

CVP lines

CVP lines are frequently inserted in critically ill infants and children for hemodynamic monitoring, delivery of intravenous fluids and medications, blood products, TPN, and fat emulsion. They may also be used for drawing blood samples. Hemodynamic monitoring of central venous pressure reflects intravascular volume status and RV function. Normal CVP values are 1-7 mmHg in children. Low CVP measurements indicate hypovolemia. High CVP measurements indicate hypervolemia or elevated RV end-diastolic pressure. Pulmonary disease and PEEPs greater than 5 can result in false high CVP readings.

The CVP line should be zero/calibrated every 12 hours. Also zero/calibrate when there is a change in caregiver, after changing tubing, or if readings are questionable. The yellow squeeze flush transducer will be used for transducing CVP lines. It will be primed with a solution of NS and 1 unit of heparin/ml. The transducer should be in the child's bed at the phlebostatic axis. Medications, TPN and intralipids can be Y'd into the line at the distal stopcock. In a multilumen line, vasoactive drips should be placed in the smallest lumen. Avoid infusing other solutions with vasoactive infusions if possible. **To obtain an accurate CVP reading, turn off all stopcocks to fluids before reading measurement.** The physician should be notified if the CVP line has no blood return or if a change in waveform is noted, which may indicate malposition of the catheter tip.

Troubleshooting

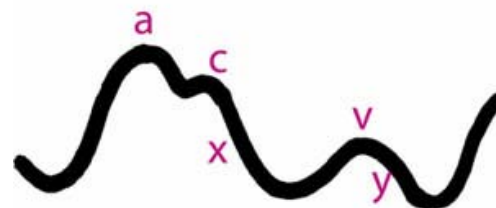
If the CVP reading appears inaccurate: check for kinks in the tubing, ensure absence of air bubbles in the system, assess patency of line by aspirating for blood, recalibrate transducer. If no waveform is present following these measures, notify MD and obtain order for chest x-ray to confirm placement.

Removal of CVP

Verify MD order for removal. Review lab data for PT/PTT, INR, and low platelets. Ensure coagulopathies are corrected, if possible, prior to procedure. Place patient in supine position. Clamp line and stop infusion. Don clean gloves and remove dressing. Remove sutures, if any. Prep exit site with Chloraprep, use crisscrossing back and forth friction scrub over exit site for at least 30 seconds using one applicator wand. Withdraw catheter slowly. Immediately apply manual pressure using gauze for at least 5 minutes until bleeding is controlled. Apply occlusive dressing to site after bleeding has stopped.

Complications

Complications during insertion include inadvertent arterial puncture, hematoma, pneumothorax, hemothorax. The subclavian approach is associated with risks to mediastinal structures: pneumomediastinum, hemomediastinum, pneumopericardium, and pericardial tamponade. Air embolism can occur during insertion of catheter, when IV tubings are changed, or with inadvertent disconnects. A toothless catheter clamp should be available at the bedside of every patient to prevent air embolism. Complications after insertion include infection and thrombosis.



Central Venous Trace

A wave: Rise in pressure due to atrial contraction
C wave: Rise in pressure due to ventricular contraction
(V=atrial filling, X=atrial relaxing, Y=ventricular filling)