



## PREDICTORS OF ATRIAL CONDUCTION DELAY IN HEMODIALYSIS AND PERITONEAL DIALYSIS PATIENTS: THE ROLE OF INFLAMMATION

Kultigin Turkmen<sup>1</sup>, Levent Demirtas<sup>2</sup>, Emin M. Akbas<sup>3</sup>, Mutlu Buyuklu<sup>4</sup>, Eftal Bakirci<sup>4</sup>, Ismail Kocuyigit<sup>5</sup>, Ozcan Orscelik<sup>6</sup>, Ibrahim Guney<sup>7</sup>, <sup>1</sup>Konya Necmettin Erbakan University, Nephrology, Konya, TURKEY, <sup>2</sup>Erzincan University, Internal Medicine, Erzincan, TURKEY, <sup>3</sup>Erzincan University, Endocrinology, Erzincan, TURKEY, <sup>4</sup>Erzincan University, Cardiology, Erzincan, TURKEY, <sup>5</sup>Erciyes University, Nephrology, Kayseri, TURKEY, <sup>6</sup>Erciyes University, Cardiology, Kayseri, TURKEY, <sup>7</sup>Meram Training and Research Hospital, Nephrology, Konya, TURKEY.

### INTRODUCTION AND AIMS:

Atrial electromechanical delay (AEMD) times were considered independent predictors of cardiovascular morbidity in general population (1,2). Data is scant about these parameters in end-stage renal disease (ESRD) patients receiving hemodialysis (HD) and peritoneal dialysis (PD) (3). We aimed to evaluate predictors of AEMD times in HD and PD patients.

### METHODS:

44 healthy individuals, 62 HD and 50 PD patients were enrolled in the study. Echocardiography performed before mid-week dialysis session for HD patients and on admission for PD patients. Data were expressed as mean  $\pm$  SD. Spearman test was used to assess linear associations. Multivariate regression analyses were undertaken to determine independent associations among left intra-atrial EMD time and other variables. Age, dialysis vintage, systolic blood pressure, serum albumin, uric acid, potassium, ultrafiltration volume, neutrophil-to-lymphocyte ratio, LA passive emptying volume, being diabetic and LA active emptying volume were entered into the regression model as independent variables and left inter-atrial EMD time was entered as a dependent variable.

### RESULTS:

Demographic, clinic, and laboratory features of healthy individuals, HD and PD patients were depicted in Table 1. Left intra-atrial-AEMD times were significantly longer in HD patients compared to PD patients. We found positive correlations between left intra-atrial time and LAaEV, LAVmax, LAVp and NLR ( $r:0.28, p:0.002; r:0.27, p:0.003; r:0.27, p:0.003; r:0.22, p:0.03$ , respectively) and negative correlations with albumin, uric-acid and potassium ( $r:-0.24, p:0.008; r:-0.19, p:0.04; r:0.26, p:0.037$ , respectively). NLR, as a marker of inflammation, was found to be an independent predictor of AEMD time in this population.

**Table 1. Demographic, clinic, and laboratory features of healthy individuals, HD and PD patients**

Parameters	Healthy Individuals (n=44)	HD patients (n = 62)	PD Patients (n = 50)	P value Between Three Groups	P value Between HD vs PD
Age (years)	52 $\pm$ 8	54 $\pm$ 11	52 $\pm$ 10	0.11	0.94
Female/Male	18/26	29/33	18/32	0.51	0.33
BMI (kg/m <sup>2</sup> )	26.3 $\pm$ 4.9	23.9 $\pm$ 1.9	23.8 $\pm$ 2.0	<0.0001	0.92
SBP (mmHg)	124 $\pm$ 15	126 $\pm$ 20	135 $\pm$ 13	0.002	0.004
DBP (mmHg)	74 $\pm$ 13	77 $\pm$ 10	83 $\pm$ 9	0.001	0.003
Glucose (mg/dL)	94 $\pm$ 9	111 $\pm$ 45	117 $\pm$ 46	0.12	0.41
Urea (mg/dL)	26 $\pm$ 7	158 $\pm$ 39	59 $\pm$ 14	<0.0001	<0.0001
Creatinine (mg/dL)	0.7 $\pm$ 0.1	9.0 $\pm$ 2.7	7.7 $\pm$ 3.3	<0.0001	0.01
Calcium (mg/dL)	8.9 $\pm$ 0.6	8.1 $\pm$ 0.9	9.3 $\pm$ 1.0	<0.0001	<0.0001
Phosphorus (mg/dL)	2.9 $\pm$ 0.2	5.4 $\pm$ 1.6	4.3 $\pm$ 1.0	<0.0001	<0.0001
Albumin (g/dL)	4.3 $\pm$ 0.1	3.4 $\pm$ 0.3	2.9 $\pm$ 0.4	<0.0001	<0.0001
Uric Acid (mg/dL)	3.9 $\pm$ 0.6	6.2 $\pm$ 1.2	5.3 $\pm$ 1.2	<0.0001	<0.0001
Left intra-atrial Time (msn)	12.2 $\pm$ 5.1	15.3 $\pm$ 10.0	17.8 $\pm$ 7.6	0.004	0.018
Right intra-atrial Time (msn)	7.5 $\pm$ 4.1	13.0 $\pm$ 9.8	12.4 $\pm$ 6.0	0.001	0.40
Inter-atrial time (msn)	19.5 $\pm$ 7.9	27.6 $\pm$ 13.4	30.4 $\pm$ 10.0	<0.0001	0.12
Triglyceride (mg/dL)	120 $\pm$ 67	213 $\pm$ 131	116 $\pm$ 77	<0.0001	0.98
NLR	1.2 $\pm$ 0.3	2.6 $\pm$ 1.5	2.9 $\pm$ 1.3	<0.0001	0.17

### CONCLUSIONS:

There were four main findings of the present study. First, AEMD times were significantly prolonged in HD and PD patients compared to healthy subjects. Second, left intra-atrial EMD times were significantly longer in PD patients compared to HD patients. Third, in the bivariate correlation analysis, we found positive correlations between left intra-atrial EMD time and LA active emptying volume, LAVmax, LAVp and NLR and negative correlations with serum albumin, uric acid and potassium levels in this population. Fourth, only NLR was found to be an independent predictor of AEMD time in this population. To our knowledge, this is the first study that compare the parameters regarding AEMD times in healthy subjects and ESRD patients receiving hemodialysis and peritoneal dialysis.

### REFERENCES

1. Levey AS, Beto JA, Coronado BE, Eknayan G, Foley RN, Kasiske BL, et al. Controlling the epidemic of cardiovascular disease in chronic renal disease: what do we know? What do we need to learn? Where do we go from here? National Kidney Foundation Task Force on Cardiovascular Disease. Am J Kidney Dis. 1998 Nov;32(5):853-906.
2. Bayes de Luna A, Cladellas M, Oter R, Torner P, Guindo J, Marti V, et al. Interatrial conduction block and retrograde activation of the left atrium and paroxysmal supraventricular tachyarrhythmia. Eur Heart J. 1988 Oct;9(10):1112-8.
3. Karavelioglu Y, Karapinar H, Ozkurt S, Sarikaya S, Kucukdurmaz Z, Arisoy A, et al. Evaluation of atrial electromechanical coupling times in hemodialysis patients. Echocardiography. 2014 Apr;31(4):449-55.

