The Dead Donor Rule
Pro-Con Debate

Sam D. Shemie

Critical Care Canada Forum Oct 3rd 2017

McGill University Health Centre,
Montreal Children’s Hospital,
MUHC Research Institute
Division of Critical Care

McGill University
Professor of Pediatrics

Canadian Blood Services
Medical Advisor, Deceased Donation
Influences & Disclosures

1. Full time pediatric ICU physician, ECMO specialist & trauma team leader

2. Research and health policy program in organ replacement during critical illness, deceased organ donation and death determination

3. Medical advisor for deceased donation at Canadian Blood Services, a non-profit, government funded organization to coordinate the donation & transplant system in Canada

4. No industry funding

5. No transplant society funding
The Dead Donor Rule

by John A. Robertson

The scarcity of vital organs has prompted several calls to either modify the dead donor rule or interpret it more broadly. Given its symbolic importance, however, the rule should be changed only cautiously.

The medical, ethical and legal foundation for the trust and integrity of the donation & transplant system.
The price of our illusions and myths about the dead donor rule

“the transplantation community has twisted themselves into pretzels creating ethical justifications for increasingly contrived ways to extract functioning organs from people deemed to be dead.”

“Twisting into Pretzels”

1. Scientific advances inform & complicate death
2. The public and health care professionals lack understanding
3. Adhering to theDDR can become convoluted
4. We are losing donors unnecessarily
With informed first person or surrogate consent, death by donation is permissible.
Abandon the DDR?
An Electric Fence around a Nuclear Facility

DANGER
DO NOT TOUCH
NOT ONLY WILL THIS KILL YOU, IT WILL HURT THE WHOLE TIME YOU ARE DYING
‘Dead-donor’ rule dangerously misleading, experts say

Doctors should abandon the policy of having to declare donors dead before their organs can be extracted for transplant, Canadian and Spanish experts say
Worldwide, there are approximately **27,000 deceased donors/year** in 70 countries with deceased donation programs.
Scaring Us To Death?
Alarming Language & Need for Responsible Scholarship

Naffine et al, J Law Med, 2009

• Fear of: death
  mistaken diagnosis of death
  premature declaration of death
  premature removal of organs
  premature burial

Academia and Media
‘truly dead?’
“almost dead?”
“as good as dead?”
“nearly but not quite dead?”
“not completely dead but dead enough?”
Response to Complexity
Death Determination & Deceased Organ Donation

1. Perform research to answer the complex questions.
2. Reset organ donation eligibility prior to death and create an entirely new and larger set of complexities.

Acknowledged Realities:
• Ongoing criticism of death determination are vital
• It may not be as difficult as anticipated to perform research on the imminently or recently dead.
The Difference Between Life and Death
Oxygen & Nutrient Delivery

Monolayer cell culture

Mitochondria

Merten MD, Groupe Recherche Glandes Exocrines, Faculte de Medecine, Marseilles
Biology of Life = Oxygen & Nutrient Delivery

Oxygenated Circulation

Organs as Functioning Parts

Lungs oxygenate
Heart circulates
Blood vessels are conduits
Liver metabolizes
Kidney filters

86 Billion Neurons &
100 Trillion Interconnections
Technology Informs & Complicates Death Determination

Fascination with the Beating Heart
“from ancient times, when the respiration and heart stopped, the brain would die in a few minutes”

“in those times, the heart was considered to be central organ of the body”

“this is no longer valid when modern resuscititative and supportive measures are used”

“characteristics of a permanently nonfunctioning brain”
“no discernable central nervous system activity”
Models for Oxygenated Circulation

Living patients
1. Intrinsic cardiopulmonary support
   • mechanical ventilation, hemodynamic support, cardiac compressions
2. Extrinsic extracorporeal support
   • ventricular assist devices, ECMO

Dead persons
1. Intrinsic cardiopulmonary support
   • somatic support after brain death
   • mechanical ventilation/cardiac compressions in uDCD
2. Extrinsic extracorporeal support
   • normothermic regional perfusion, donor ECMO

Individual organs
• ex-vivo organ support
Circulation without Heart Function
Is not death if you have a machine to provide oxygenated circulation
Death in Modern Times - inevitable but...
Timing is Contingent

Availability and decision to deploy: CPR and/or extracorporeal support
If oxygenated circulation stops to the body or an individual organ, and does not resume within a finite period the body/organ will never function again.
1. When does the heart stop generating circulation?
   = electrical versus mechanical

2. When does the brain cease functioning?
   = are they conscious/aware, can they suffer?

3. Can the heart resume spontaneously?
   = autoresuscitation = will they return to life?

4. What happens if oxygenated circulation resumes?

5. What is the outer limit of brain resuscitatability?
Loss of Neurological Function after abrupt Circulatory Arrest

1. Clinical loss of consciousness: 4-21 seconds

2. Isoelectric EEG: 10-30 seconds
   - May occur prior to circulatory arrest in progressive hypoxia-ischemia

Electroencephalographic Recordings During Withdrawal of Life-Sustaining Therapy Until 30 Minutes After Declaration of Death

Loretta Norton, Raechelle M. Gibson, Teneille Gofion, Carolyn Benson, Sonny Dhanani, Sam D. Shemie, Laura Hornby, Roxanne Ward, G. Bryan Young

ABSTRACT: Background: The timing of the circulatory determination of death for organ donation presents a medical and ethical challenge. Concerns have been raised about the timing of electrocerebral inactivity in relation to the cessation of circulatory function in organ donation after cardio-circulatory death. Nonprocessed electroencephalographic (EEG) measures have not been characterized and may provide insight into neurological function during this process. Methods: We assessed electrocortical data in relation to cardiac function after withdrawal of life-sustaining therapy in four patients in a Canadian intensive care unit.
Death Prediction and Physiology after Removal of Therapy

The DePPaRT Study
Progress to Aug 2017

- **Total Active Sites:** 20
  - 16 in Canada, 3 in Czech Republic, 1 in Netherlands
  - 1 pediatric (CHEO)
- **Total Enrollment:** 555 patients
  - 7 pediatric patients
  - 235 international patients
  - 57 DCD patients
- **Consent rate:** 94% (33 refusals out of 577 asked)
  **Protocol compliance:** ~90%
- **Planned study completion:** ~December 2017

1. Autoresuscitation
2. Predictors of death after withdrawal of life sustaining treatment
3. Family experiences
Vital signs during dying process after withdrawal of life sustaining therapy
Prospective study of CT-perfusion in clinical brain death

• Prospective multicenter diagnostic test study

• Population:
  – Deeply comatose patients (n=300) with no factors preventing clinical brain death exam

• Test: CT-Perfusion (with secondary CTA reconstruction)

• Comparator: Complete clinical examination

• Outcome: SE + SP with 95% LCI >95%
  – Expected SE/SP 97.5% ME ± 2.5%
If They Are Likely to Die….
But They Are Not Dead….

1. Anencephalic infants
2. Executed prisoners
3. Euthanasia
4. ICU patients - withdrawal of life sustaining treatments

More or less complicated?
European Variation in EOL Care
37 ICU`s, prospective, (n=4248)

Adapted from Sprung et al, Ethicus Study, JAMA, 2003

Withdrawal of All Active Treatment
Wide Variation in United Kingdom ICU’s

Wunsch et al, Int Care Med, 2005
Life Sustaining Treatment to Death

- 69% extubated
- 65% all Rx withdrawn
- 80% all Rx withdrawn within 10 minutes
- Median time to death 75 minutes

6 patients, 1.2% discharged from hospital alive

Characteristics of Withdrawal of Life Support Practices in ICU

Substantial practice variation depends on:

1. Patient factors:
   - disease/acuity
   - cognitive function
   - advance directives
   - ethnocultural attitudes

2. Physician factors:
   - religious background
   - subspecialty
   - practice style
   - geography
   - ICU/hospital culture
Response to Complexity

Death Determination & Deceased Organ Donation

1. Perform research to answer the complex questions.
2. Reset organ donation eligibility prior to death and create an entirely new and larger set of complexities.
Single Unified Brain-Based Determination of Death
Permanent Arrest of Brain Function
After Primary Brain Injury or Circulatory Arrest

Primary Brain Event → Brain Arrest
Primary Respiratory Event → Respiratory Arrest
Primary Cardiac Event → Circulatory Arrest

Within approximately 30 seconds
Assuming oxygenated circulation to the brain does not persist or resume
The Dead Donor Rule

Winter is Coming, Game of Thrones
The Declaration of Death is the point in time after which:

1. No requirement to continue/provide resuscitation
2. Loss of personhood and most individual rights
3. Autopsy
4. Organ and/or tissue procurement for donation/transplantation
5. Burial/cremation proceedings
6. Execution of legal estate and life insurance
7. Loss of a loved one and family grieving
END
Dying, Death, Determination and Declaration

Death of the person versus death of the organism and its parts

• Death is a biological process

• Organs and cells dies at different rates in response to anoxic ischemia

• Procedures to determine death are a process

• The *declaration* of death is a moment in time