



Total Artificial Heart

History

- SAMPLE
- Bridge to transplant
- Destination therapy
- Estimated downtime
- LVAD, RVAD, Bi-Vad, TAH
- DNR, MOST, or Living Will
- Contact with LVAD coordinator

Signs and Symptoms

- Unconsciousness
- Pulseless
- Apneic
- Poor capillary refill / skin color
- AMS or decreased mental status
- No electrical activity on ECG
- No heart tones on auscultation

Differential

- See Reversible Causes below
- Infection/Sepsis
- Hypovolemia
- Cardiac arrest
- Hemorrhage

Rapid assessment
Check for signs of life
Assess for adequate perfusion

DO NOT USE ECG MONITOR

- Total Artificial Heart does not generate ECG

Criteria for Death / No Resuscitation
Review DNR / MOST Form

YES

Decomposition, Rigor mortis, Dependent lividity, Blunt force trauma
Injury incompatible with life
Extended downtime
Do not begin resuscitation
Follow Deceased Subjects Policy

NO

Pulse Present?

NO

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YES

	Airway Protocol(s) AR 1, 2, 3 <i>if indicated</i>
	Respiratory Distress Protocol AR 4 <i>if indicated</i>
	Altered Mental Status Protocol UP 4 <i>if indicated</i>

Check Blood Pressure

Systolic BP
≥ 150 mmHg

Systolic BP < 150 mmHg
And
≥ 90 mmHg

Systolic BP
< 90 mmHg

A	Nitroglycerin 0.3 / 0.4 mg SL Repeat every 5 minutes as needed
	Maintain SBP ≥ 90 mmHg
P	Furosemide 40 mg IV / IO <i>if available</i>
	May assist patient taking their antihypertensive medication
	Maintain SBP ≥ 90 mmHg

DO NOT USE:

- Manual or mechanical chest compressions
- ECG/Defibrillation/Pacing/AED devices
- Vasopressor medications
- Antiarrhythmic medications

	IV / IO Access Protocol UP 6
A	Normal Saline Bolus 500 mL IV / IO May repeat as needed Maximum 1 L

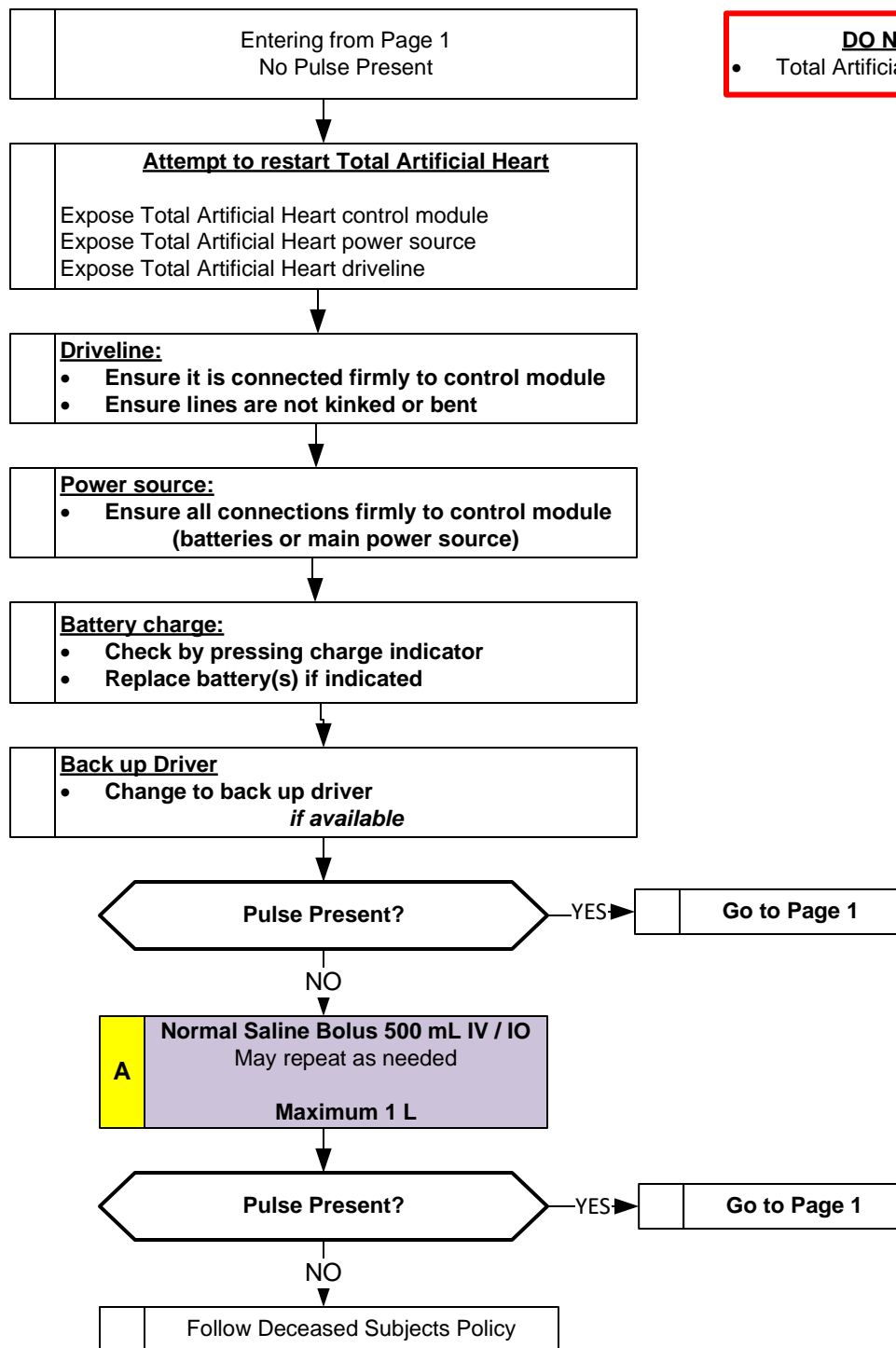
Notify Destination or
Contact Medical Control

Contact transplant coordinator:

- As quickly as possible for troubleshooting and treatment advice, but do not delay emergency treatment
- Follow patient specific emergency plan if present



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Pearls

- **Recommended exam:** Mental status, skin color, capillary refill, peripheral pulses, blood pressure.
- **Assessment of blood flow and perfusion status:**
 - Manual and automated BP devices can measure a BP.
 - Skin color, skin temperature, capillary refill
- **ECG and telemetry monitoring:**
 - The artificial heart does not procedure an ECG wave form or tracing.**
 - Do not use the 12-Lead ECG or ECG monitoring as it will only show asystole.**
- **Total Artificial Heart:**
 - Different than Ventricular Assist Device (LVAD, RVAD, or Bi-VAD)
 - The patient's left and right ventricles are removed and the artificial heart is connected to the right and left atria.
 - The patient is totally dependent on the artificial heart for circulatory support – the native heart is removed.
 - There are both a right and left side pump, driven by air, and each side driven by a separate driveline.
 - The drivelines are not electric, they are driven by air, so kinking can disrupt the pumping action.
 - Artificial heart produces a pulsatile wave form so the patient will have a palpable pulse when operational.
- **Reasons for use:**
 - Bridge therapy – patients awaiting transplant or anticipated recovery.
 - Destination therapy – advanced heart failure, not candidate for transplant, and will live rest of life with device.
- **Common complications:**
 - Most common is kinking or bending of the driveline(s) which stops air from moving and stops pumping action.
 - Disconnection of power supply, either battery disconnect, or electrical cord to receptacle disconnection.
 - Driveline failure or disconnection from controller unit.
 - Controller failure
 - Blood clot formation, acute stroke, and bleeding (mucosal and gastrointestinal most common sites)
 - Infection
- **Blood pressure:**
 - Optimal SBP is < 130 mmHg and > 90 mmHg.
 - Hypertension puts great strain on the pump and can cause blood to back up into the lungs and cause pulmonary edema and respiratory failure.
 - Epinephrine and vasopressors are ineffective, can cause hypertension, and may worsen the patient's condition.
- **Manual or mechanical chest compressions:**
 - Do not use**
- **End Tidal CO₂ (EtCO₂)**
 - Helpful in monitoring adequate perfusion status.
- **Defibrillation/Cardioversion:**
 - Do not use.
- **Transcutaneous Pacing:**
 - Do not use.