PRACTICE TOOL

Dispelling Myths About Parenteral Nutrition Use

Parenteral nutrition (PN), one of the most notable achievements of modern medicine, serves as a life-saving/life-sustaining therapeutic nutrition modality that may be initiated in all age groups across the healthcare continuum when nutrition needs cannot be met by mouth or via the enteral route. Although life-sustaining, PN carries the risk of short- and long-term side effects. Optimal PN efficacy and safety outcomes can be ensured by adhering to best practices and through close monitoring.

Yet, despite the facts, several myths about the initiation and safe delivery of PN exist. This document is aimed at dispelling common myths related to patient conditions, PN components, stability and compatibility, and administration.

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Patient Related PN Myths

Myth	Facts	Ref. Num.
Adult patients with hyperglycemia should never be started on PN.	• Cautious initiation of PN may be warranted in adult patients with hyperglycemia (glucose >180 mg/dL). • Metabolic complications may be prevented through implementation of the following strategies: » Initiate PN with lower dextrose dose adjusted for hyperglycemia. » Advance PN more conservatively with vigilant laboratory monitoring and prompt intervention, if indicated. » Consider daily use of lipid injectable emulsions (ILE) to provide non-dextrose energy. » Use insulin per institutional protocols to control glucose levels.	1, 2
Adult patients with hypertriglyceridemia should not be started on PN.	• Cautious initiation of PN may be warranted in adult patients with hypertriglyceridemia (serum triglycerides >200 mg/dL). • Metabolic complications may be prevented through implementations of the following strategies: » Initiate PN with lower ILE dose for baseline hypertriglyceridemia. » Advance PN more conservatively with vigilant laboratory monitoring and prompt intervention, if indicated.	1
PN causes central line-associated bloodstream infections.	Use of “care bundles” for the insertion and maintenance of central venous access devices, improvements in central venous access device care, and blood glucose control have reduced infection rates over time, curtailing one of the most common and serious adverse events associated with PN administration. Infection prevention techniques may include: • Aseptic PN compounding procedures • Adherence to standard venous access device and line care policies • Infection control and sepsis management • Feeding strategies and glucose control	1

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Patient Related PN Myths, continued

Myth	Facts	Ref. Num.
Patients should never be initiated on PN at home without first receiving PN in the hospital setting.	• Adult patients can have PN safely initiated in the home setting when the following steps are taken: » Establish organizational policies that delineate circumstances in which initiation of home PN (HPN) can occur. » Delineate patient-centered eligibility criteria for initiating HPN. » Develop strict protocols and procedures for initiating HPN, monitoring response to therapy, patient education, and documenting outcomes. » Conduct a comprehensive medical, clinical, and psychosocial assessment of candidates to assess risk factors for adverse events related to initiating HPN. » Consider initiating HPN therapy only when assessment confirms that the benefits greatly outweigh the risks.	1
PN is not indicated until a malnourished adult patient has been NPO for 7 days.	• In adult patients who are malnourished or at risk for malnutrition AND in whom a contraindication to Enteral Nutrition (EN) exists, inadequate EN tolerance is present or there is insufficient bowel function to maintain or restore nutrition status, PN should be initiated early: » Nutritionally at risk: 3-5 days » Moderate or severe malnutrition: as soon as feasible • It is, however, acceptable to wait 7 days to initiate PN in stable, well-nourished patients if they are unable to meet >50% of nutritional needs from oral or enteral nutrition. • Initiation of PN should be delayed in a patient with severe metabolic instability until a patient's condition has improved.	1
Patients with hyponatremia always require higher doses of sodium in the PN.	Higher doses of sodium in the setting of hyponatremia is not always required. The etiology of the hyponatremia must first be established to guide sodium dosing. • If hyponatremia etiology is from volume overload, additional sodium may worsen the volume overload and hyponatremia. • Patients may need more sodium in PN if they have high sodium losses from stoma, diarrhea, or gastric output. • ASPEN standard sodium dosing requirements for adults = 1–2 mEq/kg/day (pediatric dosing varies by age).	3,4
Patients with normal calcium levels do not require calcium in the PN admixture.	• Bone releases free calcium in response to decrease in serum levels; long term omission of calcium from PN contributes to progression of metabolic bone disease. • ASPEN standard calcium dosing requirements for adults = 10–15 mEq per day (pediatric dosing varies by age). • Properly monitor calcium levels according to institutional protocols.	3,4

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PN Compatibility and Stability Related Myths

Myth	Facts	Ref. Num.
Using existing literature on compatibility and stability can be applied to current PN products.	• Existing literature is based on older products and cannot be extrapolated to newer products on the market today. • When assessing PN stability or compatibility, evaluate safety using data from the products specifically being used only. Contact manufacturers for details.	5
Beyond Use Date (BUD) is only based on sterility.	For PN, the BUD date must be based on compatibility, stability and sterility: • Although not specifically assigned by USP <797>, the complexity of PN would assign it Category Compounded Sterile Preparation (CSP). • Unlike other Category 2 CSPs where BUD is based on sterility alone, for PN the BUD must account for physical and chemical stability (i.e., compatibility and stability) in addition to sterility. • For PN, the BUD provided in Table 13 of the USP<797> should not be followed; rather, a shorter BUD must be assigned that accounts for physical and chemical stability. (At room temperature: 30 hours; Refrigerated: 9 days)	10, 11

PN Administration Related Myths

Myth	Facts	Ref. Num.
PN must always be infused through a central line.	• PN may be infused via a central or a peripheral venous catheter depending on the osmolality, though infusion via a central is the preferred route. For peripheral PN, do not exceed 900 mOsm/L. • Avoid the use of the term "TPN, total parenteral nutrition." This term is antiquated. • Spell out Central PN or Peripheral PN to avoid confusion about the site of infusion. • Read the label to know whether infusion site should be a central or peripheral venous catheter—this should always be specified on the PN label. • ILE can be infused through a central or peripheral venous catheter.	2, 6, 12
Filters are not required for PN administration.	Filters are required for PN administration. » The use of multiple size filters is no longer recommended; the use of one filter rather than multiple filters offers a more simplistic approach and may increase filter use adherence. » A single 1.2 micron filter is recommended for use when infusing all types of PN admixtures and formulations. » A single 1.2 micron filter is likely to prevent infusing particles >2 microns, which pose the greatest risk if infused. » Place the inline filter closest to the catheter hub.	13
ILE has a hang time of 24 hours when y-sited with a 2-in-1 PN.	• If ILE are formulated in a Total Nutrient Admixture (TNA), the TNA can be infused for up to 24 hours. • If ILE are infused separately from a 2–in–1 PN admixture (whether in a repackaged container or in the original container), the maximum hang time should be limited to 12 hours. This is due to the increased risk of microbial contamination due to the isotonic nature of ILE solutions. • If a longer than 12–hour infusion of ILE is clinically warranted (e.g., neonatal and pediatric patients), the daily dose may be divided into two equal containers.	6, 7

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PN Component Related Myths

Myth	Facts	Ref. Num.
Calcium gluconate and calcium chloride are interchangeable.	Calcium gluconate and calcium chloride are not interchangeable. • Calcium gluconate has a pH of 6.0 to 8.2 and dissociates less extensively in water than calcium chloride, rendering less free calcium ions to form calcium phosphate precipitates.	5
All ILEs are created equal.	• All ILE products are sources of calories and essential fatty acids. • There are four FDA approved ILE products for use in adults and they are not equivalent. • There are three FDA approved ILE products for use in neonates and pediatric patients and they are not equivalent. • Newer ILEs contain decreased amounts of soybean oil with the addition of fish oil, MCT or olive oil. One product is 100% fish oil. • Each presentation of ILE (e.g., SO, MCT, OO, FO-ILE, SO-ILE, OO,SO-ILE) is unique in several ways, including but not limited to: » Indications for use in neonatal, pediatric and adult patients » Fatty- acid content » Dosing required to adequately supply essential fatty acids (see ASPEN guidelines) » PN compatibility and stability—do not assume if a drug or PN admixture is stable with one type of ILE that it will be compatible with another type of ILE.	6, 7
Commercially-available multichamber bags (MCB) of PN are ready for patient administration.	• MCB-PN are not ready for patient administration; chambers must be activated (mixed) in a sterile environment prior to administration. • MCB-PN products are not a complete PN admixture alone. Multivitamins and trace elements must be added to MCB-PN prior to administration.	8, 9
Any combination/ concentration of electrolytes can be added to MCB.	• Each MCB has different components, which affects compatibility and stability. • Specific compatibility and stability information must be obtained from the manufacturers of MCBs prior to the addition of electrolytes or other additives.	10, 11

ILE= lipid injectable emulsion; SO-ILE= soybean oil; SO, MCT, OO, FO-ILE, ILE= soybean, medium chain triglyceride, olive oil, fish oil-ILE; OO, SO-ILE = olive oil, soybean oil-ILE

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