Increasing Use of “Riskier” Deceased Kidney Donors in the US in the Past Decade.

Jon J. Snyder, PhD, MS
Sally K. Gustafson, MS
Melissa A. Skeans, MS
Bertram L. Kasiske, MD, FACP

United States Renal Data System
Background

• Survival of kidney transplants from deceased donors has remained fairly stable over the past decade, with a 5-year graft survival of 67% for transplants performed in 1999 and 69% in 2003, and first-year graft survival from 88% in 1999 to 91% in 2007.
First-time, adult, kidney-only transplants. Graft survival estimates are adjusted for age, gender, race & primary diagnosis, using Cox proportional hazards models. Conditional half-life estimates are conditional on first-year graft survival.
Background

• This is despite a 50% decline in the first-year incidence of acute rejection over the same 10-year period.
Background

- Additionally, continued increases in the waiting list have lead to increased use of marginal kidney donors through the ECD program as well as increased use of DCD kidneys.
Deceased donor transplants from ECD & DCD donors

Figure 7.16 (Volume 2)

Donation rates, by age, gender, & race

Figure 7.13 (Volume 2)

Donors younger than 70, whose organs are eventually transplanted.
Background

- We hypothesized that transplant programs were accepting higher risk deceased donor kidneys in many aspects of deceased donor quality.
A Comprehensive Risk Quantification Score for Deceased Donor Kidneys: The Kidney Donor Risk Index

Panduranga S. Rao,1,2,7 Douglas E. Schaubel,2,3 Mary K. Guidinger,2,4 Kenneth A. Andreoni,5 Robert A. Wolfe,2,4 Robert M. Merion,2,6 Friedrich K. Port,2,4 and Randall S. Sung2,6

- Developed on 1995-2005 kidney donors
- KDRI formula includes (all donor elements):
  - Age
  - Race (African American vs. Other)
  - History of Hypertension
  - History of Diabetes
  - Terminal Serum Creatinine
  - Cause of death (CVA vs. Other)
  - Height
  - Weight
  - DCD
  - HCV+ Serology
  - HLA B & DR Mismatches
  - Cold Ischemia Time
  - Transplant Type (single, en bloc, double)
Kidney donor risk index (KDRI) & ECD status, 2008

Figure 7.17 (Volume 2)

Patients age 18 & older receiving a first-time, kidney-only, deceased donor transplant, 2008.
Population & Methods

• We examined trends in the kidney donor risk index (KDRI, Rao, Transplantation 2009) as well as trends in the individual components of the KDRI in first-time, adult, deceased donor kidney recipients in the US (N=83,901) using data from the United States Renal Data System (USRDS).

• Linear trends across transplant years were assessed using a logistic regression model.
Reference Donor in the KDRI Formula, Results in KDRI = 1.0:

- 40 years old
- Non-black
- Non-hypertensive
- Non-Diabetic
- Terminal Serum Creatinine = 1.0 mg/dL
- Non-CVA Cause of Death
- Height = 170 cm (5’ 10”)

- Weight = 80 kg (176 lbs.)
- HCV seronegative
- 2 HLA B mismatches
- 1 HLA DR mismatch
- 20 hours of cold time
- Single Kidney
Distribution of KDRI

FIGURE 1. Histogram of kidney donor risk index.


ASN 2010
Change in KDRI Distribution over the Past Decade

- **1999:**
  - 25th Percentile: 1.13
  - 75th Percentile: 1.89
  - Mean: 1.24
  - 95th Percentile: 2.12

- **2000 - 2008:**
  - 25th Percentile: 1.13 - 1.24
  - 75th Percentile: 1.89 - 2.12
  - Mean: 1.24 - 2.12
  - 95th Percentile: 1.89 - 2.12
KDRI factors that have seen a significant increase over the decade:

- HLA B Mismatches > 0
- HLA DR Mismatches > 0
- Weight > 80 kg
- Age > 50
- History of Hypertension
- SCr > 1.5 mg/dL
- DCD
- Diabetic

Test for Trend p<0.05 for all factors shown here.
KDRI factors that did not significantly increase over the decade:

% CVA

% HCV+

Average Cold Time

Hours

1999 2001 2003 2005 2007
Conclusions

• KDRI can be used to track changes in the risk profile of donors whose kidney(s) is/are used for transplant.
• The distribution of kidney donor risk has been increasing on a population level over the past decade.
• A few donor risk factors have seen a decline over the decade: CVA, HCV+, and cold ischemia time.
• KDRI supports the contention that transplant programs are transplanting higher risk kidneys on average over time.
Increasing Use of “Riskier” Deceased Kidney Donors in the US in the Past Decade.

Jon J. Snyder, PhD, MS
Sally Gustafson, MS
Melissa A. Skeans, MS
Bertram L. Kasiske, MD, FACP

United States Renal Data System