



Ministry of Health, Kuwait

Extracorporeal Membrane Oxygenation(ECMO) Dietetic Guideline

Al-Adan Hospital ICU

Patients receiving ECMO require specific macronutrient needs and regular dietetic follow up throughout their admission. Critically ill patients on ECMO have the tendency to develop increased metabolic activity, elevated catabolism of protein, insulin resistance & negative nitrogen balance. If enteral and parenteral nutrition support is insufficient, deficiency accumulates which contributes to lean tissue wasting, consequently adverse outcomes.

Feeding challenges with ECMO patients include:

1. Altered gut motility and permeability
2. Reduced gut Perfusion
3. Reduced gut absorption

Feeding initiation:

Enteral feeding should be initiated within 12-24 hours of admission to ICU, unless the patient is hemodynamically unstable, inadequately resuscitated, or the gastrointestinal (GI) tract is believed to be non-functioning. Patients with recent abdominal surgeries require prior discussion with the surgeon before commencing enteral feeding.

Initiation rate: 15-20 ml/hr.

Increment: $\uparrow 20$ ml Q 8hr

Calculating energy needs:

Indirect calorimetry is not accurate and possible to calculate energy needs. Body temperature, acid base status, pCO₂ are altered during ECMO. The following methods are best used to calculate energy needs:

1. 25 – 30 kcal /kg of Actual Body Weight (ABW) or Ideal Body Weight (IBW)
2. ETCO₂ equation:
 - a. $ETCO_2 \text{ Kpa} / 101,325 \times ETCO_2 \text{ ml}$
 - b. $ETCO_2 \times 10 \times L_{gasfl}$

.Feeding tolerance:

1. It is preferred that patients receive continuous enteral feeding. EN should start at 20ml/hr and if tolerating advance to goal rate within 48 hours, reaching the goal rate as determined by Clinical Dietitian.
2. EN tolerance is determined by physical examination, passage of flatus and stool, radiology evaluation, absence of abdominal pain, discomfort, and distention.
3. If malabsorption persists, change to elemental formula.
4. If the patient experiences persistent nausea and vomiting, consider initiating parenteral nutrition.
5. Inappropriate cessation of enteral nutrition should be avoided. The time period that a patient is made NPO prior to, during, and immediately following the time of diagnostic tests or procedures should be minimized to prevent inadequate delivery of nutrients.

Management of Diarrhea:

Diarrhea: greater than 3 liquid stools per day for 2 consecutive days

1. Do not stop enteral feeding for incidence of diarrhea. Feeding should be continued while evaluating etiology (enteral medications, Clostridium difficile, or other infectious etiologies).
 - i. If diarrhea persists, after evaluation of etiology, consider alternative tube feed formula or use of anti-diarrheal agent.
 - ii. If it is determined that the patient exhibits gastrointestinal absorption difficulty, the use of
 - iii. peptide based or elemental formula may be justified.

Management of Constipation:

Constipation: difficulty passing or no bowel movement >3 days

- iv. Check for signs of dehydration.
- v. Increase the amount of free water.
- vi. Add fiber supplement (HYfiber, Medtricia 1 Sachet B.D)

Protein Requirements:

- 1.5 – 2 grams / kg / day

Nutritional needs of the obese ECMO patient

- High protein, hypocaloric feeding to preserve lean body mass, mobilize adipose tissue and minimize overfeeding
- 2-2.5 g protein/kg Ideal body weight (BW)

Nutritional Goals:

1. Achieve 70 % of total energy needs within the first week on ECMO
2. Achieve 80-90 % of total protein needs within the first week of ECMO

References:

MacGowan, L et al, Adequacy of nutrition support during extracorporeal membrane oxygenation (2018) Journal of Clinical Nutrition, 1-8.

Craucamp, E., Nutrition in ECMO (2016) Critical care nutrition, 1-17.

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