Infectious Disease Considerations in Organ Donation

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Chief Medical Officer

DONATE LIFE UW ORGAN AND TISSUE DONATION
Screening Donors and Infectious Disease considerations:

• Deceased Donor Screening
• Donors at “increased risk” for transmission of viral illness
• HIV and the HOPE Act
Screening Deceased Donors

- HIV antibody and NAT when PHS risk*
- Hepatitis B: HBsAg, HBcAb
- Hepatitis C Ab and RNA or NAT testing
- Syphilis Screening
- Toxoplasma Ab test
- Cytomegalovirus testing
- Epstein-Barr Virus serological testing
- Blood and urine cultures

OPTN Policies 2.7, 2.8 and 14.4
http://optn.transplant.hrsa.gov/policiesAndBylaws/policies.asp
Donor-Derived Infections: Screening

Exposure → Viremia → Nucleic acid testing → Serologic testing → Serologic conversion

SEROLOGIC WINDOW

NAT WINDOW

<table>
<thead>
<tr>
<th>Virus</th>
<th>Serology</th>
<th>NAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td>22 days</td>
<td>5-9 days</td>
</tr>
<tr>
<td>HBV</td>
<td>44 days</td>
<td>22 days</td>
</tr>
<tr>
<td>HCV</td>
<td>66 days</td>
<td>5-7 days</td>
</tr>
</tbody>
</table>
Transmission of Hepatitis C Virus From Organ Donors Despite Nucleic Acid Test Screening

- 2011, 25yo hx IVDA died Overdose
  - four organs to four recips, two had prior HCV
  - Two contracted HCV
- 2012, 35y man hx IVDA died crash
  - two kidneys to two recips
  - One recipient contracted HCV
- 2013, 38y man died assault, hx IVDA
  - Gave 6 organs to 5 recipients
  - One had prior HCV infection
  - Two recipients contracted HCV
Donors at increased risk for transmission

Past 12 m:

- Sexual partner with HIV/HBV/HCV
- Men sexually active with men, or their sexual partner
- Sex in exchange for $ or drugs, or partner of
- Inject drugs, or sexual partner of
- In jail 72+hours
- Newly diagnosed or Rx for STD
- Child <18m born to mother with above risk
- Child <12m breastfed from mother with above risks
- Dialysis
OPTN-Defined Increased Risk Donors

- OPTN Policy 15.3: Informed Consent of Transmissible Disease Risk
  - Requires special informed consent when using an “PHS increased risk” donor
  - Requires post-transplant follow-up for disease transmission

<table>
<thead>
<tr>
<th>Risk per 10,000 donors</th>
<th>HIV ELISA</th>
<th>HIV NAT</th>
<th>HCV ELISA</th>
<th>HCV NAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window Period</td>
<td>22 days</td>
<td>9 days</td>
<td>66 days</td>
<td>7 days</td>
</tr>
<tr>
<td>Men who have sex with men</td>
<td>8.3</td>
<td>3.4</td>
<td>36.0</td>
<td>3.8</td>
</tr>
<tr>
<td>IV Drug Users</td>
<td>12.9</td>
<td>5.3</td>
<td>350.0</td>
<td>37.8</td>
</tr>
<tr>
<td>Hemophiliacs</td>
<td>0.05</td>
<td>0.02</td>
<td>0.46</td>
<td>0.05</td>
</tr>
<tr>
<td>Prostitutes</td>
<td>2.9</td>
<td>1.2</td>
<td>107.8</td>
<td>11.5</td>
</tr>
<tr>
<td>Partner with the above</td>
<td>2.7</td>
<td>1.1</td>
<td>126.2</td>
<td>13.5</td>
</tr>
<tr>
<td>Blood product exposure</td>
<td>1.3</td>
<td>0.5</td>
<td>22.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Incarceration</td>
<td>1.5</td>
<td>0.6</td>
<td>68.6</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Transplantation Risks and the Real World: What Does ‘High Risk’ Really Mean?

**Medications**
- Liver wait list - MELD 15-20
- Kidney ECD - age 50-64
- Living liver donor - mortality
- AIDS from “High risk” donors
- Living kidney donor - mortality
- AIDS from all donors

**Work**
- Liver wait list - MELD 15-20
- Kidney ECD - age 50-64
- Living liver donor - mortality
- AIDS from “High risk” donors
- Living kidney donor - mortality
- AIDS from all donors

**Transportation**
- Liver wait list - MELD 15-20
- Kidney ECD - age 50-64
- Living liver donor - mortality
- AIDS from “High risk” donors
- Living kidney donor - mortality
- AIDS from all donors

**Recreation**
- Liver wait list - MELD 15-20
- Kidney ECD - age 50-64
- Living liver donor - mortality
- AIDS from “High risk” donors
- Living kidney donor - mortality
- AIDS from all donors

Notes: Vertical axes are on a log scale.

AIDS risk reflects assumption that all recipients infected with HIV convert to AIDS. The actual proportion may be less than 100% (see text).

Source: Medical, work, transportation, and recreation risks are from Cohen and Neumann\[18\]

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American Journal of Transplantation
HOPE IN ACTION
HIV/AIDS: What are your reference points?
Quick Vocabulary Check

• AIDS victims, HIV patients
  – People Living with HIV (PLWH), People Living with AIDS (PLWA) (PLWHA)

• “Innocent” AIDS patients/victims
  – People can contract HIV in many ways
  – Differentiating for “innocence” implies guilt

• People with AIDS are homeless, drug addicts, etc.
  – HIV crosses all lines: racial, class, gender, sexual orientation
    • Trauma informed language: People experiencing homelessness, people experiencing drug addiction
HIV Organ Policy Equity (HOPE) Act
HOPE Act Mandates

• Directs the Secretary to revise current regulations (specifically, 42 CFR 121.6)  
  – June 2015

• Directs Secretary to publish research criteria relating to HIV+ to HIV+ transplant  
  – November 2015

• Requires the OPTN to revise standards for the acquisition and transportation of donated HIV+ organs  
  – November 2015
Getting HOPE in Action

• Learn if the use of HIV+ deceased donor organs for transplant is feasible, safe, and effective in the U.S.

• Reduce the organ shortage for HIV+ and HIV- individuals alike. “It’s not just who gets the transplant...it’s who moves “up” behind them.”

• Save lives.
HIV+ Donor Potential

Estimating the Potential Pool of HIV-Infected Deceased Organ Donors in the United States

B. J. Boyarsky\textsuperscript{a}, E. C. Hall\textsuperscript{a,b}, A. L. Singer\textsuperscript{a}, R. A. Montgomery\textsuperscript{a}, K. A. Gebo\textsuperscript{c,d,e} and D. L. Segev\textsuperscript{a,d,*}

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\textsuperscript{b}Department of Surgery, Georgetown University School of Medicine, Washington, DC
\textsuperscript{c}Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, MD
\textsuperscript{d}Department of Epidemiology, Johns Hopkins School of Public Health, Baltimore, MD
\textsuperscript{e}HIV Research Network, Baltimore, MD
\textsuperscript{*}Corresponding author: Dorry L. Segev, dorry@jhmi.edu

- 2000-2008
- 2 national registries (NIS, HIVRN)
- Excluded those with missing data and medical contraindication
- 500+ donors per year

HOPE IN ACTION
Donor Potential:

Wisconsin - Rates of Persons Living with Diagnosed HIV, 2013

Illinois - Rates of Persons Living with Diagnosed HIV, 2013

Rates displayed are the number of cases per 100,000 people.
*Data not shown to protect privacy because of a small number of cases and/or a small population.
**State health department, per its HIV data re-release agreement with CDC, requested not to release data to AIDSVu. See Data Methods for more information.

NOTE: There are no county-level maps for Alaska, District of Columbia, and Puerto Rico because there are no counties in these states.
Talk Recipient Potential

★Johns Hopkins Hospital
★Columbia University Medical Center
★University of California, San Francisco
★Northwestern Feinberg School of Medicine
★Icahn School of Medicine at Mount Sinai
★Duke University Medical Center
★University of Washington
★Rush University Medical Center
★Methodist Dallas Medical Center
★Emory University
★Yale School of Medicine
★New York Presbyterian Hospital
★Virginia Commonwealth University
★Indiana University School of Medicine
★University of Alabama at Birmingham
★David Geffen School of Medicine at UCLA
★Cleveland Clinic Foundation
★Drexel University
★University of Maryland School of Medicine
★Massachusetts General Hospital
★Miami Miller School of Medicine
★Saint Barnabas Medical Center
★University of Pennsylvania
★Medstar Georgetown Transplant Institute
★University of Colorado Denver
False Positive Donor Potential

Another benefit of the HOPE Act and HOPE in Action Study is the ability to place organs from donors who had a suspected false positive result. Six donors have been able to save lives, including pediatric patients.
### HOPE ACT, unanticipated result

<table>
<thead>
<tr>
<th>HIV-FALSE POSITIVE DONORS</th>
<th>Donor 1</th>
<th>Donor 2</th>
<th>Donor 3</th>
<th>Donor 4</th>
<th>Donor 5</th>
<th>Donor 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Characteristic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (yr)</td>
<td>25</td>
<td>44</td>
<td>32</td>
<td>23</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>Male</td>
<td>Male</td>
<td>Male</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Race</td>
<td>African American</td>
<td>Caucasian</td>
<td>Hispanic</td>
<td>African American</td>
<td>Caucasian</td>
<td>Caucasian</td>
</tr>
<tr>
<td>Blood type</td>
<td>O</td>
<td>A</td>
<td>O</td>
<td>A</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>KDPI</td>
<td>28</td>
<td>30</td>
<td>25</td>
<td>58</td>
<td>9</td>
<td>41</td>
</tr>
<tr>
<td>Cause of death</td>
<td>Head Trauma (Gunshot Wound)</td>
<td>CVA/Stroke</td>
<td>Head Trauma (Blunt Injury)</td>
<td>CVA/Stroke</td>
<td>Head Trauma (Gunshot Wound)</td>
<td>Anoxia (drowning)</td>
</tr>
<tr>
<td>Increased infectious risk</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>HIV nucleic acid test (result)</td>
<td>PROCLEIX ULTRIO Plus (negative)</td>
<td>Roche Cobas TaqScreen MPX Test, version 2.0 (negative)</td>
<td>Gen-Probe Procleix Ultro TMA Assay (negative)</td>
<td>Gen-Probe Procleix Ultro TMA Assay (positive) HBV, HCV, HIV, discriminatory (negative)</td>
<td>Roche Cobas TaqScreen MPX Test, version 2.0 (positive)</td>
<td>Gen-Probe Procleix Ultro TMA Assay (negative)</td>
</tr>
<tr>
<td>Organs transplanted</td>
<td>Liver, 2 kidneys</td>
<td>Liver, 2 kidneys</td>
<td>Liver, 2 kidneys</td>
<td>Liver, 2 kidneys</td>
<td>Simultaneous liver-kidney, kidney</td>
<td>Double kidneys</td>
</tr>
</tbody>
</table>
Feasible, Safe, Effective: South Africa

An opportunity to lead: South Africa started the process...the U.S. can expand and innovate

• In South Africa, Dr. Elmi Muller began performing HIV-to-HIV transplants in 2008 due to a critical need not unlike that facing transplant candidates in the US.

• More than 5 years after the first South African HIV-to-HIV transplants--27 HIV-to-HIV transplants to date--Dr. Muller reports ongoing success.

• 93% (25) of these initial recipients continue to experience good health and favorable long-term graft survival (1 year-93%, 3 year-84%, 5 year-84%).
South African Experience

27 cases with 5 year follow up data

<table>
<thead>
<tr>
<th>Category</th>
<th>South Africa</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>53 million</td>
<td>316 million</td>
</tr>
<tr>
<td>Estimated living with HIV</td>
<td>5.6 million</td>
<td>1.1 million</td>
</tr>
<tr>
<td>HIV prevalence (15-49 years)</td>
<td>17.8%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Predominant subtype</td>
<td>HIV-1, Group M, Subtype C</td>
<td>HIV-1, Group M, Subtype B</td>
</tr>
<tr>
<td>Estimated annual deaths among HIV+</td>
<td>310,000</td>
<td>17,000</td>
</tr>
<tr>
<td>Transmitted drug resistance</td>
<td>&lt;5%</td>
<td>10-18%</td>
</tr>
<tr>
<td>Kidney transplants performed in 2013</td>
<td>229</td>
<td>16,896</td>
</tr>
</tbody>
</table>

Our early experience:

- **Feb 2016:** 49y HIV+ brain dead after stroke. Consented. Ruled out for CD4+ 70 and history *Pneumocystis*
- **March 2016:** 44y HIV/HCV brain dead after VF arrest. Consented. Developed MSOF, ruled out.
- **March 2016:** 25y no PMH/ current *coccidioidomycosis* meningitis, newly diagnosed HIV. Ruled out
- **November 2016:** DNWest first HOPE Donor
March 30, 2016: First HIV+ Donor

HIV-positive organ transplant now possible

HIV-positive to HIV-positive organ donation
1,000 lives could be saved every year
Hospital Education

• Ban on HIV+ donors since 1988 is ingrained

• Start with hospital outreach
  – IRB approval letter
  – Letter to CEOs
  – Brochures
Check your State Laws

- Learned that CA had its own Health and Safety Code prohibiting HIV+ donors
- Went to CA State Assembly in June 2016
- Other states have similar statutes!
Specific Training on HIV:

• Expanded education
  – hospital teams
• Target the Clinical Coordinators:
  – What is a CD4+ count?
  – Viral Load?
  – AIDS and defining conditions
  – opportunistic infections
  – Identifying and consulting with the ID physician
Family Support/Auth Process

- Collaborate with hospital: who discloses new dx?
- Next steps if ruled out-
  - Language for HOPE Act and research potential
  - blood draw to expand future donor pool
  - 2 very disappointed families in our experience
- Media considerations
First Person Authorization

- CA and 50% of states, “research” included in FPA
  - “transplantation, education and/or research”
- HOPE Act OPO responsibilities, section 4 p9:
  - “Obtain research consent from the next of kin”
  - Clarified: disclosure per usual practice and UAGA
- Complete addendum if state FPA does not include research
Donor Workup and Mgmt

• Typical donor management begins with “discontinue all other previous medications” and a standardized order set implemented

• Keep donor on their anti-retroviral regimen!!
HOPE IN ACTION TO DATE

HIV-to-HIV Transplants Save Lives

Lives Saved by Transplant: 26
Organ Donor Heroes: 11
Transplant Center Partners: 19
Organ Procurement Organizations: 15

Visit transplantepi.org for more about HOPE
Register to be an organ donor at registerme.org