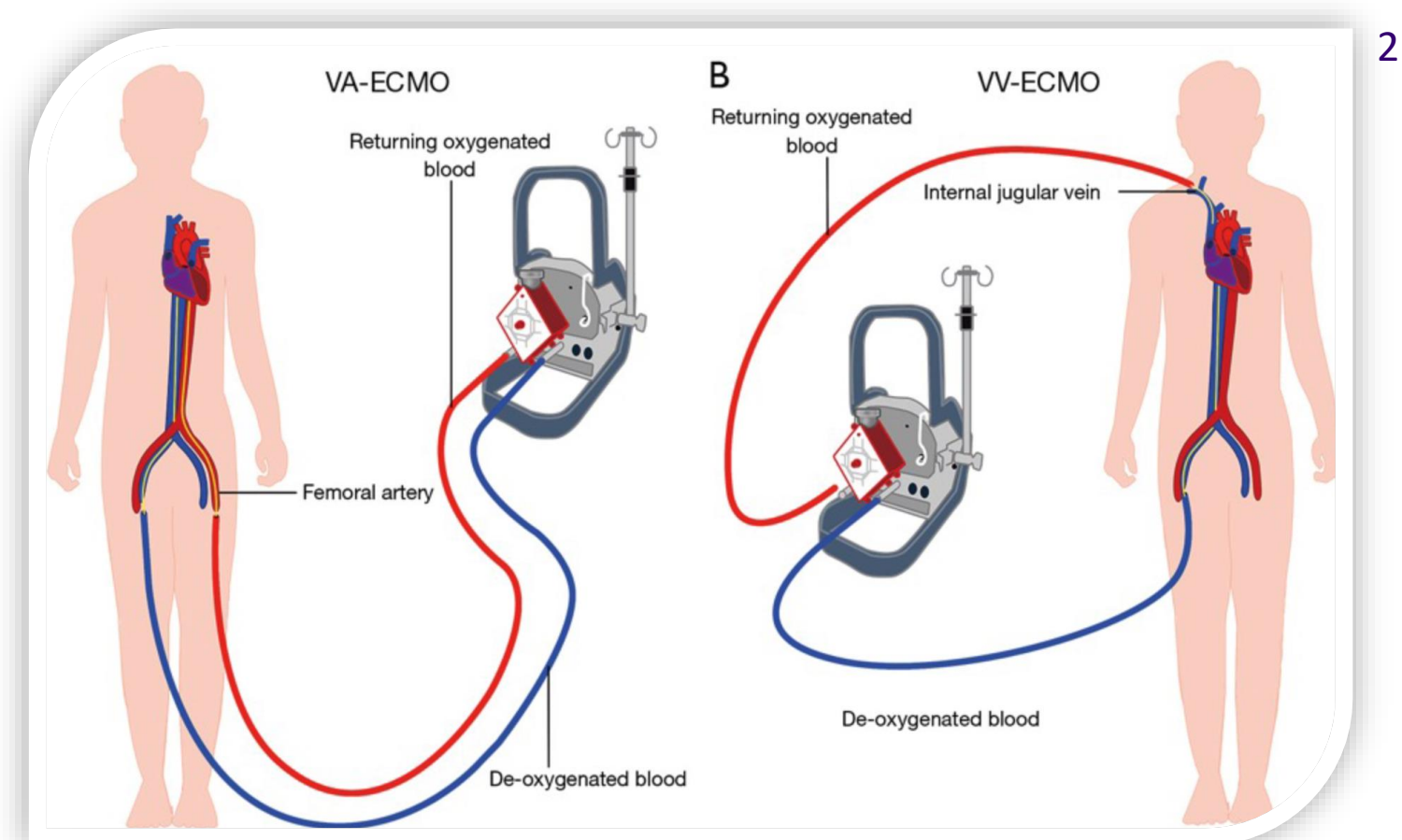


Nutrition Requirements for Patients on Extracorporeal Membrane Oxygenation (ECMO)

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What is Extracorporeal Membrane Oxygenation?

- > Machine that replaces the function of the heart and lungs.¹
- > Lungs are either unable to provide enough oxygen to the body or remove carbon dioxide from the blood even with ventilator assistance. (Veno-venous ECMO)¹
- > Heart is unable to pump enough blood to the body. (Veno-arterial ECMO)¹



Extracorporeal Membrane Oxygenation

Case:

Mr. KT is a 29-year-old male admitted from an outside hospital with Acute Respiratory Distress Syndrome secondary to the flu.

Cannulated and started VV ECMO also developed Acute Kidney Injury on HD1. Continuous Renal Replacement Therapy was initiated.

Nutrition Assessment

Based needs on recommendations for patients on CRRT instead of patients on ECMO due to higher estimate.

While on CRRT:

- Energy Needs: 2600-3030kcal (30-35kcal/kg)*
- Protein Needs: 170-215g (2-2.5g/kg)*

*Based on adjusted body weight of 86.5kg

Off CRRT

- Energy Needs: 2330-2720kcal (BEE \times 1.2-1.4)*
- Protein Needs: 104-130g (1.2-1.5g/kg)*

*Based on adjusted body weight of 86.5kg, Harris Benedict for BEE

- Adjusted body weight is the average of KT's weight and IBW

Course of Treatment

Feeding Progression

- HD2-HD22: Osmolite 1.5 @ 65mL/hr + 60mL prosource twice a day: 2700kcal, 188g protein*
*decreased to 45mL/hr if propofol rate >20mL/hr
- Briefly on Nepro @ 65mL/hr due to hyperkalemia, adjusted back to original goal on Osmolite 1.5 with no additional prosource once resolved
- Cleared for a diet on HD 29 → dysphagia pureed with nectar thick liquids via straw
- TFs discontinued HD 31, eating 50-100% of all meals
- Advanced to general diet and thin liquids on HD 32
- Discharged to skilled nursing facility on HD 45 to regain muscle mass/stamina



References

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Nutrition Guidelines

Extracorporeal Life Support Organization: full caloric and protein nutritional support, as with all critically ill patients³

ASPEN: (same recommendation for critically ill)

Energy: 25-30kcal/kg dry weight, or 11-14kcal/kg dry weight for BMI>30⁴

Protein 1.2-2g/kg or ≥ 2g/kg ideal weight for BMI >30⁴

Difficulties in Advancing Research

> Difficult to utilize indirect calorimetry for energy needs due to losses in the ECMO circuit.

> Often require additional therapies, like CRRT which make it difficult to determine protein requirements

> May have a loss of glucose, isoleucine, vitamin A and vitamin E during the ECMO circuit.⁵

> Use of metabolic carts may require intensive calculations or “home-made” adaptors to determine oxygen/carbon dioxide levels pre and post circuit.⁶