ORGAN DONATION: AN INTEGRATED APPROACH TO SAVING LIVES

Virginia EMS Symposium 2009

Elizabeth Spencer, MPH
Director of Hospital Services & Professional Education
Washington Regional Transplant Community

Christopher P. Michetti, MD
Medical Director, Trauma ICU
Inova Regional Trauma Center
CASE 1: FUTILE CARE?

- 22 year old male with GSW to head
- Large defect right frontotemporal skull, visible brain matter
- Agonal breathing, weak pulse
- Bleeding wound
- BP 80’s, O2 sat 88%
- Pupils fixed, dilated
- Intubated without medications
- Fluids bolused
- Dressing on wound for hemostasis
- Transported to Level 2 Trauma Center with BP 110 and O2 sat 99% after resuscitation
- Still GCS 3 after 90 minutes
CASE 2: IS DONATION AN OPTION?

- Dispatched to home of a 68 year old female diabetic with heart disease
- Found on ground outside house, last seen an hour ago
- Unresponsive, dilated left pupil
- BP 160, shallow breathing
- Temperature 94°F
- Aspirated gastric contents, O2 sat 81%
- Suctioned, has gag
- RSI performed
- Covered to preserve body temperature
- Transported to nearby hospital (stroke center)
- Cerebral edema worsens
- Prognosis poor after gag reflex lost, other pupil dilates
OVERVIEW

- Clinical case presentations
- The need for organ donors
- National trends in organ donation
- Goals and best practices of an effective organ donation process
- Video: personal stories from an organ recipient and a donor family
OVERVIEW

- The donation process
  - Who can be a donor?
  - What clinical conditions allow for donation?
  - How is organ allocation determined?
- How does early patient care in the field and the ER enhance donation potential?
- Myths and Facts about organ donation
- Audience feedback
LACEY’S STORY
More than 105,000 patients wait nationally.
2,600 patients wait in Virginia.

18 people die every day waiting for a life-saving transplant

• For perspective, approximately 30,000 organ transplants occur per year in the US
ORGANS TRANSPLANTED PER MONTH

(12 Month Moving Average)
WHERE WE NEED TO BE...

Collaborative Starts Here
THREE PATHWAYS TO ORGAN DONATION

- Living Donation
  - Related or non-related living donors.

- Organ Donation After Brain Death (DBD)
  - Patients who are declared dead via neurological criteria.
    - “Typical” Organ Donors

- Organ Donation After Cardiac Death (DCD)
  - Patients who are declared dead via cardiac criteria.
    - Pt is vent dependent
    - Family has decided to withdraw life support.
LIVING DONATION
WHAT ORGANS CAN BE DONATED BY LIVING PATIENTS?

Whole organs:
- Kidney

Portions of organs:
- Liver
- Lung
- Intestine
- Pancreas
Deceased organ donors account for approximately \( \frac{3}{4} \) of the organ transplants performed annually in the U.S.
LIVING ORGAN DONOR CANDIDATES

- Good overall physical health
- Good mental health
- Fully informed
- Compatible with intended recipient
  - Or part of an alternative pairing process
THE LIVING DONATION PROCESS

- Potential donor contacts recipient’s transplant center
- Initial screening and information
- Evaluation / work-up
- Donation and transplantation
WHAT ARE THE ALTERNATIVE PATHWAYS TO LIVING DONATION?

- Non-designated, a.k.a. “altruistic” donors
  - No specific recipient in mind

- Potential donor and intended recipient are not clinically compatible matches
  - Referred by transplant center to participating OPOs
Non-Designated Donation

Living/Deceased Donor Swap

Paired Exchange

Waiting List
1. Jane Doe
2. Mary Smith
3. John Brown

Waiting List - A recipients
1. Jane Doe
2. Mary Smith
3. John Brown

Waiting List - B recipients
1. RECIPIENT!!
2. Fred Jones
3. Susan Hall
4. Tim Frank
DBD:
ORGAN DONATION AFTER BRAIN DEATH
DONATION AFTER BRAIN DEATH

- Brain death definition
- How brain death is determined
- How organ donation occurs after brain death
BRAIN DEATH

- Irreversible loss of brain function, including the brainstem
- Circulation continues
  + Heart beat, pulse, rhythm, perfusion
- Determined primarily by clinical exam
- Recognized medically and legally as death since 1968
  + DBD allowed by every state by 1980s
- Large majority Stroke and TBI
BRAIN DEATH

- **Cardinal findings**
  - Coma
  - Loss of brainstem reflexes
  - Apnea

- **Prerequisites**
  - Evidence of compatible CNS condition
  - Absence of confounders
  - Absence of drug intoxication
  - Normal BP & core temperature >32°C (90°F)
Virginia Law 54.1-2972

- Requires examination by 2 licensed physicians
- One physician must be in a neurological specialty
BRAND DEATH EXAMINATION

- Coma: no response to pain in all 4 extremities and supraorbital area
- Absent brainstem reflexes
  + Pupils
  + Corneal
  + Gag
  + Cough
  + Vestibulocochlear
  + Oculocephalic
- Apnea test...
APNEA TEST

- Start with normal BP, temperature, pCO2
- Preoxygenate
- Disconnect ET tube from ventilator
- Reconnect for breathing, unstable BP or O2
- After 10 minutes, draw ABG and reconnect
- Apnea confirmed by
  + No respiratory movement
  + Rise in pCO2 to 60mmHg or
  + 20mmHg above normal baseline
BRAIN DEATH: AN IN-HOUSE DIAGNOSIS

- 2 exams needed, often separated in time
- Apnea test requirement
- Shock reversed
- Drugs or alcohol metabolized
- Temperature corrected
- Cause reasonably determined
CONFIRMATORY TESTS

- Confirm equivocal exams
- Aid diagnosis where accurate or complete exam not possible
  - severe facial trauma
  - high spinal cord injury
- Nuclear brain flow study
- Cerebral angiogram
**AFTER THE DIAGNOSIS**

- Preparation of family *before* the exam
- Discussion with family *after* exam
  - Understanding of brain death as death
- Patient transferred to OPO service
  - Maintenance of normal physiology
  - Assessment of organ suitability
  - Allocation
- Organ Recovery...
ORGANS AVAILABLE FOR TRANSPLANTATION

- Heart
- Lung(s)
- Liver
- Kidney(s)
- Pancreas
- Small Intestine

*Potential Lives Saved From 1 Organ Donor = 8*
ORGAN RECOVERY IN DBD

- Up to 8 organs may be recovered
- In OR; Sterile procedure
- Organs flushed with solution
  - Clear blood & metabolic waste
  - Rapid cooling of tissues
  - Preserve cell homeostasis until reperfused
- Organs removed with vessels/tissues
- Packaged steriley in cold storage (ice) or machine perfusion (kidneys)
DCD: ORGAN DONATION AFTER CARDIAC DEATH
DONATION AFTER CARDIAC DEATH

- Donation after irreversible cessation of circulatory and respiratory function
  + “usual” death
- Method of organ donation prior to 1968
- Process
  + Candidate selection
  + Life-sustaining interventions withheld
  + Organs recovered after death pronounced
WHO IS ELIGIBLE FOR DCD?

- Devastating non-recoverable condition
- Mechanically ventilated
- Likely to die within 60” of withdrawal of care
- Legal next of kin and medical team decide (based on patient’s wishes) to withhold support: Comfort Care
- After the decision for comfort care, OPO approaches family with donation option
WITDRAWAL OF LIFE SUPPORT

- In operating room (rarely, ICU)
- Full support continues until withdrawal
- Medical team accompanies patient
- Patient prepped and draped in OR
- Preparation
  - heparin, steroids, bicarbonate, mannitol given
WITHDRAWAL OF LIFE SUPPORT

- No member of transplant team present
- Family *may* be present
- Palliative care
  - Fluids, drips, medications stopped
  - Extubation
  - Sedation and analgesic drips + PRN doses
- Death pronounced
  - EKG leads correct + apnea + coma + pulselessness by arterial line
  - 5” nonperfusing rhythm: asystole, Vfib, PEA
60 MINUTES

- Death confirmed within 60 minutes allows organ recovery
- Depending on ischemia time
  - Kidneys
  - Liver
  - Pancreas
  - Lungs
- If >60”, back to ICU
Best practices = effective practices
Goals set to define best practice and allow measurement and comparison
You treasure what you measure
Sharing data and ideas nationwide
  + What are others doing to achieve results?
  + How can we use those strategies at home?
BENCHMARKS

- 100% referral rate
- 100% appropriate requestor rate
- 75% conversion rate
- 3.75 organs transplanted per donor
- >10% of donors from DCD
Refer 100% of deaths and impending deaths

Timely referral is key
- Time to evaluate suitability, OPO/clinician collaboration, prepare family, allocate organs
- Progression of brain death to somatic death
- Prolonged management of brain dead patients risks organ suitability
KEY TO TIMELY REFERRAL: TRIGGERS

- Every death or imminent death
- Mechanical ventilation and any of:
  - GCS ≤5 off sedation with traumatic brain injury or nontraumatic SAH
  - Brain death testing to be initiated
  - Patient made DNR or family considering comfort care measures
  - Care to be withheld per wishes

To Comply With Hospital Policy, State & Federal Law
CALL WRTC ON EVERY DEATH OR IMMINENT DEATH
WASHINGTON REGIONAL TRANSPLANT CONSORTIUM
703-641-0100
Please call WRTC for a patient on mechanical ventilation and meeting any of the following triggers:
- Glasgow Coma Scale of 5 or less with brain injury or nontraumatic SAH
- Brain death testing to be initiated
- Patient being made DNR or family considering comfort care measures
- Life sustaining therapy to be withdrawn pursuant to the family's decision (Call PRIOR to D/C of Vent Support)
THE REQUEST: RIGHT PERSON AT THE RIGHT TIME

- Family must understand brain death
- Temporal dissociation between death discussion & donation discussion
- No mention of donation before the formal request
- Experienced and trained requestors (OPO) get more positive decisions
Why No Mention Of Donation?

- Perceived conflict of interest
- Donation suitability not known – false hope?
- Family needs time to process death
- Donor designation should be determined first
  - family request vs. patient’s wishes
<table>
<thead>
<tr>
<th>Requestor</th>
<th>Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician</td>
<td>25%</td>
</tr>
<tr>
<td>Other hospital staff</td>
<td>37.5%</td>
</tr>
<tr>
<td>All non-WRTC</td>
<td>30%</td>
</tr>
<tr>
<td>WRTC</td>
<td>66%</td>
</tr>
</tbody>
</table>

Inova Fairfax Hospital 2006
CONVERSION RATE

- CR = #actual / # “eligible” organ donors
- Core measure of success
- 2003 WSJ/Harris poll: 63% Americans want their organs donated after death
- National CR confirms majority opinion
- Medical professionals work to provide this option for those who want it
- An eye toward improvement
VARIATION IN DONATION CONVERSION RATES

Nation’s 300 Largest Hospitals: 2003
Potential 8 organs donated per BD donor
Want to maximize OTPD – but how?
Modifiable factors affecting organ suitability
- Ischemia
- Hypoxia
- Infection
MINIMUM 10% DCD RATE

- Rate of DCD increasing
  - 189 DCD donors in 2002
  - 645 DCD donors in 2006
    - 8% of all deceased donors

447 DCD donors in 2009*  *Jan – June alone

- Concerted effort to increase DCD
  + Triggers!
- DCD policy made a Joint Commission standard in 2007
HOW ARE ORGANS ALLOCATED?

- Potential recipients are listed through United Network for Organ Sharing (UNOS).
- OPO generates lists for each potentially transplantable organ for each donor.
- Organs are offered based on the list.
  - Local allocation
  - Regional allocation
  - National allocation
WHAT DETERMINES POSITION ON THE UNOS WAITING LIST?

- Organ allocation is based on three criteria:
  + Medical urgency
  + Medical match
    - Blood type
    - Height
    - Weight
  + Time on the waiting list.
ROLE OF EMS IN THE ORGAN DONATION PROCESS
How does treatment of 1 patient by pre-hospital providers enable multiple lives to be saved?

- Pre-hospital care directly influences the 2 main determinants of organ suitability
  + Oxygenation and Perfusion

- Timely TBI resus = 2 good outcomes
EMS INFLUENCE ON DONATION OUTCOME

- Does the patient you’re treating want to be a donor?
- Every response to a devastating “nonsurvivable” condition means you might be saving up to 8 lives
- Not theoretical!
  - 18 people die each day waiting for an organ transplant
EMS INFLUENCE ON DONATION OUTCOME

- Shock resuscitation
- Reverse/prevent hypothermia
- Treating hypoglycemia
- Short transport
- Transport to appropriate facility for definitive care
- Accurate documentation: timing of sedatives, narcotics, paralytics
- Promoting education & public awareness
Through organ donation, resuscitation in seemingly futile cases is *not* ultimately futile.

- Does this benefit anyone but the organ recipients?
- Is thinking about donation potential a conflict of interest?
RAY OF HOPE

DEATH

REBIRTH

LIFE

RAY OF HOPE
FIRST PERSON CONSENT

- Donor Designation
  A documented, legally binding commitment by an individual to make an anatomical gift that can be revoked only by that individual

- Donor Designation Rate
  The rate of increase in registered donors out of all new and renewing licensed drivers/IDs
NATIONWIDE DONOR DESIGNATIONS OF LICENSED DRIVERS
(50 STATES AND DISTRICT OF COLUMBIA)

- 40.7%
- Goals: 100 million
  50%

Period ending 6/30/09

207,998,790 totalLicensed drivers
83,726,900

Designated Donors
NATIONAL IMPACT ON DONATION

Designated Donors as % of Recovered Donors

June 30, 2009

- Organ Donors: 28.0% in 52 states
- Tissue Donors: 32.0% in 49 states
- Eye Donors: 37.0% in 38 states
### TOTAL DONOR DESIGNATIONS BY STATE
**AS OF JUNE 30, 2009**

<table>
<thead>
<tr>
<th>State</th>
<th># Designated</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL</td>
<td>5,366,317</td>
</tr>
<tr>
<td>CA</td>
<td>5,104,371</td>
</tr>
<tr>
<td>OH</td>
<td>4,825,594</td>
</tr>
<tr>
<td>NC</td>
<td>4,644,663</td>
</tr>
<tr>
<td>IL</td>
<td>4,592,622</td>
</tr>
<tr>
<td>PA</td>
<td>4,187,410</td>
</tr>
<tr>
<td>GA</td>
<td>3,486,526</td>
</tr>
<tr>
<td>VA</td>
<td>3,371,730</td>
</tr>
<tr>
<td>WA</td>
<td>3,222,566</td>
</tr>
<tr>
<td>IN</td>
<td>3,190,000*</td>
</tr>
</tbody>
</table>

**8th**

<table>
<thead>
<tr>
<th>State</th>
<th># Designated</th>
</tr>
</thead>
<tbody>
<tr>
<td>MO</td>
<td>2,574,471</td>
</tr>
<tr>
<td>WI</td>
<td>2,338,600</td>
</tr>
<tr>
<td>MN</td>
<td>2,234,936</td>
</tr>
<tr>
<td>CO</td>
<td>2,200,000*</td>
</tr>
<tr>
<td>OR</td>
<td>2,044,017</td>
</tr>
<tr>
<td>MA</td>
<td>2,036,033</td>
</tr>
<tr>
<td>MD</td>
<td>2,000,000*</td>
</tr>
<tr>
<td>NJ</td>
<td>1,945,698</td>
</tr>
<tr>
<td>NY</td>
<td>1,808,180</td>
</tr>
<tr>
<td>LA</td>
<td>1,757,406</td>
</tr>
</tbody>
</table>

*Estimated
NATIONAL VS VIRGINIA IMPACT

June 2009: National vs. Virginia

% of Recovered Donors from Save7lives Registry

Organ Donors
- National: 27.0%
- Virginia: 43.0%

Tissue Donors
- National: 30.0%
- Virginia: 52.0%

Eye Donors
- National: 37.0%
- Virginia: 40.0%

National Level
## DONOR DESIGNATION RATE BY STATE

### Q2 2009

<table>
<thead>
<tr>
<th>State</th>
<th># Designated</th>
<th>ADL Issued</th>
<th>Desig Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK</td>
<td>9,126</td>
<td>18,601</td>
<td>49%</td>
</tr>
<tr>
<td>IN</td>
<td>55,454</td>
<td>113,497</td>
<td>49%</td>
</tr>
<tr>
<td>SC</td>
<td>77,937</td>
<td>160,363</td>
<td>49%</td>
</tr>
<tr>
<td>PA</td>
<td>309,041</td>
<td>685,261</td>
<td>45%</td>
</tr>
<tr>
<td>NE</td>
<td>58,829</td>
<td>136,157</td>
<td>43%</td>
</tr>
<tr>
<td>HI</td>
<td>13,585</td>
<td>33,289</td>
<td>41%</td>
</tr>
<tr>
<td>OR</td>
<td>46,389</td>
<td>117,218</td>
<td>40%</td>
</tr>
<tr>
<td>CT</td>
<td>84,655</td>
<td>231,536</td>
<td>37%</td>
</tr>
<tr>
<td>MO</td>
<td>585,811</td>
<td>1,654,674</td>
<td>35%</td>
</tr>
<tr>
<td>DC</td>
<td>9,065</td>
<td>26,399</td>
<td>34%</td>
</tr>
<tr>
<td>VA</td>
<td>35,542</td>
<td>116,308</td>
<td>31%</td>
</tr>
<tr>
<td>TN</td>
<td>139,473</td>
<td>459,119</td>
<td>30%</td>
</tr>
</tbody>
</table>
MYTHS & FACTS
If they know I am a registered donor, doctors won’t do everything they could to save my life in the hospital.

MYTH!
MYTH OR FACT?

- If someone has hepatitis they can not be an organ donor.
- If someone has hepatitis, they can not receive an organ transplant.

MYTHS!
MYTH OR FACT?

- A lot of religions won’t allow people to donate organs.

MYTH!
MYTH OR FACT?

- People who don’t really want to donate are often coerced or pressured into donating organs.

MYTH!
Even if someone is a full organ donor, an open casket funeral is possible without obvious signs of a donation.
The family of a donor will have to pay some substantial fees in order for their loved one to donate.

MYTH OR FACT?

MYTH!
Sometimes fame or wealth can purchase someone a higher position on the organ donation waiting list.

MYTH!
Recipients will be told everything possible about their organ donor so that they know who gave them a second chance at life.

Trick Question...
Most people would opt for organ donation. Assume that your patients would.

From the moment medical intervention starts, you can deliver care that preserves the option of donation for patients and families in a time of tragedy.

Excellent pre-hospital and early acute care is the foundation of an excellent organ donation system!
THOUGHTS & QUESTIONS

donatelife.org

save7lives.org    BeADonor.org