

# THE EFFECTS OF A SINGLE DIALYSIS SESSION ON ATRIAL ELECTROMECHANICAL CONDUCTION TIMES AND FUNCTIONS

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## OBJECTIVES

Atrial fibrillation (AF) is the most common arrhythmia in hemodialysis (HD) patients (1). The prevalence of AF is estimated about 7-23.4% (2,3) in end stage renal disease (ESRD) patients which is 10-20 folds higher than in the general population (4,5). Abnormalities in atrial electromechanical delay (EMD) times and mechanical functions are considered as independent predictors of atrial fibrillation. However, to date, effects of a single hemodialysis (HD) session and acute volume-preload changes on atrial-EMD functions have not been investigated by Tissue Doppler Echocardiography (TDE). The aim of the present study was to evaluate atrial-EMD times and mechanical functions in HD patients.

## METHODS

Thirty-five non-diabetic, normotensive HD patients and 35 healthy control subjects were enrolled in the study. Patients with diabetes mellitus, hypertension (blood pressure  $\geq 140/90$  mm Hg), cardiac arrhythmia such as atrial flutter or fibrillation (current presence or a previous history), valvular heart diseases, heart failure, coronary artery disease, chronic obstructive pulmonary disease, a history of cardiac surgery or implanted device, sick sinus syndrome and active infectious disease were excluded from the study. Standard and TDE performed before mid-week dialysis session for hemodialysis group and on admission for control group.

## RESULTS

Age, sex, smoking status, heart rate, lipid profiles, glucose and thyroid stimulant hormone levels, systolic and diastolic blood pressure, and left ventricular (LV) end-systolic diameter were similar between two groups. Interatrial, left intratrial and right intraatrial EMD intervals were significantly longer in HD group compared to controls ( $32.2 \pm 6.5$  vs  $17.4 \pm 3.8$ ,  $p < 0.01$ ;  $22.8 \pm 7.2$  vs  $11.6 \pm 3.4$ ,  $p = 0.013$ ;  $14.4 \pm 5.3$  vs  $7.2 \pm 1.7$ ,  $p = 0.036$ ; respectively). Both left and right intraatrial and interatrial EMD intervals significantly reduced on after HD session compared to before HD period ( $22.8 \pm 7.2$  vs  $17.3 \pm 8.3$ ,  $p = 0.013$ ;  $14.4 \pm 5.3$  vs  $11.7 \pm 4.8$ ,  $p = 0.036$ ; and  $32.2 \pm 6.5$  vs  $26.1 \pm 6.5$ ,  $p < 0.01$ , respectively). We found a correlation between UF volume and the difference of inter and left intraatrial EMD interval measurements before and after HD period. (Pearson correlation test,  $r = 0.814$ ,  $p < 0.01$ ;  $r = 0.502$ ,  $p = 0.011$ ; respectively). However, no such correlation found between right intra atrial EMD difference and UF volume. (Pearson correlation test,  $r = -0.318$ ,  $p = 0.290$ ). LA-passive emptying volume, ultrafiltration volume, LV-E/E' ratio, and Vp were independent predictors of interatrial-EMD.

## CONCLUSIONS

Results of the present study reflects not only negative effects of structural remodeling, which has been mentioned in previous studies in literature, but also negative effects of electrical remodeling. This study demonstrated that, LA passive emptying volume, LA volume before atrial systole, ultrafiltration volume, and LV E/E' ratio are independent predictors of interatrial EMD. Prolonged inter- and intra-atrial EMD intervals should be the underlying pathophysiological factors of increased rate of AF in patients undergoing HD. Further studies evaluating the value of our findings in predicting the occurrence of atrial fibrillation will be needed to establish the clinical significance of our results.

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