Complications Associated With IV Therapy

Complication	Signs and Symptoms	Prevention	Nursing Interventions/Treatment
Occlusion is the partial or complete obstruction of a catheter, which obstructs the infusion of solutions or medications. Occlusions can result from the coagulation of blood (thrombotic) or from obstruction due to catheter problems or buildup of infusion precipitates and residue (mechanical).	1. Electronic pump "occlusion" alarm is activated frequently 2. Noticeable slowing of infusion rate 3. Difficulty aspirating from catheter 4. Visible clots in the catheter 5. Pain upon infusion	1. Flush the access device according to facility guidelines. 2. Correct any obvious signs of mechanical occlusion. 3. Use in-line, air eliminating filters. 4. Monitor infusions of possible precipitate-forming solutions. 5. Monitor three in one parenteral infusions. 6. Avoid temperature fluctuations during parenteral nutrition infusions.	1. Identify type of occlusion (thrombolytic or mechanical). 2. Notify the physician immediately if occlusion is thrombolytic (or cause of occlusion can not be determined). Obtain orders for thrombolytic agent and catheter clearance. 3. If mechanical occlusion, troubleshoot the catheter line (e.g., observe for kinks, clogged in-line filter, sutures causing occlusion). If occlusion cannot be resolved, notify physician. 4. If occlusion is due to precipitates (drug or mineral), notify physician and obtain orders for catheter clearance and catheter clearing agent. 5. If occlusion is due to lipid residue, notify physician and obtain orders for catheter clearance and catheter clearing agent. 6. **Notify the physician immediately if pinch-off, catheter rupture, or migration is suspected.** 7. Document observations, interventions, resident's response and outcome in the resident's medical chart.
Phlebitis is inflammation of the vein. It is a common complication associated with intravenous therapy. It may occur up to 48 hours after catheter removal.	1. Warmth, redness and inflammation 2. Resident complains of heat, stinging 3. Discomfort at access site 4. Pain and tenderness along pathway of afflicted vein 5. Induration of vein, palpable venous cord 6. Purulent drainage *(See **Phlebitis Scale** located on page A-9)*		1. Assess degree of phlebitis using the **Phlebitis Scale**. 2. Discontinue infusion and remove catheter. 3. Disinfect the access site. (**Note**: If purulent drainage is present, obtain a culture sample prior to disinfection.) 4. Apply pressure to removal site to prevent bleeding. 5. Apply intermittent warm, moist heat for 20 minutes TID, per physician's order. 6. If infection is suspected, culture catheter tip. 7. Notify physician of phlebitis. 8. Document the observations, interventions, resident's response and outcome in resident's medical chart. **Note**: When inserting a new catheter, use the non-affected extremity if possible.

Complications Associated With IV Therapy

Complication	Signs and Symptoms	Prevention	Nursing Interventions/Treatment
Infiltration occurs when the catheter dislodges from the vein and nonvesicant solution or medication is administered into the surrounding tissue.	1. Edema, blanching, cool, stretched and/or firm skin 2. Mild to moderate pain; numbness 3. Pitting edema 4. Circulatory impairment 5. No blood return from IV access *(See **Infiltration Scale** located on page A-7)*	1. Confirm patency of catheter prior to administering medications or solutions. 2. Once infusion begins, observe the access site for 1 to 2 minutes. 3. Do not pull or tug on the catheter or administration set. 4. Use a syringe barrel size of 10 ml or greater when flushing.	1. Assess degree of infiltration using the **Infiltration Scale**. 2. Discontinue infusion and remove catheter. 3. Apply pressure at removal site to prevent bleeding. 4. Apply warm compress to help absorb infiltrate. 5. If leaking of the tissue is present, apply sterile dressing. 6. Notify physician of infiltration grade 3 or 4. 7. Complete an Incident Report. 8. Document observations, interventions, resident's response and outcome in resident's medical chart. **Note**: When inserting a new catheter, use the non-affected extremity if possible.
Extravasation occurs when the catheter dislodges from the vein and a *vesicant* solution or medication is administered into the surrounding tissue, leading to tissue necrosis.	1. Blisters, tissue necrosis, sloughing of tissue 2. Edema, blanching, stretched, firm and/or cool skin 3. Pain, heat, stinging at access site	1. Confirm patency of catheter prior to administering medications or solutions. 2. Once infusion begins, observe the access site for 1 to 2 minutes. 3. Do not pull or tug on the catheter or administration set. 4. Administer vesicant solutions with extreme caution. 5. Use a syringe barrel size of 10 ml or greater when flushing.	1. Discontinue infusion immediately. Do not remove catheter unless instructed to do so by physician. 2. Notify physician and obtain orders to treat extravasation. 3. Administer antidote as ordered, either through existing catheter or by injection. 4. If ordered to remove catheter, aspirate as much infiltrate as possible before removing and apply pressure to access site to prevent bleeding. 5. Apply ice to affected area. 6. Elevate affected extremity. 7. Encourage normal ROM of affected extremity. **Note**: When inserting a new catheter, do not use the affected extremity. 8. Document in resident's medical record: a. date and time of extravasation; b. catheter type and size, date, and time of catheter insertion; c. solution or medication infused, method of administration, time and rate of infusion, and estimated amount infused; d. appearance of site; e. physician notification; f. treatment/ antidote measures; and g. resident's response and outcome. 9. Photograph the access site at time of injury, at 24 hours post-injury, at 48 hours post-injury, and at one week post-injury. 10. Complete Incident Report.

Complications Associated With IV Therapy

Complication	Signs and Symptoms	Prevention	Nursing Interventions/Treatment
Allergic Reaction is a generalized hypersensitivity reaction to a solution, medication, or additive. Allergic reactions can be immediate or delayed, mild or severe. Severe allergic reactions (anaphylaxis) can be life threatening.	1. Chills and fever 2. Urticaria 3. Erythema 4 Pruritis 5. Shortness of breath 6. Respiratory distress 7. Anaphylactic shock 8. Cardiac arrest	1. Obtain a thorough history of drug allergies. 2. Place ID bracelet on resident noting allergies. 3. Flag medical record and alert other providers of resident's allergies. 4. Re-check resident identification and blood type during blood transfusion procedures.	1. Stop infusion immediately. 2. Discontinue any suspected medication or substance causing the reaction. 3. Maintain vascular access. 4. Notify physician immediately. 5. Administer treatment as ordered. 6. **Do not use the same administration tubing used to administer the suspected allergen.** 7. Monitor vital signs. 8. Document observations, interventions, resident's response and outcome in the resident's medical chart. 9. Complete an Incident Report.
Catheter-related Infections (CRIs) can be local, systemic or both. Local infections are limited to the catheter insertion site, exit site of tunneled catheters, or implanted port pocket. Systemic infections are characterized by the presence of >10-15 times the colony forming units of bacteria per ml of blood drawn from the vascular access device. CRIs can be life threatening. Prompt assessment and intervention are essential.	1. Inflammation or purulence at catheter site 2. Tenderness 3. Erythema 4. Induration 5. Sudden onset of symptoms 6. Onset or worsening of symptoms upon start or increased rate of infusion 7. Febrile episode 8. Necrosis of skin over reservoir of implanted port	1. Use aseptic technique during initiation and care of IV catheters. 2. Follow the CDC guidelines for proper hand antisepsis. 3. Assess access site and administration set at established intervals. (See policies entitled *Peripheral IV and Midline IV Dressing Changes* and *Central Venous Catheter Dressing and Extension Set or Injection/Access Port Changes.*) 4. Change administration set and rotate IV access site at established intervals. (See policy entitled *Administration Set Changes.*)	1. If local infection is suspected: a. notify physician immediately; b. obtain site culture, per physician order and report results; c. apply warm compresses, as ordered; d. administer anti-infective therapy, as ordered; and e. remove VAD, as ordered. 2. If systemic infection is suspected: a. notify physician immediately; b. obtain blood cultures from vascular access device and from a peripheral vascular site; c. culture infusion solution of medication, if contamination is suspected; d. administer anti-infective therapy, as ordered; and e. remove VAD, as ordered. 3. Document observations, interventions, physician notification, resident's response and outcomes. 4. Complete an Incident Report.

Complications Associated With IV Therapy

Complication	Signs and Symptoms	Prevention	Nursing Interventions/Treatment
Septicemia is a systemic infection characterized by the presence of pathogens and their toxic metabolites in the circulating blood.	**Septicemia:** 1. Fever 2. Chills 3. Hypotension 4. Backache 5. Nausea 6. Headache 7. Diarrhea 8. Vomiting 9. Flushing **Late Stage Septicemia:** 10. Cyanosis 11. Hyperventilation 12. Vascular collapse 13. Shock 14. Death	1. Use aseptic technique during initiation and care of IV catheters. 2. Follow the CDC guidelines for proper hand antisepsis. 3. Inspect medications and solutions prior to administration. 4. Assess access site and administration set and established intervals. 5. Change administration set and rotate IV access site at established intervals.	1. Notify physician immediately. 2. Administer interventions and treatment as ordered. 3. Obtain cultures of catheter, infusate, blood, as ordered. 4. Obtain cultures prior to administration of anti-infectives 5. Remove VAD, as ordered. 6. Document observations, interventions, resident's response and outcome in the resident's medical chart. 7. Complete an Incident Report.
Catheter-related Venous Thrombosis (CRVT) is the formation of a thrombus (fibrin) along the venous wall. CRVT is a potentially life-threatening complication. Prompt assessment and intervention are essential.	1. Pain or burning in neck, chest, or shoulders 2. Swelling of face, neck, arm, or at catheter exit site 3. Numbing or tingling in extremities 4. Superficial collateral veins on the chest 5. Periorbital edema 6. Tachycardia 7. Shortness of breath	1. Flush catheters routinely. 2. Administer low-dose anti-coagulant therapy, as ordered. 3. Use a syringe barrel size of 10 ml or greater when flushing.	1. Notify physician immediately. 2. Initiate anti-coagulant and/or thrombolytic therapy as ordered. 3. Prepare resident for radiographic studies, as ordered. 4. Document observations, interventions, resident's response and outcome in the resident's medical chart. 5. Complete an Incident Report.
Air Embolism is characterized by the entry of an air bolus into the vascular system. If the air bolus enters the cardiac circulation, it blocks the ejection of blood from the right ventricle into the pulmonary artery.	1. Chest pain 2. Shortness of Breath 3. Cyanosis 4. Hypotension 5. Weak pulse 6. Tachycardia 7. Syncope 8. Loss of consciousness 9. Shock 10. Cardiac arrest	1. Use air-eliminating filters. 2. Clamp catheter and tubing during administration set changes. 3. Use luer-lock connections for infusion equipment and piggy-backs. 4. Prime infusion sets and tubing prior to connecting to VAD. 5. Place resident in supine position and have them perform Valsalva maneuver when removing CVCs. 6. After catheter removal, apply pressure to exit site. 7. Apply occlusive dressing to exit site and change every 24 hours until site is epithelialized.	1. Notify physician immediately. 2. Place resident in left Trendelenburg's position. 3. If embolism is due to open or leaking administration set, clamp line close to VAD and change administration set and tubing. 4. If embolism is due to disconnected or damaged central venous access device, clamp catheter and repair, if appropriate. 5. Remove CVC, as ordered after new catheter has been inserted. 6. Administer interventions and treatment, as ordered. 7. Monitor resident closely 8. Document observations, interventions, resident's response and outcome in the resident's medical chart. 9. Complete an Incident Report.

Complications Associated With IV Therapy

Complication	Signs and Symptoms	Prevention	Nursing Interventions/Treatment
A **Catheter Embolism** occurs when a catheter piece becomes dislodged and enters the general circulation. Major vessel blockage results in loss of circulation, cardiac irritability, and/or cardiac arrest.	1. Cyanosis 2. Hypotension 3. Tachycardia 4. Syncope/ loss of consciousness	1. Inspect catheters for defects before using. 2. When using through-the-needle catheters, never pull catheter back through the needle. 3. When using over-the-needle catheters, never withdraw or reinsert once threaded. 4. Use appropriate size syringe and technique when flushing catheter.	1. Notify physician immediately. 2. Place tourniquet above venipuncture site. Do not occlude arterial flow. 3. Place resident on bed rest. 4. Monitor resident closely for signs of distress. 5. Administer interventions and treatment, as ordered. 6. Document observations, interventions, resident's response and outcome in resident's medical chart. 7. Complete Incident Report.
Pulmonary Edema is a result of fluid overload within the circulatory system. Pulmonary edema can lead to congestive heart failure, shock and cardiac arrest.	1. Restlessness 2. Increased pulse rate 3. Headache 4. Shortness of breath 5. Non-productive cough 6. Flushed skin 7. Hypertension 8. Dyspnea with gurgle, rales upon auscultation 9. Frothy sputum 10. Engorged neck veins 11. Pitting edema 12. Edematous eyelids	1. Assess resident prior to infusion therapy for history of complications related to IV therapy, cardiac or respiratory problems, present fluid status, ability to tolerate fluid volume. 2. Monitor closely for signs and symptoms of fluid intolerance.	1. Place resident on strict bed rest in high Fowler's position (HOB elevated 90°). 2. Slow infusions, maintain venous patency. 3. Notify physician immediately. 4. Monitor vital signs/ intake and output. 5. Administer interventions and treatments per physician orders: a. oxygen; b. pain medication; c. diuretic; and/or d. vasodilators. 6. Document observations, interventions, resident's response and outcome in resident's medical chart. 7. Complete Incident Report.
Speed Shock occurs when a foreign substance is too rapidly introduced into the body. Speed shock can occur even when the amount introduced is small in volume. Speed shock can be identified when sudden onset of symptoms is associated with infusion therapy.	1. Dizziness 2. Flushed skin 3. Headache 4. Irregular Heart Rate	1. Monitor administration sets and electronic pumps to ensure correct flow-rate. 2. Use electronic pumps to ensure accurate rate of flow.	1. Stop the infusion immediately. 2. Maintain vascular access. 3. Notify physician immediately. 4. Administer interventions and treatments as ordered. 5. Document observations, interventions, resident's response and outcome in resident's medical chart. 6. Complete Incident Report.