



## PREDICTORS OF LEFT ATRIAL MECHANICAL FUNCTIONS IN END STAGE RENAL DISEASE PATIENTS

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### INTRODUCTION AND AIMS:

Left atrium (LA) mechanical functions 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 the predictors LA mechanical functions and associated risk factors 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. Lineer regression analyses were undertaken to determine independent associations among LA active emptying volume and other variables. Inter-atrial and left intra-atrial conduction time, systolic blood pressure, ultrafiltration volume, dialysis vintage, being diabetic, serum calcium, uric acid, albumin, age, NLR were entered into the regression model as independent variables and LA active emptying volume (LAaeV) was entered as a dependent variable.

### RESULTS:

Table 1 shows the demographic, laboratory and echocardiographic features of study population. Left atrium active emptying volume, as a measure of LA mechanical function was positively correlated with inter-atrial time, left intra-atrial time, systolic and diastolic BP, calcium, neutrophil-to-lymphocyte ratio (NLR)( $r:0.22, p:0.016; r:0.28, p:0.002; r:0.34, p<0.001; r:0.35, p<0.001; r:0.37, p<0.001; r:0.46, p<0.001$ , respectively) and negatively correlated with serum uric acid ( $r:-0.31, p:0.013$ ) in ESRD patients.

Advanced age, decreased serum albumin and increased NLR were found to be independent predictors of LAaeV in ESRD patients (Table 2).

### REFERENCES

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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
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
Uric Acid (mg/dL)	3.9 $\pm$ 0.6	6.2 $\pm$ 1.2	5.3 $\pm$ 1.2	<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
NLR	1.2 $\pm$ 0.3	2.6 $\pm$ 1.5	2.9 $\pm$ 1.3	<0.0001	0.17
Left atrium passive emptying volume (mL/m <sup>2</sup> )	7.7 $\pm$ 2.5	13.7 $\pm$ 11.7	16.3 $\pm$ 7.2	<0.0001	0.018
Left atrium active emptying volume (mL/m <sup>2</sup> )	6.5 $\pm$ 2.4	11.2 $\pm$ 9.9	17.0 $\pm$ 8.8	<0.0001	0.001

Table 2. Predictors of Left Atrium Active Emptying Volume in ESRD Patients

Parameters	Standardized Beta	t value	p value	95% Confident Interval
NLR	0.328	3.154	0.003	0.773-3.461
Albumin	0.353	3.344	0.001	3.547-14,133
Age	0.283	2.649	0.010	0.058-0.418
$r^2=0.440$				
adjusted $r^2=0.401$				
Model $p<0.0001$				

### CONCLUSIONS:

There were four main findings of the present study. First, LA mechanical functions including LAV<sub>max</sub>, LAV<sub>p</sub>, LA active and passive emptying volumes were found to be higher in HD and PD patients compared to healthy subjects.

Second, LA active and passive emptying volumes were found to be higher in PD patients compared to HD patients.

Third, in the bivariate correlation analysis, LA active emptying volume was positively correlated with inter-atrial and left intra-atrial EMD times, systolic and diastolic BP, serum calcium, low-density lipoprotein levels, and neutrophil-to-lymphocyte ratio whereas negatively correlated with serum uric acid in ESRD patients.

Fourth, advanced age, decreased serum albumin (as a marker of malnutrition) and increased NLR (as a marker of inflammation) were found to be independent predictors of left atrium active emptying volume in this population.

To our knowledge, this is the first study that compare the parameters regarding LA mechanical functions in healthy subjects and ESRD patients receiving hemodialysis and peritoneal dialysis.

