INTRODUCTION AND AIMS: Ambulatory blood pressure monitoring (ABPM) is recommended as the gold standard for the diagnosis of hypertension in the general population and in dialysis patients. However, evidence on ABPM and risk prediction is still limited in hemodialysis patients. Reported results are not fully aligned. Thus, the goal of this study was to investigate the association between ambulatory blood pressure (BP) and mortality in a large cohort of hemodialysis patients. Furthermore, this study attempted to assess a possible effect of cardiac diseases on this nonlinear association.

METHODS: Within the ISAR study cohort (‘rISk strAtification in endstage Renal disea”e”), 344 hemodialysis patients underwent 24h ABPM on the dialysis day. All-cause and cardiovascular mortality served as endpoints in the study. Risk prediction was performed using linear and nonlinear Cox regression to determine the associations between BP and study endpoints.
RESULTS: 115 patients died, of which 47 due to cardiovascular reasons during a mean follow-up of 37.6 (17.5 SD) months. In the whole cohort, systolic BP (SBP) and pulse pressure (PP) showed a nonlinear U-shaped association with all-cause and cardiovascular mortality (see Figure exemplarily for cardiovascular mortality). In linear sub-group analysis, SBP and PP were independent risk predictors and inversely related to all-cause (SBP HR=0.97, p<0.001; PP HR=0.97; p=0.03) and cardiovascular (SBP HR=0.95, p<0.001; PP HR=0.93; p=0.003) mortality in patients with atrial fibrillation or heart failure. In patients without atrial fibrillation or heart failure, these associations were to the opposite directions. SBP and PP were independent risk predictors for cardiovascular (SBP HR=1.03, p=0.02; PP HR=1.06, p<0.001), and just PP for all-cause (SBP HR=1.01, p=0.30; PP HR=1.04, p<0.001) mortality.

CONCLUSIONS: This study provides strong evidence for the U-shaped association of peripheral ambulatory SBP or PP with all-cause and cardiovascular mortality in hemodialysis patients. Furthermore, the findings of this study suggest that these nonlinear effects can be explained by the underlying patients’ cardiac disease.

![Figure: Nonlinear association of systolic blood pressure (A) and pulse pressure (B) with cardiovascular mortality related to the median value.](image-url)