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Clinical and Echocardiographic Profile of Renal Transplant Recipients

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Abstract: ***Introduction: Cardiovascular diseases tend to be the major cause of mortality and morbidity in patients with kidney disease. The persistence of cardiac structural abnormalities after renal transplant and its effect on patient outcomes is largely unknown. This study intends to study the echocardiographic profile of renal transplant recipients. Methodology: This is a cross sectional observational study conducted in a tertiary care centre in south Indian Population. A Total of 400 Patients were selected after analyzing for appropriate inclusion and exclusion criteria. Comprehensive clinical and echocardiograhic evaluation was carried out in all patients and results were tabulated and analyzed using standard statistical methods. Results: Mean age of the study population was 36.23± 8.86 years. 76% were males and 34% were females. Mean BMI was 24.13±3.96 Kg/m^2. 82.66% were hypertensive and the remaining were normotensive Mean Systolic blood pressure was 135.70±14.95 mmHg. Mean Diastolic blood pressure was 86.29±9.00 mmHg. Mean Left ventricular mass index calculated by area length method was 119.33±39.18 gram/m^2. 27.7% of the participants had Left ventricular mass index of more than 110 gram/m^2. Mean LV ejection fraction was 66 ± 6%. 53% patients had diastolic dysfunction. Conclusion: Cardiac dysfunction, mainly Left Ventricular hypertrophy and diastolic dysfunction persists even after renal transplantation in majority of patients. Careful search and treatment of cardiac abnormalities shall be a part of standard management of renal transplant recipients.***

1. Introduction

The burden of non-communicable diseases has increased exponentially over the past decade and they account for majority of the health-related morbidity and mortality worldwide. Renal origin of cardiovascular disease (CVD) was first suggested by Richard Bright as early as in 1836. CKD per se is considered to be a coronary artery disease (CAD) equivalent and in fact persons with early stages of CKD are more likely to die of CVDs than progress to end-stage renal disease (ESRD).[1.] Kidney transplantation is the gold-standard treatment for many patients with end-stage renal disease. Renal transplant recipients (RTRs) remain at an increased risk of fatal and non-fatal cardiovascular (CV) events compared to the general population, although rates are lower than those patients on maintenance haemodialysis. Death with a functioning graft is most commonly due to cardiovascular disease (CVD) and therefore this remains an important therapeutic target to prevent graft failure. [2-4] Left Ventricular Hypertrophy (LVH) is present in 36% to 41% of patients with hypertension and is a risk factor of death . In population with resistant hypertension it is even more common . Hypertension is thought of as the strongest and most prevalent risk factor of heart failure with preserved ejection fraction. After kidney transplantation in some patients, regression of left ventricle mass was observed [5], but LVH was still present in 65%of non-diabetic patients 12 months after transplantation. LVH was more common in patients with glomerular filtration rate (GFR) <60 mL/min/m2 and was associated with worse course of cardiovascular disease[6]. Also, higher mortality due to cardiovascular diseases in renal transplantation patients compared with the general population was associated with LVH. The prevalence of LVH increases with age. Detection of left ventricular dysfunction with Doppler echocardiography is one of the diagnostic criteria. Because there are no evidence-based therapies reducing mortality, the best approach relies on alleviation of risk factors[7]. The aim of this study was to evaluate the incidence of echocardiographic abnormalities among renal transplant recipients.

2. Methodology

This was a cross sectional observational study conducted in the Institute of Cardiology, Rajiv Gandhi Government General Hospital, Chennai for a period of 12 months from April 2018 to March 2019. Our inclusion criteria was all the renal transplant recipients of age more than 18 years who visited Cardiology out patient clinic for echocardiographic evaluation during the study period. The patients who did not give consent were excluded from the study. A total of 400 patients were included after analyzing for inclusion and exclusion criteria. Informed consent was obtained from all the study participants. Detailed history, clinical and anthropometric measurements including height, weight and BMI were measured. Comprehensive Echocardiographic examination was conducted in all subjects by a single operator in ALOKA Prosound Alpha 7 model. The results were tabulated. Appropriate statistical methodologies were applied.

3. Results

Mean age of the study population was 36.23± 8.86 years. 76% were males and the remaining 34% were females. Mean Body mass index was 24.13±3.96 Kg/m^2. Mean Systolic blood pressure was 135.70±14.95 mmHg. Mean Diastolic blood pressure was 86.29±9.00 mmHg. In the study population, 82.66% were hypertensive and the remaining were normotensive. 5.6% of the participants were diabetic and were on treatment for the same and 30.97% had history of dyslipidemia and were on treatment for it. 2.1% of the participants had history of Coronary Artery disease. Mean Left ventricular mass index calculated by area length method was 119.33±39.18 gram/m^2. Maximum LV mass

was 213.45 gm/m^2 and minimum LV mass was 59.28gram/m^2. 27.7% of the participants had Left ventricular mass of more than 110 grams. Left Ventricular ejection fraction measured by modified Simpson's method. Mean LV ejection fraction (LVEF) was 66 ± 6%. LV diastolic function was graded as either normal or as stages I to IV on the basis of mitral inflow profiles and tissue Doppler imaging. 53% of the study participants had diastolic dysfunction.

4. Discussion

Left ventricular hypertrophy (LVH) is common in Renal Transplant Recipients and is present in 40%-60% [8]. Its persistence in the first year following renal transplantation is associated with increased patient morbidity and mortality. Furthermore, in the same cohort, LVH actually proved to be the strongest predictor of all-cause mortality together with diabetes. LVH is an adaptive response to volume expansion and subsequent increase in blood pressure. The most common underlying causes include hypertension, anaemia [9], hyperparathyroidism, aortic valve calcification [10], leading to LV outflow obstruction, and worsening graft function[11]. Following renal transplant, LVH has been shown to improve when measured using echocardiography .[12] This regression of LVH was seen until two years following transplantation, after which the effect plateaued[13]. The present study being a cross sectional study could not establish the cause effect relationship between Left Ventricular Hypertrophy and mortality and morbidity in renal Transplant recipients. A long term prospective follow up study with sufficient sample size is required for drawing possible correlations between LVH and patient treatment outcomes.

5. Conclusions

Involvement of Cardiovascular factors represents the major cause of mortality and morbidity in patients with Chronic Kidney disease, and this relationship persists even after Renal transplantation. There are numerous data to support that LVH causes diastolic dysfunction, arrhythmias, congestive heart failure and sudden cardiac death. So search for these factors should be a part of comprehensive cardiac evaluation in all renal transplant recipients and aggressive treatment for these factors should be initiated as early as possible to improve patient outcomes.

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