

# IV Filter and Air Vigilance in the Presence of an Intracardiac Shunt

## Site Applicability

PHC Acute Care

## Practice Level

*Basic: RN, LPN, RPN*

## Requirements

1. Air particulate filters/bubble trap filters are required for all intravenous lines when the patient is known to have an intracardiac shunt

**Note:** *do not infuse blood products and propofol infusions through the 0.22 Micron High Pressure Filter - (product number: 00079998) as they are known to clog the filter. Please use extra vigilance in monitoring for air in IV tubing with propofol and blood product infusions.*

2. Air particulate filter/bubble trap filters are changed:
  - a. every 96 hours or
  - b. with IV administration set changes or
  - c. with confirmed/suspected contamination, or
  - d. when the integrity of the solution or system has been compromised
3. A visual inspection of the intravenous line (site to source) is required every 2 hours (from the insertion site to the infusion) to ensure that no air or particulate has accumulated in the intravenous tubing and potentially placing the patient at risk of an air or particulate embolism.

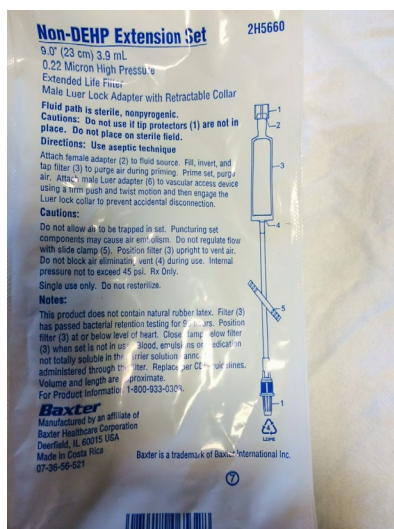
## Need to Know

1. In the presence of intra-cardiac shunts with right to left shunting (associated with some congenital heart defects and some congenital heart defect surgical repairs) it is recommended that vigilance in reducing air and particulate from entering the arterial circulation be prevented through the use of air vigilance – including the use of filters on intravenous infusions.
2. Examples of congenital heart defects or surgical repairs that may produce shunting of blood from the right side of the heart to the left side of the heart (right to left shunting) in the presence of high pulmonary pressures (pulmonary hypertension, pulmonary stenosis, etc.) include:
  - Atrial Septal Defects (ASD)
  - Patent Foramen Ovals (PFO)
  - Patent Ductus Arteriosus (PDA)
  - Ventricular Septal Defects (VSD)

- Fontan circulation with a fenestration
3. Risk of introducing air into intravenous tubing is greater when intravenous bags are changed, IV lines are changed and during IV medication administration.
  4. Expected outcomes include:
    - Identification of patients at risk of developing a paradoxical or air embolism.
    - Filters utilized on intravenous infusions of patients at risk of developing air or paradoxical embolism associated with right to left intracardiac shunting.
    - Prevention of a paradoxical or air embolism occurring in a patient with an inter-atrial or inter-ventricular connection.

## Equipment and Supplies

0.22 Micron High Pressure Filter - (product number: 000799998)



## Procedure

### Steps

Steps	Rationale
1. <b>GATHER</b> supplies and prepare work area. Wash hands.	
2. <b>PRIME</b> intravenous tubing with solution and <b>PERFORM</b> visual inspection of tubing ensuring air is removed prior to connecting to 0.22 Micron High Pressure Filter.	Ensures air removal prior to connection.

3. <b>CONNECT</b> filter to end of primed intravenous therapy tubing and <b>PRIME</b> filter to ensure removal of air.	Filter added to intravenous tubing reduces the risk of exposure to air or particulate embolism.
4. <b>INFORM</b> patient and family that IV site will be <b>ASSESSED</b> on an every 2 hour basis for signs of complications.	Educates patient and family on performing the routine site and system assessment.
5. <b>INSTRUCT</b> patient and family to report any pain, swelling, numbness, redness or bruising at site or if site is wet, firm, hot or cold to touch or if visible amount of air is visible in the infusion tubing. <b>STOP</b> infusion immediately and assess site to determine appropriate interventions (removal of air or filter/tubing change).	Engages patient and family as 'partners' in their care.
6. <b>PERFORM</b> infusion system safety check when starting or restarting IV therapy and as part of the routine bedside check at shift assessment, transfers, and handovers	Provides thorough assessment of infusion system at transition points.

### Documentation

Document all site-to-source intravenous tubing inspections in IV line in 'Interactive View and I&O' under 'Adult Lines – Devices', or Interdisciplinary Notes.

### Related Documents

This section contains additional and supporting information.

### References

1. Gorski, L. A. MS, Hadaway, L. Hagle, M. E. Broadhurst, D. Clare, S. Kleidon, T. Meyer, B.M. Nickel, B. Rowley, S. Sharpe, E. Alexander, M. FAAN Infusion Therapy Standards of Practice, 8th Edition, *Journal of Infusion Nursing*: January/February 2021 - Volume 44 - Issue 1S - p S1-S224 doi: 10.1097/NAN.0000000000000396.
2. Messé, S.R., Ammash, N.M.,(2021) Atrial Septal Abnormalities (PFO, ASF and ASA) and risk of cerebral emboli in adults. In UpToDate. Kasner, S.E., Connolly, H.M (Ed). Retrieved Dec 6, 2021.
3. Warnes, C. A., Williams, R. G., Bashore, T. M., Child, J. S., Connolly, H. M., Dearani, J. A., Del Nido, P., Fasules, J. W., Graham, T. P., Jr, Hijazi, Z. M., Hunt, S. A., King, M. E., Landzberg, M. J., Miner, P. D., Radford, M. J., Walsh, E. P., & Webb, G. D. (2008). ACC/AHA 2008 guidelines for the management of adults with congenital heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Develop Guidelines on the Management of Adults With Congenital Heart Disease). Developed in Collaboration With the American Society of Echocardiography, Heart Rhythm Society, International Society for Adult

Congenital Heart Disease, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. *Journal of the American College of Cardiology*, 52(23), e143–e263. <https://doi.org/10.1016/j.jacc.2008.10.001>

## Definitions

**Paradoxical embolism:** a blockage of a systemic artery by a thrombus originating in a systemic vein that has passed through a defect in the inter-atrial or inter-ventricular septum.

**Air Vigilance:** A systematic inspection of an intravenous infusion tubing set from site (insertion site) to source (intravenous fluid) to ensure that there is no air identified in the system and the active removal of the air bubbles prior to them entering the patients' blood stream.

**Site to Source inspection:** A systematic inspection of infusion therapy.

- Assess vascular access site for infiltration and phlebitis
- Trace tubing from site to infusion bag/bottle/syringe assessing for kinks, air bubbles, clamps (open or closed), loose connections, breaks in system, correct solution infusing per correct channel at correct rate.
- Ensure tubing is secure.

## Created By

Educator IV Therapy

CNS PACH Clinic

Nurse Educator CSICU

## Revised By

Clinical Nurse Specialist, IV Therapy and Chemotherapy

<b>First Released Date:</b>	April 2014
<b>Posted Date:</b>	01-FEB-2022
<b>Last Revised:</b>	01-FEB-2022
<b>Last Reviewed:</b>	01-FEB-2022
<b>Approved By:</b>	PHC
	Professional Practice Standards Committee
<b>Owners:</b>	PHC
	IV Therapy