UCSF Health

NEONATAL PEDIATRIC NURSING PROCEDURE

PARENTERAL NUTRITION ADMINISTRATION

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Critical Points

1. Parenteral nutrition (PN) solutions, including lipid emulsions, are high risk medications for pediatric patients, and require a 2 RN Independent Check. (See Medication Administration (General) for description of 2 RN Independent Check.)

2. PN solutions with either osmolarity greater than 1000 mOsm, or dextrose greater than 12.5%, must be administered through a central venous catheter (CVC) due to potential for phlebitis or vessel injury with infiltration/extravasation.

3. All PN solutions must be administered via an infusion pump.

4. No additions can be made to a PN solution after it has been prepared.

5. All PN solutions are filtered with a 0.22 micron filter. All lipid emulsions are filtered with a 1.2 micron filter.

6. Heparin will be added to all PN in the Intensive Care Nursery (ICN), except for ECMO patients. This includes solutions given in peripheral IVs and CVCs. The standard dose is 0.2 units/mL. Heparin is optional in other units. Consider adding if the rate is < 10 mL/hour.

Supplies

- Pharmacy-prepared bag of PN solution and/or lipid emulsion
- 0.22 micron filter tubing for PN
- 1.2 micron filter tubing for lipids
    - Tubing for Alaris Pump: PMM 129844
    - Tubing for Medfusion Pump: PMM 214721

Procedure

HANGING A NEW BAG OF PARENTERAL NUTRITION & / OR LIPIDS

1. All PN orders must be checked **INDEPENDENTLY** by 2 RNs.
    a. One of the RNs **MUST** be the RN caring for the patient. Check includes:
        i. Ordered individual components **AND** rate for PN
        ii. Rate for lipids
    b. Both RN signatures should be in the EHR and also on PN and lipid bags along with date and time.
    c. 2nd RN name is entered into the MAR when documenting hanging the new bag.

PARENTERAL NUTRITION ADMINISTRATION *(continued)*

- The 2 RN Independent Check for PN and lipids includes **BOTH RNs** checking:
  - ✓ Right **Medication**
    - Check each ordered component against the bag label to ensure they match.
  - ✓ Right **Dose**
    - Check that the RATE programmed into the pump is correct and the pump drug library is set accurately.
  - ✓ Right **Route**
    - Check that the tubing is properly set up, using an infusion pump, filter is in the line, and tubing has not expired.
    - Concentration of dextrose and osmolarity appropriate for intravascular catheter used.
  - ✓ Right **Time**
    - Verify expiration date on bag has not been exceeded and date on order is the date you are hanging the bag.
  - ✓ Right **Patient**
    - Scan bag and patient arm band.
    - Compare name band to MAR to ensure PN/lipids are being hung for the correct patient.

2. Inspect solutions for turbidity, separation, or precipitates and return to pharmacy if found.
3. Independently review PN orders against PN and lipid bags. Both RNs sign in the EHR and on the PN and lipid labels indicating they have verified all components are accurate.
4. Spike new PN solution bag and label tubing.
   - For Critical Care units and Cardiac Transitional Care Unit (CTCU):
     a. If PN is cycled over less than 24 hours and disconnected, hang new tubing and filter with PN every 24 hours.
     b. If PN is infusing continuously, hang new tubing and filter with PN every 96 hours.
   - For Acute Care Units, including Transitional Care Unit Pediatrics (TCUP):
     a. Spike new PN bag, using new tubing, every 24 hours.
5. Spike new lipids bag, using new tubing with 1.2 micron filter, every 24 hours. Connect via bi- or tri-fuse. For lipids infusing in a syringe, the tubing with 1.2 micron filter and syringe are also changed every 24 hours.
6. Independently ensure tubing sets are inserted into infusion pump channels correctly and the drug libraries are programmed as per the EHR order.
7. Start infusion pump once all 'Rights' are verified.
8. Document new PN and lipids on MAR using dual sign-off.

HANDOFF OF CARE FROM ONE RN TO ANOTHER

1. Each time a new RN assumes care of a patient receiving PN:
   a. **BOTH** the off-going and the on-coming RN meet at the bedside and do the following:
      i. Verify the rate for PN and lipids on the infusion pump align with the EHR order and the drug library is appropriately set.
      ii. Perform **INDEPENDENT** verification of rate against the MAR.
   b. Document 2 RN verification on MAR, by choosing the drop-down option of **"**HANDOFF**"** on the PN line currently infusing.

PARENTERAL NUTRITION ADMINISTRATION *(continued)*

MONITORING

1. Follow provider orders.
2. Typical monitoring ordered for patients receiving PN includes:
    a. Daily weight, unless significantly unstable.
    b. Blood glucose:
        - Pediatric patients**:** typically checked daily with point of care testing until stable.
        - ICN patients**:** typically checked one hour after hanging a new PN bag and one hour after any infusion rate change. This is done per Protocol thus does not require a provider order. Obtain a Blood Glucose one hour after the discontinuation of PN in ICN infants.
        - Notify provider immediately if PN line is interrupted and obtain a blood glucose as ordered if duration of interruption is longer than 15 minutes.
    c. Intake and output, for duration of PN therapy.
    d. Biochemical parameters:
        - Pediatrics: baseline TPN panel and blood glucose; daily labs (electrolytes, BUN, Creatinine, Ca, Phos, Mg, triglycerides) until stable, then weekly pediatric TPN panels are sent.
        - ICN**:** Mon/Thurs − Pedi TPN panel and blood gases as needed.
        - Triglycerides:
            - Draw separately or as part of pediatric TPN panel.
            - Clear/flush CVC lumen infusing lipids well before using to draw triglyceride level.
            - Draw at any time; not correlated with lipid infusion timing.

Troubleshooting

Problem	Suspected issue	Action
Solution has turbidity, separation, or precipitates	• Formation of precipitates in solution	• Notify and return to pharmacy • Notify provider
PN solution has osmolarity greater than 1000 or dextrose greater than 12.5% and patient does not have CVC access	• Order error • Change in patient access status	• Notify provider • Do not administer through peripheral IV due to risk for extravasation

References

Level of Evidence (EAME*)	Level*	Reference
	E4	Baker, R. D., Baker, S. S., Briggs, J., Bojczuk, G. (2018). *Parenteral nutrition in infants and children*. Retrieved from https://www.uptodate.com/contents/parenteral-nutrition-in-infants-and-children. (To access information on parenteral nutrition from UpToDate: log onto UCSFCareLinks, click on UpToDate.com located under Healthcare Information and type in "parenteral nutrition.")
	E4	Boullata, J. I., Gilbert, K., Sacks, G., Laboussiere, R. J., Crill, C., Goday, P., . . . Holcombe, B.; American Society for Parenteral and Enteral Nutrition. (2014). A.S.P.E.N. Clinical guidelines: Parenteral nutrition ordering, order review, compounding, labeling, and dispensing. *Journal of Parenteral and Enteral Nutrition, 38(3),* 334-377.

PARENTERAL NUTRITION ADMINISTRATION *(continued)*

	E4	Pediatric Parenteral Nutrition (2017). In *Pediatric and Neonatal Lexi-Drugs*. Retrieved from https://www.uptodate.com/contents/parenteral-nutrition-in-infants-and-children
* FAME Scale details: See nursing policy *Policy, Procedure, & Competency Development, Review, & Approval*		

Procedure History

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