ARROWHEAD REGIONAL MEDICAL CENTER
Department of Pharmacy Services Policies and Procedures

SECTION: **DRUG ORDERING, PREPARATION, DISPENSING, AND ADMINISTRATION**

SUBJECT: **PARENTERAL NUTRITION**

APPROVED BY: _____
Director of Pharmacy Services

PURPOSE

To establish policy and procedures for ordering, preparing, distributing, administering, and monitoring parenteral nutrition (PN).

PERSONNEL

- Clinical Staff

BACKGROUND

Parenteral nutrition (PN) is a complex therapeutic modality reflected in complex orders with multiple ingredients, each with clinical rationales, dosing implications, and interaction potential. Clinicians must employ safe and appropriate use of parenteral nutrition. A.S.P.E.N. consensus recommendations on the appropriate use of parenteral nutrition provide guidance on clinical and safety concerns related to this complex therapy.

DEFINITIONS AND TERMS

- Parenteral Nutrition (PN) is a complex combination of nutrients (i.e., amino acids, dextrose, and fats) administered intravenously to correct or prevent malnutrition that is not, or cannot be, corrected via enteral nutrition. PN may be total parenteral nutrition (TPN) or peripheral parenteral nutrition (PPN).
- Total Parenteral Nutrition (TPN) is administered via central IV lines
- Peripheral Parenteral Nutrition (PPN) is restricted to a maximum osmolality and typically administered via peripheral IV lines
- 3-in-1 PN combines injectable lipid emulsions (ILE) in the same bag as the amino acids and dextrose.
- 2-in-1 PN is the combination of amino acids and dextrose in the same bag.

POLICY

- Parenteral nutrition (PN) is managed collaboratively by the medical staff, dietitians, pharmacy, and nursing staff.
- A.S.P.E.N. guidelines or medical staff-approved criteria are utilized to monitor and assess patients receiving PN.
- The Pharmacy and Therapeutics (P&T) Committee, or equivalent medical staff committee, as part of the formulary management process, develops and approves standardized order forms or order sets for ordering and monitoring PN.

- PN order forms/order sets use the same units (e.g., mEq/L, mEq/bag, or mEq/day) and the same order of ingredients as the output label(s), e-MAR and Automated Compounding Device (ACD).
- Verbal and telephone orders for PN are prohibited except for pharmacist to prescriber communication to clarify an order.
- Pharmacy-based Parenteral Nutrition Services (PNS) that include monitoring labs and dose adjustments by pharmacists are based on medical staff-approved criteria. Pharmacy-based PNS are interpreted as full dosing privileges to the extent allowed by State scope of practice laws, hospital policies, medical staff bylaws, and rules and regulations.
- PN may be outsourced to a qualified contracted vendor.

PROCEDURE

I. Ordering and Prescribing

A. Hospital-approved PN order forms/order sets are used to order PN on a daily basis. Adult PN is ordered based on the total amount per day.

B. PN orders must be received in the pharmacy on a daily basis by 15:00.

C. Orders received after 15:00 will not be initiated until the next day at the universal start time of 18:00.

D. Albumin and other blood products are not added to PN.

II. Pharmacist Order Review

A. Pharmacists that participate in Parenteral Nutrition Service (PNS) receive training and have documented competencies in the management of PN.

B. PN orders are reviewed for appropriateness and compatibility with the patient's other drug therapies, diagnoses, nutritional needs, and allergies.

C. PN orders are reviewed for appropriate route of administration assessing the PN formulation's osmolality. Centrally infused PN is preferred.

D. For peripheral catheters: PPN maximum concentration of 900 mOsmol/L

E. In addition to the initial screening, a pharmacist monitors daily laboratory values and other parameters comparing each PN formulation to the previous day's order.

F. Clinical interventions/recommendations are communicated and documented per hospital policy.

G. PN order entry/verification by a pharmacist in the order entry system is double-checked preferably by a second pharmacist. Checks include accuracy of order entry, incompatibilities with solutions and additives, and the appropriateness of the rate and route of administration.

III. Preparing and Dispensing

A. PN is prepared in the Pharmacy's IV room by pharmacy personnel trained in aseptic technique.

B. Automated Compounding Device (ACD) set-up and ALL manual ingredients are visually checked by a pharmacist prior to compounding. See Automated Compounding Device (ACD) section below.

C. Albumin or other blood products are not added to PNs.

D. PN labels are formatted to list ingredients in the same sequence and using the same units as the order and what appears on the nursing medication administration record (e-MAR/MAR).

E. Final product release checks include visual inspection of the final product for turbidity and verification of labeled ingredients with the order by an individual other than the person who compounded the PN.

IV. Automated Compounding Device (ACD)

A. Access to the ACD database is limited to select individuals qualified to manage and maintain the activity. Changes are traceable.

B. Note: Database changes due to drug shortages must be considered in all systems including ACDs.

C. Staff are trained, and their competency for operating the ACD is assessed before use.

D. Soft and hard limits are established for PN ingredients consistent with the needs of the patient populations served.

E. Weight-based warning limits are defined and enabled.

F. Safeguards within the ACD are enabled to detect scenarios that could result in inaccurate compounding (i.e., occluded tubing, empty vials) and the ability to keep incompatible ingredients separate.

G. Only pharmacists are allowed to override ACD alerts. ACD override alerts are monitored.
H. Calibration checks for volume and weight accuracy testing are performed and documented daily.
I. Daily base solution and additive set-up is checked by a pharmacist prior to compounding and when any bulk ingredient is changed. An independent double-check is conducted.
J. Machine-readable (e.g., barcode, RFID) confirmation of ingredients and setup is utilized. This safeguard requires the actual scanning of the product and port.
K. Compounding confirmation by the pharmacist requires visual confirmation of the ingredients and the volumes pumped.
L. Backup emergency power is available to avoid an abrupt shutdown while the ACD is running.
M. In the event of ACD failure, a contingency plan is in place to continue the provision of PN therapy to patients as needed.

V. Storage and Delivery

A. PNs are placed in individual plastic bags and stored under refrigeration until delivery to the patient care units.

VI. Administration

A. The standard administration hang time for PN is 18:00 each day.

B. Administration of 2:1 PN

1. Administer 2:1 PN (i.e., dextrose and amino acid-based solutions) using an infusion pump and a 1.2-micron filter.

C. Administration of Lipids (ILE)

1. Administer injectable lipid emulsions using a 1.2-micron filter.
2. Infuse ILE at the prescribed rate or at a rate to allow infusion of the total ILE volume within the timeframe defined by the product manufacturer.

D. Administration of 3:1 PN

1. Administer 3:1 PN (i.e., dextrose, amino acids, and lipids) via an infusion pump using a 1.2-micron filter.

E. Prior to PN Administration

1. Check the PN for evidence of precipitation or microbial growth. If there are signs, the bag should not be used. Notify the Pharmacy immediately.
2. Verify the patient's name and each labeled ingredient with the order.
3. Verify route of administration as peripheral or central. If a central line is placed, validate that the line placement is verified before initiating the infusion.
4. Remove and discard the previous bag.
5. Trace administration set tubing to the point of origin.
6. Perform an independent double-check to include verification of patient, PN ingredients, and infusion pump settings with a second clinician before starting the infusion.
7. Document the double-check verification in the medical record or per hospital policy.

F. During PN Administration

1. Monitor patients for signs of infiltration, infection at the IV site, or adverse events. Notify the prescriber immediately and report per hospital policy.
2. Do not allow infusions to run dry. Continue flow with Dextrose 10% in water at the same infusion rate as per PN order form/order set or as defined by the prescriber.

G. Administration Precautions

1. At no time should medications, albumin, or other blood products be added to an infusing PN.
2. Do not draw or administer blood or add drugs through the catheter or Y sites.
3. Contact a pharmacist for Y-site incompatibility with PN.

VII. Monitoring

A. During PN administration patients are monitored for signs of infiltration, infection at the IV site, or adverse events. Practitioners are notified and events are report per hospital policy.

B. In addition to the initial screening, a pharmacist monitors daily laboratory values and other parameters comparing each PN formulation to the previous day's order.

C. Clinical interventions/recommendations are communicated and documented per hospital policy.

VIII. Quality Control/Quality Assurance

A. Adverse drug events and medication errors associated with PN are reviewed.

B. Order entry, preparation, and administration double checks are periodically assessed for compliance with this policy.

C. ACD data (i.e., calibration, set-up, bar-code verification, etc.) is reviewed prior to compounding. Review is documented with corrective action when indicated.

D. Out of compliance findings are addressed.

E. Alert overrides are reviewed regularly to determine appropriateness and to facilitate process improvement.

REFERENCE AND RELATED DOCUMENTATION:

- **American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Parenteral Nutrition Resources Accessed June 2024**
- **ACG Clinical Guidelines: Nutrition Therapy in the Adult Hospitalized Patient Accessed June 2024**
- **ASHP Guidelines on the Safe Use of Automated Compounding Devices for the Preparation of Parenteral Nutrition Admixtures Accessed June 2024**
- **Institute for Safe Medication Practices (ISMP) Guidelines for Sterile Compounding and the Safe Use of Sterile Compounding Technology Accessed June 2024**

DEFINITIONS: N/A

ATTACHMENTS: N/A

APPROVAL DATE:

9/19/24	**Theo Moy, Director of Pharmacy** Department/Service Director, Manager or Supervisor
9/19/24	**Pharmacy and Therapeutics Committee** Applicable Administrator, Hospital or Medical Committee
10/16/24	**Quality Management Committee** Applicable Administrator, Hospital or Medical Committee
10/24/24	**Medical Executive Committee** Applicable Administrator, Hospital or Medical Committee
	Board of Supervisors Approved by the Governing Body

REPLACES: **N/A**

EFFECTIVE: **10/24/24**

REVISED: **N/A**

REVIEWED: **N/A**