

Invited Editorial / Davetli Editöryal Yorum

Which dialysis modality is better for the heart?

Hangi diyaliz yöntemi kalp için daha iyidir?

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Patients with chronic kidney disease (CKD) have an increased risk of cardiovascular morbidity and mortality.^[1,2] Traditional risk factors, such as diabetes mellitus, hypertension, and dyslipidemia are more common in patients with CKD than in the general population.^[3-5] Non-traditional risk factors, such as malnutrition, inflammation, oxidative stress, hyperphosphatemia, anemia, and volume overload are common, and are associated with increased cardiovascular risk in CKD patients.^[6] Moreover, this risk increases significantly as the patients approach end-stage renal disease (ESRD).^[7] As a result, cardiovascular problems are a major cause of death in patients undergoing dialysis.

Volume overload develops early during the course of CKD and may contribute significantly to the development of cardiovascular disease. Hung et al.^[8] investigated the volume status of 338 patients with stages 3-5 CKD with a multifrequency bioimpedance device and found that only 48% were euvoletic. Patients with volume overload were found to use significantly more antihypertensive medications and diuretics, but had a higher systolic blood pressure and a greater arterial stiffness than patients without volume overload. In a more recent study, Zoccali et al.^[9] investigated the relationship between chronic fluid overload and mortality in 39,566 patients on incident hemodialysis (HD) in a large dialysis network in 26 countries using whole-body bioimpedance spectroscopy to assess fluid status. They found that chronic exposure to fluid

overload was a strong risk factor for death across discrete blood pressure categories.

Studies comparing patient survival and the use of HD and peritoneal dialysis (PD) have reported conflicting results. Some studies demonstrated no difference in survival rate

between patients treated with HD and patients treated with PD, while other studies showed better results in favor of either HD or PD.^[10-12] Therefore, it is still not clear which dialysis modality is better for the cardiovascular status of the patients. These conflicting results may be due, at least in part, to the heterogeneous characteristics of the CKD patients.

There are very few studies that have investigated right ventricular (RV) function in patients undergoing chronic dialysis treatment. In this issue of the Archives of the Turkish Society of Cardiology, Demirci et al.^[13] report the findings of their study, which investigated RV function in PD patients. They included 36 PD patients and 37 controls in this cross-sectional study. Echocardiography, including tissue Doppler imaging (TDI) of the right ventricle, was performed in all of the subjects. The mean age of the patient population was 52.2 years and the prevalence of diabetes

Abbreviation:

AV	Arteriovenous
CKD	Chronic kidney disease
ECW/TBW	Extracellular water to total body water
ESRD	End-stage renal disease
HD	Hemodialysis
LA	Left atrial
LV	Left ventricular
PD	Peritoneal dialysis
RA	Right atrial
RV	Right ventricular
TDI	Tissue Doppler imaging

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was 40.9%. There was no difference between groups with respect to right atrial (RA) diameter, RA area, RV fractional area change, myocardial performance index, or pulmonary vascular resistance, but the tricuspid annular plane systolic excursion values were significantly lower in PD patients. On the other hand, the left ventricle (LV) end-systolic dimension, LV mass index, left atrial (LA) diameter, posterior wall and interventricular septum thicknesses were significantly greater in the PD group compared with the control group. They concluded that RV systolic and diastolic functions, as estimated by using conventional Doppler and TDI echocardiography, were preserved in patients undergoing PD.

It is difficult to interpret the above-mentioned interesting findings of the study by Demirci et al.^[13] The major limitation of this study is the small number of the patients. Moreover, the lack of a control group of chronic HD patients precludes the comparison of two dialysis modalities. It may be speculated that the presence of arteriovenous (AV) fistula may have detrimental effects on the heart in patients undergoing chronic HD therapy. Paneni et al.^[14] reported that HD increased the risk of RV dysfunction, particularly in the presence of brachial AV fistula, compared with PD treatment. As suggested by Demirci et al.^[13] in their manuscript, the absence of AV fistula may be the reason for the preservation of RV function in their PD patients.

Volume overload is associated with increased cardiovascular morbidity and mortality in patients with ESRD.^[9,15] Thus, volume control is one of the major targets in the follow-up of dialysis patients. However, hypervolemia is reported to be a common finding both in HD and in PD patients.^[16–18] In a retrospective study of 72 asymptomatic HD patients and 115 asymptomatic PD patients conducted by Papakrivopoulou et al.,^[18] multi-frequency bioimpedance measurements of extracellular water to total body water (ECW/TBW) were performed. The ECW/TBW value was greater than the normal reference range in 30% of PD patients, 28% of patients before HD, and 20% of patients after HD. Therefore, volume status should also be investigated even in asymptomatic dialysis patients, whether they are being treated with HD or PD.

A randomized, controlled trial investigating ventricular function and volume status in a large number of patients undergoing HD and PD is needed in order

to understand which modality of dialysis is better for the heart.

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