Disclosures

- I have no relevant financial relationships to disclose.
Types of Organ Donation

- LIVING
- DECEASED
  - By cardiorespiratory criteria ("DCD")
  - By neurological criteria ("brain dead")

Organ Donation Process

- Hospital contacts Mid-America Transplant about potential donor
- Declaration of brain death and consent
- Mid-America Transplant evaluates and transports donor to Mid-America Transplant facility
- Mid-America Transplant: ICU, CCRN, CT, cath lab, surgery suite, lab

- Organ Donation Process
  - Manage donor to optimize organ function in the ICU
  - Allocation of organs
  - Set OR time
  - Surgeons arrive at OR
  - Organs procured and transported
  - Transplantation occurs at transplant center
What organs can be donated?

Organs Transplanted

![Graph showing organs transplanted over time]

Livers and Kidneys comprised 80% of all organs transplanted.
## Donor Age Limit

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Age Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart</td>
<td>55 years</td>
</tr>
<tr>
<td>Lung</td>
<td>60</td>
</tr>
<tr>
<td>Liver</td>
<td>75</td>
</tr>
<tr>
<td>Kidney</td>
<td>70</td>
</tr>
<tr>
<td>Pancreas</td>
<td>50</td>
</tr>
</tbody>
</table>
Labs

- ABO typing
- Serology
  - HIV, HBV, HCV: (antibody and NAT)
  - RPR
  - EBV
  - CMV
  - (toxoplasma, strongyloides, Zika)
- HLA
Donor Management

Management of the Potential Organ Donor in the ICU: Society of Critical Care Medicine/American College of Chest Physicians/Association of Organ Procurement Organizations Consensus Statement

Crit Care Med 2015; 43: 1291-1325

Donor Management

- Flight nurse
- RT
- Xray tech
- Insert a-line
- Insert central lines with US
- Bronchoscopy
- Liver biopsy
- Lymph node dissection
- OR nurse
- Manage donor HOB in OR

- Hemodynamics
- Normothermic
- Urine output, renal function
Donor Management

- Corticosteroids

Donor Management

- Antibiotics
- Ventilator management and respiratory care
- Supportive care, e.g. lacrilube and tape eyelids shut

Donor Management

- Antibiotics

**VENTILATOR MANAGEMENT AND RESPIRATORY CARE**

- Supportive care, e.g. lacrilube and tape eyelids shut
Lung Donor Criteria

- Age <60
- Smoking hx <20 pk-yr
- No significant lung disease (asthma, COPD)
- Clear CXR
- P/F ratio >300
- Acceptable pulmonary compliance
- Acceptable FOB, no gastric aspiration
- No previous cardiopulmonary surgery
Principles of Mechanical Ventilation in Potential lung Donor Patients

<table>
<thead>
<tr>
<th>Objective</th>
<th>Parameters Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention of overdistention</td>
<td>Tidal volume 6-8 mL/kg IBW, plateau pressure &lt; 30 cm H2O</td>
</tr>
<tr>
<td>Maintain alveolar recruitment</td>
<td>Adequate PEEP 8-10 cm H2O</td>
</tr>
<tr>
<td>Prevention of oxygen toxicity</td>
<td>Lowest FiO2 (≤ 0.5) to keep SpO2 92%-95%</td>
</tr>
</tbody>
</table>

Mid-America Transplant Lung Donor Protocol

- Vt 6-8 ml/kg IBW
- Rate to achieve PaCO2 35-45 mm Hg
- Flow rates to achieve I:E = 1:1
- Add pause as needed to achieve I:E ratio
- Plateau press <30
- PEEP 8-10 at baseline
- FOB q 8 hrs as needed
- FiO2 ≤ 50, to avoid O2 toxicity

- Use In-line suction to avoid de-recruitment
- Albuterol nebs, suctioning, heated humidity
- Intrapulmonary percussive ventilation (IPV)
- Increase PEEP to 15 cm after suctioning and FOB for 15-20 min
- Recruiting lung if P/F <300, after volume resuscitated, by increasing PEEP to 15-20 cm H2O, increased IP 30, or increased TV 1.5 x
Ex Vivo Lung Perfusion

- Poor quality lungs, infiltrates, edema, ↓P/F
- Lungs procured, ventilated and perfused at 37 degrees for 4-6 hrs

- Cold ischemia slows cell death.
- Normothermia, with ventilation and perfusion, potentially allows organ healing.

IN THE NEW ENGLAND JOURNAL OF MEDICINE

ORIGINAL ARTICLE

Normothermic Ex Vivo Lung Perfusion in Clinical Lung Transplantation

Mervick Card, M.D., Jonathan C. Young, M.D., Wing Tat Lo, M.D., Masaaki Ariyama, M.D., Fenglei Chen, M.D., Ph.D., Wajeeh Kaddou, M.D., Massad Saleh, M.D., Ph.D., John Lambe, R.N., Daron Arai, C.R.A., Manlio Madore, C.C.P., Chong-Wei Chen, M.D., Debrae Chopra, M.D., Michael Heier, M.D., Liane C. Singer, M.D., Arthur S. Shmuel, M.D., Kazukiyo Yamasaki, M.D., Ph.D., Marc de Perrot, M.D., Andrew F. Pierre, M.D., Thomas E. Waked, M.D., Ph.D., and Shaf Keshavjee, M.D.
Ex Vivo Lung Perfusion

- Prospective non-randomized, 111 control pts; 23 EVLP pts
- 20 EVLP lungs improved and were TX (9 DCD)
- P/F ratio increased from 335 to 443
- PGD @ 72 hrs: EVLP 15%, control 30%
- No difference in 30 d mortality, ICU or hospital stay, or duration of mechanical vent
Allocation of Organs

- Blood Type
- Size compatibility
- Medical Urgency
- Age
- Wait Time
- Type of organ needed
- Geographic location between donor & recipient
Lungs transplanted per donor

Distribution graph of all OPOs, 2015

Mid-America Transplant

National average is 0.4 lungs/donor

Causes of death among deceased Lung Donors

Anoxia
Cerebrovascular/stroke
Head trauma
CNS tumor
Other

Percent

Year


American Journal of Transplantation
pages 141-168, 11 JAN 2016 DOI: 10.1111/ajt.13671

#ajt13671-fig-0012
Cold Ischemic Times

<table>
<thead>
<tr>
<th>ORGAN</th>
<th>PRESERVATION TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart</td>
<td>4-6 hrs</td>
</tr>
<tr>
<td>Lung</td>
<td>4-6 hrs</td>
</tr>
<tr>
<td>Liver</td>
<td>8-14 hrs</td>
</tr>
<tr>
<td>Pancreas</td>
<td>12-18 hrs</td>
</tr>
<tr>
<td>Kidney</td>
<td>24-36 hrs</td>
</tr>
</tbody>
</table>
Please Register Today to be an Organ and Tissue Donor and Save Somebody’s Life
Thank You

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