Transthoracic Lines

Infants and children undergoing open heart surgery may require intracardiac monitoring. The hemodynamic data can assist in the assessment of contractility, preload, and afterload. The waveform tracing can further assist in the evaluation of the effects of rhythm disturbances and valve function.

General Guidelines:

Label all lines carefully, close to the catheter stopcock and near transducer. Secure all lines to the child. All lines need to be continuously transduced with ALARMS set on. All transducers need to be on the child's bed near the HOB at the pheblostatic axis. All lines are zeroed once a shift and with position changes. ALL LINES ARE REMOVED BY CV SURGERY ONLY. Chest tubes are generally maintained until all lines are removed and exceptions are made on an individual basis by the attending physician. All lines should have either heparinized saline or D5W infusing. Change the dressing with sternal wound care following the LPCH policy for central lines. Blood must be present in a cooler or blood refrigerator prior to line removal. Children may be extubated prior to line removal.

Right Atrial Lines

The RA line monitors RA pressures and is indicative of RV function, RV preload, and afterload. The RA line enters the right atrium through the RA appendage and always exits the R side of the chest medial to the LA line. It is typically a double lumen catheter; the tip is usually cut so both ports are side by side. Normal RA values are 1-7mmHg. Transduce one port; vasoactive infusions typically are in the other port. Avoid infusing other solutions with vasoactive infusions. The RA line may be used for continuous or bolus infusion. Avoid infusing blood products through line due to the potential for clot formation. Observe for waveform changes (may indicate displacement into heart or wedging.) After mediastinal chest tube removal, assess line every 6 hours for blood return to insure placement. Notify CV surgery immediately if you are unable to withdraw blood from the line.

Left Atrial Lines

The left atrial line monitors LA pressure and is indicative of LV function, LV preload, and LV afterload. The LA line enters form the right superior vein or LA appendage and exits the far side of the chest. Normal LA values are 4-12 mmHg. It is a single lumen catheter and is transduced only; do not use for infusions or bolus medications. Monitor the line for AIR. If AIR is noted, stop the infusion and call CV surgery. Monitor for waveform changes that may indicate displacement or wedging.

Pulmonary Artery Lines

PA lines enter the RV, follow the right ventricular outflow tract through the main PA or a conduit and enter the right or left PA. These lines are typically single lumen catheters which are transduced continuously and displayed as RV or PA pressures. Normal PA mean pressures are 7-18mmHg and PA systolic 20-30mmHg. They may be used for bolus medications or infusions if other access is not available. Gentle flushing is necessary to avoid vascular trauma.

Removal of Transthoracic Lines

Check the most recent coagulation labs (PT, PTT, INR, platelets) Patient needs to have Plt count > 70 and INR<1.5. Ensure that 1 unit of PRBC's is in cooler or blood refrigerator at bedside and must stay at bedside for one hour after line is removed. Single ventricle patients' blood needs to be washed (potential heart transplant candidates) Maintain continuous hemodynamic monitoring during line removal and at least one hour after. Assess IV access and chest tube patency prior to removal. Evaluate need for sedation/ analgesia. Intracardiac lines should not be removed within one hour of each other. Check HCT one hour post line removal or sooner if bleeding is suspected. Monitor for signs of tamponade (tachycardia, narrow pulse pressure and high atrial pressures) and bleeding (presence of blood in chest tubes, decreased blood pressure, pallor, altered mental status) Strip and milk chest tubes immediately after removal and frequently thereafter. If sudden arterial waveform dampening occurs assume cardiac tamponade exists and initiate resuscitation. Prepare to open chest and notify CV surgery team. Do not leave the bedside or transfer patient for at least two hours after line removal. Document vital signs every fifteen minutes for the first hour, every thirty minutes for the second hour and every hour thereafter until stable.

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