New Ways to Tackle a Growing Health Care Dilemma - ESRD

J. Keith Melancon, M.D., F.A.C.S.
George Washington University
Professor of Surgery
Chief, Transplant Surgery and Transplant Institute
Thanks to our speaker!

- **Dr. Keith Melancon**
- Director of the George Washington Transplant Institute
- Professor of surgery & the medical director of the Ron and Joy Paul Kidney Center
- Internationally renowned expert in paired kidney exchanges, ABO incompatible kidney transplantation, pancreas transplantation, and immunologic desensitization for organ transplants
- On four occasions set the world’s record for largest paired kidney exchange
Nietzsche – “The Birth of Tragedy”

- Apollo
- Dionysus
Why ESRD?

• Diabetes
• Hypertension
• Obesity
• Increased rates in minority population
Obesity
Hypertension
Diabetes
Where is ESRD?
Who is ESRD?
Addressing Disparities

National MOTTEP
minority organ tissue transplant education program
Community Outreach
Community Health Delivery Models
CKD Increasing
Incidence ESRD
Cost of ESRD
Cost of ESRD vs Transplant
Outcomes for first-time wait-listed patients three years after listing in 2008, by age, race, & PRA Figure 7.5 (Volume 2)

Patients age 18 & older listed for a first-time, kidney-only transplant in 2008; transplanted patients may have subsequent outcomes in the three-year follow-up period.
Survival Difference: Transplant vs. Dialysis
Number of Kidney Transplants
Incidence of ESRD by Race
Graft Survival by Race
Apol1 in Black Patients

Nejm raj 2013

A. Patients with Diabetes

B. Patients without Diabetes

C. Patients with Diabetes

D. Patients without Diabetes

No. at Risk
White 624 496 368 153
Black APOL1 low risk 610 450 305 116
Black APOL1 high risk 112 74 46 21

No. at Risk
White 920 807 681 319
Black APOL1 low risk 531 455 351 164
Black APOL1 high risk 158 124 89 41
African Ethnicities
Middle Passage

Plantation Crops sent from the Americas to Europe

Manufactured Goods sent from Europe to Africa

Slaves sent from Africa to the Americas

The Triangular Trade

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Current Issues in Kidney Transplantation

- Access
- Graft survival
- Sensitization
- Increasing organ numbers (DD and LD)
Addressing Kidney Transplant Issues

• Access – outreach, education
• Sensitization- PKE (paired kidney exchange), desensitization
• Graft survival- novel immunosuppressive protocols, tolerance
• Donors – sign up potential donors, educate potential living donors
Paired Kidney Exchange

Traditional Paired Exchange

Two Pair Exchange

Three Pair Exchange

Chains

Non Directed Altruistic Donor

Cluster #1

Cluster #2

Cluster #3

Etc.
Desensitization
Addressing Crisis – Increasing Organ Availability

- DCD/ECD organs
- Increasing living donation/ Altruistic donation
- ABO incompatible transplantation
- Desensitization protocols
- Paired kidney exchanges
ABO Incompatible Transplantation

- Must know and reduce ABO titer incompatibility (Antibody therapy, plasma exchange)
- Oftentimes better option than sensitized transplantation and timing better than PKE
Desensitization Protocols

• Must have luminex single bead technologies to isolate Antibody specificities and then tract titers during reduction therapy (Antibody therapy, plasma exchange, immunoglobulin therapy)
• Best fitted for living donor transplantation
Paired Kidney Exchanges

- Utilize computerized matching algorithms to optimize organ utilization schemes in local, regional, and national organ exchanges
- Can be combined with ABO incompatible transplant and desensitization
- Domino exchanges can be fashioned to multiply successes
Disparities

Impact of Medicare Coverage on Disparities in Access to Simultaneous Pancreas and Kidney Transplantation


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Introduction

The incidence of type 1 diabetes, a common cause of end-stage renal disease (ESRD) (1), has been rising steadily in the United States (2). Studies have consistently shown that simultaneous pancreas and kidney transplantation (SPKT) is the best treatment for patients with both type 1 diabetes and ESRD, offering a significant survival advantage over kidney transplant (KT) alone (3–11). Significant improvements in diabetic neuropathy, gastropathy and vasculopathy have been demonstrated following SPKT (3–9), and it is the only method of reliably maintaining euglycemia (12). Long-term outcomes are excellent, with a 45% lower risk of death 10 years following SPKT compared to KT (13). Furthermore, the current allocation system favors combined
Paired Kidney Exchanges


Joseph K Melancon, MD, FACS, Lee S Cummings, MD, Jay Graham, MD, Sandra Rosen-Bronson, PhD, Jimmy Light, MD, FACS, Chirag S Desai, MD, Raffaele Girlanda, MD, Seyed Ghasemian, MD, Joseph Afica, MD, Lynt B Johnson, MD, FACS

BACKGROUND: Currently ethnic minority patients comprise 60% of patients listed for kidney transplantation in the US; however, they receive only 55% of deceased donor renal transplants and 25% of living donor renal transplants. Ethnic disparities in access to kidney transplantation result in increased morbidity and mortality for minority patients with end-stage renal disease. Because these patients remain dialysis dependent for longer durations, they are more prone to the development of HLA antibodies that further delay the possibility of receiving a successful kidney transplant.

STUDY DESIGN: Two to 4 pretransplant and post-transplant plasma exchanges and IV immunoglobulin were used to lower donor-specific antibody levels to less than 1:16 dilution; cell lytic therapy was used additionally in some cases. Match pairing by virtual cross-matching was performed to identify the maximal exchange benefit. Sixty candidates for renal transplantation were placed into 4 paired kidney exchanges and/or underwent antibody reduction therapy.

RESULTS: Sixty living donor renal transplants were performed by paired exchange pools and/or antibody reduction therapy in recipients whose original intended donors had ABO or HLA incompatibilities or both (24 desensitization and 36 paired kidney exchanges). Successful transplants were performed in 38 ethnic minorities, of which 33 were African American. Twenty-two recipients were white. Graft and patient survival was 100% at 6 months; graft function (mean serum creatinine 1.4 g/dL) and acute rejection rates (20%) have been comparable to traditional live donor kidney transplantation.

CONCLUSIONS: Paired kidney donor exchange pools with antibody reduction therapy can allow successful transplant in difficult to match recipients. This approach can address kidney transplant disparities. (J Am Coll Surg 2011;212:740-747. © 2011 by the American College of Surgeons)
# Results

<table>
<thead>
<tr>
<th></th>
<th>Category</th>
<th>Caucasian</th>
<th>AA</th>
<th>Other</th>
<th>Mean Cr</th>
<th>Median Cr</th>
<th>Range of Cr</th>
<th>Pt/Graft Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non PKDE</strong></td>
<td>ABOi</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>1.38</td>
<td>1.3</td>
<td>0.9 to 2.1</td>
<td>100%/100% (12 months)</td>
</tr>
<tr>
<td></td>
<td>Sensitized</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1.34</td>
<td>1.3</td>
<td>0.9 to 2.3</td>
<td>100%/100% (9.9 months)</td>
</tr>
<tr>
<td><strong>PKDE</strong></td>
<td>ABOi</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>1.58</td>
<td>1.35</td>
<td>0.8 to 2.6</td>
<td>100%/100% (6.4 months)</td>
</tr>
<tr>
<td></td>
<td>ABOc Non Sensitized</td>
<td>6</td>
<td>12</td>
<td>3</td>
<td>1.44</td>
<td>1.4</td>
<td>0.8 to 3.2</td>
<td>100%/100% (4.4 months)</td>
</tr>
<tr>
<td></td>
<td>ABOc Sensitized</td>
<td>2</td>
<td>10</td>
<td>1</td>
<td>1.38</td>
<td>1.3</td>
<td>0.9 to 1.9</td>
<td>100%/100% (7.4 months)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>22</td>
<td>33</td>
<td>5</td>
<td>1.42</td>
<td>1.3</td>
<td>0.8 to 3.2</td>
<td>100%/100% (7.4 months)</td>
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Table 1. Categories of patients with follow up creatinine.

ABOi = ABO incompatible

ABOc = ABO compatible
Results

<table>
<thead>
<tr>
<th>Categories</th>
<th>Local (PKDE)</th>
<th>US</th>
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<tbody>
<tr>
<td>AA</td>
<td>55%</td>
<td>13.7%</td>
</tr>
<tr>
<td>Whites</td>
<td>37%</td>
<td>66%</td>
</tr>
<tr>
<td>Others</td>
<td>8%</td>
<td>20%</td>
</tr>
<tr>
<td>Male</td>
<td>50%</td>
<td>61%</td>
</tr>
<tr>
<td>Female</td>
<td>50%</td>
<td>39%</td>
</tr>
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</table>

Table 2. Demographics of local PKDE participants vs national living donor kidney recipients.
PKE (Paired Kidney Exchange)

Multiple-Pair Matching

2-Pair Donation

Pair 1
- Donor 1
- Recipient 1

Pair 2
- Donor 2
- Recipient 2

3-Pair Donation

Pair 1
- Donor 1
- Recipient 1

Pair 2
- Donor 2
- Recipient 2

Pair 3
- Donor 3
- Recipient 3
The Bonds that Tie

13-way kidney transplants form life-altering bond

Surgeons at Georgetown University and Washington Hospital Center performed a 13-way kidney exchange, performing 26 operations to give 13 people healthy new kidneys.

SOURCE: Georgetown University Hospital
Paired Exchanges
World’s Largest Kidney Exchange
Questions?
Join us for next month’s webinar!

Unique Strategies for Improving the Effectiveness of Exercise Training in Patients with Kidney Failure

Tuesday, January 17
1-2 p.m. (ET)

Dr. Ken Wilund
• Associate Professor in the Department of Kinesiology and Community Health and Division of Nutritional Sciences at the University of Illinois at Urbana-Champaign

Join us to learn about:
• Research regarding exercise in hemodialysis and transplant patients (What has worked, and what has not)
• Strategies for improving outcomes from exercise training interventions (How much and what type of exercise is recommended)
• Strategies for improving patient compliance with exercise and physical activity programs

Go to www.KidneyFund.org/webinars to learn more and register!