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Abstract

<u>Background</u>. Cardiovascular disease (CVD) leads to increased mortality among renal transplant recipients; however, its effect on allograft survival has not been well studied.

<u>Methods</u>. The records from the United States Renal Data System (USRDS) and the **United Network for Organ Sharing (UNOS) from January 1, 1995 through December** 31, 2002, were examined in this retrospective study. The outcome variables were allograft survival time and recipient survival time. The primary variable of interest was CVD, defined as the presence of at least one of the following: cardiac arrest, myocardial infarction, dysrhythmia, congestive heart failure, ischemic heart disease, peripheral vascular disease, and unstable angina. The Cox models were adjusted for potential confounding factors.

<u>Results</u>. Of the 105,181 patients in the dataset, 20,371 had a diagnosis of CVD. The presence of CVD had an adverse effect on allograft survival time (HR 1.12, p<0.001) and recipient survival time (HR 1.41, p<0.001). Among the subcategories, congestive heart failure (HR 1.14, p<0.005) and dysrhythmia (HR 1.26, p<0.05) had adverse effects on allograft survival time.

<u>Conclusions</u>. In addition to increasing mortality, CVD is also a significant risk factor for renal allograft failure. Further research is needed to evaluate the role of specific forms of CVD in allograft and recipient outcome.

Introduction

• Cardiovascular disease (CVD) events in renal transplant recipients (RTR) account for 35-50% of all cause mortality and 36% of deaths with a functional allograft [1-3].

•Evidence of CVD association with death-censored allograft survival is scarce.

• Ischemic heart disease has been shown to be associated with poor short-term outcome (i.e., acute rejection) [4], but to the best of our knowledge there are no studies demonstrating an association between recipient CVD and long term allograft survival.

•The goal of this project was to study the association between the presence of CVD in **RTR** and kidney allograft survival using kidney transplant registry data.



• We performed a retrospective analysis of the records of 105,181 post-kidney transplant patients (both adults and children) during the period of January 1, 1995 through December 31, 2002.

• Data related to pre-transplant ESRD course was collected by the United States Renal Data System (USRDS) and transplant-related data was collected by the United Network for Organ Sharing (UNOS).

• The outcome variables were death-censored allograft survival time and recipient survival time.

• The primary variable of interest was CVD (at the time of first ESRD service) defined as the presence of at least one of the following conditions: cardiac arrest, myocardial infarction (MI), dysrhythmia, heart failure, ischemic heart disease (IHD), peripheral vascular disease, unstable angina, and coronary artery disease (the presence of IHD, MI, and/or unstable angina)

• Data were analyzed using SAS version 9.1 (SAS Institute, Cary, NC).

ACKNOWLEDGMENT

This study was supported in part by the Dialysis Research Foundation (Ogden, UT). The data reported here have been supplied by the USRDS. The interpretation and reporting of these data are the responsibility of the authors and in no way should be seen as official policy or interpretation of the U.S. government.

THE IMPACT OF RECIPIENT HISTORY OF CARDIOVASCULAR DISEASE ON **KIDNEY TRANSPLANT OUTCOME**

Table 1. Cox models: graft and recipient survival ¹					Table 2. The results of Cox model evaluating the association of CVD with the allograft survival stratified by recipient history of diabetes status ¹					Table 3. The results of Cox model evaluating the association of CVD with the recipient survival stratified by recipient history of diabetes status ¹				
	Graft survival		Recipient Survival			Graft Survival					Recipient Survival			
			Hazard			Diabetic recipients		Non-diabetic recipients			Diabetic recipients		Non-diabetic recipients	
	Hazard Ratio p-va (95% CI)	alue	Ratio (95% CI)	p-value		Hazard Ratio	p-value	Hazard Ratio	p-value		HR (95% CI)	р	HR (95% CI)	р
Cardiovascular Disease	1.12 (1.06 - <0.0 1.19)	001	1.41 (1.34 - 1.48)	<0.001	Cardiovascular Disease	(93 % CI) 1.03 (0.93- 1.13)	0.579	(93 % CI) 1.18 (1.09- 1.27)	<0.001	Cardiovascular Disease	1.30 (1.21- 1.40)	<0.001	1.52 (1.42-1.64)	<0.001
Cardiac Arrest	1.39 (0.90 - 0.14 2.16)	40	1.34 (0.94 - 1.91)	0.106	Cardiac Arrest	1.42 (0.74- 2.74)	0.294	1.35 (0.75- 2.45)	0.317	Cardiac Arrest	1.16 (0.72- 1.88)	0.533	1.61 (0.95-2.73)	0.075
Congestive Heart Failure	1.14 (1.05 - <0.0 1.25)	005	1.36 (1.27 - 1.47)	<0.001	Congestive Heart Failure	1.17 (1.03- 1.33)	<0.05	1.12 (0.99- 1.27)	0.074	Congestive Heart Failure	1.30 (1.19- 1.43)	<0.001	1.53 (1.36-1.71)	<0.001
Dysrrhythmia	1.26 (1.01 - <0.0 1.57)	.05	1.45 (1.23 - 1.71)	<0.001	Unstable Angina	0.97 (0.87- 1.07)	0.514	1.08 (0.98- 1.20)	0.108	Unstable Angina	1.32 (1.24- 1.41)	<0.001	1.35 (1.24-1.46)	<0.001
Ischemic Heart Disease	1.03 (0.92 - 0.57 1.16)	577	1.28 (1.18 - 1.39)	<0.001	Dysrrhythmia	1.73 (1.23-	< 0.005	1.05 (0.79-	0.727	Dysrrhythmia	1.15 (0.88- 1.51)	0.303	1.68 (1.36-2.07)	<0.001
Myocardial Infarction	0.98 (0.80 - 0.85 1.20)	351	1.31 (1.15 - 1.49)	<0.001	Ischemic Heart	2.43) 1.04 (0.89- 1.21)	0.652	1.40) 1.01 (0.84- 1.21)	0.946	Ischemic Heart Disease	1.22 (1.10- 1.35)	<0.001	1.44 (1.26-1.64)	<0.001
Peripheral Vascular Disease	1.07 (0.97 - 0.19 1.18)	.93	1.38 (1.29 - 1.49)	<0.001	Myocardial Infarction	0.92 (0.70- 1.24)	0.634	1.21)	0.940	Myocardial Infarction	1.18 (0.99- 1.41)	0.070	1.51 (1.24-1.83)	<0.001
Unstable Angina	1.03 (0.96 - 0.4) 1.10)	17	1.33 (1.27 - 1.40)	<0.001	Peripheral Vascular Disease	0.98 (0.86- 1.11)	0.746	1.27 (1.07- 1.51)	<0.01	Peripheral Vascular Disease	1.28 (1.18- 1.40)	<0.001	1.70 (1.49-1.95)	<0.001
Coronary Artery Disease ²	1.07 (1.00 - 0.05 1.15))58	1.35 (1.28 - 1.43)	<0.001	Coronary Artery Disease ²	1.01 (0.91- 1.12)	0.898	1.10 (1.00- 1.21)	<0.05	Coronary Artery Disease	1.29 (1.20- 1.39)	<0.001	1.43 (1.32-1.55)	<0.001

¹ Only the primary variables of interest are presented in the table. The Cox models were adjusted for the following covariates: recipient age; gender; race; height; weight; history of diabetes and hypertension; ESRD duration; smoking history; CMV status, history of prior renal transplant, donor type (living or cadaveric; heart-beating); age; gender; race; height; weight; CMV status, number of matched HLA antigens, cold storage time, cause of ESRD (GN, DM, HTN, other), maintenance regimen (tacrolimus/cyclosporine/other), and procedure type (single kidney, en bloc, dual, or kidney-pancreas). ² defined as presence of ischemic heart disease, myocardial infarction, or unstable angina.





Results



- survival.

- and recipient outcome.

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• We demonstrated a significant adverse impact of CVD on death-censored allograft

• Of the individual variables, CHF and dysrhythmia had significant adverse impact of allograft survival, while a history of CAD reached a borderline significance.

• We did not find an adverse impact of CVD on allograft survival in diabetics, but the combination of diabetes and CVD increases the risk of allograft failure by almost 2.5 times (as compared to patients with neither DM nor CVD), which may be due to the much greater risk for the allograft failure presented by diabetes as compared to CVD.

• Further research is needed to evaluate the role of specific forms of CVD in allograft

References