Lung Rescue Unit -***Guidelines*** for initiation and management of VV ECMO for non transplant/non trauma patients

Inclusion Criteria

1. Murray Score ≥ 3 (cesar.lshtm.ac.uk/murrayscorecalculator.htm) (see below)
    a. Enter # of quadrants with infiltrates on CXR
    b. Enter Pao2/Fio2 in mmHG on 100% for 20 minutes
    c. Enter PEEP value
    d. Enter compliance (ml/cmH2) - [Tidal volume/(PIP-PEEP)]
2. Hypercapnia (CO_2>60) with pH <7.25, or inability to adequately ventilate with Pplat ≤ 30
3. On ventilator ≤ 10days
4. ≤ 75 years of age
5. Patient with a reversal form of ARDS, infectious, trauma, post-operative
6. Should have bronchoscopy if able
7. Bedside physician clinical discretion

Exclusion criteria (Relative)

1. > 75years of age
2. > 10 days on ventilator
3. Requiring home O_2 therapy for severe lung disease
4. Severe neurological insult
5. Inability to tolerate anticoagulation
6. **terminal disease with low 1 year survival rates**
7. Bedside physician clinical discretion

Ventilator management on ECMO

1. Pressure control ventilation preferred
2. PEEP at 10 cmH_2O
3. Total pressure to range from 20-30 cmH_2O
    a. If/When compliance improves – target low tidal volume (6ml/kg) ventilation
4. FiO_2 on ventilator goal is ≤ 50%
5. Respiratory rate 10
6. Goal O_2 saturation ≥ 88% and/or Goal PaO_2 ≥ 55

7. Normocarbia

Transfusion Goals

1. Hematocrit goal is 24 – depending on hemodynamics, O2 saturation and PaO2
2. Platelets goal > 50,000 if not clinically bleeding.

Indications for Decannulation

1. Hemodynamically stable
2. ECMO weaning trial ***(Sweep 0, FiO2 21% on ECMO)*** if adequate SaO2 on:
    a. FiO2 on ventilator ≤ 40%
    b. PIP ≤ 30 cm H20
    c. PEEP ≤ 10 cm H20
3. Check serial ABG
4. **Weaning trial should last no longer than 2 hours**
5. Discussion between Dr. Pham (or designee) and LRU attending
    a. Decannulation if gas exchange is adequate
6. Decannulation should occur prior to ***4pm***

Procedures

1. Chest tube placement
    a. Emergent chest tubes will be placed as clinically needed
    b. All non-emergent chest tubes will placed with **Bovie utilization** in conjunction with the cardiac surgeon/designee
        i. Per Dr Pham - PGY≥3 CS fellow can perform without CS attending presence
2. Central line placement
    a. *Emergent*
        i. Stop heparin
        ii. Ultrasound preferred
        iii. Internal jugular/femoral site preferred
    b. *Elective*
        i. Hold Heparin for 2 hours
        ii. Use of ultrasound is mandatory

iii. Preferred sites are Internal jugular/femoral

iv. Performed prior to 4pm

v. Restart heparin 1 hour post procedure

3. Bronchoscopy

a. *Emergent -*

i. as clinically indicated

b. *Elective*

i. No set schedule/frequency

ii. Hold heparin for 2 hours

Dialysis

1. Use Quinton catheter if in place prior to initiation of ECMO
2. Preferred use ECMO circuit if Quinton catheter not in place prior to ECMO initiation

ECMO

1. Titrate flow to saturation ≥ 88%
2. Fi02 on ECMO 100% at all times
3. Sweep as clinically indicated
4. Heparin infusion for PTT 45-55
    a. Argatroban as clinically indicated PTT 45-55

The lung injury score (Murray score)

1. Chest roentgenogram score		
No alveolar consolidation		0
Alveolar consolidation confined to 1 quadrant		1
Alveolar consolidation confined to 2 quadrant		2
Alveolar consolidation confined to 3 quadrant		3
Alveolar consolidation in all 4 quadrant		4
2. Hypoxemia score		
PaO_2/FiO_2	≧300	0
PaO_2/FiO_2	225-299	1
PaO_2/FiO_2	175-224	2
PaO_2/FiO_2	100-174	3
PaO_2/FiO_2	＜ 100	4
3.PEEP score (when ventilated)		
PEEP	≦ 5 cm H_2O	0
PEEP	6-8 cm H_2O	1
PEEP	9-11 cm H_2O	2
PEEP	12-14 cm H_2O	3
PEEP	≧ 15 cm H_2O	4
4. Respiratory system compliance score (when available)		
Compliance	≧80 ml/cmH_2O	0
Compliance	60-79 ml/cmH_2O	1
Compliance	40-59 ml/cmH_2O	2
Compliance	20-39 ml/cmH_2O	3
Compliance	≦ 19 ml/cmH_2O	4

The final value is obtained by dividing the aggregate sum by the number of components that were used .

	Score
No lung injury	0
Mild-to-moderate lung injury	0.1-2.5
Severe lung injury (ARDS)	＞ 2.5

* Abbreviations: PaO_2/FiO_2 ＝ arterial oxygen tension to inspired oxygen concentration ratio: PEEP ＝ positive end-expiratory pressure.