PURPOSE: To provide guidelines for the safe administration of parenteral nutrition and Intravenous Fat Emulsion to the adult and pediatric patient.

DEFINITIONS:
1. Parenteral Nutrition—(PN) is the provision of intravenous nutrients; dextrose; amino acids, electrolytes, vitamins and minerals whose gastrointestinal (GI) tract is not functioning or cannot be accessed.
2. Intravenous Fat Emulsion—(IVFE) is the intravenous administration of essential fatty acids and is a source of calories.
3. Fluid Pathway: Includes any and all contact the infusate or patient’s blood will make with the tubing, needleless connectors or hub. The fluid pathway shall always be kept sterile and free from contamination. If the fluid pathway becomes compromised, a new device shall be obtained.

EXCEPTION: Refer to SMH Nursing Procedure “Parenteral Nutrition-Neonatal” (nur43) for the procedure used with neonates.

KNOWLEDGE BASE:
1. When 5 to 7 days have passed with insufficient enteral intake, PN should be considered.
2. The primary nurse is to monitor the following during adult PN therapy daily.
   a. Assessment for signs and symptoms of cardiac, respiratory or renal compromise
   b. Weight
3. The primary nurse is to monitor the following during pediatric PN therapy daily.
   a. Assessment for signs and symptoms of cardiac, respiratory or renal compromise
   b. Weight
   c. Stool frequency and consistency
   d. Anthropometric measurements, as indicated
4. IVFE infusion patients shall be monitored for
   a. Dyspnea
   b. Chest tightness
   c. Palpitations
   d. Chills
e. Headache, fever and nausea may be related to the speed of the infusion

5. Verify access. Infusions shall be delayed until the lack of blood return can be investigated and resolved.

6. Hypertonic fluid overload can cause cardiopulmonary overload, which can lead to death. Observe the patient for signs of fluid overload: distended veins on the neck, arms, and hand, shortness of breath, cyanosis, etc. Decrease the rate of the infusion to 25 ml/hour and immediately notify the physician.

7. Patients receiving solutions of greater than 10% Dextrose should be weaned gradually from the solution to prevent rebound hypoglycemia. If no rate is specified, nursing will clarify a rate with the physician.

INDICATIONS:
1. Large wounds
2. Short bowel syndrome
3. Enterocutaneous fistula
4. Inflammatory bowel disease
5. Ulcerative colitis
6. Mild to moderate hepatic failure
7. Gastroparesis
8. Obstruction
9. Peritonitis
10. Intractable Vomiting
11. Acute Pancreatitis
12. GI related Carcinoma
13. Unable to receive adequate nutrition enterally

SOLUTIONS:
1. Solution is to be started within twenty-four hours after manufacture time. Solution expires twenty-four hours after protective solution cap is removed.

EQUIPMENT:
1. Parenteral nutrition solution.
2. Macrodrip tubing (For TPN with no lipids, use Continu-flo solution set with Duo-vent spike)
3. Electronic regulator (Smart Pump)
4. Alcohol wipes
5. In-line 0.22 micron filter (if no lipids) (Pharmacy sends it)
6. In-line 1.2 micron filter (if TPN and lipids) (Pharmacy sends it)
7. 10 ml normal saline flush
8. Germicidal surface wipes
9. Connector
10. Curos Caps
PROCEDURE:

ORDERING:

1. Verify physician order in electronic record. For Downtime orders verify initial order on Form 02-3070, and subsequent orders on Form #02-3016.

2. The nursing staff will monitor blood chemistry values and report as ordered by the physician.

3. If parenteral nutrition is ordered for a patient and the solution is not available at the time of intravenous access, an alternative solution of 5% Dextrose in water for peripheral route, and 10% Dextrose in water for central route may be hung until the solution is available. The Dextrose is infused at the same rate as the PN. Obtain a physician order for infusion rate of alternative solution for Pediatric patients.

4. In the event that new parenteral nutrition orders are written that require immediate changes in the parenteral nutrition formulation, discontinue the present solution and hang an alternate solution of 5% Dextrose in water for peripheral route and 10% Dextrose in water for central lines at the same rate as the PN until the formulation is available.

5. Parenteral Nutrition Orders are to be received in the Pharmacy by 1400. All PN will begin each day at 1700; therefore, 1700 will become the “universal hang time”.

PREPARATION AND ADMINISTRATION:

1. Prepare a cleaned surface with germicidal surface wipes.

2. Perform hand hygiene.

3. Check the label and the solution number for correct patient identification, and check the label with physician’s order either on the electronic records order detail or physician order sheet. Two nurses will independently verify the contents and document it on the eMAR.

4. Examine the solution for clarity. The solution should be yellow tinged and clear. It should not be cloudy. There should be an absence of particulate matter. Report any abnormalities to pharmacy.

5. Examine the vascular access site and assure patency. Do not use the vascular access site if in question. A dedicated line needs to be used for TPN.

6. Using aseptic technique and while protecting the fluid pathway, connect the new needleless connector to the IV
tubing; attach the tubing to the solution container and prime the tubing and connector.

7. The solution may hang no longer than twenty-four hours from this time.

8. KBMA is used to verify correct TPN with patient ID.

9. The rate is ordered by the physician. Perform hand hygiene then connect the tubing with new connector to the IV pump and adjust the rate accordingly. Don gloves.

10. Clamp lumen (if clamp present). Remove the Curos cap and needleless connector. Vigorously scrub the catheter lumen with alcohol for 15 seconds and allow to air dry. Connect the new primed IV tubing and connector. An in-line filter is to be used (ASPEN) and it will be dispensed from Pharmacy along with the solution. The filter should be placed as close to the access site as possible (Lippincott, p. 553). The filter provided by pharmacy may be sent as either: solution set with a downstream filter or extension set with filter.

11. Check to be certain that all connections are secure and that tubing and dressings are labeled. Attach Green Curos Caps to all connections.

OBSERVATIONS DURING THE FIRST SOLUTION:

1. Assess and observe the patient for the development of sudden hives, wheals, and dyspnea.

2. If symptoms develop, discontinue the solution and hang 10% Dextrose in Water for central lines and 5% Dextrose for peripheral lines at same rate (or age appropriate rate).

3. If the above-mentioned symptoms develop, take and record blood pressure, temperature, pulse, and respiration.

4. Using the AccuChek, test blood for glucose content and record the results.

5. Monitor the vascular access site frequently for patency and phlebitis.

6. Notify the physician for further orders.

MAINTENANCE CARE:

1. PN has a hang time of 24 hours at which time administration sets, needleless connectors and the bag will be discarded.

2. IVFE, as a single infusion, has a hang time of 12 hours at
which time administration sets, needleless connectors and the bag will be discarded.

3. Vigorously scrub the hubs for 15 seconds before applying new needleless connectors. Needleless connectors will be changed with each tubing change.

4. Dressings will be changed every 7 days for central lines and every 96 hours for peripheral lines or as needed, wet and/or non-occlusive

5. Monitor patients for signs and symptoms of glucose metabolism, fluid and electrolyte imbalance, and nutritional aberrations. Test the blood sugar via the use of AccuChek every six (6) hours until the PN rate is constant for 48 hours, then every 12 hours unless otherwise ordered. (Refer to the Parenteral Nutrition Orders on the patient’s medical record). Monitor the results of laboratory tests and report abnormal findings to the physician.

6. The patient should be weighed daily with the same amount of clothing, using the same scale.

7. Maintain intake and output record. Record fluid totals separate from other fluid intake.

8. Take and record vital signs as per the unit assessment standards.

9. Parenteral nutrition is administered at a constant rate specified by the physician. An electronic regulator or controller is used.
   a. If rate falls behind, do not catch up.
   b. If the twenty-four hour total deviates from the prescribed infusion rate by 10% or more, notify the physician on rounds.
   c. Document the pertinent information concerning the rate and prescribed amount in the nursing reassessment.

10. No additives are to be inserted into PN solution on the nursing unit.

11. If IVFE backs up into the PN solution, consult with Pharmacy as the PN solution may need to be discarded.

**INTERRUPTION OF THE LINE:**

Only parenteral nutrition fluid is to flow through the established line. All other IVs, blood and blood products, piggybacks,
intravenous push medications, and CVP lines must flow through alternate lines.

EXCEPTION:

1. Pediatric patients IV medications may be infused into same line as PN through T-connector or triple extension if compatibility is established.

2. Propofol (Diprivan) may be infused into same line as PN through stopcock if no other line is available and peripheral site is unobtainable in Critical Care Setting. Attempt to get a central line as soon as possible.

3. The line may be interrupted in the case of an emergency situation, e.g., Code Blue, when there is no other line available. In this situation, use the port closest to the catheter site, turn off the PN, and flush the line with Normal Saline before and after use.

DOCUMENTATION: Medication Administration Record (eMAR): Enter solutions administered on the eMAR.

REFERENCES:


