Take A Breath:
Pulmonary Management of the Organ Donor

Whitni Noyes, RN, CPTC
Midwest Transplant Network
Objectives

• Recognize MTN referral criteria.

• Be familiar with the apnea test for brain death pronouncement.

• Be familiar with basic ventilator donor management goals.

• Know why YOU are so important to donation!
Let’s talk numbers...

- National Waiting List
  - 118,549
- Lung waiting list
  - 1,391
- Transplants in 2016
  - 33,600
- Lung transplants in 2016
  - 2,327
Why?

• Every 10 minutes, someone is added to the waiting list.

• On average, 22 people die a day while waiting for a transplant.
Keeping it close to home

- MTN 2016 donors
  - 228
- 2016 Lungs
  - 103
- Wichita area hospitals (WMC, VCSF, SRHC)
  - 25 lungs!!
How do we know about your patient?

- Imminent Death Criteria
  - Neuro injury
    - Anoxia, trauma, CVA
  - GCS ≤5
    - Assessment of eye opening, painful response and awareness
  - Ventilated
- Referred to MTN from hospital staff within 60 minutes
  - 24/7 call center
Imminent Death

**MAKE THE GOLDEN HOUR CALL THAT CAN SAVE LIVES**

Clinical triggers for Midwest Transplant Network consult:

- **Trauma**
  - *MVC, falls, blunt injury, etc.*
  - **Severe Brain Injury**
    - And
    - **GCS ≤ 5**
    - And
    - **Requiring mechanical ventilation**
  - ****OR****
  - **Severe decline in LOC requiring mechanical vent**

- **Neuroscience**
  - *Aneurysm, ICH, SAH, etc.*
  - **Severe Brain Injury**
    - And
    - **GCS ≤ 5**
    - And
    - **Requiring mechanical ventilation**
  - ****OR****
  - **Severe decline in LOC requiring mechanical vent**

- **Anoxic Injury**
  - *S/p code, hypoperfusion episodic, drowning, seizures, SIDS, hanging, overdose*
  - **Severe Brain Injury**
    - And
    - **GCS ≤ 5**
    - And
    - **Requiring mechanical ventilation**
  - ****OR****
  - **Severe decline in LOC requiring mechanical vent**

- **Other Illnesses**
  - *Primary brain tumor, DKA, meningitis, encephalopathy*
  - **Severe Brain Injury**
    - And
    - **GCS ≤ 5**
    - And
    - **Requiring mechanical ventilation**
  - ****OR****
  - **Severe decline in LOC requiring mechanical vent**

- **Deceleration of Aggressive Therapies**
  - Plan for family conference regarding shift in goals of care to comfort
  - ****OR****
  - Actual shift in goals to comfort measures
    - ****AND****
  - Before deceleration of artificial support

CONSULT MIDWEST TRANSPLANT NETWORK
1-800-366-6791 or 1-913-262-9229 within the golden hour

*Consult Midwest Transplant Network regardless of on-going aggressive therapies, pt age, or co-morbidities*

Register to be a donor at mwtn.org
Death by Neurological Criteria

• American Academy of Neurology guidelines (2010)
  – Must have cause of death
  – Absence of brainstem reflexes
    • Pupils
    • Oculocephalic reflex (doll’s eyes)
    • Facial Sensation
    • Tracheal & pharyngeal reflexes
    • Oculovestibular reflex (cold calorics)
  – Coma
  – Apnea
    • Assure pressure trigger setting
  – Ancillary tests
Ancillary tests...

- EEG
  - Isoelectric line (flat)
- CBF
  - No uptake of isotope
- Angiography
  - 4 vessel angio
- Transcranial Doppler
  - Flow to cerebral vessels
Electroencephalography

Normal

Flat
Cerebral Scintigraphy

Negative

Normal on top, Negative on bottom
Cerebral Angiography

NORMAL BLOOD FLOW

NO BLOOD FLOW
Apnea Exam

• Hospital protocols mirror the AAN guidelines
• Preoxygenate with 100% fiO2
• Normal ABG
  – pH 7.35-7.45
  – pCO2 35-45
• Remove vent & provide “blow by” O2
• Observe for respiratory effort, 8-12 minutes
  – Any instability, exam is aborted and reconnected to vent
• Recheck ABG
  – pCO2 >60 and >than 20 from baseline
Apnea Exam

• Case #1
  – Baseline ABG: 7.32/41/456
  – 10 minutes: 7.14/67/426

• Case #2
  – 6.98/97/65
  – Cerebral angiogram

• Case #3
  – 7.44/34/59
  – 8 minutes: 7.23/59/89
  – 14 minutes: 7.13/72/99

Register to be a donor at mwttn.org
Vent Management

- Initial consultation with RT
  - 10 minutes of “playing” to get the right settings
  - Modified SALT
    - PC, IP 25 and wean to achieve 8ml/kg TV IBW
    - Switch to AC/VC+ after recruitment
    - Recruitment maneuvers: 40x40 Q2
      - Staircase Recruitment
    - Breathing treatments as needed

- Minimal vent settings
  - AC/VC+, 40%, PEEP 8
Vent Management, cont’d

• Bronchoscopy
  – Therapeutic
  – Visual

• O2 Challenge
  – ABGs on 40% & 100%
  – PFR, goal is >350

• Patient positioning
  – Prone
  – High side positioning
Additional considerations

• Limited suctioning
  – Once recruitment starts, suction only with obvious need
• Clamp ETT with disconnection
  – Do not want to lose recruitment
• Transport vent
  – Use transport vent for road trips and trip to OR
• Speak up!!
  – This is still your patient! If you have questions or concerns, let’s talk!

Register to be a donor at mwtn.org
Case Study

- 61/F
- Unresponsive
- Intubated in the ED
- MRI showed bilateral infarcts
- Pronounced brain dead at 1840
- Authorization at 1900
Vent Management

• Pre Apnea
  – 7.43/34/292

• Post Apnea
  – 7.21/74/318

• Vent changes
  – AC/VC+, PEEP 8, rate & volume for ABG

• Recruitment Maneuvers

• Pronation
  – 360 protocol
Additional testing

- CT chest: Mild interstitial edema, mild basilar atelectasis
- Bronchoscopy: Normal, minimal secretions
- CXR: Minimal atelectasis
- Final PO2 521
Outcome

• Liver recovered, but discarded due to biopsy results
• Bilateral kidneys recovered, but discarded due to biopsy results
• Bilateral lungs recovered and transplanted into a 51/M!!!!

Register to be a donor at mwtn.org
Did I forget to mention...

Donor was a 1-1 ½ pack per day smoker for 47 years!!!!!!!
Case Study

- 17 year old male
- MVC
- No chest trauma suspected
- Pronounced with 4 vessel angio due to pulmonary instability
- Initial PO2 was 53
- CXR: Extensive hazy opacities in bilateral lungs, likely edema.
Interventions

- Vecuronium and Narcan
- Solumedrol
- Bronch
- Recruitments started 30x30, then up to 40x40 (hourly)
- Albumin
- Lasix
- Dobutamine
- High left turn
- Positioned prone
- Repeat Vec and Narcan
- Repeat Solumedrol
Outcome

• After 12 hours, PO2 395
• Continued hourly recruitments
• Repeated bronch
• Allocated lungs to 26 year old male
• Final PO2 392
• Hourly recruitments...

–56 hours
Thinking outside the box...

• https://www.youtube.com/watch?v=CUUq7fLMruM&oref=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DCUUq7fLMruM&has_verified=1