Nutrition Support in Adult Critical Illness

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Objectives

- Discuss why nutrition support in critical illness is important.
- Discuss enteral nutrition during hemodynamic instability.
- Discuss Enteral Nutrition (EN) tolerance recommendations.
- Discuss when to initiate Parenteral Nutrition (PN) in patients with low and high nutritional risk.

ASPEN & SCCM Guidelines Published February 2016

Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient:

Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.)

Stephen A. McClave, MD; Robert G. Martindale, MD, PhD; Vincent W. Vanek, MD; Mary McCarthy, RN, PhD; Pamela Roberts, MD; Beth Taylor, RD; Juan B. Ochoa, MD; Lena Napolitano, MD; Gail Cresci, RD; the A.S.P.E.N. Board of Directors; and the American College of Critical Care Medicine

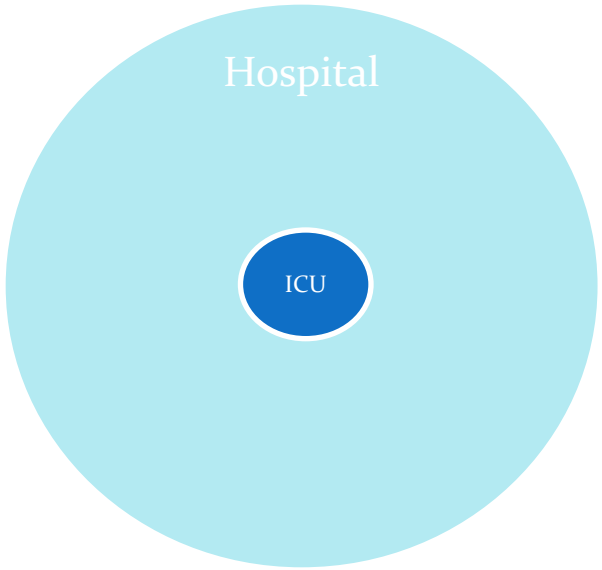
Introduction to Guidelines

- **Basic Recommendations**
  - **Not absolute requirements**
  - **Do not project or guarantee outcome or mortality benefits**
  - **Not a substitute for clinical judgment**
    - **Clinical judgement takes precedent**

ICU Growth in Hospitals

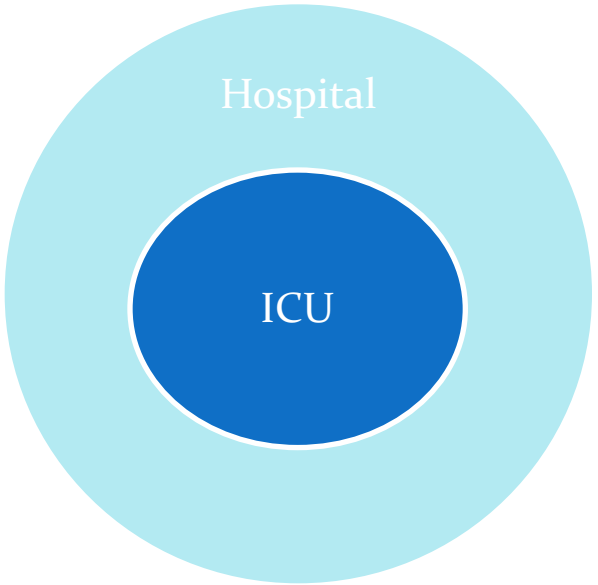
1980

3 % to 5 % in the ICU



2015

20 % to 30 % in the ICU



ASPEN

Critical illness

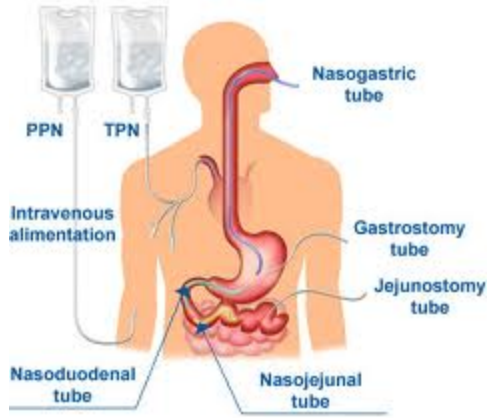
- Typically associated with a catabolic stress state
- Patients demonstrate a systemic inflammatory response coupled with complications such as
  - Increased infectious morbidity
  - Multiple-organ dysfunction
  - Prolonged hospitalization
  - Disproportionate mortality

Nutrition Support in the Critically ill

- Traditionally regarded as adjunctive care in the critically ill population

- Designed to
  - provide exogenous fuels
  - to preserve lean body mass
  - support the patient throughout the stress response.

Nutrition Support



- This strategy has evolved to represent Nutrition Therapy.

- Feeding is now thought to

  - Help attenuate the metabolic response to stress
  - Prevent oxidative cellular injury
  - Favorably modulate immune responses

Nutrition Support

- Now seen as a proactive therapeutic strategy that may
  - Reduce disease severity
  - Diminish complications
  - Decrease LOS in the ICU
  - Favorably impact patient outcomes

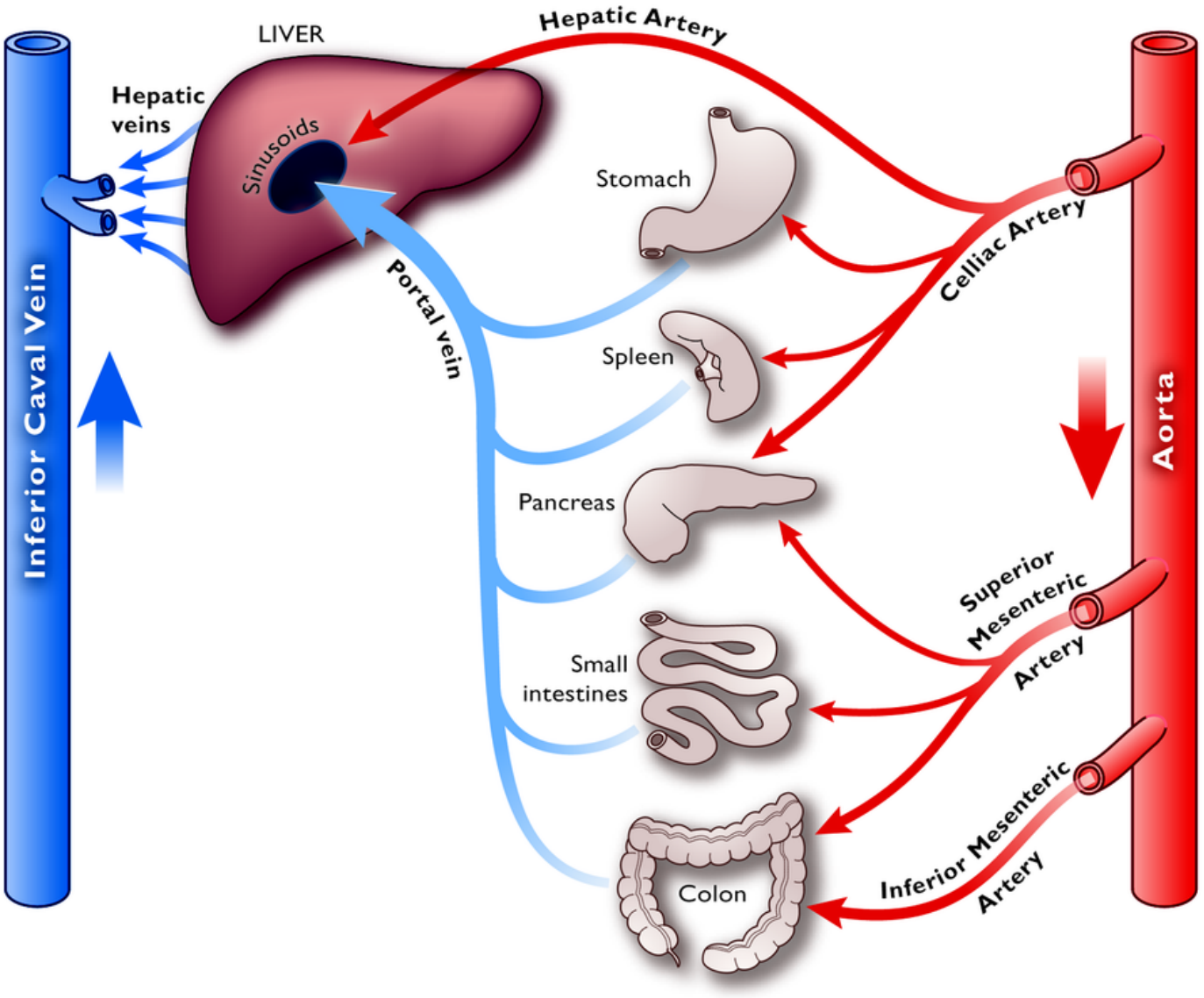
Improvement in the clinical course of critical illness may be achieved by

- Meticulous glycemic control
- Appropriate macronutrient & micronutrient delivery
- Early EN (within 24 -48 hours of ICU admission)
  - To maintain gut integrity
  - Reduce oxidative stress
  - Modulate systemic immunity.

Hemodynamic Instability

- Inadequate perfusion to support normal organ function
- Hypertension
- Hypotension
  - Norepinephrine
  - Vasopressin
  - Phenylephrine
  - Epinephrine
  - Dopamine

Normal Splanchnic Blood Flow



Vasopressors Effect on Splanchnic Blood Flow

- Vasopressors shunt blood flow away from the splanchnic bed.
- Increased risk for gut ischemia & reperfusion injuries involving the intestinal microcirculation.

Is EN safe during periods of hemodynamic instability in adult critically ill patients?

Section B5.

- Based on expert consensus, we suggest that in the setting of hemodynamic compromise or instability, EN should be withheld until the patient is fully resuscitated and/or stable.

- Initiation or re-initiation of EN may be considered with caution in patients undergoing withdrawal of vasopressor support.

Is EN Safe ?

- EN may be provided with caution
  - Patients on chronic, stable low doses of vasopressors
- EN should be withheld in patients
  - Who are hypotensive
    (mean arterial blood pressure <50 mm Hg)
  - Who are being started on vasopressors
  - Needing escalating doses of vasopressors to maintain hemodynamic stability

Signs of GI Intolerance

- Vomiting
- Abdominal Distention
- Complaints of Discomfort
- High NG Output
- High Gastric Residual Volume (GRV)
- Diarrhea
- Reduced Flatus and Stool
- Hypoactive Bowel Sounds
- Abnormal Abdominal Radiographs
- Increasing Metabolic Acidosis and/or Base Deficit

Any signs of intolerance should be closely scrutinized as possible early signs of gut ischemia.

Should GRVs be used as a marker for aspiration to monitor ICU patients receiving EN?

Section D2a.

- Suggest that GRVs not be used as part of routine care to monitor ICU patients receiving EN.

Section D2b.

- Suggest that, for those ICUs where GRVs are still utilized, holding EN for GRVs <500 mL in the absence of other signs of intolerance should be avoided.

Rationale

- Results from 4 Randomized Clinical Trials (RCTs) indicate that raising the cutoff value for GRVs to 250–500 mL

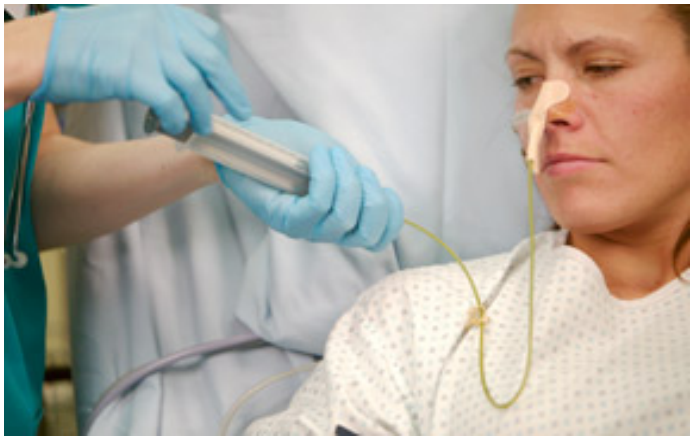
- Does not increase the incidence of
  - Regurgitation
  - Aspiration
  - Pneumonia

Rationale

- Use of GRVs leads to:

- Increased enteral access device clogging
- Inappropriate cessation of EN
- Consumption of nursing time
- Allocation of healthcare resources
- May adversely affect outcome through reduced volume of EN delivered.

GRV



- For those ICUs reluctant to stop using GRVs, care should be taken in their interpretation.
- GRVs in the range of 250–500 mL should raise concern
- Implement measures to reduce risk of aspiration

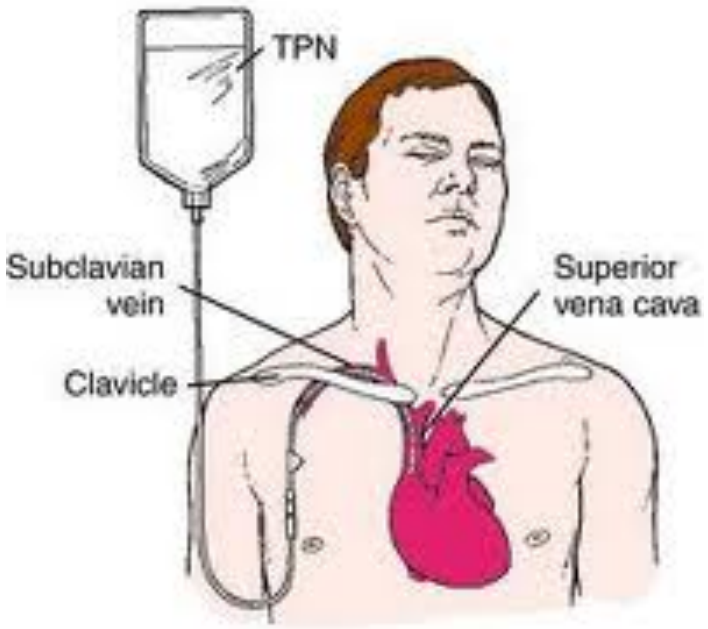
To Reduce Risk of Aspiration

- Elevate head of bed to 30 – 45 degrees
- Use continuous EN infusion
- Use Prokinetic agents in patients at high risk of aspiration
  - Help control acid reflux
    - Zantac
    - Pepcid
  - Help strengthen the Lower Esophageal Sphincter (LES)
  - Help the contents of the stomach to empty faster

To Reduce Risk of Aspiration

- Recommend diverting to postpyloric access
  - Patients at high risk for aspiration
  - Patients not tolerating EN
- Use Chlorhexidine mouthwash twice daily

Parenteral Nutrition



When should PN be initiated in the adult critically ill patient at **Low nutrition risk**?

- Low Risk (eg, NRS 2002 ≤3 or NUTRIC score ≤5)

Section G1.

- Suggest that, in the patient at low nutrition risk, PN be withheld over the first 7 days following ICU admission.
  - If the patient cannot maintain volitional intake and if early EN is not feasible.

Rationale

- The risk/benefit ratio for use of PN in the ICU setting is much narrower than that for use of EN.

- In a previously well-nourished patient
  - Use of PN provides little benefit over the first week of hospitalization in the ICU.

When should PN begin in the critically ill patient at **High nutrition risk**?

- High risk (eg, NRS 2002 ≥5 or NUTRIC score ≥5)
- Severely malnourished
  - when EN is not feasible

Section G2.

- Suggest initiating exclusive PN as soon as possible following ICU admission.

Supplemental PN

Section G3.

- We recommend that, in patients at either low or high nutrition risk, use of supplemental PN be considered after 7–10 days
  - if unable to meet >60% of energy and protein requirements by the enteral route alone.

- Initiating supplemental PN prior to this 7- to 10-day period in critically ill patients on some EN does not improve outcomes.

Rationale

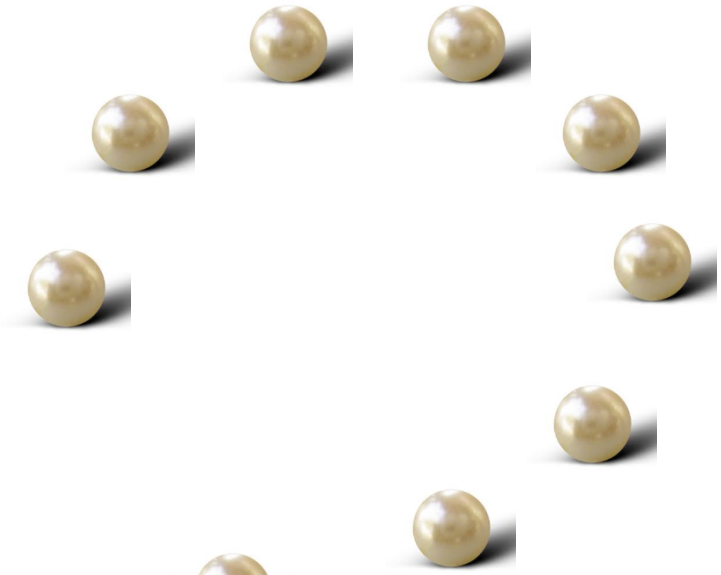
- A large multicenter observational study found no additional outcome benefit when patients were provided early (<48 hours) supplemental PN.
- The optimal time to initiate supplemental PN in a patient who continues to receive hypocaloric EN is not clear.
- At some point after the first week of hospitalization, if the provision of EN is insufficient to meet requirements, then the addition of supplemental PN should be considered, with the decision made on a case-by-case basis.

Summary and Conclusion

- **EN preferred over PN**
- **EN has both nutritional and non nutritional benefits**
- **Hemodynamic Stability is required for EN**
- **Do not stop EN if GRV are < 500 ml with no other signs of intolerance**
- **Withhold PN in low risk population for 7 days if EN is not feasible**

Summary and Conclusion

- **Start PN ASAP in high risk or severely malnourished patients if EN is not feasible**
- **Provide supplemental PN after 7 – 10 days if EN is providing < 60 % of goal (high or low risk)**
- **Clinical judgment *always* takes precedence over guidelines**
- **Guidelines will change with ongoing trials, keep an open mind & remain flexible**



Reference

- McClave SA, et al. Guidelines for the Provision and Assessment of Nutrition Support Therapy in the adult critically ill patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (ASPEN). JPEN 2016;40(2):159–211.