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INVITED COMMENTARY

Atrial changes after kidney transplant: what diagnostic and therapeutic perspectives?

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Kidney transplant represents the gold standard therapy for patients with end-stage kidney disease (ESKD), mostly due to the significant reduction in cardiovascular events and mortality compared to patients in hemodialysis.

On the other hand, cardiovascular disease still represents the leading cause of death for kidney transplant recipients with higher risk of ischemic attacks and mortality in the first year after transplant [1].

In kidney transplant recipients, the principal cardiovascular disease is represented by coronary artery disease (CAD), left ventricular hypertrophy (LVH), and peripheral vascular disease (PVD). In most of kidney transplant recipients, LVH usually regress after kidney transplantation and persistent LVH is associated with an increased risk of allograft failure [2]. Moreover, after kidney transplant there is reduction of both CAD and PVD progression compared to the hemodialysis patients: It was assumed that the regression of the uremic status may play a fundamental role. The progression of vascular calcification after kidney transplant is seams regulated from several factors, above all metabolic, genetic, and pharmacological factors; recently also the immune system has been supposed to have a central role in the pathogenesis and progression of cardiovascular disease in kidney transplant recipients [3,4].

Recent studies have focused the attention on atrial pathology: In subjects with ESKD is reported an higher percentage of death presumably related to arrhythmic cardiac events; after kidney transplantation, the incidence is not reduced: Left atrial (LA) diameter at time of transplantation was shown to predict cardiovascular and overall mortality in kidney transplant recipients [5–7].

In this issue, Regele *et al.* [8], in a retrospective study, considering a cohort of 414 kidney transplant recipients, for a median follow-up of 8 years, reported a significant regression of left ventricular (LV) diameter but, on the other hand, a significant progression of the diameters of LA, right atrium (RA), and right ventricle (RV). Considering a subgroups regarding LA diameter measurement, reduction in LA diameter was associated with reduced risk of mortality. Younger age of kidney transplant recipients resulted to be the only significant independent predictor of LA regression. Peritoneal dialysis and the number of antihypertensive drugs used were correlated with a positive trend, but not a statistical significance, with LA diameter regression.

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The presented data significantly contribute to our knowledge on morphological mutations of heart before and after kidney transplant, clearly showing how atrium and ventricle structural conditions can evolve in a different way after transplant. Unfortunately, reduction in LA diameter, that has been significantly correlated with a reduction post-transplant mortality, has been verified only in a minority of patients.

Considering the younger age as the only significant independent predictor of LA diameter regression and, moreover, considering the correlation of LA diameter regression with uncontrolled systolic blood pressure and peritoneal dialysis, it may be hypothesized that lower myocytes fibrocytic changes are present in these patients compared to whom with no regression of LA diameter and that volume status may be a fundamental factor in the genesis of the disease.

It would be of great interesting to evaluate the serum atrial natriuretic peptide (ANP) levels in this setting: ANP is an hormone released from atrial myocytes in response to volume overload or rise of ventricular blood pressure. It acts acutely to reduce plasma volume by at least three mechanisms: increasing renal excretion of salt and water, vasodilatation, and vascular permeability [9,10].

Several cardiovascular disorders are strongly correlated with higher excretion of natriuretic peptides and higher activation of genes related; for this reason, serum ANP level is used in as a marker of myocites hypertrophic response in *in vitro* and *in vivo* experiments [11]. Serum natriuretic peptide (NP) value was showed to rise in patients with acute coronary syndrome or in exercise-induced myocardial ischemia, but without ventricular dilation [12]. Moreover, ANP levels were also found to decrease after catheter ablation in patients with atrial fibrillation and pretreatment ANP levels predict left atrium reverse remodeling after procedure [13].

In patients with chronic kidney disease (CKD), serum ANP levels are directly proportional to CKD stages. It remains unclear whether elevated serum natriuretic peptide (NP) levels in CKD patients effectively reflect the activation of NP system and effects on target organ. Elevated NP levels may indeed reflect a reduced ability to activate NP system and affect target organ in CKD.

New therapies, based on possible cardio-protective effects of NPs, with the aim to rebalance neuroendocrine abnormalities in heart failure (HF), are under development.

Current therapeutic strategies trying to increase NPs include the synthesis of NPs or agonists to increase NP bioactivity and inhibition of neutral endopeptidase (NEP) to reduce NP breakdown [12].

Future studies may elucidate the predictive role of natriuretic peptides in morphological heart changes after kidney transplant. The possible role of new drugs acting on NPs to reduce cardiovascular mortality in kidney transplant recipients is a new interesting research field.

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Conflicts of interest

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