

Operation: **Arterial line – Setup, leveling, and zeroing**

Supplies: pole, transducer holder, pressure cable, pressure bag, arterial/CVP kit, 5 or 10 mL syringe, blunt needle, IV bag label, IV bag of normal saline, hand sanitizer, and gloves.

	IMPORTANT STEPS	KEY POINTS	REASONS	RISKS
1	Allen Test	<ul style="list-style-type: none"> - Used to determine whether the patency of the radial or ulnar artery is normal. - Normal = positive - Abnormal = negative 	<ul style="list-style-type: none"> - Done prior to radial cannulation (make a fist, occlude both radial and ulnar artery, open the hand, the hand should be pale. Release both the radial and ulnar and the hand should pink up quickly. 	<ul style="list-style-type: none"> - Can result in thrombosis therefore the test is used to reduce the risk of ischemia to the hand.
2	Remove air from IV flush bag	<ul style="list-style-type: none"> - Hand hygiene - Only normal saline IV fluid - Use 5 or 10 mL syringe and blunt needle - Label bag with date, time, and initials. 	<ul style="list-style-type: none"> - Infection control - Dictated by hospital policy and decreases the chance of introducing air into the system. 	<ul style="list-style-type: none"> - Expelling the air from the flush bag reduces the risk for an air embolism.
3	Open the Arterial/CVP line kit	<ul style="list-style-type: none"> - Red color for arterial - Make sure all connections are secure 	<ul style="list-style-type: none"> - Securing the connections will prevent air from entering the system. 	
4	Spiking the IV flush bag	<ul style="list-style-type: none"> - Clamp the tubing prior to spiking - Fill drip chamber ½ full 	<ul style="list-style-type: none"> - Prevents fluid flow and air bubbles. 	
5	Priming (flushing) the tubing	<ul style="list-style-type: none"> - Unclamp tubing - Apply pressure bag to 300 mmHg - Do not tap transducer - Pull Safeset plunger completely and invert while priming. - Flush until tubing is primed and no air bubbles. - Push Safeset plunger until locked in position. 	<ul style="list-style-type: none"> - Decreases the chances of air being introduced into the system. - Continuous flow equal to 3 mL/hr 	
6	Set up transducer	<ul style="list-style-type: none"> - Place transducer holder on pole and slip the transducer into the slot - Connect monitor cable to the transducer - Flush system 	<ul style="list-style-type: none"> - Ensure proper monitor function - Ensure airtight system - Remove all air from system 	
7	Attach system to patient	<ul style="list-style-type: none"> - Arterial insertion site - Don gloves 	<ul style="list-style-type: none"> - Infection control/universal precautions 	
8	Level transducer	<ul style="list-style-type: none"> - Use unit's level device or a laser to align - Level to phlebostatic axis (4th ICS, mid-axillary line) - Transducer reference point 	<ul style="list-style-type: none"> - Patient in supine position - Proper alignment for accurate and consistent reading - Aligns at the level of the atria 	<ul style="list-style-type: none"> - Most reliable reading but not 100% accurate

9	Zeroing arterial line	<ul style="list-style-type: none"> - Hand hygiene - Turn stopcock "OFF" to the patient (up) - Remove dead-end cap - Do not contaminate cap - Press "ART" on the monitor - Press "ZERO" on monitor - Allow systolic and diastolic to read '0' 	<ul style="list-style-type: none"> - Infection Control - Turns system off to patient - Activates art line pressure module on the monitor - Infection control - Zeros the monitor to patient's position 	
10	Complete the procedure	<ul style="list-style-type: none"> - Reattach dead end cap - Open the system by turning stopcock to 3 o'clock - Flush the system 	<ul style="list-style-type: none"> - Ensure system is closed - Ensure system is open - Avoids clotting of system - Ensures proper waveform 	
11	Monitoring	<ul style="list-style-type: none"> - Sufficient fluid in the flush bag - Pressure bag pumped up to 300 mmHg - No air bubbles in the system - No loose connections - No kinks in the line 	<ul style="list-style-type: none"> - Keeps artery open to monitor blood pressure with a continuous 3 mL/hr flow - Overdamped rule out system causes - Underdamped rule out system causes 	<ul style="list-style-type: none"> - Avoids introducing air into the system - Avoids an air embolism - Severe hypotension - Systolic hypertension with low diastolic due to ↑ HR
12	Complications	<p>Air embolism:</p> <ul style="list-style-type: none"> • Difficulty breathing or respiratory failure • Chest pain or heart failure • Muscle or joint pains • Stroke • Mental status changes • Low blood pressure • Bluish skin hue <p>Circulation:</p> <ul style="list-style-type: none"> • Monitor circulation • Capillary refill • Skin color/temp. 	<ul style="list-style-type: none"> - Due to empty fluid bag - Air introduced by empty fluid bag - Arterial line displacement - Loose connectors 	<ul style="list-style-type: none"> - Most common is air embolism - NO medications should be administered through an arterial line. - Only normal saline can be administered continuously and intermittently through an arterial line.

Operation **FYI: Central venous pressure (CVP) AKA Right atrial pressure (RAP) – Setup, leveling and Zeroing**

Supplies: pole, transducer holder, pressure cable, pressure bag, arterial/CVP kit, 5 or 10 mL syringe, blunt needle, IV bag label, IV bag of normal saline, hand sanitizer, and gloves.

Important Steps	Key Points	Reasons	Risk
Steps 2 -10	<ul style="list-style-type: none"> - Blue for CVP - Setting up for CVP is the same as arterial line set-up 	Same as above	<ul style="list-style-type: none"> - Most common is air embolism - May administer medications through the CVP and draw blood.
Attaching system to patient	<ul style="list-style-type: none"> - Connected to patients central line distal port - Normal CVP 2 – 8 mmHg 	<ul style="list-style-type: none"> - CVP high <ul style="list-style-type: none"> ➤ Over hydration ➤ Increased venous return (rapid infusion) ➤ Heart failure 	<ul style="list-style-type: none"> - CVP low <ul style="list-style-type: none"> ➤ dehydration ➤ Hypovolemia ➤ Shock

References:

ATI RN Adult Medical Surgical Nursing – Hemodynamic Monitoring

Lewis, Medical-Surgical Nursing – Nursing Care in Critical Care Setting & Hemodynamic Monitoring