



BC
TRANSPLANT

ICU RESOURCE PACKAGE

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Good end of life care includes the opportunity to GIVE.

G

GRAVE
PROGNOSIS

I

INTENTION TO
MOVE TOWARDS
COMFORT CARE

V

VENTILATED

E

EXPLORE
ELIGIBILITY/
REGISTRATION
STATUS WITH BCT
PRIOR TO FAMILY
MEETING

CALL BC TRANSPLANT:

1-877-DONOR-BC



We may ask for:

- Name
- Age
- PHN (BCT to check organ donor registry)
- Admission date & diagnosis
- Previous medical history
- Current hemodynamic status
- GCS/neurological assessment
- NOK information
- Plan of care

WHEN I MAKE A REFERRAL TO BC TRANSPLANT, WHAT WILL BE ASKED?

Patient demographics: Name, DOB, PHN

- When BCT is paged, they aren't given any of this information
- With the PHN, BCT can look up to see if patient is a registered donor

Reason for admission and diagnosis

Past medical history

Current hemodynamic status- allows BCT to assess what organs could be used for donation or potentially failing

- Support medications: inotropes, vasopressors, or anti-hypertensives
- Ventilation: Mode and FiO2
- Neurologic Assessment/GCS: sedation medication, reflexes
- Urine output

Next Of Kin (NOK) information

- Who is next of kin or TSDM (Decision Maker)?
- Was poor prognosis meeting had with MRP?
 - If yes, how has family responded to this information?
 - If yes, has organ donation been brought up to family?

Make a plan of care

- Family meeting *has not* been had:
 - BCT will look up patient in CareConnect* to see if there are any auto-rule outs that wouldn't allow us to pursue donation
 - BCT will wait until after end-of-life discussion has been had and family is accepting of prognosis before we will discuss organ donation with the family
- Family meeting *has* been had:
 - BCT will look up patient in CareConnect* to see if there are any auto-rule outs that wouldn't allow us to pursue donation
 - Is family interested in talking to BCT about organ donation?
 - Does family need some time to digest information about poor prognosis before organ donation has been brought up?

**Please note:* Length of time for BC Transplant coordinator to perform CareConnect review is usually 30-60 minutes. Coordinator may need more time depending on a variety of circumstances (i.e. lengthy PMH, borderline organ function and discussions with transplanting physicians are being had, heavy case load, etc).

HOW TO APPROACH FAMILY ABOUT ORGAN DONATION

❖ If patient is a registered:

- *"I'm not sure if you are aware of this, but your loved one has registered their wishes to become an organ donor. I can have an Organ Donation Specialist from BCT come and talk to you about what that may look like. What are your thoughts about this?"*
- *"Mrs. Smith, you may not be aware of this but your husband registered to be an organ donor X years ago. Have you had any recent conversations about this with him? I can call BCT so they can come and explain how we can honour his wishes and answer any questions you might have."*

❖ If patient is not registered:

- *"I'm not sure if you have ever spoken to your loved one about their wishes around organ donation but that could be an option for John. If you'd like, I can have an Organ Donation Specialist from BCT come and talk to you about what that may look like?"*

❖ Including organ donation as an option for End-of-Life-Care:

- *"Now that there is no further treatment available to John, one of the options/choices you have as a family includes organ donation. I can have an Organ Donation Specialist from BCT come and talk to you about what that may look like. What are your thoughts about this?"*
- *"We would like to talk about what kind of end of life care John would want, and one of the options available to you and to John is organ donation. I can have an Organ Donation Specialist from BCT to come talk to you about what that may look like."*

❖ If the family raises organ donation:

- *"We can call BCT to determine if there is an opportunity for John to donate his organs. They will be available to speak with you about donation".*

Key points:

- Donation should not be raised until it is clear that a family have understood and accepted their loss. If this is not the case, the discussion in which donation is raised should be delayed.
- Avoid negative or apologetic language when discussing organ donation (i.e. I'm sorry to mention this but...).
- Try not to create a situation where a family is being asked by multiple people or multiple times about organ donation. Communication between the team is key.
- Building trust and a relationship with the family and the patient (through the stories of the family) makes difficult conversations feel more safe.
- Remember that this conversation is never going to feel easy and it is difficult to make a one-size-fits-all script for this conversation. Find the language (or 'script') that feels most comfortable to you.

ROLE OF THE PRIMARY NURSE

- ❖ **Be aware of the referral being called into BCT** (regardless if it's the nurse, SW, or MD calling)
- ❖ **Primary contact with BCT for what is happening at the bedside**
 - Vital signs and hemodynamic status
 - Treatments- i.e. fluid bolus given, HTN med given, how labs are being treated, etc
 - Status of diagnostic testing- i.e. when is CT scan, ECHO, etc scheduled?
 - Family meetings
- ❖ **Following through orders that are written by MRP**
 - Once orders written, be sure to go through with BCT to make sure nothing is missed
 - BCT may ask for additional testing after first set of orders are written – these are based off transplanting physicians request
- ❖ **Send in requested documentation to BCT – See 'Requested Documents' on page 9**
 - EHS and/or ED report
 - ICU admission note
 - DNC determination of death forms (x2) or WLST notes (x2)
 - EKG (if done within last 12 hours, most recent)
 - Physical Assessment form
 - Bronchoscopy form (if completed)
- ❖ **Make MRP and BCT aware of any changes with management of patient**
 - Hemodynamics
 - Urine output
 - Changes with support medications
 - Changes with oxygenation
 - Out of range lab values
- ❖ **Day of DNC & DCC – See 'Day of DCC WLST' on pages 12-16**
 - DNC
 - Manage patient up until OR staff comes to take patient back to the operating room
 - Support family
 - DCC
 - Ensure comfort care medications are ordered and ready to administer
 - Ensure heparin is drawn up
 - Cap all unnecessary lines prior to WLST
 - Transfer patient onto stretcher with draw sheet in place – see picture on page 12
 - Compile patients chart
 - Support family

ROLE OF THE RESPIRATORY THERAPIST

❖ Assess, optimize, and maintain lung function for the donor to have the best opportunity to donate their lungs

❖ Apnea Testing

- The clinical bedside procedure used to determine the response of the medullary brainstem respiratory center to CO₂ stimulus
- Completed with two staff physicians (either both at the same time or two full tests separately)
- Review if there are any confounding factors prior to starting the test (see back of DNC form)
- Refer to your hospital policy on how to perform
 - Baseline ABG is drawn prior to disconnecting patient from the ventilator
 - Thresholds on ABG at completion of the apnea test must be: PaCO₂ ≥ 60 mmHg and ≥ 20 mmHg above the pre-apnea test level and pH ≤ 7.28

❖ Optimizing PEEP

- Optimizing PEEP is individual to each patient
- It is characterized by a balance ensuring recruitment and avoiding over distention
- Use any number of techniques to optimize (i.e. PEEP study, PV tool, esophageal balloon, etc)

❖ Oxygen Challenges

- Routine screening for donor lung function (Q2-Q6H as requested by BCT)
- Change the FiO₂ on the ventilator to 100% with a minimum PEEP of 10 cmH₂O (or current if higher) and draw an ABG after 10 minutes
- Target for PaO₂ >300 mmHg
- FiO₂ can be changed back to the original level after challenge gas is drawn

❖ Recruitment Maneuvers

- Main objective: open unstable distal airways and/or airless alveoli
- Intentional transient increase of transpulmonary pressure (PL) above values used during regular mechanical ventilation
- Beneficial in restoring lung volume and improving gas exchange in potential organ donors where lungs are being considered for transplantation
- Refer to your hospital policy on how to perform
 - Typically 30-40 cmH₂O for 30-40 seconds
 - Done Q2-4H, and after each suction and/or circuit disconnection
 - PEEP may be increased or decreased to suit patient tolerance or results
 - Usually followed by an O₂ challenge gas

❖ Bronchoscopy

- Needs to be performed on every potential lung donor
- Be sure a bronchial is sent for C&S, AFB, and fungal cultures
- Please review and be sure the BC Transplant Bronchoscopy form is filled out

❖ DCC – Withdrawal of Life Sustaining Therapy

- Extubate the patient when indicated from BC Transplant coordinator
- No need to pre-oxygenate or deep suction (okay to suction mouth)

ROLE OF THE SOCIAL WORKER

- ❖ **Ensure family is supported throughout end-of-life and withdrawal of life sustaining therapies (WLST) discussions**
 - This is done along with the ICU team
 - After poor prognosis discussion, verify with ICU team to see if organ donation was brought up as a pathway for end-of-life care

- ❖ **Provides BC Transplant coordinator direction on who appropriate NOK is**
 - See chart below as NOK may be different than what ICU is using (NOK ≠ TSDM)

BC Human Tissue Gift Act – Section 5	BC Health Care (Consent) and Care Facility (Admission) Act – Section 16
<ul style="list-style-type: none">(a) Spouse (19 years of age or older)(b) Adult children (19 years of age or older)(c) Parent(d) Adult sibling(e) Any other adult next of kin	<ul style="list-style-type: none">(a) Spouse(b) Adult children(c) Parent(d) Adult sibling(e) Grandparent(f) Grandchild(g) Person related by birth or adoption(h) Close friend(i) Person related by marriage

- ❖ **Provide support for family during discussion for organ donation consent**
 - If available, be present while BC Transplant explains process to family (discussion is sometimes done over the phone if in-person is not available)
 - Bring up questions/concerns that family had mentioned prior to BC Transplant coordinator arrival
- ❖ **Provides BC Transplant guidance on family dynamics** (if needed)
- ❖ **Provides family support on the day of DCC withdrawal of life sustaining therapies**
 - Set up in room with chairs, Kleenex, water, etc
 - Once patients heart stops and moved to the OR, SW to stay with family either in room or private space
 - If patient's heart does not stop within the timeframe needed for organ donation to occur, support family that comfort care measures will continue in the ICU
- ❖ **Debriefing session after patient has been moved to the OR for organ recovery surgery**
 - Can be with family if they wish
 - Review with ICU team about how process went

HOW TO DRAW RED BLOOD BOX

1. Red Blood Box
2. Check expiration date on blood tubes and replace as needed
3. There are two layers and 20 tubes:
 - 5 EDTA (purple top), 3 SST (gold top), 12 ACD (glass yellow top)



4. Instructions located inside of blood box
5. Each tube must have a patient label (with full patient name and DOB) and the date and time of collection. If it takes more than a minute to draw, be sure the time is the same on all tubes.
6. Speak with your lab about arranging transport to deliver box to VGH lab.
 - Vancouver General Hospital – Immunology Lab
Lab Reception
910 West 10th Ave, Vancouver, BC V5Z 1M9
Phone: 604-877-2240
7. Notify BCT coordinator what time blood was drawn at
 - BCT coordinator will need to calculate hemodilution of the sample (ensures accuracy of testing)
 - BCT coordinator will ask for the following information:
 - Donor height, weight, and draw time of blood box
 - Volume (mL) of blood products and colloids (mannitol, propofol, plasma, albumin, dextran, hespan, platelets, cryo, and/or TPN) infused within the last 48 hours prior to the blood box collection time
 - Volume (mL) of any crystalloids (saline solutions, LR, D5, etc) infused in the 1 hour prior to the blood box collection time

REQUESTED DOCUMENTS

- EHS Report
- ED Report
- ICU Admission Note
- [Death by Neurological Criteria forms \(DNC\)](#)
 - Two Staff Physicians to complete
- Death by Circulatory Criteria notes (DCC)
 - Two staff physicians progress notes clearly documenting poor prognosis and recommended comfort care
- EKG (most recent, or have ordered if one not done within last 12 hours)
- [Physical Assessment form](#) (with *accurate* ht/wt)
 - Weight- on admission (“Dry weight”)
 - Height- patient flat, no pillows, crown of head to bottom of heel along the side of patient
 - Found on BCT Website
 - transplant.bc.ca -> Health Professionals -> Circulatory Death/Neurological Death -> Physical Assessment Form
- [Bronchoscopy form](#) (if lungs included)
 - Found on BCT Website
 - transplant.bc.ca -> Health Professionals -> Circulatory Death/Neurological Death -> Bronchoscopy for Organ Donation

DEATH BY NEUROLOGICAL CRITERIA – DNC

“NEUROLOGICAL DEATH”

❖ **Definition:** Irreversible cessation of function of the entire brain, including the brainstem

- Brain death is *equivalent to death of the individual*, even though the heart continues to beat and spinal cord functions may persist
- Legal time of death is marked by the first determination of death

❖ **Requirements:**

- Two staff physicians must perform:
 - Clinical Examination
 - Apnea Testing
- If the physician cannot be sure of the validity of the clinical exam or apnea test, an ancillary test should be performed

❖ **Clinical Examination:**

- Deep unresponsive coma with an established etiology
- Temperature $>36^{\circ}\text{C}$
- Brainstem reflexes:
 - Bilateral absence of motor responses (excluding spinal reflexes)
 - Absent cough
 - Absent gag
 - Bilateral absence of corneal responses
 - Bilateral absence of vestibule-ocular responses
 - Bilateral absence of pupillary response to light (pupils \geq mid size)

❖ **Apnea Testing:**

- No respiratory effort throughout test
- Draw ABG prior to start of testing
- Draw ABG at completion of testing
 - ABG at completion: $\text{pH} \leq 7.28$, $\text{CO}_2 \geq 60$ mmHg & ≥ 20 mmHg above pre-apnea test level

❖ **Ancillary testing:**

- Alternative test to the clinical examination and/or apnea testing that cannot be conducted or validated
- Recommended tests:
 - Radionuclide Imaging Techniques – Otherwise known as Nuclear Med or Cerebral flow scan (Preferred method)
 - Cerebral CT angiogram

DEATH BY CIRCULATORY CRITERIA – DCC

❖ **Definition:** Process of solid organ donation for patients pronounced death according to circulatory criteria

- Applies to a patient who does not meet neurological death criteria,
- Has a non-recoverable injury or illness,
- Dependent on life-sustaining therapy,
- Option when decision has been made to remove all life-sustaining treatments by the decision maker (NOK or TSDM) and health care team
- Considered when death is anticipated, but has NOT yet occurred

❖ **Requirements:**

- Two staff physicians must:
 - Assess patient for poor prognosis
 - Write a note stating their assessment and recommendation to move to comfort care or end-of-life care options

❖ **Things to remember:**

- Keep the discussion of poor prognosis separate from the discussion about organ donation
- Ensure family has had time to digest, understand, and accept poor prognosis prior to bringing up organ donation
 - See “How to Approach Family About Organ Donation”
- It’s recommended to call in the BC Transplant prior to family meeting
 - BCT can look up to see if patient is a registered donor
 - BCT can assess whether organ donation can be an option or not

❖ **See “Day of DCC Withdrawal of Life Support – How to Prepare”**

DAY OF DCC WITHDRAWAL OF LIFE SUPPORT –

HOW TO PREPARE

- Ensure comfort care orders are written
 - Will be started by ICU at time of withdrawal
- Ensure heparin order has been written
 - Recommended 400 units/kg
 - Will be administered either at extubation or warm ischemic time (SBP<60) per medical and/or nurse practitioners discretion
- Move patient onto a stretcher with draw sheet folded lengthwise and positioned under the patient widthwise to help secure arms in the OR
 - See pictures below for example
- Shave chest and abdomen (if needed)
- Cap all unnecessary lines (SCD's, IV's, etc.)
- Compile chart
- Move patient into room with best access to the OR



WHY IS BC TRANSPLANT ASKING FOR... ?

❖ Apnea Test

- Is an evaluation of the brainstem function and is one of the clinical criteria used in the Death by Neurological Criteria (DNC)
- Defined as the absence of spontaneous respiration
- Used to determine the response of the medullary brainstem respiratory center to CO₂ stimulus
- In the absence of significant pulmonary disease or neuromuscular paralysis, a lack of respiratory effort to hypercarbia implies destruction of the most caudal part of the brain
- Be sure to review confounding factors prior to starting test

❖ Ancillary Scan

- Required if any part of the clinical exam or apnea test cannot be done or when there are confounding factors
- Recommended tests:
 - Radionuclide Imaging Techniques – Otherwise known as Nuclear Med or Cerebral flow scan (Preferred method)
 - Cerebral CT angiogram

❖ Antibiotics and Antifungals

- Organ donors are susceptible to nosocomial infections such as ventilator-associated pneumonias (VAP), catheter-induced bladder colonizations, and septicemia resulting from intravenous access
- Antibiotic therapy should be initiated in cases of proven or presumed infection. Duration of therapy depends on the virulence of the organism, and is determined in consultation with the transplant team and infectious disease services
- Culture blood, sputum, urine, and other suspected sites of infection, and treat suspected infections with appropriate antibiotics
- Coordinator may call and ask if the patient has been switched to an appropriate antibiotic when sensitivities become available

❖ Biopsy

- Transplant programs may ask for a biopsy due to marginal organ function or if there is a suspicious lesion is noted on previous scan
- Depending on significance, this may be asked prior to the operating room

❖ Bronchoscopy

- May be requested if lungs are being considered for organ donation
- If the lungs are ruled out by the transplant program prior to bronchoscopy being completed, coordinator may let you know that it is not required
- Bronchial Wash must be sent for C&S, AFB, and fungal cultures
- Please fill out BC Transplant Bronchoscopy for Organ Donation Form found on BCT website and fax to coordinator
 - transplant.bc.ca -> Health Professionals -> Circulatory Death/Neurological Death -> Bronchoscopy for Organ Donation

❖ Cardiac Catheterization (Angiogram)

- Used to help evaluate the function of the coronary arteries of the heart
- May be requested in patients where high risk behaviours have been identified
- No ventriculogram is needed per our cardiac transplant program
- Review your providence order set

❖ CT Chest

- Used to help evaluate the function of the lungs
- Ordered as non-contrast high resolution (unless requested otherwise)
- May also be used to provide information regarding coronary calcification for heart
- May provide additional information while screening for COVID-19
- May provide additional information if patient has any TB risk factors
- Repeat CT scan may be asked for depending what was seen on the initial scan. Sometimes incidental findings happen that need further investigation

❖ CT Abdomen/Pelvis

- Used to help evaluate the function of abdominal organs
- Ordered as non-contrast high resolution (unless requested otherwise)
- Coordinator will always try to know if this is required to have it done at the same time as the CT chest

❖ COVID-19 Tests

- National recommendation from Canadian Blood Services that all potential donors must be tested for COVID-19
- A reasonable screening may include two samples: a NP swab plus a lower respiratory tract specimen (endotracheal aspirate or bronchial wash aspirate)
- Testing should be completed within five days of the donor recovery
- CT chest screening is unknown but could provide added information especially for lung transplantation and may be requested

❖ Confounding Factors

- Variables that influence outcome (neurological death)
 - Unresuscitated shock
 - Hypothermia (core temperature $<36^{\circ}\text{C}$ by central blood, rectal or esophageal/gastric measurements)
 - Severe metabolic disorders capable of causing a potentially reversible coma. If the primary etiology does not fully explain the clinical picture, and if in the treating physician's judgment the metabolic abnormality may play a role, it should be corrected or an ancillary test should be performed
 - Peripheral nerve or muscle dysfunction or neuromuscular blockade potentially accounting for unresponsiveness
 - Clinically significant drug intoxications (e.g. alcohol, barbiturates, sedatives). Therapeutic levels and/or therapeutic dosing of anticonvulsants, sedatives and analgesics do not preclude the diagnosis

❖ Cultures

- Organ donors are susceptible to nosocomial infections such as ventilator-associated pneumonias, catheter-induced bladder colonizations, and septicemia resulting from intravenous access.
- Blood, sputum, and urine cultures should be drawn Q24H, including the day of the OR
- We follow the results even after the OR so transplant programs can properly treat their recipients in the event of a positive result

❖ Downtime

- Neurological assessments may be unreliable in the acute post-resuscitation phase after cardiorespiratory arrest. In cases of acute hypoxic-ischemic brain injury, clinical evaluation for DNC should be delayed for 48 hours or an ancillary test could be performed. Examiners are cautioned to review confounding issues in the context of the primary etiology and examination. Clinical judgment is the deciding factor
- Downtime is presented to transplant physicians and may have an impact on the function of the organs

❖ ECHO

- Used to evaluate the function of the heart
- Coordinators sometimes have difficulty accessing the report – BCT may ask for the report to be faxed to them
- Repeat ECHO may be ordered to see if the function/EF has improved after interventions (i.e. starting up levothyroxine, turning off inotropes, etc.)

❖ Hemodilution

- Calculation to ensure accuracy of blood samples drawn from the red blood box
- BCT coordinator will ask for the following information:
 - Donor height, weight, and exact draw time of blood box
 - Volume (mL) of blood products and colloids (mannitol, propofol, plasma, albumin, dextran, hespan, platelets, cryo, and/or TPN) infused within the last 48 hours prior to the blood box collection time
 - Volume (mL) of any crystalloids (saline solutions, LR, D5W, etc.) infused in the 1 hour prior to the blood box collection time

❖ Lab Draws

- Work-up to evaluate the function of organs is anywhere from 24-72 hours, frequent lab work (Q6H) is requested to see the trends of the lab values
- Requirement per Health Canada regulations and CSA Standards

❖ Optimizing PEEP

- The application of PEEP shows positive effects on gas exchange based on the opening or reopening of recruitable atelectasis
- An increased PEEP is not necessarily combined with a higher lung donation rate
- It is essential to find the optimal PEEP, individual to each patient, characterized by a balance ensuring recruitment and avoiding over distention
- Respiratory therapists have a number of techniques to optimize PEEP and BC Transplant encourages use of these to optimize PEEP (i.e. PEEP study, PV tool, esophageal balloon etc.)

❖ Oxygen Challenges

- Routine screening test for donor lung function
- Oxygenation is believed to be the most important indicator for the functional quality of the lungs. Donor gas exchange before organ retrieval is significantly associated with early and long-term outcomes
- Target PaO₂ > 300 mmHg
- To perform oxygen challenge:
 - Respiratory therapist will place the patient on 100% FiO₂ with a minimum PEEP of 10 cmH₂O (or current patient setting if higher), and an ABG is taken after 10 minutes
- Typically performed Q4H, but may be asked to be done more frequently or less frequently based on lung status
- FiO₂ may return to baseline value after challenge gas is obtained

❖ Physical Assessment

- Assess for any physical evidence that could indicate high-risk behaviour associated with the presence of a transmissible disease:
 - Signs of sexually transmitted diseases such as genital ulcerative disease, herpes simplex, syphilis, or chancroid
 - Physical evidence of anal intercourse including perianal condyloma
 - Physical evidence of nonmedical percutaneous drug use such as needle tracks, including an examination of tattoos as they may cover needle tracks
 - Physical evidence of recent tattooing, ear piercing, or body piercing
 - Disseminated lymphadenopathy (swollen lymph nodes)
 - Oral thrush
 - Blue or purple spots consistent with Kaposi's sarcoma
 - Unexplained jaundice, hepatomegaly (hepatomegaly may not be apparent in a physical examination unless an autopsy is performed) or icterus
 - Physical evidence of sepsis, such as unexplained generalized rash
 - Large scab consistent with recent smallpox immunization
 - Eczema vaccinatum (complication of smallpox vaccine)
 - Generalized vesicular rash (generalized vaccinia)
 - Severely necrotic lesion consistent with vaccinia necrosum
 - Corneal scarring consistent with vaccinia keratitis
- Provide accurate height and weight
 - Weight – on admission (“dry weight”)
 - Height – lay patient flat, no pillows, measure from crown of head to bottom of heel along the side of patient
- Please fill out form found on BCT website and fax to coordinator
 - transplant.bc.ca -> Health Professionals -> Circulatory Death/Neurological Determination of Death -> Physical Assessment Form

❖ Recruitment Maneuvers

- Recruitment maneuvers are the intentional transient increase of transpulmonary pressure (P_L) above values used during regular mechanical ventilation. The main objective is to open unstable distal airways and/or airless alveoli
- Beneficial in restoring lung volume and improving gas exchange in potential organ donors where the lungs are being considered for transplantation
- Typically to perform recruitment maneuvers:
 - Sustained inflations from 30-40 cmH₂O for 30-40 seconds
 - Usually will be asked to be done Q2-Q4H and after each suction, and circuit disconnect
 - PEEP may be increased or decreased to suit patient tolerance or results
 - Recruitment maneuvers are usually followed by an O₂ challenge and an ABG
- Refer to your hospital policy on how to perform a recruitment maneuver

❖ Ultrasound

- Used to evaluate liver, kidney, or pancreatic function
- If something is seen on previous scan causing suspicion, transplant programs may ask for ultrasound to investigate further

❖ Withdrawal of Life Sustaining Therapies Notes

- Two progress notes by two staff physicians (no fellows/residents) documenting the discussion of moving to comfort care with family/decision maker