Central aortic pulse pressure (CAPP) can be assessed noninvasively based on radial tonometry and may potentially be a predictor of clinical outcomes in hemodialysis patients. A total of 106 HD patients (mean age 63 years, 61.3% men, 35.8% diabetics, 45.3% smokers) underwent applanation tonometry (SphygmoCor system, Atcor, Australia). The primary endpoint was all-cause mortality. The patients were divided into two groups based on CAPP values: lower CAPP group (0-54 mmHg, n=57) and higher CAPP group (55-112 mmHg, n=49). During the follow-up period, 12 (16.4%) patients in the lower CAPP group and 24 (46.4%) patients in the higher CAPP group died. A Kaplan-Meier curve (Figure 1) showed that the survival rate in the higher CAPP group was significantly lower than that in the lower CAPP group (Log Rank test: p<0.002) turned out to be an independent predictor of death.

INTRODUCTION AND AIMS: Pulmonary hypertension is an indicator of increased mortality and morbidity in dialysis patients. Pulmonary artery (PA) pressures can be directly measured by a device using induction energy (CardioMEMS). The use of the information provided by the device in guiding therapy of heart failure patients reduces hospital admissions and improves quality of life. We investigated whether the system is applicable in hemodialysis patients.

METHODS: The sensor was implanted to PA of six hemodialysis patients during right heart catheterization. PA pressures were measured from each patient prior to, during and after 10-12 dialysis sessions. The PA pressures for each dialysis phase were averaged over all the dialysis sessions for each patient.

RESULTS: Pre-dialysis systolic PA pressures were 36.6 ± 10.4 mmHg (mean ± SD). The pressures decreased during the dialysis by 8.6 ± 6.2 mmHg (p=0.02). The pressures partially recovered at the very end of the dialysis with the return of extracorporeal blood volume from the dialysis system to the patient. The system produced highly reproducible results. Mean ultrafiltration (UF) volume was 1991 ± 505 mL.

CONCLUSIONS: This is the first study to demonstrate the feasibility of the CardioMEMS system in hemodialysis patients. Systolic PA pressures decreased during hemodialysis consistently with UF, suggesting that PA changes during dialysis are mainly dependent on fluid status. Larger studies should be launched to investigate whether the system would motivate patients for better fluid balance, or whether the system can be used to guide dialysis sessions to optimize PA pressures and whether the novel approach would decrease morbidity, hospitalizations and improve quality of life. Particularly, patients with instable hemodynamics during dialysis might benefit of improved control of PA pressures.