

# Use of Supplemental Parenteral Nutrition for Critically Ill Patients

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## Use of Supplemental Parenteral Nutrition for Critically Ill Patients Webinar



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## Background

- Indications for parenteral nutrition (PN) and enteral nutrition (EN): International guidelines agree that whenever possible, generally with 48 hours, EN is the preferred method of nutrition therapy<sup>1-3</sup>
- Increased focus on providing PN when nutrition requirements cannot be met with oral or EN include:<sup>4,5</sup>
  - » GI dysmotility or other EN intolerance
  - » Hemodynamic instability/escalating vasopressor dose
  - » Repeated interruptions in EN infusion
  - » EN interrupted/held an average of 7-8 hours per day in the ICU
  - » Many ICU patients receive only 50% of prescribed calories for the first 12 days in the ICU
- Increasing focus on providing PN earlier for patients who are malnourished or at high nutrition risk
- Definition of supplemental parenteral nutrition (SPN): Supplemental means “provided in addition to what is already present or available to complete or enhance it.” SPN = PN provided in addition to EN or oral intake to meet calorie and protein targets.
  - » Originally proposed as a rescue therapy to meet 100% of energy needs as measured by indirect calorimetry when EN fails to do so by day 4 of ICU admission

## Considerations for SPN Management<sup>6</sup>

- Avoid overfeeding for all and monitor for refeeding in severely malnourished patient
- Consider nutrition status and phase of critical illness
  - » In acute early phase (ICU day 1-2), use conservative calorie and protein goals
  - » In acute late phase (ICU day 3-7), grade up to full calorie and protein goals

## Guidelines and Supporting Literature for Use of Supplemental PN in the ICU<sup>1-3</sup>

### ASPEN 2017 PN Consensus Recommendations

- 4A. Initiate PN after 7 days in well-nourished, stable adult patients who have been unable to receive...≥50% of estimated requirements
- 4B. Initiate PN within 3-5 days in those who are nutritionally at risk and unlikely to achieve desired oral intake or EN

### ESPEN 2018 Guideline on Clinical Nutrition in the ICU

- 8. To avoid overfeeding, early full EN and PN shall not be used in critically ill patients but shall be prescribed within 3-7 days
- 20. In patients who do not tolerate full dose EN during the first week in the ICU, the safety and benefits of initiating PN should be weighed on a case-by-case basis
- 21. PN should not be started until all strategies to maximize EN tolerance have been attempted

### ASPEN 2021 Guidelines for Nutrition Support Therapy in the Adult Critically Ill Patient

- Q4. Based on findings of no clinically important benefit in providing SPN early...we recommend not initiating SPN prior to day 7 of ICU admission

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Continues on next page

## SPN and Outcomes in the Critically Ill<sup>7-9</sup>

- SPN + EN results in higher mean values of energy and protein intake compared to EN alone
- No significant difference in the mean values of duration of mechanical ventilation between SPN + EN and EN alone
- The risk of occurrence of infection was reduced by 26.7% with SPN + EN compared with EN alone
- No significant difference in the mean length of ICU stay
- The risk of ICU mortality was reduced by 43.1% with EN + SPN

### Case Presentation #1

#### Patient with Gastrointestinal Fistula<sup>10-11</sup>

- Patient 69-year-old male s/p SMA stent for acute SMA dissection, developed mesenteric ischemia. In a two-month period the patient underwent 17 major abdominal operations and left with ~60cm small bowel, colon with ileocecal valve, fistula ~30cm distal to ligament of treitz.
- Nutrition status: patient with weight loss and unable to take in oral diet or adequate EN.
- Clinical course: Profound septic shock and ongoing necrotic bowel. Ultimately there were two ends of small bowel in discontinuity, proximal jejunum and distal ileum with tubes in them. Underwent tracheostomy, G-tube, proximal decompressive tube that turned into the fistula, distal tube for fistuloclysis/re-feeding. Hospital LOS was 3 months, then went to LTAC, then rehab, and finally home.
- Nutrition support: Inadequate EN in first week because of septic shock. Placed on SPN with trickle/trophic EN via nasoenteric tube but had intermittent feeding intolerance. Had high output fistula.
- Complicated EN course, fistuloclysis, added GLP2-analogue, and continued on SPN.

### Case Presentation #2

#### Patient with ARDS

- Patient: 62-year-old woman with diabetes, hypertension, chronic kidney disease.
- Nutrition status: BMI 31, 75kg, but with significantly reduced oral nutrition intake and weight loss over the past 3-4 months.
- Clinical course: Worsening respiratory status, lung protective ventilation, prone position, dilatative tracheostomy on day 2, ECMO until day 16, bacterial pneumonia on day 26, ARDS.
- Nutrition support: Start nutrient dense EN after hemodynamic stabilization after 24 hours with 10 mL/h. Depending on tolerance, further increase to 30 mL/h with goal to 50 mL/h. Needs for calories (25 kcal/kg) = 1875 kcal and protein (1.3 g/kg) = 97.5 g.<sup>2</sup> Tolerance of EN is limited. Intensivists reluctant to add SPN but solution to nutrient deficits is to start SPN.

## Key Messages from the Experts

- Achieving nutrition goals is challenging in critically ill patients
- Care of a patient with high output enterocutaneous fistula is complex in terms of nutrition delivery
- Patients on ECMO represent a specific cohort of critically ill patients who are at increased risk for underfeeding
- Frequent interruptions or intolerance to EN make it challenging to achieve nutrition goals by EN alone
- Supplemental PN or the combined use of EN/PN has repeatedly been shown to significantly increase the nutrition intake
- Aggregated evidence indicates that SPN may lead to better functional recovery in critically ill patients

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