Kidney Transplantation in the United States

SRTR Data
- Total patients listed
  - 2004 – 57,623
  - 2014 – 98,956
- Patients removed from waitlist 2014
  - Total – 29,023
  - Death – 4,931
  - Too sick – 3,384

Patients Transplanted in U.S. 2014
- Total – 17,098
- First kidney transplant – 15,086
- Retransplant – 2012
- Deceased – 11,087
- Living – 5291

Deceased kidney transplant in U.S. 2014
- Donation after brain death (DBD) – 9,791
- Donation after circulatory death (DCD) – 2,016
- KDPI <20% - 2,529
- KDPI 21-34% - 1,642
- KDPI 35-65% - 6,116
- KDPI > 85% - 965
- Unknown – 355

Types of Deceased Donor Kidney Transplants
- ECD – Expanded Criteria Donor
  - Any donor > 60 years of age or age 50-59
  - with two of the following: History of hypertension
  - Serum cr > 1.5
  - Death due to cerebrovascular accident
- SCD – Standard Criteria Donor
  - All other deceased donors
Types of Deceased Donor Kidney Transplants

- SRTR Data
  - Deceased donor kidney transplants 2012
    - Total – 11,195
    - SCD – 9,399
    - EDC – 1,856

- Outcomes SCD vs. ECD
  - Lamb et. al.
    - SRTR data 1989 – 2005
      - 164,480 deceased donor transplants
        - SCD – 140,900
        - ECD – 23,580
      - Overall first transplants (142,198)
        - 1989 – half lives 6.7 years
        - 1995 – half lives 8 years
        - 2005 – half lives 9 years

Types of Deceased Donor Kidney Transplants

- Outcomes SCD vs. ECD
  - Lamb et. al.
    - SCD first transplants (120,675)
      - Donor/Recipient age < 45
        - 1989 – half lives 7 years
        - 2005 – half lives 11 years
    - ECD first transplants (21,523)
      - 1989 – half lives 3 years
      - 2005 – half lives 6.4 years

Types of Deceased Donor Kidney Transplants

- Outcomes SCD vs. ECD
  - Lamb et. al.
    - Death censored graft half lives
      - SCD
        - 1989 – 10.6 years
        - 2005 – 15.5 years
      - ECD
        - 1989 – 4.3 years
        - 2005 – 10.1 years

Types of Deceased Donor Kidney Transplants

- Risk of Transplant in Elderly Recipients
  - Mortality risk higher due to age and higher degree of comorbid disease.
  - Gill et. al.
    - Quantify early post-transplant mortality risk for patients >65 years of age
      - Time to equal risk of death vs. survival
        - SCD
        - ECD
        - LD
        - Waitlist

Types of Deceased Donor Kidney Transplants

- Risk of Transplant in Elderly Recipients
  - Gill et. al.
    - All ESRD >65 4/1/95 and 12/31/07
    - Low, intermediate and high cardiovascular risk
    - Total patients – 25,468
      - 45% low, 12% intermediate, 43% high
    - Transplanted (follow up 2.67 years)
      - Total 11,072
        - 51% low, 46% intermediate, 35% high
Types of Deceased Donor Kidney Transplants

Risk of Transplant in Elderly Recipients

- Gill et. al.
  - Deaths on waiting list
    - Total: 6540 (25%)
      - 20% low, 28% intermediate, 31% high
  - Removed from the waiting list
    - Total: 1489 (6%)
      - 6% low, 6% intermediate, 6% high
  - Death after transplant
    - Total: 3,600 (33%)
      - 27% low, 34% intermediate, 41% high

Risk of Transplant in Elderly Recipients

- Gill et. al.
  - Overall findings
    - LD transplant demonstrated an immediate lower risk of death for low and intermediate risk patients
    - ECD recipients had the highest risk of death compared to SCD and LD recipients
    - Overall, transplant of any kind demonstrated a lower risk of death than remaining on the waitlist.

“Labeling Effect”

Types of Deceased Donor Kidney Transplants

- KDRI/KDPI
  - Rao et al.
    - Continuous graft failure risk score
    - Donor and recipient characteristics
    - Donor Factors
      - Age, race, hypertension, diabetes, cause of death, Height, weight, DCD, HepC, Number B mismatch, Number DR mismatch, cold time, Enbloc kidney transplant, dual kidney transplant.
    - KDPI 85% includes ECD kidneys
      - 15% risk of failing within one year of transplant

Types of Deceased Donor Kidney Transplants

- DCD vs. DBD
  - DCD – Donation after circulatory death
  - DBD – Donation after brain death
    - Primary difference
      - Additional injury to the kidney in form of warm ischemia time.
    - WIT – warm ischemia time
      - Calculated as time from withdrawal to cold perfusion
        - Includes 5 min of silence

Types of Deceased Donor Kidney Transplants

- Summers et. al.
  - Reviewed DCD transplant practices in U.K.
    - 50% increased risk of delayed graft function in DCD kidney transplants compared to DBD
    - 5 and 10 year graft survival
      - DCD – 85.9% and 74.9%
      - DBD – 84.5% and 74.3%
    - Primary non-function
      - DCD – 3.1%
      - DBD – 2.9%
Types of Deceased Donor Kidney Transplants

- DCD/ECD
  - Locke et. al.
    - 1993-2005 total 170,668
      - DCD = 2562
  - Findings
    - DCD <50 yo with CIT >24 hr and pulsatile perfusion had worse allograft survival
    - DCD > 50 yo had 60% greater risk of graft loss greater than 15% reduction in DCGS compared to DCD < 50 yo
    - CIT was strongly correlated to increased delayed function and DGF was reduced by 15% when CIT was <12 hrs

Types of Deceased Donor Kidney Transplants

- Conclusion
  - Better utilization of ECD and DCD donor kidneys has increased the total number of transplants in the U.S.
  - KDRI/KDPI is an effective scoring system to better aid the transplant surgeon in choosing the right kidney for the right recipient
  - Transplanting elderly recipients with ECD or higher KDPI allografts has clear survival benefits when compared to remaining on the waitlist
  - DCD allografts have increased DGF but similar overall survival compared to DBD
  - Reduction CIT to < 12 hrs decreases DGF in DCD allografts
  - DSB allografts from donors < 50 yo have improved survival compared to those > 50 yo