the most important single parameter predicting aPWV. This association has also been described by others in the general population. aPWV is considered a strong risk marker and possibly even a risk factor for all-cause and cardiovascular mortality in hemodialysis patients, with higher aPWV values indicating shorter survival.

CONCLUSION

To our knowledge, this is the first study with long-term follow-up which reveals that the impact of pulse wave velocity as a predictor for all-cause mortality in patients on hemodialysis is age-dependent.

