Donation After Circulatory Death - From Adults to Pediatrics

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President of Canadian pDCD Guideline Development Committee
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Objectives

- Distinguish between donation after circulatory and neurologic determination of death
- Understand the process of DCD in adults and children
- Understand current practice and feasibility of DCD, particularly in children
- Be familiar with frequently addressed controversies in pDCD

Plan

- Define terminology
- Give a brief history
- Explain the process
- Discuss current practice and feasibility
- Introduce frequent controversies
Definitions

- DCD - donation after circulatory death
  - AKA: donation after cardiac death (DCD), donation after circulatory determination of death (DCDD), non-heart beating donation (NHBD)
- pDCD - pediatric DCD, including neonates
- NDD - neurologic determination of death (AKA brain death)

Definitions

- ODO - Organ donation organization (e.g. Transplant Québec)
- WLST - withdrawal of life sustaining therapies
- WIT - warm ischemic time, interval between WLST and organ procurement
A brief history of DCD

Comebacks Elsewhere
A Brief History of DCD

• Before 1968 Harvard Committee, DCD only deceased donation pathway
  • Includes first deceased organ transplant, a kidney in 1951
• After 1968 NDD became preferred; organs perfused until procurement
• Increasing need for organs and decreasing NDD rates led programs to re-explore DCD starting in 1980 in the Netherlands

A Brief History of DCD

• In 2006 Sarah Beth Therien suffered a sudden cardiac arrest at 32 y/o
• Resuscitated and hospitalized in Ottawa with substantial neurologic sequela, but did not meet NDD criteria
• WLST was discussed, and family was highly motivated for organ donation
• Care team organized for her to become first Canadian DCD donor in nearly 40 years

http://www.cbc.ca/m/touch/health/story/1.2577269
A comparison of DCD and NDD

As opposed to NDD, determination of death in DCD in Canada occurs

A. Before the ODO has been contacted
B. After organ procurement
C. In or near the OR just before organ procurement
D. Prior to WLST
DCD vs. NDD

• Two fundamental differences
  – Time pressure after the determination of death
  – When death is determined

Time Balance in DCD Death Determination

• Two factors in balance during DCD
  • Must be short enough to limit ischemic damage to organs
  • Must be long enough to ensure that death is permanent
As opposed to NDD, determination of death in DCD in Canada occurs:

A. Before the ODO has been contacted
B. After organ procurement
C. In or near the OR just before organ procurement
D. Prior to WLST
Which of the following is true for patient management in pDCD

A. The patient must have minimal changes to standard WLST care
B. Medication and ante mortem treatment should be given by an ODO representative
C. Families are discouraged from being present at the time of death determination
D. Death determination should be done by an ICU physician and the transplant surgeon to ensure that organs have not suffered prolonged ischemic time
ID and Referral

- Not limited by diagnosis, but does require a prior decision to WLST
  - The majority will be significant neurologic insults that do not meet NDD criteria
- The decision to WLST must be made:
  - Before and independent of transplant decision
  - Transplant team and ODO can **NOT** participate in WLST decision
ID and Referral

• Exact moment to contact ODO varies by jurisdiction and hospital practice
• Initial conversation between ODO and team can occur prior to WLST decision
  • Serves to evaluate donation eligibility
  • Does not involve ODO contact with families
  • Avoids consent approaches for non-eligible potential donors

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DCD

[Diagram showing the process of ID and Referral, Consent, WLST, Death Determination, Organ Recovery, Donor Care, and Family Care]
Consent

• Once WLST decision in place and patient deemed eligible, consent discussion can occur:
  • Approach can be made by medical team or the ODO
  • Must have extensive knowledge of local process
  • Elements that define informed consent should be established in advance
WLST

- Team must be committed to limiting interruptions to palliative care
  - WLST should follow existing practices, including pharmacologic and non-pharmacologic support
- Time pressures inevitably lead to some alterations of palliative care
  - Ex: WLST occurs in or near OR
- Wherever WLST happens, patient remains in care of ICU treating team

WLST

- WLST can be thought of in 3 phases
  - Acts of WLST
  - Cardiorespiratory deterioration
  - Acirculatory status
- Most centers use 60 minutes as a maximum for WIT
  - Non-physiologic factors also play a role in maximum WIT
DCD

Death Determination

- Criteria must be precise and pre-defined
  - Example: Acirculatory status confirmed by art line
- ‘Hands off’ time - observation of acirculatory status for 5 minutes
- Once death is determined, parents escorted out and care is transferred to the procurement team
DCD

Procurement

• All aspects of procurement done by surgical team
• No intervention that could re-established brain blood flow can be performed
• If desired, patient could be returned to family for continued palliative care
Which of the following is true for patient management in pDCD

A. The patient must have minimal changes to standard WLST care
B. Medication and ante mortem treatment should be given by an ODO representative
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DCD in Canada and Elsewhere

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Regarding pDCD practice in Canada:

A. The of pDCD are expected to be low and decrease over time
B. Organ outcomes in pDCD are poor compared to NDD
C. Makes up 10 - 20% of annual deceased transplantation
D. All provinces have active pDCD programs

DCD in Practice

- In the UK 170% increase in DCD donation from 2007 - 2014
- American hospitals must have a DCD plan in place for accreditation
  - One factor in increase from 2007-2013 from 66 to 134 pDCD cases
- pDCD represented 29/157 (17%) of Canadian donors from 2006-2015*
  - *preliminary CBS data
2014 data from Canadian Blood Services in collaboration with DTAC.

- 120 adult DCD cases
- 22% of overall adult deceased donation (120/595)
- Significantly smaller proportion of pediatric deceased donation

HC and CHEO are the only centers with active programs.

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**Canadian pDCD Donors**

Pediatric DCD donors in Canada 2006 - 2013

Pediatric deceased organ donation Canada 2004 - 2013

# donors

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Pediatric DCD donors in Canada 2006 - 2013

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DCD: Organ Outcomes

- Outcomes vary by organ but in general:
  - Higher incidence in initial dysfunction
  - Limited medium and long term data suggest similar outcomes to NDD donors
- Halsted et al. (2012) reported no differences between pDCD kidneys procured from patients < ou >10 kg
  - Smallest donor in that series weighted 2.3 kg
- Growing body of evidence supporting efficacy of cardiac DCD

Pediatric Feasibility

- Not a lot of data
- Retrospective estimates: 9-20% ventilated deaths potential pDCD donors
  - Vary according to criteria applied, e.g. WIT and predicted consent
- Only center to publish actual data: 7% of deaths became donors

Regarding pDCD practice in Canada:

A. Rates pDCD are expected to be low and decrease over time
B. Organ outcomes in pDCD are poor compared to NDD
C. Makes up 10 - 20% of annual deceased transplantation
D. All provinces have active pDCD programs

The controversies
Which of the following would prevent a child from becoming a pDCD donor:

A. The child had never expressed a wish to donate
B. The child will require morphine for distress during agonal breathing
C. The child is hospitalized in a center that cares for transplant recipients
D. An arterial line and echo are impossible for logistic reasons

Controversies

• Are the donors dead at the time of procurement
  • Really, really dead?
  • We’re sure, right?
• Perceived and possible conflicts of interest
• Consent concerns and ante mortem interventions
• Impact on palliative care
DCD vs. “standard” death determination

- NDD has clearly defined criteria and process
- Circulatory death is less well defined
- No universal standard, thus lots of practice variability

Survey of determination of death after cardiac arrest by intensive care physicians

Sonny Dhanani, MD, FRCP; Roxanne Ward, RN, BA (Psych); Laura Homby, MSc; Nicholas J. Barrowman, PhD; Karen Homby, BScA, MSc; Sam D. Shemie, MD, FRCP; for the Canadian Critical Care Trials Group, and the Bertram Lebo Research Consortium in Organ and Tissue Donation

Federal Law

  - a person is dead when an irreversible cessation of all that person’s brain functions has occurred;
  - the irreversible cessation of brain functions can be determined by the prolonged absence of spontaneous circulatory and respiratory functions;
  - when the determination of the prolonged absence of spontaneous circulatory and respiratory functions is made impossible by the use of artificial means of support, the irreversible cessation of brain functions can be determined by any means recognized by the ordinary standards of current medical practice
Medical Standard

• Also just a proposition, but...

Medical Standard

• Death is the permanent loss of capacity for consciousness and all brainstem functions. This may result from permanent cessation of circulation or catastrophic brain injury.

• In the context of death determination, ‘permanent’ refers to loss of function that cannot resume spontaneously and will not be restored through intervention.
Permanent vs Irreversible

- Several death definitions use the word irreversible instead of permanent
- Problematic in DCD because waiting until true irreversibility despite CPR would preclude DCD
- Important point is that in DCD we have a DNAR
  - Allows the time when auto-resuscitation will not occur to be the time when death can be considered permanent

Auto-resuscitation

- Defined as the spontaneous return of circulation after circulatory arrest
- Medical literature around AR of very poor quality
  - Almost all cases occur after CPR
- No pediatric cases of AR after WLST
- Few adult cases, none after 89 seconds of aciruclatory status
- Justification for 5 minute wait time of aciruclatory status during death determination
DCD and the Dead Donor Rule

- If DNAR order in place and no possibility of AR:
  - Donor loses rights of personhood
  - Vital organ procurement is permissible
  - DDR is respected
- Wide, but not universal, agreement that 5 min wait period respects DDR

Controversies

- Are the donors dead at the time of procurement
  - Really, really dead?
  - We’re sure, right?
- Perceived and possible conflicts of interest
- Consent concerns and ante mortem interventions
- Impact on palliative care
Conflicts of Interest

• In general
  • HCPs are often pro-organ donation
  • Hospitals are generally pro-organ donation
  • ODOs are systematically pro-organ donation
• Neuroprognositication difficult and WLST decisions never easy
• Concern that we might subtly push patients towards decisions that benefit the system more than them

Controversies

• Are the donors dead at the time of procurement
  • Really, really dead?
  • We’re sure, right?
• Perceived and possible conflicts of interest
• Consent concerns and ante mortem interventions
• Impact on palliative care
Consent and Authorization

- In DCD informed consent is necessary for any ante mortem procedures
  - Ethical question: Can families give consent for a procedure without direct benefit to the donor
- DCD logistics are generally complicated and disrupt standard WLST palliative care
- Families need to understand that procurement might not happen

Controversies

- Are the donors dead at the time of procurement
  - Really, really dead?
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- Perceived and possible conflicts of interest
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- Impact on palliative care
Palliative Care Impact

• Needs coordinated support from all HCPs
• Many HCPs have reservations about WLST in or near an OR
• Requires incorporation of the idea that donation can be palliative care

Which of the following would prevent a child from becoming a pDCD donor:

A. The child had never expressed a wish to donate
B. The child will require morphine for distress during agonal breathing
C. The child is hospitalized in a center that cares for transplant recipients
D. Both an arterial line and echo are impossible
Pediatric Donation After Circulatory Determination of Death: A Scoping Review

Matthew J. Weiss, MD1,2,3; Laura Hornby, MSc3; William Witteman, MIS; Sam D. Shemie, MD4,5,6


Merci à vous et

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