



Peri-Partum Veno-Arterio-Venous Extracorporeal Membrane Oxygenation as A Rescue Therapy for Cardiogenic Shock and Acute Respiratory Distress Syndrome.

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INTRODUCTION

- ECMO emerged a crucial management for patients with severe heart and/or lung failure.
- Its uses and configurations have evolved significantly, including the use of triple cannulation strategies.
- Favorable maternal and fetal results have been reported with use of peri-partum veno-arterial or veno-veno ECMO for cardiac or pulmonary failure¹⁻³, limited data exists for triple cannulation strategies in this population.

REFERENCES

1Zhang, et al. Extracorporeal Membrane Oxygenation In Pregnant and Postpartum Women: A Systematic Review and Meta-Regression Analysis. J Intensive Care Med. 2021 Feb;36

2. Ong, et al. Extracorporeal membrane oxygenation in pregnancy and the postpartum period: a systematic review of case reports. Int J Obst Anesth. .2020 Aug

3. Namoum, et al. Extracorporeal Life Support In Pregnancy: A Systematic Review. J Am Heart Assoc. 2020 Jul 7

CASE

37yo G1P0, admitted at 40 weeks gestation for induction of labor.

- Past medical history: Asthma and chronic sinusitis and obstetrical history for in vitro fertilization.
- She had a primary caesarean delivery on day 2 of hospitalization for non-reassuring fetal heart tracing.
- In the immediate post-operative period, she became hemodynamically unstable due to profound uterine bleeding and was rapidly returned to the operating room for dilation and curettage, massive transfusion, and administration of uterotonics.
- In the setting of ongoing hemorrhage, acidemia and hemodynamic instability, the patient went into ventricular fibrillation necessitating chest compressions and serial defibrillation.
- Supracervical hysterectomy, bilateral salpingo-oophorectomy and aortic compression were performed.
- Trans-esophageal echocardiography (TEE) demonstrated a fibrillating heart and ruled out obstructive etiology of cardiovascular collapse, favoring a diagnosis of cardiogenic shock from massive hemorrhage, acidemia. After several defibrillation attempts, the patient had return of spontaneous circulation with compromised left ventricular function LVEF=10% and normal right ventricular function.
- Given hypoxemia and tenuous hemodynamics post arrest, prompt femoral cannulation to initiate VA ECMO was performed.
- Her hemodynamics and metabolic acidosis were stabilized, however she remained hypoxic and difficult to ventilate.
- An additional third cannula was subsequently placed in her right internal jugular vein to achieve veno-arterio-venous ECMO.
- On post-operative day 1, further improvement of her cardiac function (LVEF 46%) allowed for conversion from VAV to VV ECMO.
- Ongoing respiratory support was required in the setting of pulmonary edema due to transfusion-associated fluid overload.
- With reassuring gas exchange and respiratory dynamics, she was decannulated and extubated on POD 4.
- Follow-up trans-thoracic echocardiography demonstrated improved biventricular function and she was discharged home on POD 8 without any neurological sequelae.

DISSCUSION

This case exemplifies the:

- utility of TEE for guiding diagnosis and treatment in undifferentiated shock
- importance of multidisciplinary collaboration for the institution of time-sensitive, life-saving therapies such as ECMO.
- It illustrates capabilities of diverse ECMO cannulation strategies in evolving clinical situations.
- Nonetheless, current management is based on observational data and clinical experience. No clear guidelines exist for the prompt initiation, management, and termination of advanced life support therapy, particularly in the parturient. Larger prospective studies are needed to assess various ECMO modes in different populations.

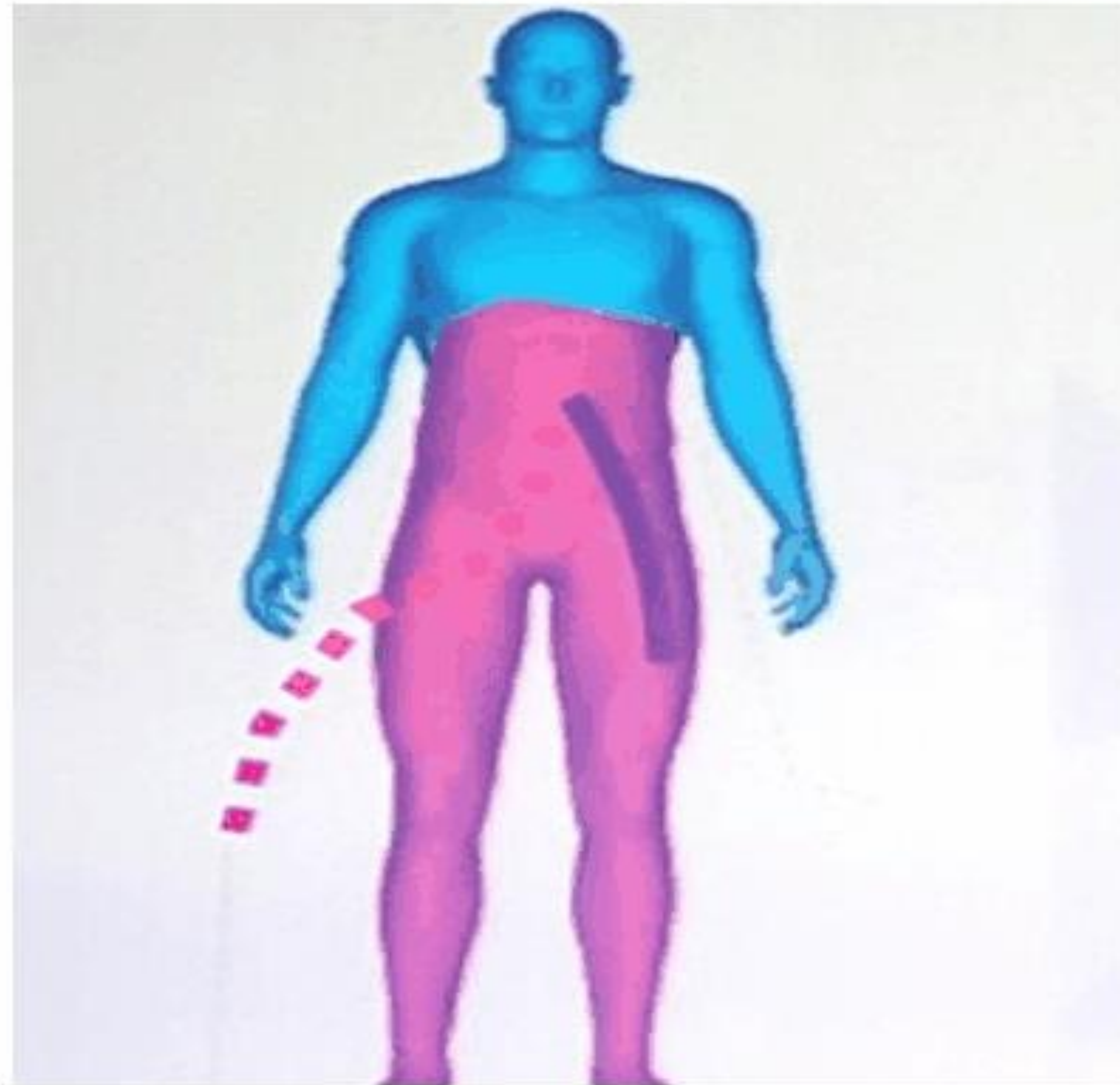
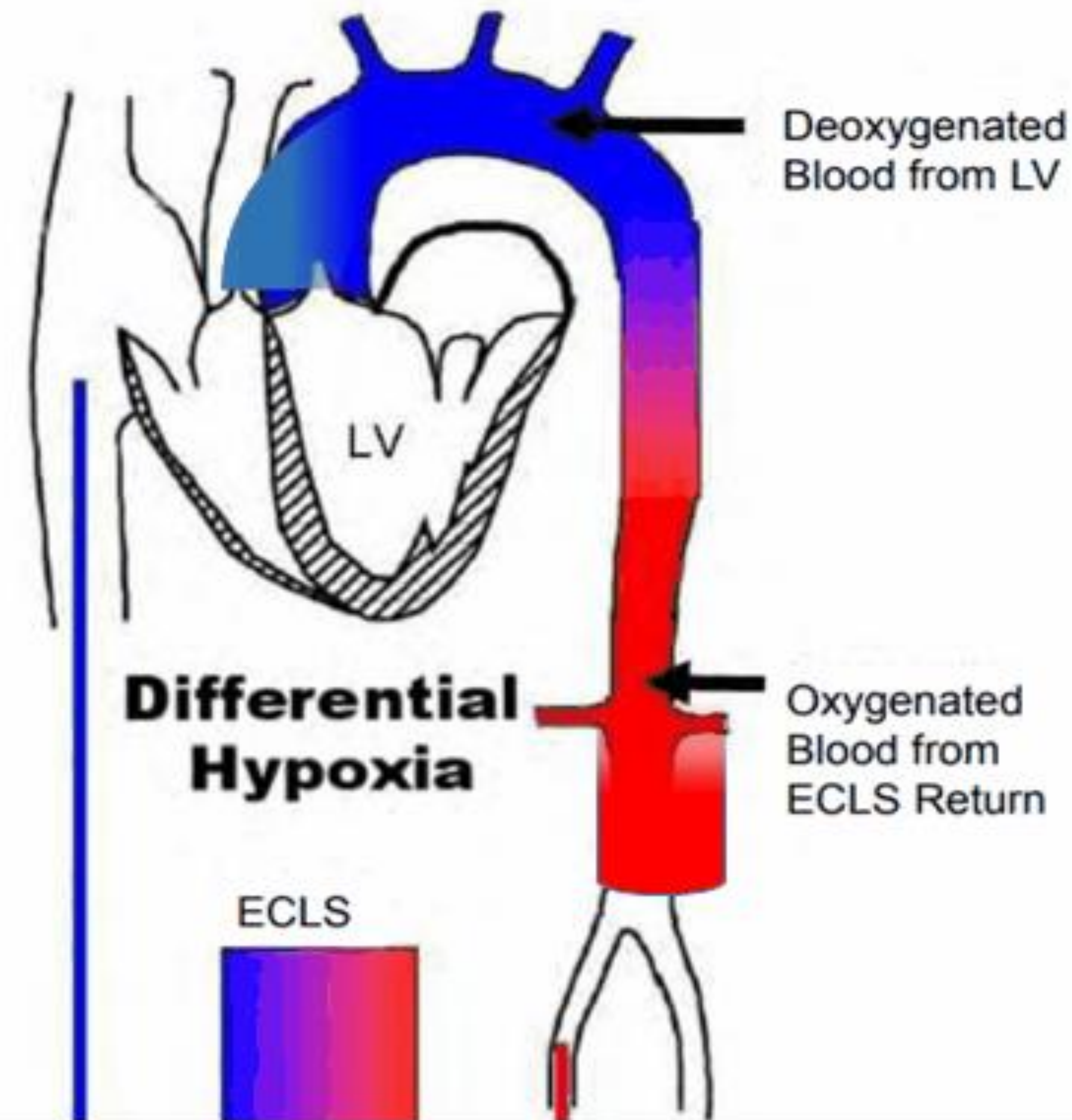
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RELEVANT LITERATURE/ASSESSMENT

ECMO “IN ONE SLIDE”

- Extracorporeal membrane oxygenation
- There are two Types VA and VV
- Survival categorized based on indication
- Acute resp failure 50-71%
- In experienced center 25% will improve w/o, 75% need ECMO
- Cardiac failure 20-50%
- Associated w/ increased survival compared to conventional CPR
- Indications: severe acute cardiac/pulm failure that is potentially reversible and unresponsive to convential mgmt.
- *Pregnancy not a contraindication
- During ECMO: blood drained, circulated outside the body by a mechanical pump, oxygenated, heat exchanged, CO2 removed and the blood is returned to circulation
- During VV blood extracted from VC/RA and returned to RA. ECMO provides respiratory support but remain dependent on own hemodynamics
- VA extracted from RA returned to arterial sx bypassing heart and lungs providing hemodynamic support
- The major complications are bleeding and thromboembolism

North –South Syndrome of VA ECMO



This situation specifically occurs when the native LV function improves and competes with upcoming stream from femoral cannulation. The battle ground is drawn somewhere in around aortic arch. It's a fight between stroke volume from native LV and ECMO return.

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