**Symptoms:** Dehydration

**Cause:** Depletion of fluids/electrolytes due to increased losses from vomiting, diarrhea, fistula/ostomy output; inadequate intake of HPN infusion-extra fluids as ordered.

**Immediate Action:** Call M D and relate signs and symptoms, describe any change in fluid intake or output. Start measuring urine output.

**Prevention:** Infuse complete volume of HPN and fluids as ordered by M D. Keep daily input and output log; report any significant changes from usual pattern to M D. Follow orders and guidelines given to you during training period and upon discharge from hospital. Monitor weight at least 3 times per week. Inform M D if taking any over-the-counter medications or herbal supplements.

**Symptoms:** Hypoglycemia

**Cause:** HPN fluids stopped abruptly without adequate period of tapering; HPN bag finishing early due to malfunction of pump or decreased volume in bag; too much insulin in infusion solution. Hypoglycemia can come on during infusions but is more likely to come within 15-30 minutes of stopping.

**Immediate Action:** Drink a glass of orange juice with 2 teaspoons of sugar in it (if you are unable to tolerate fluids by mouth, place hard candy or cake decorating gel under tongue or let a teaspoon or two of sugar dissolve in mouth); then call M D immediately. Stay in bed. Restart HPN, if able, and taper slowly. If directed by M D, adjust infusion rate or decrease insulin in infusion. Follow instructions on other side of chart for specific pump or catheter-related problems if applicable.

**Prevention:** Close monitoring of glucose tolerance by M D/RN during tapering process in hospital before discharge; monitor blood glucose levels at home as directed by M D (depending on the model/program, tapering may be done automatically by the pump). Verify volume of bag and that pump is functioning correctly, prior to infusing; report any discrepancies or problems to provider. See also “Prevention” for Hyperglycemia.

**Symptoms:** Hyperglycemia

**Cause:** Fluids infused too fast; too little insulin in infusion solution if diabetic; improper mixture of HPN solution; infection (hyperglycemia can be a very early warning sign, even before fever is present); certain medications (steroids and some chemotherapy agents).

**Immediate Action:** Call M D immediately; may need to decrease infusion rate or add insulin as directed by M D.

**Prevention:** Maintain prescribed drip rate – never try to “catch up” if rate slows. Maintain aseptic technique at all times. Inspect labels of all HPN bags/closely for consistency in formula; changes in formula should be indicated to you by your primary M D/pharmacist/RN prior to shipment of new bags, any questions call M D; if requested, return bag to M D for analysis of solution. Monitor temperature. Alert nutrition M D if started on any new medications by other physicians, or if you start any over-the-counter medications or herbal supplements.

**Symptoms:** Dehydration

**Cause:** Depletion of fluids/electrolytes due to increased losses from vomiting, diarrhea, fistula/ostomy output; inadequate intake of HPN infusion-extra fluids as ordered.

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HPN Complication Chart

Users are strongly advised to review this chart with their M.D., noting any differences in protocol/procedures, prior to taking any actions recommended by this chart. The chart is intended as a helpful reference and should not replace the advice of your M.D. Users should read the entire chart, at least briefly, comparing symptoms listed in each action with those actually experienced by the consumer, before taking any action.

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<table>
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<th>CATHETER/PUMP COMPLICATIONS</th>
<th>(Metabolic Information on Front)</th>
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### Air embolism
**Symptoms:** Chest pain; coughing; shortness of breath; loss of consciousness.
**Cause:** Air siphoned into catheter due to IV tubing becoming disconnected or injection cap falling off; air in line below filter; tubing not primed.
**Immediate Action:**
- A) Lie on left side with head lower than feet for 20 minutes.
- B) Meanwhile, prepare usual flush (heparin or saline). Attach to catheter. Hold syringe vertically and withdraw any accessible air until only blood returns. Flush catheter.
- C) Call 911.
**Prevention:**
Use luer lock attachments on tubing. Use an adequate length of tubing for connection. Tighten all tubing connections. Secure tubing for active consumers with catheter holder/protective clothing (Call Oley for information on specific products). Primetubing prior to flushing.

### Blood in catheter
**Symptoms:** Blood seen in tubing.
**Cause:** Injection cap not attached securely; cracking of hub; tear in line; not flushing immediately after infusion is complete.
**Immediate Action:**
- If caused because injection cap is not attached securely:
  - A) clamp catheter.
  - B) remove injection cap; C) flush with saline and heparin again; D) replace with new injection cap.
- If caused by cracking of hub, or tear in line:
  - A) clamp catheter; B) remove IV tubing if attached; C) unclamp catheter, flush as per protocol and attach injection cap, if able; D) clamp catheter; E) notify M.D. or provider for hub replacement (catheter should be repaired as soon as possible).
**Prevention:**
Avoid excessive pressure in hookup/disconnection. If repeated cracking occurs, report to primary supplier of catheter, noting type and lot # (if available). Assess older catheters for thinning of silicone and cracks.

### Cracking of hub
**Symptoms:** Cracking sound with insertion of IV tubing upon hookup or disconnection of tubing; fine cracking seen in hub.
**Cause:** Excessive pressure in hookup/disconnection; faulty hub; wear and tear of aged catheter.
**Immediate Action:**
- A) clamp catheter; B) remove IV tubing if attached; C) unclamp catheter, flush as per protocol and attach injection cap, if able; D) clamp catheter; E) notify M.D. or provider for hub replacement (catheter should be repaired as soon as possible).
**Prevention:**
Avoid excessive pressure in hookup/disconnection. If repeated cracking occurs, report to primary supplier of catheter, noting type and lot # (if available). Assess older catheters for thinning of silicone and cracks.

### Catheter tear
**Symptoms:** Leakage of blood or fluid from catheter tubing; broken/damaged tubing.
**Cause:** Catheter tubing damaged by a sharp object (scissors, unpadded clamp, etc.), excessive pressure in line when flushing, or excessive twisting of tubing in hookup/disconnection; wear and tear of aged catheter; faulty tubing.
**Immediate Action:**
- Attempt to instill flush solution into line to keep patent. Clamp catheter between the break and your body. **Do not place tape over tear.** If infusing, stop infusion, follow precautions to prevent hypoglycemia. Call M.D. or provider to schedule repair as soon as possible.
**Prevention:**
Handle catheter gently: use padded clamp only at reinforced area of tubing (if no reinforced area, clamp at different places of tubing daily); avoid excessive pressure/twisting of tubing with hookup/disconnection; avoid contact with sharp objects; do not secure tubing for active consumers with catheter holder/protective clothing (Call Oley for information on specific products). Tape over tear as needed.

### Catheter clot
**Symptoms:** Increased resistance or inability to flush catheter; unable to infuse HPN solution.
**Cause:** Blood or precipitate in catheter lumen; catheter not flushed properly following last infusion; catheter not clamped prior to last flush procedure.
**Immediate Action:**
- Clamp catheter; call M.D. or provider for further directions. If infusing, follow precautions to prevent hypoglycemia. Call M.D. or provider to schedule repair as soon as possible.
**Prevention:**
Flush catheter before and after infusing as directed. Maintain prescribed drip rate. Inspect line/hub daily for weakness, tears, cracking.

### Inflammation of vein in PICC users (Phlebitis)
**Symptoms:** Pain, tenderness, swelling, hardness felt along the path of the vein.
**Cause:** Typically not an infectious problem, but rather an irritation of the vein caused by the insertion procedure.
**Immediate Action:**
- Apply warm compress and elevate extremity. Notify M.D. immediately and proceed as directed. Typically subsides following treatment and does not require catheter removal.
**Prevention:**
None. (This complication occurs with approximately 15-20% of insertions.)

### Pump or power failure
**Symptoms:** Unable to start/pause pump; pump alarms incorrectly.
**Cause:** Inadequate power supply; loss of power source; malfunction of pump; low battery.
**Immediate Action:**
- Check to see if pump is plugged into wall socket or that battery is installed correctly. Call home care company to troubleshoot pump problem, and if necessary to obtain a replacement. Follow steps to prevent hypoglycemia.
**Prevention:**
Contact local power company for inclusion on list of customers having durable medical equipment at home in case of major power loss. Follow recommendations by pump manufacturer for routine service and maintenance. Recharge battery daily. Carry extra battery supply.

Understand that many clinicians are unfamiliar with the use of long term central venous access devices for HPN. To protect your access, always carry an ID card or Medic Alert Bracelet on your person that describes vital information about your medical condition and catheter. HPN consumers should also keep their Travel/Hospital Admission Packet updated and handy for emergency or scheduled hospital admissions. Call (800) 776-OLEY/(518) 262-5079 or E-mail DahlR@mail.amc.edu for a copy of the packet.