Management of PICC Complications

PURPOSE
To maintain the integrity of the catheter throughout the course of therapy, ensure patient safety and promote optimal outcomes.

POLICY
1. The integrity and sterility of the catheter dressing shall be maintained at all times to prevent potential contamination of the insertion site.

2. The catheter shall be stabilized using transparent dressings, Steri-Strips® (or other stabilization device), elastic-net gauze and other products as appropriate. This will prevent movement of the catheter and potential contamination or irritation of the insertion site and the vein.

3. Monitor and instruct the patient to observe for signs and symptoms of complication on a regular basis, including the first 24 hours post-insertion and at least weekly thereafter. Encourage the use of flow sheets by nurses and caregivers to document basic measurements and information.

4. Report any signs and symptoms of complications to physician as appropriate.

5. Using the appropriate clinical pathway, instruct patient or caregiver in all aspects of use and maintenance of the catheter, and when to report potential problems.

6. Monitor catheter outcomes, track rates of complications and recommend changes as needed as a component of the Performance Improvement Program. Enter an adverse event in applicable outcomes databases, or complete a Quality Assessment Report (QAR) for any complications.

7. If another health care provider will be providing care and changing the catheter dressing, facilitate education of the key staff members and encourage them to share outcome data.

COMPLICATIONS/INTERVENTIONS

1. <u>Bleeding at the Insertion Site</u>

    a. Some bleeding may present at the insertion site within the first 24 hours. This is most likely to occur with the larger catheters.

    b. Excessive trauma to the vein during insertion may cause bleeding at the site or under the skin. There is also a potential for hematoma formation.

c. Facilitate clotting at the insertion site by having patient keep arm flat during the dressing application, clean up and documentation after the insertion procedure. Bleeding will be minimized if patient keeps arm extended for 20 minutes (or as directed) following the procedure.

d. Pressure may be applied with a sterile 2x2 gauze folded and placed directly over the insertion site under the dressing. This should be changed after 24 hours.

e. Patients who are on anticoagulants or have a coagulopathy disorder may be at increased risk for bleeding and need to be monitored closely.

2. Phlebitis

Signs and Symptoms: Pain, tenderness, erythema, warmth, swelling, induration, purulence, or palpable venous cord.

INS Phlebitis Scale	
Grade	Clinical Criteria
0	No Symptoms
1	Erythema at access site with or without pain
2	Pain at access site with erythema and/or edema
3	Pain at access site with erythema Streak Formation Palpable venous cord
4	Pain at access site with erythema Streak formation Palpable venous cord > 1 inch in length Purulent drainage

a. Potential causes of phlebitis include: trauma to the vein wall on insertion, chemical irritation from infusates (pH, osmolality), particulate matter, powder from gloves, movement of the catheter against the vein wall, and lack of adequate blood flow around the catheter.

b. Always insert the catheter gently and slowly.

c. Minimize trauma to the vein during venipuncture.

d. Use the smallest device possible that will accomplish the desired therapy.

e. Check the osmolality and concentration of infusates and decrease osmolality or dilute whenever possible to decrease the risk of chemical phlebitis.

f. Application of moist heat after insertion may decrease the risk of phlebitis.

g. Instruct patient or caregiver to observe for signs of phlebitis and report any symptoms or discomfort immediately.

h. Assess the vascular access site for signs, symptoms and severity of phlebitis using a standardized scale (refer to INS Phlebitis Scale on page 2 of this document). Document findings.

i. If phlebitis develops post-insertion (within 7 days) elevate the arm and apply moist heat.

j. If chemical or mechanical phlebitis is suspected, pulling back on the catheter so the tip is repositioned may provide relief.

k. Some sources advocate the use of non-steroidal anti-inflammatory (NSAID) drugs to reduce the risk of phlebitis. Discuss with physician and obtain an order if appropriate.

l. If symptoms of phlebitis do not improve after 24-48 hours, notify physician and remove the catheter. If symptoms worsen, remove the catheter immediately and notify the physician.

m. Document the phlebitis on a Quality Assessment Report (QAR) or record the data in appropriate outcomes database for further evaluation as part of the Performance Improvement process.

3. <u>Occlusion</u>

a. Prevention of occlusion is the best management.

b. Flush with positive pressure (push-pause technique) whenever possible (always follow manufacturer's instructions).

c. Consider flushing regularly and more frequently with smaller catheters (2Fr – 3Fr).

d. Consider the use of 0.9% Sodium Chloride flushes prior to and after each medication administration, especially through smaller (2Fr – 3Fr) catheters.

e. Occlusions are most likely caused by blood clotting within the lumen, but can also be caused by drug precipitates and lipid deposits. For more information, refer to the policy on Management of Catheter Occlusion. Fibrin sheaths may form along the length of the catheter and cover the tip. Fibrin sheaths may also act like one-way valves, permitting infusion but not withdrawal.

f. Frequent blood draws through a catheter may increase the risk of occlusion. It is preferable to draw blood directly from another vein when possible. If a catheter is inserted that is to be used frequently for blood draws, consideration should be given to inserting a larger catheter (for example, 4 Fr), as it is less likely to occlude.

g. Review potential causes of an occluded catheter (for example, fibrin sheath, kinking, and incompatible infusates) and assess for methods to reduce the risk of occlusion.

h. Document the occlusion on a Quality Assessment Report (QAR) or record the data in appropriate outcomes database for further evaluation as part of the Performance Improvement process.

4. Thrombosis

a. Venous thrombosis is thought to occur in some degree with all indwelling catheters. Some disease states (for example, cancer patient with solid tumors, coagulopathies, diabetes, irritable bowel syndrome, or end stage renal failure) may predispose patients to clotting and thrombus formation. Inactivity, age extremes and a history of multiple vascular access device placements may also increase the risk of thrombosis.

b. Thrombosis can occur anywhere along the vein.

c. Fibrin formation usually begins at the point of insertion, due to initial trauma to the intima of the vein, and may cover the entire length of the catheter.

d. Thrombus formation is more likely to occur when the tip of the catheter is at the shoulder or axilla. Size of the vein and blood flow around the catheter may also influence thrombus formation from venous irritation.

e. Any cause of phlebitis may also lead to the development of thrombosis.

f. Assess the patient for pain, venous distension on the affected side, increase in mid-arm circumference, sluggish flow, or any swelling on the arm, neck, shoulder or chest on the side of the body where the catheter is located. An increase in mid-arm circumference of more than 1.2 cm may be significant, especially in pediatric patients.

g. Instruct patient to report any “tightness”, discomfort or swelling of the arm.

h. Nursing staff should be encouraged to use a flow sheet to record the mid-arm circumference on a regular basis, usually at the time of the weekly dressing change.

i. Notify the physician if thrombosis is suspected. You may be instructed to remove the catheter. The physician, depending on the symptoms, may order catheter dye studies.

j. Document the thrombosis on a Quality Assessment Report (QAR) or record the data in appropriate outcomes database for further evaluation as part of the Performance Improvement process.

5. Catheter Damage or Breakage

a. Prevention is preferred to treatment.

b. Damage may initially be caused during insertion from the introducer needle, guidewire, forceps or excessive force in flushing.

c. Damage has also been reported by clamping, excessive manipulation, and inadequate stabilization of the hub.

d. Secure all connections and then check the catheter for leaks while flushing.

e. Signs of damage may include leaking or a wet dressing.

f. When appropriate, repair may be attempted by using the appropriate repair kit from the manufacturer. The repair shall be completed in a nurse that is competent in access device repair. Follow the manufacturer’s instructions.

g. Consideration should be given to removing the catheter if damaged. Consider the risk of infection if the system has been exposed due to

damage, the length of therapy remaining, and the availability of another vein for access.

h. The greatest risk from a damaged catheter is catheter embolus. If this is suspected, keep the patient calm, notify physician immediately and monitor vital signs. The most severe symptoms occur when the catheter lodges in a pulmonary vein and are similar to pulmonary embolus. There may be no symptoms. If the catheter is broken and the pieces are available, verify that the total length is the amount that was inserted. Catheter fragments may be retrieved by interventional radiologists.

i. Document the catheter damage or breakage on a Quality Assessment Report (QAR) or record the data in appropriate outcomes database for further evaluation as part of the Performance Improvement process.

6. Infection (refer to the Infection Prevention Manual for definitions)

Insertion Site – erythema, exudate, pain or tenderness

a. Infection at the insertion site may be caused by skin contaminants at the time of insertion or during dressing changes.

b. Dressing changes for Peripheral-Midline / PICC catheter should follow strict aseptic procedure.

c. If signs and symptoms of insertion site infection are present, notify the physician and culture the exudate as ordered.

d. Aggressive cleansing of the area, more frequent dressing changes and/or use of specialized dressings may be initiated.

e. If signs of infection do not improve or resolve within 24-48 hours, notify the physician and remove the catheter.

f. Document the insertion site infection on a Quality Assessment Report (QAR) or record the data in appropriate outcomes database for further evaluation as part of the Performance Improvement process.

Catheter Sepsis (also called catheter-related bloodstream infection or CR-BSI) – fever, chills, malaise, positive blood culture from the catheter, positive tip culture, no other identified source of infection.

a. May be caused by contamination during insertion, through movement of the catheter through the insertion site, poor technique in manipulating the IV system or dressing changes.

b. Patient may also have an overgrowth of microbes due to an immunocompromised status or other infection, such as urinary tract or respiratory tract.

c. Assess the patient for signs, symptoms, or other sources of infection. Report symptoms to the physician, remove the catheter and culture the tip. The physician may order antibiotics or observe the patient for resolution of fever and signs of infection.

d. In some cases, when there is no other alternative, the physician may choose to treat the patient with antibiotics and a declotting agent and leave the line in place. This patient is at increased risk for complications and must be monitored closely.

e. Document the catheter sepsis on a Quality Assessment Report (QAR) or record the data in appropriate outcomes database for further evaluation as part of the Performance Improvement process.

7. Catheter Malposition

a. Peripheral-Midline and PICC catheters are long and flexible, and can move within the vascular system with increased intrathoracic pressure, increased physical activity, use of crutches, weight lifting, forceful flushing of the line and aberrant advancements of the catheter. There have been reports of catheters turning around in the vein, being tied in a knot or migrating to an unintended vein. These lines are not sutured or tunneled and the only thing stabilizing them is the dressing and stabilization device.

b. Malpositioning can occur after initial insertion. No standard frequency for repeat x-rays has been determined. Centrally placed catheters that have been repositioned into the jugular veins pose the greatest risk with any infusate. Monitor patients for signs and symptoms, such as noise on flushing, headache, jugular venous distension, facial edema, and complaints about vision.

c. Document the catheter malposition on a Quality Assessment Report (QAR) or record the data in appropriate outcomes database for further evaluation as part of the Performance Improvement process.

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RESPONSIBILITY
The Clinical Specialist has the responsibility for approval of, compliance with, and revisions to this policy.

MODIFICATION/REVISION
This policy is subject to modification or revision in part or its entirety to reflect changes in conditions subsequent to the effective date of this policy.

REFERENCES

1. Infusion Nursing Standards of Practice – Revised 2016; Journal of Infusion Nursing, Supplement to January/February 2016, Volume 39, Number 1S.

2. Infusion Nursing: An Evidence-Based Approach, Third Edition edited by Mary Alexander, Ann Corrigan, Lisa Gorski, Judy Hankins, and Roxanne Perucca.

3. INS (Infusion Nurses Society) Policies and Procedures for Infusion Nursing, 3rd Edition.