

Adult Dietitians BIMDG Subgroup:

Considerations in the assessment of IMD Critically Unwell Covid-19 patients

KEY EQUIPMENT (if possible)

- IMD patients should be prioritised for feeding pumps and filters
- If patient uses enteral feeding in community, consider asking them to bring in their pump if needed (fully labelled with their details)

FLUIDS

- Has your patients IV emergency regimen been adjusted?
- How many kcals are being provided by IV fluids?
- Is there an aim for fluid balance / restriction in place? (check local protocol - a restrictive fluid management strategy may be used)

VENTILATION STATUS

- Is your patient receiving breathing support (NC02/ NIV/ CPAP)?
- Be proactive with early intervention of nasogastric tube (NGT) placement if CPAP/ NIV started
- If your patient is ventilated consider:
 1. Early intervention with parenteral nutrition (PN) if not absorbing enteral nutrition (EN)
 2. Close monitoring of bowels

PRONING

- Is your patient being proned? If yes, for how long?
- Check the local protocol for feeding whilst proning
- Consider additional feed breaks due to proning - adjust feed regimen as needed
- Patient may need IV fluids (and calories) to continue during enteral feeding breaks to help avoid underfeeding
- Check blood glucose levels are being monitored closely and insulin, if required, being given appropriately with feed regimen (i.e. stopped when feed stopped to avoid hypoglycaemia).
- Proned patients may require significant levels of sedation which can exacerbate GI intolerance. PN may be indicated if post pyloric feeding is not available.

MEDICATIONS

- In Fatty Acid Oxidation Disorder (FAOD) patients – DO NOT USE Propofol (contains a high proportion of fat and can impair cellular energy processes, including fatty acid oxidation and mitochondrial function). Inhalational agents, barbiturates, ketamine, benzodiazepines, fentanyl, and opioids are considered safe.
- If on propofol:
 1. Are they on 1% or 2%? How many additional kcals is this providing? (see propofol chart, section 2)
- Consider early use of prokinetics, especially if high gastric residual volumes (GRV) (follow BDA critical care advice for further information on choice of prokinetics).
- Consider that IV ammonia scavenging medications may be given in higher concentrations to reduce total fluid input.

CALCULATING NUTRITIONAL REQUIREMENTS FOR CRITICALLY UNWELL PATIENTS

- Consider ESPEN and/ or PENG guidelines for energy and protein requirements (re: protein except urea cycle disorder/ organic academia patients).
- Predictive equations for estimating calorie requirements for critically ill patients, use PENG requirements (Table 16.6) or local protocol. Main concern with overfeeding appears to be uncontrolled hyperglycaemia (rather than concern re: excess CO₂).
- Initially aim for ~80% of calorie requirements for the first few days (~3 days) although practices may vary by unit/local Trust guidance
- Follow ESPEN guidelines re: increasing energy provision to meet 100% of requirements (between Day 3 and 7).

CHOOSING FEEDING ROUTE

- If not for oral feeding, consider use of NGT if no concerns re: GI intolerance.
- Maximal Gastro residual volumes (GRV) threshold <300mls/4hrs. If high GRV persist for > 48-72hrs consider bedside placement of post-pyloric feeding tube. (*In IMD pts, may be better to move straight to PN to avoid possible time delay for placement of nasojejunal (NJ) tube.*)
- If post-pyloric feeding is not an option – consider semi elemental feed and/or PN.

FEED REGIMEN CONSIDERATIONS FOR CRITICALLY UNWELL PATIENTS

- Establish effective feeding route quickly.
- Advise caution if considering use lipids for proportion of energy. Some COVID patients noted to have unexplained elevated triglycerides so needs to be balanced against risk of hyperglycaemia.
- If no concern re: hypertriglyceridemia, consider IV intralipid + IV glucose for early phase management of metabolic patients with COVID to reduce glucose burden if patient has uncontrolled blood glucose levels
- Aim to avoid large volumes / high rates (ml/hr) of enteral feeds due to fluid restrictions and/or GI intolerance
- Consider 1.3-1.5kcal/ml feeds.
- Caution with using 2kcal/ml feeds as may exacerbate GI intolerance
- If concerns re: renal function, patients may need volume restricted / low electrolyte enteral feeds, especially limited availability of filters
- Follow local infection control protocol for feed hanging times especially if using a modular feed.

CONDITION SPECIFIC CONSIDERATIONS

UREA CYCLE DISORDERS (UCD) AND ORGANIC ACIDAEMIA'S

- **ORAL ROUTE:** continue usual oral emergency regimen
- **ENTERAL ROUTE:** Basecal can be made up to a higher concentration (but will also increase osmolality). Concentrating to 1.25kcal/ml may be tolerated
- **IV ROUTE:** Consider venous access for parenteral feeding. Reported experience given intravenous dextrose and then lipid down the same lumen, over the day (e.g. 16 hours dextrose, then 8 hours intralipid)
- **UCD** – consider IV medication concentrations may have changed- check total volume of IV dextrose given and corresponding energy provision.

MAPLE SYRUP URINE DISEASE

- **IF ADMITTED:** Concern re: access to filtration if leucine levels are high. Essential to establish effective feeding route quickly.
- **ENTERAL ROUTE:** MSUD Aid III or MSUD Amino5 (Reported increased concentration of 1 Amino5 sachet dissolved in 20mls of water), can useful if patient fluid restricted or GI intolerance. Will need supplemental parenteral nutrition with complete protein and energy).
- **IV ROUTE:** BCAA-free PN likely very hard to obtain. Check with local team what PN options are available. Anecdotal reports of MSUD patients on filtration receiving standard PN

GLYCOGEN STORAGE DISORDERS

- **CONSIDERATIONS:** Unknown if existing insulin resistance in GSD patients may be exacerbated with Covid-19. If feeds interrupted for proning etc. ensure insulin also stopped to avoid hypoglycaemia.
- Ask nursing staff to monitor glucose and lactate (concern re: elevated lactate and impact on respiratory function)
- Glycaemic control with GSD might not be as seen in patients with diabetes and Covid-19
- **IV ROUTE:** Standard PN can be used if carbohydrate content adequate to prevent hypoglycaemia.

FATTY ACID OXIDATION DISORDERS

- **CONSIDERATIONS:** see medications, do not use propofol.
- **ORAL ROUTES:** can use fat free ONS (juice types)
- **ENTERAL ROUTES:** depends on condition and severity and long chain triglyceride (LCT) allowance. Could use volume of standard feed to meet LCT allowance and top up with MCT, protein and carbohydrate
- Could use low fat or MCT containing feeds (not MCAD/MADD)
- **IV ROUTE:** Consider fat free bag (do not break seal for lipid chamber) or smaller volume of standard PN bag and meet requirements with additional IV dextrose

OTHER CONSIDERATIONS

PREGNANCY

<https://www.rcog.org.uk/en/guidelines-research-services/guidelines/coronavirus-pregnancy/>

- Routine antenatal care continues with some modifications
- Extremely vulnerable list for pregnancy (those with underlying cardiac disorders)
- Patients with IMD may be more vulnerable if pregnant
- MPKU – possible postal delays, and some laboratories have needed to reduce frequency of bloodspot analysis

- Acceptance of new pre-con PKU patients-varies between centres.
- Provision of support regarding patient's employer may be needed (particularly in first and second trimesters).

Consensus Guidance produced by the Adult Dietitians Sub-Group of BIMDG. With thanks to BDA Critical Care group guidance and Liesl Wandrag, ICU Lead Dietitian, St Thomas Hospital. For all references see References Appendix.