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Improvement of Severe Congestive Heart Failure and Valvular Involvement After Living Kidney Transplantation

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Introduction: Patients with end stage renal disease (ESRD) who have advanced congestive heart failure (CHF) are not usually referred for kidney transplantation because of the high risk of surgical or cardiac complications.
Case Presentation: We reported three patients on different renal replacement therapies who had severe CHF with ejection fraction (EF) of 15% to 20% and valvular heart involvement. Two patients were on maintenance hemodialysis and one patient was on ambulatory peritoneal dialysis. After successful kidney transplantation, the significant improvement in left ventricular function (increased EF) and valvular involvement was seen.
Discussion: Kidney transplantation could be considered as the best choice for CHF and valvular involvement in patients with ESRD on renal replacement therapies.

Keywords: Kidney Transplantation; Kidney Failure, Chronic; Heart Failure

1. Introduction

Recently, clinical and epidemiological studies have demonstrated that cardiovascular disease is a frequent complication of advanced chronic kidney disease and the leading cause of death in patients on renal replacement therapy (1-3). Atherosclerosis and heart failure are still highly prevalent among patients on renal replacement therapy, and the latter is an important predictor of mortality; however, some studies indicated that the risk of these morbidities has declined (3-6).

2. Case Presentation

2.1. Cases 1 and 2

Two men with ESRD, one with 28 and the other with 32 year of age, were admitted to our department with a one-month history of dyspnea, high blood pressure, and anemia. According to kidney biopsy findings, the etiology of ESRD in both patients was IgA nephropathy which had progressed to rapidly progressive glomerulonephritis (RPGN). The first patient had been on maintenance hemodialysis and the second one had been on continuous ambulatory peritoneal dialysis. The symptoms of heart failure presented in our patients and gradually exacerbated so that they had dyspnea at rest position (New York Heart Association [NYHA] class IV) at time of presentation. Blood pressure of 160/90 and 170/100 mm Hg were detected in the first and second patients, respectively. Hemoglobin levels were 9.4 and 8.7 mg/dL in the first and second patients, respectively. Chest X-ray (CXR) in both patients revealed increased cardiothoracic ratio. Echocardiographic findings in both patients demonstrated left ventricular ejection fractions (LVEF) of 15% to 20%, mitral regurgitation (MR), tricuspid regurgitation (TR), and severe cardiomegaly. The medical management of the congestive heart failure (CHF) was begun. Seven months later and after obtaining informed consent from patients and approval from cardiology consultation, living kidney transplantation was performed for both patients. After successful kidney transplantation, the CHF symptoms gradually decreased and seven months after the operation, NYHA functional class improved (i.e. regressed to class I or II) and cardiothoracic ratio decreased. Moreover, echocardiographic findings showed considerable

Implication for health policy/practice/research/medical education:
The present study would be crucial for medical physiologist.

improvements in LVEF (EF increased to 45%-50%), MR, TR, and mild cardiomegaly. Their medications after transplantation included cyclosporine, prednisolone, and mycophenolate mofetil.

2.2. Case 3

A 28-year-old man with ESRD was referred to our department with symptoms of severe CHF. According to kidney biopsy findings, the etiology of ESRD was membranous glomerulonephritis that progressed to RPGN. He was on maintenance hemodialysis nine hours thrice a week for three years. His blood pressure was 150/90 mm Hg. Hemoglobin level was 8.4 mg/dL. CXR revealed increased cardiothoracic ratio. Echocardiographic findings showed LVEF of about 15%, MR, TR, and severe cardiomegaly. After primary evaluations, the time of hemodialysis was increased to 16 hours four times a week in addition to three hours of ultrafiltration in each section. However, signs or symptoms of CHF did not change after six months. Then, the patient underwent continuous ambulatory peritoneal dialysis. Symptoms decreased and echocardiographic findings improved; i.e. LVEF of 35%, MR, TR, and moderate cardiomegaly. One year later, living kidney transplantation was performed. One year after transplantation, symptoms resolved and cardiothoracic ratio in CXR decreased; the echocardiographic findings showed considerable improvements in LVEF (EF raised to 55%), without MR or TR. The posttransplantation medications of our patients were cyclosporine, prednisolone, and mycophenolate mofetil.

3. Discussion

Data indicated that prevalence rate of CHF in patients on dialysis is 31% to 41% (7-9). Patients with CHF and ESRD on dialysis have lower survival; the median survival of patients with and without CHF at baseline are 36 and 62 months, respectively (7). Important risk factors of CHF in patients with ESRD on dialysis include diabetes mellitus, hypertension, hypoalbuminemia, renal anemia, and comorbid conditions such as coronary artery disease (9, 10). Valvular heart disease also accounts for considerable morbidity and some mortality among patients with ESRD (11). The most common involved valves in ESRD are mitral and aortic valves that usually manifested as mitral annular calcification and aortic valve calcification, respectively (12).

Kidney transplantation is the treatment of choice for most patients with ESRD and some studies have suggested dialysis as a bridge therapy to renal transplantation (13, 14) Some studies have demonstrated improvement of left ventricular function and decrease in left ventricular hypertrophy after kidney transplantation in patients with mild to moderate CHF (15-18). Wali et al. evaluated the impact of transplant on 103 patients with CHF and EF of less than 40%; they showed a significant improvement posttransplantation as the mean LVEF increased from 31.6% to 47.2% and to 52.2% at six and 12 months posttransplantation, respectively (19). In our report, we also showed a significant improvement in patients with ESRD and advanced CHF. Although, many studies showed improvement in left ventricular function, only few studies have suggested improvement in valvular heart disease after kidney transplantation, especially severe multivalvular involvement with severe CHF (15).

Here, we reported three patients with different renal replacement therapies. They had severe CHF and valvular heart involvement. After successful kidney transplantation, a significant improvement in left ventricular function as well as valvular disease was seen. In conclusion, renal transplantation in patients with ESRD with advanced systolic heart failure and valvular involvement can significantly improve left ventricular function, functional class of CHF, and valvular involvement. Therefore, renal transplantation should not be considered as an absolute obstacle in patients with ESRD and even it could be considered as a choice for CHF and valvular involvement in some patients with ESRD on other renal replacement therapies.

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Authors' Contribution

All authors participated equally in the study.

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