Discuss patient needs and eligibility:

* Include ECMO TEAM, PICU TEAM, Cardiology, Surgery and Anesthesia as needed.
* Consider weight, duration of ventilation/CPR, surgical availability, comorbidities, patient access.
* Consider type of ECMO (VA/VV), size/type of cannulas.

Activate ECMO team:

* Charge nurse, ECMO specialist/coordinator
* ECMO physicians: ECMO BU, Community MD, PICU MD
* Huddle to delineate tasks.
* Alert Cardiology for pre- and post-cannulation ECHOs, Radiology for HUS/neck US.
* Notify Surgical and Anesthesia teams (day PSO, night On-Call Anesthesia).

Obtain/verify parental consents:

* ECMO consent (surgeons to obtain surgical consent separately).
* Blood products - if possible, delegate to PICU.

Pre-ECMO Orders:

* CALL BLOOD BANK (3528) and request:
  + “Possible ECMO” – make blood bank aware for possible EMCO
  + **“Emergency ECMO blood” – O NEG Irradiated blood** for most ECMO
  + “STAT ECMO blood”- Type specific crossmatched blood for ECMO patients with known antibodies
  + **In Apex, order 3 units PRBC irradiated, 1 unit platelets for ALL patients**
  + Patients >15kg ok to crystalloid prime. Prefer blood prime if time permits.
* Verify that **nurse “RELEASES” blood.**
* Order priming meds (can be picked up without order)
* Order sedation medications (NICU only)
* Order heparin (bolus and drip)
* Have crystalloid boluses drawn up (consider code meds as well).

Prep for Cannulation:

* Bring cannulas and cannula connectors to bedside.
* Confirm either Anesthesia or sedation meds are at bedside.
* Confirm lines, foley, gastric tube in place.
* Discuss ventilation plan with RT:
  + Move ventilator/iNO out of surgeon’s way
  + Discuss plan for rest settings.
* Advance ETT or CXR after hyperextension.
* Blood prime circuit at bedside.
* Remind surgeon/anesthesia to ask for heparin upon vessel visualization.
  + *Max initial heparin dose is 5000 units*
  + Send ACT and consider repeat heparin dose if >30-60min

Post-Cannulation:

* Once on ECMO, check the following:
  + Heater on, lid plugged in
  + Sweep gas on to 0.5-1:1 of circuit flow, 80% FiO2
  + Gas from wall, tanks off
  + Venous probe on
  + Transfuse platelets
* Once CXR/ECHO confirm good position:
  + **Secure new connections with tie-bands**
  + Clean bedding and position patient
  + Secure tubing to metal Christmas Tree and side of bed
  + No tripping hazards
* Obtain ACT, first round of gases and labs (CBC, coags), correlating with SVO2 monitor.
* For neonatal patients:
  + Place Transonic monitor and note difference in flow between Cardiohelp and Transonic.
  + Open bridge and adjust flow to patient.
* Begin **heparin infusion at 25 units/kg/hr when ACT < 350.** 
  + *Max starting heparin drip is 1000 units/hr*.
  + For post-op Cardiac patients, determine with CT surgeon whether to start heparin immediately.

\*Delete below?

* Initial prep of Cardiohelp circuit (storeroom To Do’s):
* All patients use a 5.0 circuit with 3/8” tubing.
* Complete circuit crystalloid prime.
  + Use priming guidelines in ECMO storeroom and on sprinter carts.
* Final prep of Cardiohelp circuit (at bedside):
* Bring circuit, bedside drawers (RN), appropriately sized cannulas, and cannula connectors to bedside.
* **Blood prime at bedside for all patients.**
* If going on with crystalloid prime only,add priming meds at bedside.
* Plug circuit in
* Attaching gas hoses to wall outlet
* Turn sweep gas to 1L, 21%
* Confirm heater on
* Obtain circuit gas and patient/circuit ACT
* Adjust circuit, electrolytes as needed
* Final prep for cannulation:
* **De-activate the “Global Override” mode** **, and silence the low-flow alarm.**
* Close all 4 large white clamps and separate priming bag from clam shell
* Turn up RPMs to 1000 for 1 minute to de-air the circuit, then back to ZERO.
  + Clamp the blue line (venous) on the clamp symbol on the blood inlet side and the red line (arterial) on the outlet using metal 3/8” clamps.
* Confirm heater on
* Turn sweep gas up to 0.3L (Neo) or 1L (Pedi), 80%
* Heparin bolus to be given upon exposure of vessels. Wait 3 min. Repeat if >30 min passes.
  + **Heparin bolus 100 units/kg (1000 units/ml).**
  + **Max initial heparin bolus is 5000 units**
  + **Max starting heparin drip is 1000 units/hour**
* Once on ECMO, slowly increase flows to achieve 100-120ml/kg
* Transfuse platelets (and PRBCs if crystalloid prime)
* Place probe, check alarms, order stat gas and CBC. Complete ECMO Therapy order-set.
* Start Heparin drip when ACT<350

**\*\* Please help track the following times:**

|  |  |
| --- | --- |
| ECMO team activated: |  |
| Circuit prime complete: |  |
| Blood at bedside: |  |
| Surgeon at bedside: |  |
| Cannulas in: |  |
| Patient on ECLS: |  |