

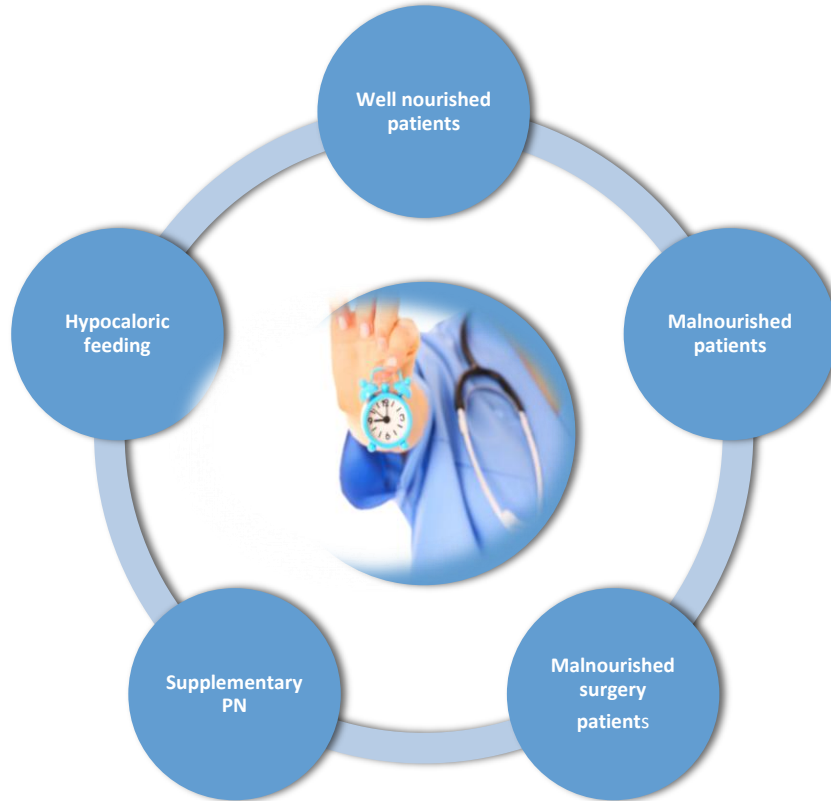
(T)PN Getting it right

Annette Prinsloo

Chief Dietitian

Chris Hani Baragwanath Academic Hospital

The current issue...timing!



Schools of thought

ASPEN
CCCG

ESPEN

AusPEN



Consensus

- ESPEN and ASPEN guidelines recommend that some sort of nutrition be commenced within 24-48 hours if one predicts that the patient will not be eating within 3 days.
- Enteral nutrition is the preferred method of feeding.

EN should be delayed if:

- Shock is uncontrolled and hemodynamic and tissue perfusion goals are not reached
- In case of uncontrolled life threatening hypoxemia, hypercapnia or acidosis
- Active upper GIT bleeding
- Overt bowel ischaemia
- High output intestinal fistula if reliable feeding access distal to the fistula is not feasible
- Abdominal compartment syndrome
- Gastric aspirate volume > 500ml/6h

Disparity

ESPEN:

- In case of contraindications to oral and EN, PN should be implemented within 3 -7 days (Grade B recommendation, 89% agreement)

Singer et al, Clinical Nutrition, 2018

Disparity

ASPEN

- Initiate PN after 7 days for well nourished, stable adult patients who have been unable to receive significant (50% or more of estimated requirements) oral or enteral nutrition

Worthington et al, JPEN, 2017

Keep in mind....

- How long has the patient been in hospital prior to ICU admission
- How long has the patient been NPO prior to ICU admission
- Nutritional status upon admission to hospital



Malnourished patients

ESPEN

- Early and progressive PN can be provided instead of no nutrition in case of contraindications for EN in severely malnourished patients. (Grade 0 recommendation, 95% consensus)

Singer et al, Clinical Nutrition, 2018

Malnourished patients

ASPEN

- Initiate PN within 3 – 5 days in those who are nutritionally at risk and unlikely to achieve desired oral intake or EN
- Initiate PN **as soon as is feasible** for patients with **baseline moderate or severe malnutrition** in whom oral intake or EN is not possible or sufficient

Worthington et al, JPEN, 2017

Malnourished surgical patients

ASPEN

- Consider preoperative PN in severely malnourished patients unable to tolerate sufficient oral intake or EN
- Reserve postoperative PN for severely malnourished patients unable to tolerate EN for more than 7 days, unless initiated preoperatively

Worthington et al, JPEN, 2017

Malnourished surgical patients

Elective malnourished perioperative patients



Emergency malnourished perioperative patients

Start TPN after 5-7 days post-operatively; and ONLY if the anticipated duration of TPN is longer than 7 days.

The diagram shows a horizontal timeline from Day 0 to Day 16. A bracket below the timeline from Day 5 to Day 7 is labeled 'Start TPN after 5-7 days post-operatively; and ONLY if the anticipated duration of TPN is longer than 7 days'. A thick grey arrow points from Day 5 to Day 16.

Supplemental PN

- Patients that reach energy and protein targets by the enteral route, show better outcomes than patients that did not
- Reaching these targets through addition of PN seems to provide different and potentially less beneficial effects.

Allingstrup MJ et al. Clinical Nutrition. 2012
Weijs PJ et al. JPEN. 2012

Suggested negative effects of SPN

- Increased risk of overfeeding
- Increased risk of refeeding
- Fat overload
- Glucose intolerance
- Immune-modulation by lipids

- Potentially, SPN may interfere with the early inflammatory response present in most ICU patients.
- **Autophagy** is associated with the healing process by aiming at the removal of mitochondria damaged during the acute phase of sepsis
- **Autophagy** is the basic catabolic mechanism that involves cell degradation of unnecessary or dysfunctional cellular components through the actions of lysosomes.
- Overfeeding and insulin are inhibitors of autophagy

“In adult critically ill patients, when full enteral nutrition support is not possible or fails to reach caloric targets, **early administration of supplemental parenteral nutrition** compared with **late administration**does not confer major benefits with respect to morbidity and mortality.

However, considering that **infectious morbidity and resolution of organ failure** may be **negatively affected** through mechanisms not yet clearly understood and acquisition costs of parenteral nutrition are higher compared with enteral nutrition, the early administration of parenteral nutrition cannot be recommended.”

Bost RB, Tjan DH, van Zanten ARH. Ann Intensive Care, 2014

Posthoc analysis of the EPaNIC study:

Parenteral protein was the likely cause of the detrimental effects in the parenteral arm, and the more feeding (either enteral or parenteral) a patient received from day 3–7, the less likely that patient would be discharged alive from the ICU

(Low nitrogen intake)

The use of parenteral nutrition should be limited within the first 6 days, and not used to augment caloric intake.

Fremont & Rice. Curr Opin Gastroenterol.2014

Trials investigating PN or SPN and comparing it with EN

Acronym [Reference] First author	Trial year	Trial type (N)	Outcome and comments	Goal tool/ Energy deficit before PN
NUTRIREA Reignier et al.	2017	RCT N=2410	Comparison of full EN and PN within 24 h in septic shock patients with targets 20 - 25 kcal/kg: Mortality ns; more digestive complications in EN	Equation/Yes
TOP-UP pilot Wischmeyer et al.	2017	RCT N=120	PN and EN vs EN alone in underweight and obese ICU patients to an estimated target with a difference of 30% in energy. No outcome differences	Equation/Yes
SPN pilot Ridley et al	2018	RCT N=100	Patients randomized to PN titration 48 -72 h after admission to estimated target. Higher energy and protein delivery. Outcomes similar	Equation/Yes 48 h

Berger & Pichard, Nutrition, March 2019

A last word on SPN

- The eventual use of SPN should be based on the clinical observation of the intestine's capacity to accommodate (or not) enteral feeds.
- Requires tight monitoring and dedicated resources such as dietitians in the ICU

Berger & Pichard, Nutrition, March 2019

Take it slow.....

- "Permissive underfeeding" is an intentional way of decreasing the risks from TPN while maximising the benefits.



“An early “aggressive” feeding strategy, that is, the delivery from day 1 of full calculated or measured energy goals, has been shown to be inappropriate regardless of the route. The term **aggressive** should be banned from vocabulary, and from feeding strategies.”

Berger & Pichard, Nutrition, March 2019

ESPEN

- To avoid overfeeding, early full EN and PN shall not be used in critically ill patients but shall be prescribed within 3 to 7 days (Grade A recommendation, 100% consensus)

Singer et al, Clinical Nutrition, 2018

ESPEN

- Hypocaloric nutrition (not exceeding 70% of EE) should be administered in the early phase of acute illness (Grade B recommendation, 100% consensus)
- After day 3, caloric delivery can be increased up to 80 – 100% of measured EE (Grade B recommendation, 95% consensus)

Singer et al, Clinical Nutrition, 2018

Conclusion

- Initiate PN based on gastrointestinal function, nutrition status and clinical status
- PN within the first 6 days of critical illness should be viewed as at best a necessary evil, and deployed with careful consideration of its risk-benefit ratio.
- Monitoring is vital
- The well-nourished patient can wait for 7 days before starting PN
- Take it slow!!!



Fools rush in where angels fear
to tread.

Alexander Pope