Incidence of Rejection in Renal Transplant Surgery in the LVHN Population Leading to Graft Failure: 6 Year Review

Jessica Ludolph
Lehigh University

Lynsey S. Biondi MD
Lehigh Valley Health Network, Lynsey_S.Biondi@lvhn.org

Michael J. Moritz MD
Lehigh Valley Health Network, Michael.Moritz@lvhn.org

Published In/Presented At

Ludolph, J., Biondi, L., Mortiz, M., (2015, July 31) *Incidence of Rejection in Renal Transplant Surgery in the LVHN Population Leading to Graft Failure: 6 Year Review.* Poster presented at LVHN Research Scholar Program Poster Session, Lehigh Valley Health Network, Allentown, PA.

Incidence of Rejection in Renal Transplant surgery in the LVHN Population Leading to Graft Failure Study: 6-year Review

Jessica Ludolph, Lynsey Biondi, MD, Michael Moritz, MD

Lehigh Valley Health Network, Allentown, Pennsylvania

Abstract

To obtain optimal outcomes, it is vital to continually investigate variables potentially effecting rejection and graft failure. 407 renal transplant recipients who were transplanted at the Transplant Center of the Lehigh Valley from January 2009 to December 2014 were analyzed using descriptive statistics. Variables potentially influencing graft survival, including delayed graft function, cell mediated and antibody mediated rejection, were compared. Demographic information, donor characteristics, and cold ischemic time were also investigated.

Rejection occurred in 39% of patients. Cellular rejection (35% of total patients) occurred more commonly than antibody mediated rejection (8% of total patients), with borderline cellular rejection the most common (40% of rejections). Antibody mediated rejection negatively impacted graft survival (p=0.0917), whereas cellular rejection did not show a statistically significant effect. Delayed graft function was common (29% of patients), but patients with delayed graft function similar rejection rates as patients without delayed graft function (29% for both). Delayed graft function was associated with significantly lower graft survival.

Methods

A retrospective study was conducted at the Transplant Center of the Lehigh Valley in Allentown, Pennsylvania. The 407 patients that underwent renal transplantation from January 2009 to December 2014 were included in the study. Patient data was collected from the Organ Transplant Tracking Record (OTTR) database and included transplant date, graft survival time, patient survival time, donor type, types of rejections, treatments received, and demographic information. Those patients who experienced one or more episodes of rejection were then further analyzed to see if there is a correlation between the other factors including, transplant type (living vs. deceased donor, PHS higher risk), demographics (age, sex), delayed graft function (defined as the patient needing dialysis within 7 days of transplant), time on dialysis prior to transplant, cold ischemic time, and the ultimate outcome of the graft.

Descriptive statistics were performed on age, gender, type of donor (living vs. deceased), graft failure, delay of graft function, time on dialysis, cold ischemic time, and incidence of rejection and the proportion of each type of rejection. Patients who died with functioning graft were excluded in graft survival. Survival analysis was used to analyze cell mediated rejection, antibody mediated rejection, and delayed graft function, versus graft survival time.

Results

Table 1: Characteristics of patients with at least one incidence of rejection vs. those with none (n=407)

	With at least 1 incidence of rejection (n=159)	With no rejection episodes (n=248)	p-value
Age (mean years +/- SD)	57 +/- 14	58 +/- 13	.6605
Female Gender	52 (.32)	75 (.30)	.5538
Living Donor Transplant	30 (.19)	57 (.23)	.3464
Graft Failure	37 (.23)	41 (.16)	.0254*
Delay of Graft Function	46 (.29)	72 (.29)	.9657
Time on dialysis (mean days +/- SD)	1401 +/- 3597	925 +/- 3601	.1935
Cold Ischemic Time (mean min +/- SD)	712 +/- 372	719 +/- 379	.8510
CMV	33 (.21)	43 (.17)	.3621

*Influence of rejection as the independent variable. All other variables show incidence of rejection as the dependent variable. Graft failure only includes those who had graft failure unrelated to patient death.

Delayed Graft Function (DGF)

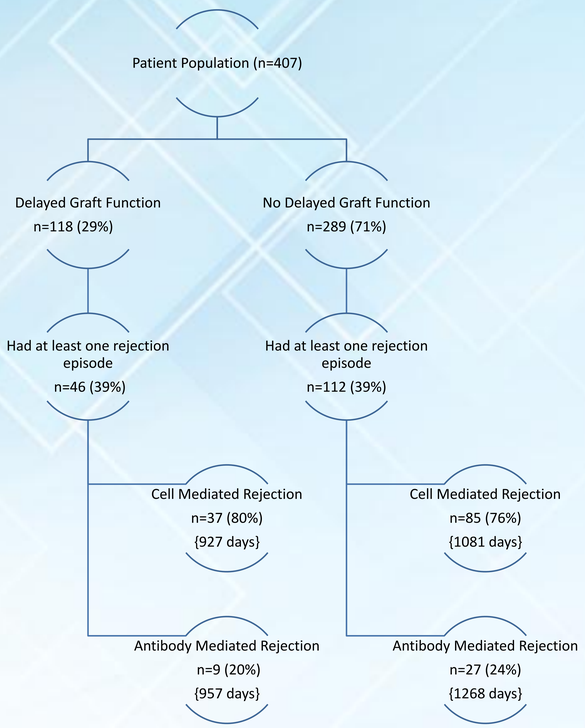

Figure 2: Delayed graft function is defined as anyone receiving dialysis within 7 days post transplant. {Mean graft survival time in days}

Types of Rejection

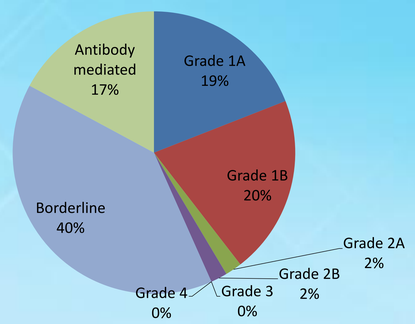

Figure 1: Includes types of cell mediated rejections Banff Scale (Grade 1A, 1B, 2A,2B,3,4,Borderline)

Type of Rejection and Graft Failure

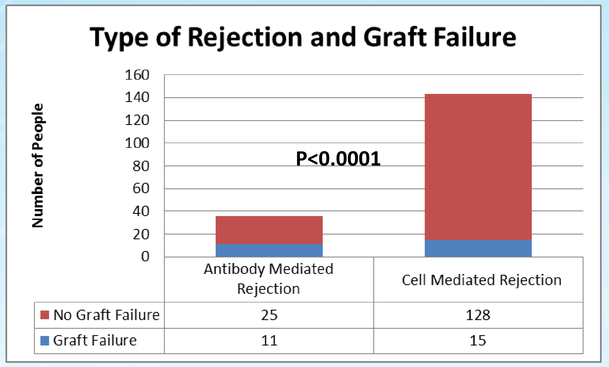

Figure 3: Graft failure only included patients who had graft failure unrelated to patient death. Effect of antibody mediated rejection on graft failure p<0.0001

Mean Graft Survival Time

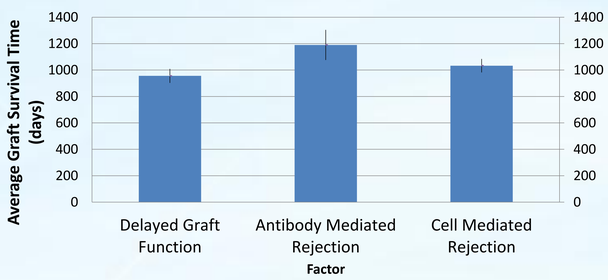

Figure 4: Delayed Graft Function p<0.0001, Antibody Mediated Rejection p=.0197, Cell Mediated Rejection p=.0530

Discussion

In the LVHN population of renal transplant patients, less severe types of cellular rejection are more common (i.e. Borderline, Grade 1B). While there was a correlation between antibody mediated rejection and graft survival time, the same correlation was not as strong for cell mediated rejection with a p value of (>0.05). Antibody mediated rejection appears to have a greater negative effect on graft survival than cell mediated rejection. The incidence of all types of rejection was similar for delayed graft function and non-delayed graft function patients. Previous studies show delayed graft function after Donor after Cardiac Death (DCD) donors does not have the same negative influence on survival as delayed graft function after brain death. Further investigation into delayed graft function patients and types of donors is warranted.

When analyzing graft survival as a continuous variable delayed graft function had a large impact, with the lowest mean graft survival time with a standard error of 53, and cell mediated rejection had the second lowest graft survival time with a similar standard error of 51. Interestingly, antibody mediated rejection had the highest mean graft survival time, but it also had the largest standard error of 114, indicating that its mean is not as well-known as the other two. Late rejections may also influence this data.

This study serves to provide a brief overview of the characteristics of the LVHN Renal transplant population. It is a springboard for future investigating the rejection process and graft survival.

Conclusions

1. Acute cellular rejection (particularly Borderline) is more common than antibody mediated rejection
2. Antibody mediated rejection has a statistically significant (p<0.0001) negative impact on graft survival
3. Delayed graft function is common but is not associated with an increased risk of rejection (cellular or antibody mediated)
4. Delayed graft function is associated with shorter graft survival time than other patients

REFERENCES

1. Controversial Issues. (n.d.) West's Encyclopedia of American Law, edition 2. (2008). Retrieved February 23 2015 from http://legal-dictionary.thefreedictionary.com/Controversial+Issues
2. Meier-Kriesche, H.U., Schold, J.D., Srinivas, T.R., & Kaplan, B. Lack of Improvement in Renal Allograft Survival Despite a Marked Decrease in Acute Rejection Rates Over the Most Recent Era. American Journal of Transplantation 2004, 4:378-383.
3. El Terse, M., Grande, J.P., Keddis, M.T., Rodrigo, E., et al. Kidney Allograft Survival After Acute Rejection, the Value of Follow-Up Biopsies. American Journal of Transplantation 2013, 13:2334-2341.