Renal Transplantation: Allocation challenges and changes

Mark R. Wakefield, M.D., F.A.C.S.
Associate Professor of Surgery/Urology
Director Renal Transplantation

Renal Transplantation

Objectives:
• Understand the new UNOS kidney allocation process:
  – Appreciate the controversies of organ allocation and the impact on access
  – Understand the potential implications for access to renal transplant
  – Discuss the economic and social implications of end stage renal disease and renal replacement therapy

No financial disclosures
Board member: MTN, Heartland Network 12, MOKP

The Numbers

ESRD/ Renal replacement therapy
– >500,000 patients in United States
  • 328,000 receiving in-center HD
  • 30,000 receiving PD or home HD
  • 151,502 patient with functioning renal graft
– 100,000 patients start renal replacement therapy annually
  • 90% with hemodialysis
  • Only 2,635 patients with pre-emptive transplant
  • 15,000 receive kidney transplant
– $14 billion on treatment of ESRD
  • Transplant cost effective at 2.5 to 3 years
  • Survival advantage for renal transplant
Organ Shortage

- 120,000 patients listed waiting for organ transplant in US
  - 28,051 received an organ transplant in 2012
  - 8143 deceased organ donors in 2012
  - Kidney:
    - 65% increase in wait list from 1998 to 2009
    - 96,687 on wait list as of June 21, 2013
    - 35% of total list is inactive
    - 34,836 new patients added in 2012
    - 16,485 kidney transplants in 2012
      - 10,866 deceased donor kidney transplants in 2012

Patients on the waiting list

Patients added to the waiting list
Rationing
Supply and demand
Limited resources
Selection for listing for organ transplantation in effect rations a limited resource, balancing risk and benefit for the patient
UNOS organ allocation policy
Economic impact

Organ Allocation
- Current System
  - Emphasizes fairness and equality
  - At expense of utility and efficiency
  - Collage of incremental priorities
  - Primary determinant of position on wait list is the amount of time spent waiting
- Inherent bias
  - Deliberate: age, sensitization
  - Unintentional: geography
http://www.unos.org/kars.asp
Organ Allocation- Current

• Geographic Distribution
  – OPO generated match list
  • Blood Group based match runs
    – ECD restricted
    – Transplant center criteria
• Priority based on points
  – Wait time
  – Age
  – Sensitization (PRA>80%), match

Organ Allocation- Current

• Criticisms:
  – Wasted organs
    • Excessive cold ischemic time (sharing)
    • National distribution of zero-antigen mismatches
    • Futile cross-matches
  – Inappropriate matching of kidney
    – Decline marginal kidney for young recipients
• Racial and ethic disparities
• Age discrimination

Organ Allocation

The current system may be inconsistent with the “Final Rule”, which mandates:

“**The best use of donated organs**”
Organ Allocation- Balances

• Utility:
  – Increased number of transplants
  – Increased number of years of functioning
    grafts
  – Increased number of years of life
  – Decreased wait-time
  – Decrease discards
• Maintain fairness

Organ Allocation

• Alternatives to age matching
  – Process from 2003 to 2013
  – Close change with LYFT
  – Age bias (ADA 1979)

• Kidney Allocation Concept
  – Public comment held until December, 2012
  – 59 page document:
    http://optn.transplant.hrsa.gov/SharedContentDocuments/KidneyConceptDocument.PDF

Revised Allocation Objectives

• Approved by UNOS/OPTN on June 24, 2013
  – One year later than the earliest possible date to consider
• Implementation in 2014
• Improve deceased kidney donor allocation
  – Lower the discard rate
    • Especially ECD
  – Decrease rate of death while waiting
• Decrease variability and disparities
  • Geographic and ethnic
• Improve utility of transplanted kidney
  • Matching life expectancy of patient to graft
Revised Allocation Objectives

1. Better approximate graft longevity and recipient longevity so that the potential survival of every transplanted organ can be realized within biological reason and acceptable levels of access for those on the waiting list.

   – Foster or promote graft survival of the kidney transplant for candidates with longest post-transplant survival who are likely to require additional transplants due to early age of ESRD.
   – Minimize loss of potential functioning years of deceased donor kidney grafts through improved matching of recipient and graft survival.

Revised Allocation Objectives

2. Improve offer system efficiency and organ utilization through the introduction of a new scale for kidney quality, called the kidney donor profile index (KDPI).

   - age
   - race/ethnicity
   - diabetes
   - height
   - donor after cardiac death
   - cerebrovascular cause of death
   - hypertension
   - creatinine
   - weight
   - hepatitis c

KDPI

[ KDPI Graph ]

Figure 8: Estimated graft Survival rates by KDPI.
Revised Allocation Objectives

3. Make comprehensive data better available to patients and transplant programs to guide them in their renal replacement choices.

4. Reduce differences in transplant access for populations described in the National Organ Transplant Act (e.g., candidates from racial/ethnic minority groups, pediatric candidates, and sensitized candidates).

Allocation Summary

• 4 groups of donor kidney based on KDPI
• 4 subsequent sequences (match runs)
  – KDPI <20 → sequence A
  – KDPI 20-35 → B
  – KDPI 35-85 → C
  – KDPI>85 → D
• Within each sequence there is ranked priority of allocation categories
• Within each category there are points awarded to determine ranking with the match run

University of Missouri-Columbia School of Medicine
New Allocation: Very Highly Sensitized

- Candidates with CPRA $\geq$98% face immense biological barriers
- New classifications ahead of 0-ABDR mismatch classifications

<table>
<thead>
<tr>
<th>CPRA (%)</th>
<th>National</th>
<th>Regional</th>
<th>Local</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPRA=100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPRA=99%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPRA=98%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Within each category 0-ABDR mismatches come first

- To participate in Regional/National sharing, review & approval of unacceptable antigens will be required

The sensitized patient

- Revised point system:
  - 1 point per year
  - 0 to 202 points based on CPRA
  - 0-2 points for HLA-DR match
  - 4 points for previous living donor
  - 1 point for pediatric candidates
  - 4 points for peds (age 0-10) for zero antigen mismatch
  - 3 points for peds (age 11-17) for zero antigen mismatch
Other changes

- Credit for time spent on dialysis prior to listing
- Sliding continuous scale for sensitized candidates
- CPRA > 97% with priority over 0 antigen mismatch
- Blood group B can receive A2 or A2B as well as O and B
- Patients with longest post transplant survival will get offered the best kidneys: top 20% EPTS will get the top 20% KDPI
- Elimination of kidney payback
- Pediatric priority for KDPI < 35
- Eliminate SCD/ECD distinction to KDPI ranking