TITLE: PARENTERAL NUTRITION GUIDELINES	POLICY NUMBER: NUR209
URAC STANDARDS: N/A	ACHC STANDARDS: N/A
TJC STANDARDS: N/A	
EFFECTIVE DATE: 1/1/2021	REVISION DATE: 5/2/24, 5/1/25
REVIEWED DATE: 5/1/21, 5/1/22, 5/1/25	APPROVAL AUTHORITY: KATHLEEN PATRICK, PRESIDENT

I. POLICY SCOPE

This policy applies to parenteral nutrition (PN) administration and care for the patient receiving PN. PN is feeding the patient through intravenous administration of fluids and nutrients. PN is indicated for patients at risk for malnutrition or are malnourished in the presence of a contraindication to Enteral Nutrition (EN), EN is not tolerated, or insufficient bowel function to achieve nutritional status. EN is preferred to PN whenever feasible.

II. NURSING OVERVIEW

PN Solution Content:

A. Lipid emulsion provides essential fatty acids and additional calories, with concentration kept below 250 mg/dL.

1. Pediatric considerations:
    a. Neonates start at 0.5g/kg/day and increase to 2-3 g/kg/day as tolerated, with concentration kept below 150 mg/dl.
    b. Older infants and other pediatric patients receive 0.5-1 g/kg/day on day 1, then 1-2 g/kg/day
    c. Maximum lipid intake is 4 g/kg/day and no more than 60% of total daily caloric intake.
    d. Cautiously administer lipids to neonate with hyperbilirubinemia.
    e. For Premature infants, protect PN admixtures from light exposure to prevent oxidation.

2. Renal patient concentration to be kept below 350 mg/dL

B. Electrolyte and trace element (concentration to meet patient's changing needs)

PN is a complex and high-alert medication, with measures in place to prevent error, promote safety and reduce adverse outcomes due to:

A. Microbial contamination and VAD complications

1. Double injection cap scrub with each access

2. Strict adherence to Aseptic Non-Touch Technique (ANTT), for more information refers to Nursing policy.
3. Additional VAD securement and/or administration set securement under clothing to prevent line migration.
4. Avoid advance preparation of PN administration sets/spiking containers and priming.
5. Consider antimicrobial lock therapy or patients receiving cyclic PN.
6. Parenteral solutions shall hang for no more than 24 hours.

B. Metabolic complications

1. Cycled for long term therapy
2. Assess metabolic tolerance, especially glucose control
3. Organ function
4. Blood glucose monitoring.
    a. Insulin may be administered subcutaneous (SC) or in the added to the PN solution for IV administration to control blood glucose levels

C. Inappropriate prescriptions

1. Standardized order forms/templates
2. Ongoing monitoring of patient's response the therapy and need for PN.
3. Need for additional

D. Compound & dispensing errors

1. Protocols

E. Home and home administration error

1. Patient/caregiver education prior to start of care, and until independent with ongoing technique assessment. Additional teaching visits may be required before the patient/caregiver is able to administer PN independently. Patient and/or caregiver to be educated, and deemed independent when able to express understanding of the following and the ability to perform the tasks through return demonstration/observation of:
    a. ANTT
    b. Signs and symptoms of infection, including temperature monitoring.
    c. Flushing per provider orders
        1) SAS or SASH method
        2) Push-Pause method
        3) Leaving a small volume of flushing solution in the syringe to prevent syringe-induced blood reflux.
    d. VAD care, monitoring, and troubleshooting
        1) Catheter occlusion, leakage, breakage, or dislodgement
    e. Assessing PN admixture
        1) Infusate contamination or precipitate
        2) Verifying correct patient name and provider
        3) Verifying product is in date (not expired)

4) If TNA solutions “oil out”, the solution may be gently agitated to return it to emulsion. If the solution does not return to emulsion, contact the center pharmacist.

f. Adding PN additives to the PN solutions according to the product label.
g. Assembling PN supplies and equipment
h. Starting and stopping the PN infusion on the electronic pump
i. Troubleshooting the electronic pump, administration set and connections.
j. Storage of PN solution, additives and supplies.
k. Electronic pump storage and power source (charging and disposable battery use).
l. Self-monitoring, including testing in the home of sugar level (blood or urine) when ordered monitoring body weight.
m. Symptoms to immediately report to the provider, including but not limited to:
    1) Fever, chills, and other signs of infection
    2) Change in activity level, or activity tolerance
    3) Sudden change in glucose tolerance
    4) Decrease in urine output
    5) Redness and/or drainage at the catheter site
n. How to fit PN into their lifestyles
o. Pharmacy contact information

PN to be administered using 1.2-micron filter for all PN solutions, with the filter placed as close to the patient as possible on the administration set. Prime the filter according to manufacture recommendations.

PN is to only be administered on an electronic pump with anti-free-flow protection and alarms for occlusion. Electronic infusion pump with dose error reduction software (DERS) is recommended.

Only medications listed on the product label as patient additives are to be added to the PN solution for administration. No other medication is to be added or co-infused with the PN solution before or during infusion without consultation with a pharmacist regarding compatibility and stability.

PN transition from facility to home to include patient-centered approaches to include coordination of nursing services, patient/caregiver education with assessment of ability to learn, assessment of the appropriateness for patient setting, appropriateness of vascular access device (VAD) for PN and expected duration, patient monitoring (laboratory studies), patient assessment, care coordination and prescription updates based on patient status. In the home, the patient and/or caregiver to be taught to administer PN, including adding the additives to the PN solution. Patient/caregiver may require repeated instruction to become independent due to the complexity of therapy.

VAD Considerations:

A. Home PN only to be administered through a central vascular access device (CVAD)
    1. Confirmation CVAD tip position prior to initiating PN, and as needed to assess line migration.

B. Consider the smallest CVAD with a minimal number of lumens

C. Consider tunneled, cuffed CVADs or peripherally inserted central catheters (PICC), and implanted vascular access ports with the non-coring needle changed at least every 7 days.

D. When possible, dedicate 1 lumen of the VAD for PN administration when a multi-lumen CVAD is in place.

PN Patient monitoring for response to therapy, per provider orders:

A. PN solution and therapeutic plan to be adjusted based on ongoing monitoring, including the need for continued PN.

B. Lab work

1. Frequency
    a. A minimum of twice weekly for the first 4 weeks of therapy
    b. After the first 4 weeks, weekly or as per provider orders
2. Testing may include:
    a. Chemistry profile (i.e., BMP, CMP, BUN, creatinine, electrolytes, glucose, magnesium, phosphorus)
    b. Vitamin and trace element assays
    c. Complete blood count (CBC) with differential and platelets
    d. Liver function Test (LFT)
    e. Albumin, pre-albumin
    f. Triglycerides
    g. Blood cultures, including fungal cultures
3. Labs to be drawn from the CVAD as a quality -of-life measure for patients receiving long-term PN patients, unless ordered to be drawn via peripheral venipuncture.

C. Home glucose (blood or urine) levels monitored by the patient/caregiver should be recorded on a log. The home nurse to review glucose log for changes or patterns to be reported to the pharmacist and/or provider.

D. Monitoring to include ongoing evaluation of gastrointestinal function, nutritional status, and electrolyte status.
    1. Growth to be monitored for pediatric patients

E. In the absence of an impaired gastrointestinal function impairing nutrient absorption, PN to be weaned when oral intake or EN achieved 50%-75% of the requirement for energy, protein and micronutrients.

PN is typically initiated in a hospital setting but may be initiated in the home on a case-by-case basis upon clinical acceptance in accordance with the Operations policy regarding Fist Dosing in the home.

III. PROCEDURES

A. Supplies:

1. Bag of compounded PN
2. Additive medication
3. Alcohol Swabs
4. Syringes with needles
    a. Syringe volume and graduate lines appropriate to measure additive dose
5. Sharps container

6. TPN Placemat if available
7. Electronic Infusion Pump
    a. Pump cradle or pole mount for use with IV pole
8. Administration set (tubing)
9. Pump pouch, if applicable
10. IV pole, if applicable
11. 2 prefilled normal saline flush syringes
12. 1 prefilled heparin flush, if ordered

B. Step-by-step

1. Perform hand hygiene & don gloves
2. Gather supplies and medications
3. PN solution verification
    a. PN solution Label:
        1) Patient name
        2) Solution components against provider orders
        3) Expiration date
        4) Additives to be added to PN solution
    b. Clarity of PN solution w/o particulate matter, and container free of cracks or leaks
    c. PN temperature at room temperature (removed from refrigerator 4-6 hours previously)
        1) Do not artificially warm PN solution
4. Prepare and inject additive(s) into PN solution, as applicable.
    a. If PN is dispensed in a dual chamber bag, remove the separator rod & gently rock container to mix solution prior to adding additives. To remove separator rod:
        1) Lay bag on a flat surface and unfold the bag (open it like a book).
        2) Remove the flexible strip by pulling upward perpendicular to the bag & rigid rod.
        3) Remove rigid rod.
        4) Discard both flexible strip and rigid rod
        5) Gently squeeze and rock the chambers to mix
5. Turn on electronic infusion pump
6. Verify pump parameters match product label administration instructions
7. Place administration set into the pump and prime tubing
8. Cleanse needleless connectors by scrubbing the hub for 30 seconds and letting it air dry for 60 seconds, then repeating for a double scrub with each access.
9. Using normal saline prefilled syringe, verify patency and flush the lumen using the push-pause method.
   NOTE: Patient/caregiver is not taught to check blood return.
10. Repeat step 8, to disinfect the hub of the needleless connector
11. Connect tubing to patient's CVAD and verify all tubing clamps are open (both VAD and administration set clamps)
    a. If intralipids are dispensed in a separate container, use of a Y-connector on the VAD lumen hub is recommended.
        1) Spike lipid container, prime tubing and BOTH intralipid line and PN line to different access points of the Y-connector.
12. Start the infusion on the pump.

13. When the infusion is complete the pump will alarm, stop the infusion and turn off the pump.
14. Disconnect the administration set from the VAD needleless connector
15. Repeat step 8 to clean the needleless connector.
16. Using normal saline prefilled syringe, flush the lumen using the push-pause method.
    a. If ordered, lock lumen with Heparin as per order, confirming Heparin concentration.
    b. To prevent syringe-induced blood reflux by leaving a small amount (i.e., 0.5 – 1mL) at the end of the flush.
17. Dispose of supplies per municipal regulations
18. Patient/caregiver education as listed above

C. Documentation to include, but not limited to:

1. Vital signs
2. Weight
3. Presence/absence of edema
4. GI symptoms if present
5. Condition of access site and patency
6. Presence/absence oral diet
7. Patient compliance
8. Tolerance of therapy
9. Education provided and patient understanding

IV. TRAINING

This policy will be posted on the Company shared drive.

V. APPROVAL AUTHORITY

Approved By:	Title:	Date:
Kathleen Patrick	President	01/01/2021
Kathleen Patrick	President	05/01/2021
Kathleen Patrick	President	05/01/2022
Kathleen Patrick	President	05/01/2024
Kathleen Patrick	President	05/01/2025

VI. REFERENCES

Worthington, P., Balint, J., Bechtold, M., Bingham, A., Chan, L., Durfee, S., Jevenn, A. K., Malone, A., Mascarenhas, M., Robinson, D. T., & Holcomb, B. (2017). When is Parenteral Nutrition Appropriate? Journal of Parenteral and Enteral Nutrition. 41(3). 324-377. https://doi.org/10.1177/0148607117695251

Nickel, B., Gorski, L., Kleidon, T., Kyes, A., DeVries, M., Keogh, S., Meyer, B., Sarver, M. J., Crickman, R., Ong, J., Clare, S., & Hagle, M. E. (2024). Infusion Therapy Standards of Practice, 9th Edition. Journal of Infusion Nursing, 47(1S), S1–S285. https://doi.org/10.1097/nan.0000000000000532