Original Research Article

Echocardiography analysis in renal transplant recipients

S.A.K. Noor Mohamed[1*], Edwin Fernando[2]

,
[1]Assistant Professor, [2]Professor
Department of Nephrology, Govt. Stanley Medical College and Hospital, Chennai, Tamil Nadu, India
[*]Corresponding author email: **Drnoor.nephro@gmail.com**

International Archives of Integrated Medicine, Vol. 3, Issue 7, July, 2016.

Available online at http://iaimjournal.com/
ISSN: 2394-0026 (P) **ISSN: 2394-0034 (O)**
Received on: 17-06-2016 **Accepted on:** 24-06-2016
Source of support: Nil **Conflict of interest:** None declared.
How to cite this article: S.A.K. Noor Mohamed, Edwin Fernando. Echocardiography analysis in renal transplant recipients. IAIM, 2016; 3(7): 166-170.

Abstract

Introduction: Renal transplantation is currently the preferred treatment modality for virtually all suitable candidates with end-stage renal disease. Compared with dialysis, kidney transplantation improves both patient survival and quality of life. Nonetheless, post transplant cardiac complications are associated with increased morbidity and mortality after renal transplantation.

Aim of the Study: To analyze the risk factors for cardiovascular disease in the renal transplant recipients. **Materials and methods**: All renal transplant recipients were ABO compatible and cross-match negative and they are followed up regularly in nephrology transplant OPD. Recipients' demographic factors like Age, Gender, Occupation, and Literacy were noted. Nature of donor, post transplant duration, graft function was noted Blood pressure was reported as the average of three manual Measurements taken at 3-minutes intervals. Echocardiograph changes were assessed by standard methods.

Results: Although all the determinants of enhanced CVD risks in renal transplant recipients had not been well defined, both conventional and unconventional risk factors had been suggested to be contributory. The former risks included diabetes mellitus, hypertension, dyslipidemia, obesity, smoking, and family history. The latter risks include pre-existing left ventricular hypertrophy, coronary artery vascular calcification, impaired allograft function, proteinuria, anemia, acute rejection episodes, hyper homocysteinemia, and inflammatory cytokines.

Conclusion: Cardiovascular mortality is increased in patients with chronic kidney disease. Mortality from cardiovascular disease is10–20 times higher among individuals treated with dialysis, as compared to general population. The incidence of cardiovascular disease in kidney transplant patients is nearly twice that of the general population. Even young transplant recipients (aged 35–45 years) experienced an almost 10-fold increase in cardiovascular disease-related mortality.

Key words

Cadaveric Graft Recipients, Metabolic Syndrome, Elevated LDL, Cholesterol, Post Transplant Erythrocytosis.

Introduction

Successful kidney transplantation has been shown repeatedly to be associated with a reduction in mortality compared with dialysis. Studies suggest that this effect largely may be the result of the reduction in cardiovascular disease (CVD) associated with the improvement in renal function [1]. In a retrospective analysis of the United States Renal Data System data consisting of more than 60,000 adult primary kidney transplant recipients transplanted between 1995 to 2000 and more than 66,000 adult wait-listed patients over the same time period [2]. Although the CVD death rates among transplant recipients were expectedly higher in the early postoperative period, they decreased significantly by 3 months post transplant. On long-term follow-up evaluation, although there seemed to be a modest increase in CVD death rates in the second transplant year, the rates actually remained low even among high CVD risk groups such as those with end-stage renal disease secondary to diabetes mellitus or hypertension [3]. This finding likely reflects the impact of Deteriorating transplant function on CVD death rates and is consistent with the relationship between declining renal function and CVD risk observed in non transplant chronic kidney disease. Yet despite the well-established survival advantage of transplantation over dialysis, CVD death has emerged as the most frequent cause of late graft loss [4]. Recognition of CVD risk factors and aggressive management of CVD risk factors should begin in the early post transplant period and should remain an integral part of long-term care in renal transplant recipients.

Major Risk Factors for Coronary Heart Disease in ATP III Guidelines

- Cigarette smoking
- Hypertension (i.e., blood pressure >140/90 mmHg or on antihypertensive medication)
- High LDL cholesterol (i.e., >159 mg/dL) Low HDL cholesterol (i.e., <40 mg/dL)
- Family history of premature coronary heart disease (i.e., <55years of age in male first-degree relative or <65 years of age in female first-degree relative)
- Age (men >45 years and women >55 years)
- Diabetes

Risk factors for coronary heart disease after renal transplantation were investigated in a report of 403 patients who received 464 kidney transplants. During 10-year period, new atherosclerotic complications developed in 14 percent of patients. After accounting for pre-transplant vascular disease, multivariate analysis revealed that the following risk factors were independently associated with post-transplant atherosclerotic cardiovascular disease [5].

Aim of the study

To analyze the risk factors for cardiovascular disease in the renal transplant recipients.

Materials and methods

The study was conducted in Govt. Stanley Medical College and Hospital Nephrology Department, Chennai from October 2010 to November 2011. Ethical Committee approval from Stanley Medical College, Chennai was obtained for this study

Inclusion criteria

Cadaver and Live related renal transplant recipients (RTR).

Exclusion criteria

- Less than one month post transplant
- Less than 18 years of age
- Death due to non cardiac causes during the study

- Graft dysfunction and on maintenance hemodialysis.

All recipients were ABO compatible and cross-match negative and they are followed up regularly in Nephrology Transplant OPD .Recipients demographic factors like Age, Gender, Occupation Literacy were noted. Nature of donor, post transplant duration, graft function were noted. Echocardiogram was done to analyze cardiac function, regional wall motion abnormality, left ventricular hypertrophy and ejection fraction [6].

Statistical methodology

The statistical analysis had been done by using SPSS (Statistical Package on Social Science) version 15.0 the non-parametric model can be used to find out the relationship of categorical variable. One of the methods was Pearson's exact Chi-square. Multi variate analysis was done by Multiple Logistic regression Analysis.

Results

Totally 170 recipients are on regular follow up in our department from the period October 2010 to November 2011.Patients who died in that period and those who were on irregular follow-up are excluded from the study Total patients were divided into groups according to Framingham Risk Score (FRS) to predict 10 year Absolute Risk of coronary heart disease event. Recipients were fit into risk category of 1-3%, 3-5%, 5-8%, 8-10% with prevalence of 80.6%, 11.8%, 4.7%, and 2.9% respectively (**Table – 1 to Table – 5**).

Table – 1: The FRS categorized among patients population.

FRS	Number	Percentage
1 – 3%	137	80.60%
3- 5%	20	11.80%
5- 8%	8	4.70%
8- 10%	5	2.90%

Discussion

Cardiovascular mortality is increased in patients with chronic kidney disease. Mortality from cardiovascular disease is 10–20 times higher among individuals treated with dialysis, as compared to general population. The incidence of cardiovascular disease in kidney transplant patients is nearly twice that of the general population [7]. Even young transplant recipients (aged 35–45 years) experienced an almost 10-fold increase in cardiovascular disease-related mortality. Our study analyzed the relationships among traditional and transplant specific risk factors and 10 year cardiovascular risk estimated by Framingham risk score. Overall 170 recipients who were on regular follow up in our department were included in this analysis. Total patients are divided into groups according to Framingham Risk Score to predict 10 year Absolute Risk of coronary heart disease event. Recipients were fit into risk category of 1-3%, 3-5%, 5-8%, 8-10%. We found that 80.6% of recipients had 1-3% of 10 year CV risk, 11.8% had 3-5% of 10 year CV risk, 4.7% had 5-8% of 10 year CV risk and 2.9% had 8-10% of 10 year CV risk [8]. Among the traditional risk factors, age > 40years was found to be statistically significant risk factor for 10 year CV risk. Almost 15.3% of the total study population was >40 years of which 19.2% had 10 year CV risk of 8-10%. This was in comparison to study which showed that Age > 45 years had hazard ratio of 1.57 (95% CI 0.99-2.38). In our study increased age was to be independent risk factor for higher CV risk in the multi variate analysis [5].

Table – 2: The systemic hypertension among patients.

SHT	Number	Percentage
No	34	20%
Yes	136	80%

Table – 3: The Echocardiograph changes among patients.

Echo-function	No	%
Diastolic dysfunction	15	8.82%
Normal function	155	91.18%

Hypertension is present in 50% to 90% of renal transplant recipients. Though Systemic

Hypertension was regarded as one of the modifiable risk factor of CV risks compared to general population, renal transplant recipients had higher prevalence of SHT and because of its universal distribution. In our study, SHT was present in 80% of the patients and there was no statistically significant relation between SHT and higher CV risks [9]. On cardiac evaluation, 8.8% had diastolic dysfunction, 22.9% had LVH and none of them had systolic dysfunction or Regional Wall Motion Abnormality. In comparison to studies done in general population, those with diastolic dysfunction had statistically significant correlation with higher CV risks [10]. Those with LVH had non significant higher CV risks (5.1% Vs 2.3%) compared to those without LVH. Prevalence of proteinuria among recipients in our study was 18.24% which is significantly associated high cardio vascular risk score. Proteinuria has been reported to occur in 9% to 40% of kidney transplant recipients. One study found that compared with no proteinuria, the presence of persistent proteinuria was associated with increased mortality, graft loss and a higher incidence of CVD [11].

Table – 4: Echocardiograph changes in LV.

Echo - LVH	Number	Percentage
No	131	77.06%
Yes	39	22.94%

Table – 5: Carotid intima media thickness.

CIMT (mm)	Number	Percentage
<1.1	158	92.95%
1.1	12	7.05%

Conclusion

According to Univariate analysis following variables were concluded as cardiovascular risk factors. Increased age, Cadaveric graft recipients, Diastolic Dysfunction, High Carotid Intima Media Thickness, All transplant recipients should currently be considered as coronary heart disease risk.

References

1. Meier-Kriesche HU, Schold JD, Kaplan B. Preservation of long-term renal allograft survival: a challenge for the years to come. Am J Transplant., 2005; 5: 632-3.
2. Anavekar NS, McMurray JJ, Velazquez EJ, et al. Relation between renal dysfunction and cardiovascular outcomes after myocardial infarction. N Engl J Med., 2004; 31: 1285-95.
3. Simmons EM, Langone A, Sezer MT. Effect of renal transplantation on biomarkers of inflammation and oxidative stress in end-stage renal disease patients. Transplantation, 2005; 79: 914-9.
4. Ducloux D, Kazory A, Chalopin JM. Predicting coronary heart disease in renal transplant recipients.A prospective study. Kidney Int., 2004; 66: 441-7.
5. Ojo AO. Cardiovascular complications after renal transplantation and their prevention. Transplantation, 2006; 82: 603-11.
6. Kalil RS, Hudson SL, Gaston RS. Determinants of cardiovascular mortality after renal transplantation: a role for cytomegalovirus? Am J Transplant., 2003; 3: 79-81.
7. Humar A, Gillingham K, Payne WD, et al. Increased incidence of cardiac complications in kidney transplant recipients with cytomegalovirus disease. Transplantation, 2000; 70: 310-3.
8. Phuong-Thu T., Phuong-Chi T., Gabriel M. Danovitch. Cardiovascular disease post transplant. Seminars in Nephrology, 2007; 27(4): 430-444.
9. Shirali AC, Bia MJ. Management of cardiovascular disease in renal transplant recipients. Clin J Am Soc Nephrol., 2008; 3: 491.
10. Dimeny EM. Cardiovascular disease after renal transplantation. Kidney International, 2002; 61(Suppl 80): S78.

11. Sarnak MJ, Levey AS, Schoolwerth AC, et al. Kidney disease as a risk factor for development of cardiovascular disease: a statement from the American Heart Association Councils on Kidney in Cardiovascular Disease, High Blood Pressure Research, Clinical Cardiology, and Epidemiology and Prevention. Circulation, 2003; 108: 2154.