

ECMO

VV ECMO is used for respiratory failure

VA ECMO is used for cardiac failure

Outcomes	
Respiratory Failure	Cardiac Failure
Survival 50-70% compared with historical controls	Survival 20-50% (observational studies)
Most benefit is from transfer to experienced center	Mortality is higher for ECMO requirement > 3 days
In ECMO centers: <ul style="list-style-type: none"> • 25% improve without ECMO • Among the 75% who require ECMO, 60-70% survive 	Unlike for respiratory failure, there will never be a RCT for VA ECMO in cardiac failure (control group is unethical)

Pre-ECMO optimization includes: ARDSnet ventilation, trial of recruitment, PEEP, neuromuscular blockade, diuresis, and prone ventilation.

Diseases that do well	Not so much
Pneumonia, in particular influenza	Septic shock, bacteremia, multisystem organ failure
Aspiration	Pulmonary fibrosis in exacerbation
Pulmonary contusion	Irreversible lung injury
Primary graft dysfunction	Cryptogenic organizing pneumonia
Steroid responsive lung disease	Frailty, debility

Complications
Bleeding – occurs in 30-50% due to both necessary anticoagulation and platelet dysfunction. Maintain platelet counts above 50,000, target ACT at 210-230
Thromboembolism – occurs around 15%, due to thrombus formation in the circuit. Monitor the circuit pressures and have a primed circuit ready to exchange when needed.
Neurologic injury – 10% in all comers, closer to 50% in the setting of cardiac arrest
VA ECMO specific complications
Pulmonary hemorrhage – due to little to no LV emptying during VA ECMO, LA pressures get very high and sometimes needs to be vented (surgical septostomy, drainage catheter). Can also try inotropes and IABP.
Cardiac Thrombus – blood flows retrograde up the aorta to the brain. In the setting of poor LV output, there is stasis and possibility of thrombosis.
Coronary, cerebral hypoxia - the oxygenated blood preferentially perfuses the lower extremities and abdomen. Oxygen saturation of blood in the lower extremities is often much higher than the upper extremities (and brain). Monitor arterial oxygen saturation in the right upper extremity. Infusion of oxygenation blood in to the RA may be necessary (called VA-V)

Our Selection Criteria	Our Exclusion criteria
Reversible disease process	Advanced lung disease not on the transplant list
Failure of pre-ECMO optimization (see above)	Age > 65 (mortality starts to increase at 55 years)
PaO ₂ <55 or saturation 88% on FiO ₂ 100%	Active GI bleeding
pH <7.2 with hypercarbia and elevated plateaus	Anoxic brain injury
Our Outcomes	Pan-resistant pneumonia
Survival 62%	Cirrhosis with MELD >20
Post-lung transplant 83%	Malignancy without surgical cure
Bridge to transplant, respiratory failure ~55%	Advanced, uncontrolled HIV/AIDS
	Moribund

Please call the ECMO attending early to discuss a case. Contact them through MEDCALL 412-647-7000