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ADULT POTENTIAL ORGAN DONOR ASSESSMENT AND MANAGEMENT DEATH DETERMINATION BY NEUROLOGIC CRITERIA (DNC)

This guide[1] is a reference tool for the assessment and management of potential donors in confirmed cases of death determination by neurologic criteria (DNC) or in cases where a decision to cease active treatment has been made. An integrated approach to the care team's clinical judgment remains essential.

MINIMUM MONITORING REQUIRED

- Cardiac monitor
- Arterial cannula; note the blood pressure (BP) q1h
- Continuous oxygen saturation (SaO_2); note the saturation q1h
- Urinary catheter, strict control of intake and output; note the diuresis q1h
- Continuous or minimal core temperature q4h

ASSESSMENT OF POTENTIAL DONOR

Initial assessment

Identifying or retrieval centre

- FSC, Na, K, Cl, Glucose, Urea, Creatinine, PTT, INR, Ca, Mg, PO4, Lactate, Albumin and Protein
- AST, ALT, Alkaline phosphatase, Total and direct bilirubin, GGT, LDH, Amylase, Lipase
- CK, CKMB or troponin I/T
- Glycated hemoglobin (HbA1c)
- Arterial blood gas
- Blood culture x 2 series
- Blood group and antibodies search
- Crossmatch (packed red blood cells in reserve, according to the care team responsible for retrieval)
- Serology, virology and histocompatibility managed by Transplant Québec
- Urinalysis, including microalbumin/creatinine ratio and protein/creatinine ratio
- Urine culture
- Sputum gram stain and culture on bronchial or endotracheal secretions
- Weight / Height
- Chest X-ray
- Abdominal ultrasound, if requested by Transplant Québec
- Abdominal and thoracic CT-scan, if requested by Transplant Québec

q8h	CK, CKMB or Troponin I/T q8h x 24 h If patient unstable, pursue q8h
q12h	AST, ALT, Alkaline phosphatase, Total and direct bilirubin, GGT, LDH, Amylase, Lipase, Na, K, Glucose, Urea, Creatinine, FSC, PTT, INR, Lactate, Arterial blood gas
q24h	Cl, Mg, Ca, PO_4
PRN	If clinical signs of infection are present, repeat: Blood culture x 2 series, Gram and bronchial sputum culture, Urine culture

Specific assessment of a potential heart donor

- EKG QD
- Echocardiogram, after DNC determination
- Coronary angiography, if requested by Transplant Québec
  - Administration of N-acetylcysteine (Mucomyst®) or HCO_3, as per hospital protocol, to protect the kidneys.

Specific assessment of a potential lung donor

- Arterial blood gas ± q2h using a ***hyperoxygenation test****
- Chest X-ray QD
- Bronchoscopy, if requested by Transplant Québec

* ***Hyperoxygenation test***

- Ventilate with 100% FiO_2, minimum PEEP of 8 cm H_2O and tidal volume of 8 mL/kg of ideal weight
- Arterial blood gas after 20 minutes
- ***Pulmonary recruitment maneuvers*** PRN

[1] Ref. : Ball, I. M., Hornby, L., Rochwerg, B., Weiss, M. J., Gillrie, C., Chassé, M., D'Aragon, F., Meade, M. O., Soliman, K., Ali, A., Arora, S., Basmaji, J., Boyd, J. G., Cantin, B., Chaudhury, P., Cypel, M., Freed, D., Frenette, A. J., Hruska, P., et al. (2020). *Management of the neurologically deceased organ donor: A Canadian clinical practice guideline*. *CMAJ : Canadian Medical Association Journal*, 192(14), E361–E369. https://doi.org/10.1503/cmaj.190631

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ADULT POTENTIAL ORGAN DONOR ASSESSMENT AND MANAGEMENT
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MANANGEMENT OBJECTIVES AND RECOMMENDATIONS

Hemodynamics

Objectives

Target euvolemia[1]
- MAP: 65-90 mmHg
- Systolic BP: 100-180 mmHg
- HR: 60-100 bpm

If hypotension

Systolic BP < 100 mmHg
or MAP < 65 mmHg:

Bolus NaCl 0.9%
or Ringer's lactate 500 mL PRN[2]

Persistent hypotension

1st choice	Vasopressin[3] ≤ 2,4 U/h ou 0,04 U/min IV (suggested dose)
2nd choice	Norepinephrine
Other choices	Epinephrine Phenylephrine Hydrocortisone 50 mg IV q. 6 h

If hypertension[4]

Systolic BP ≥ 180 mmHg
or MAP > 90 mmHg x 15 min

⬇

Wean vasosuppressors/inotropes

Heart rate > 100-120 bpm x 15 min

Esmolol 100-500 µg/kg IV bolus
Followed by 100-300 µg/kg/min IV

Alternative medication

Labetalol 5-20 mg IV q5 to 10 min
Metoprolol 1-5 mg/h perfusion IV

Heart rate > 100-120 bpm x 15 min

Nitroprusside
0.5-5.0 µg/kg/min IV

Alternative medication

Nitroglycerin
(IV infusion)

1 The rate and type of IV fluids may vary according to serum sodium and potassium levels, enteral nutrition tolerance and should target homeostasis.
2 Prioritize NS or LR administration for the first bolus. If additional boluses are required, albumin 5% may be considered. The use of hydroxyethyl starch agents should be avoided.
3 Prioritize Vasopressin for hemodynamically unstable patients, except if instability is primarily due to left ventricular dysfunction, in which case, norepinephrine is the recommended agent.
4 It is recommended to monitor volume status prior to administering beta blockers.

Cardiac dysfunction

Indicated by

Echocardiogram with ejection fraction (LVEF) < 50%
or hemodynamic instability

At the discretion of the medical team, initiate hemodynamic monitoring (intermittent or continuous), including but not limited to:
- Targeted echocardiogram*
or
- Other non-invasive procedures for cardiac output monitoring

Hemodynamic management according to standard care practices (consider using inotropes)

* Note that targeted echocardiograms are not intended as substitutes for trans-thoracic echocardiograms (TTE).

Mechanical ventilation

Objectives

- Minimal FiO_2 to maintain SaO_2 ≥ 95%
- pH 7.35-7.45
- $PaCO_2$ 35-45 mmHg
- Tidal volume (TV)
  6-8 mL/kg of ideal weight
- PEEP ≥ 8 cm H_2O
- Peak inspiratory pressure (PIP)
  ≤ 30 cm H_2O

Clinical surveillance

Endotracheal suctioning q8h and PRN

Avoid pulmonary edema

Head of bed elevated at 30°

Turn and position q2h

Pulmonary recruitment maneuvers

Lungs previously deemed inadmissible for transplant may benefit from recruitment maneuvers to regain their function.
The care team may also consult Transplant Québec, if needed.

- Pre-oxygenate with 100% FiO_2 and PEEP of 10 cm H_2O, then apply PEEP of 30 cm H_2O for 30 seconds, without ventilating.
  If MAP drops below 50 mmHg or if SaO_2 drops under 85% for 5 seconds, stop the maneuver.
- Ventilate for 2 minutes while keeping PEEP at 10 cm H_2O and FiO_2 at 100%.
- Repeat alveolar recruitment a second time.
- Ventilate for 1 h with initial baseline parameters (TV 8 mL/kg of ideal weight), keeping PEEP at 8 cm H_2O.
- After 1 h, bring PEEP back up to 10 cm H_2O and FiO_2 to 100%, then repeat the ***Hyperoxygenation test***.

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Temperature

Objective

Core T°
34.0 to 35.0°C*

< 34.0°C

- Warming blanket
- Cover the head

> 38.0 °C

- Septic profile
- Empiric broad-spectrum antibiotics, at the request of the care team

* Ensure a core temperature of ≥ 36.0°C during death determination by neurologic criteria (DNC).

Hypothermia applies to potential donors whose kidneys are under consideration for retrieval.

Diuresis

Objective

0.5-3.0 mL/kg/h

Oliguria

If urine output < 0.5 mL/kg/h:
NaCl 0.9% 500 mL bolus

Rule out low cardiac output and/or hypovolemia
(see ***Cardiac dysfunction***)
and/or
Rule out secondary causes
(postrenal obstruction)

Polyuria

If urine output > 250 mL/h x 2h or 500 mL x 1 h

Rule out diabetes insipidus*

DDAVP 4 µg IV, followed by 1 to 2 µg IV or SC q6h
or
Use vasopressin as first choice
if hemodynamic support required
(1 to 2.4 U/h infusion)

* Diabetes insipidus: Urine output > 4 mL/kg/h, Na ≥ 145 mmol/L, serum osmolarity ≥ 300 mOsm, urine osmolarity ≤ 200 mOsm, urine specific gravity < 1.005.

Glycemia

Objective

6-10 mmol/L

Capillary blood glucose* q1h

Insulin infusion PRN

* If capillary blood glucose within normal range and stable, levels may be monitored q2h, then q4h.

Electrolytes

Objectives

Na 135-155 mmol/L
K 3.5-5.0 mmol/L
Mg 0.65-1.05 mmol/L
PO_4 0.74-1.52 mmol/L
Ca 2.2-2.6 mmol/L L

Correct electrolyte abnormalities

Coagulation and hematology

Objectives

- Optimal hemoglobin > 70 g/L
- Administer platelets and fresh frozen plasma if clinical signs of hemorrhage or coagulopathy
- Preventive administration of blood products is discouraged
- CMV-negative blood is not required

Contact Transplant Québec prior to administering blood products that may interfere with plasma dilution.

Prophylaxis

Pharmacological thromboprophylaxis according to clinical context or, if contraindicated, use mechanical thromboprophylaxis

Nutrition

Standard tube feeding according to the hospital's protocol

Do not initiate parenteral nutrition. However, do not discontinue if already initiated.

Eye care

Keep eyelids closed

Avoid oily or greasy substances

The Transplant Québec team wishes to thank everyone who contributed to the revision of this document.

To download or print the guide:
https://www.transplantquebec.ca/en/procedures-and-forms
This document is overseen by Transplant Québec and is revised periodically.

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