Pulmonary Artery catheter: indications, contraindications and complications

Indications for insertion of a PA catheter

- No hard indications, per se.
- The decision should rest on the need to answer a specific question about the hemodynamically unstable patient, which can’t be answered with a less invasive technique.

- Cardiac output measurement especially in a patient with arrhythmia or aortic balloon pump, where PICCO can’t be used
- Unequal right and left ventricular failure
- Hemodynamic instability, some combination of obstructive, distributive, cardiogenic and hypovolemic shock
- To differentiate cardiogenic pulmonary edema from non-cardiogenic
- To guide use of vasopressors, inotropes, fluids and diuretics – when the patient has a hemodynamic problem combined with pulmonary edema and ventricular dysfunction.
- To titrate pulmonary antihypertensives in ARDS (like nitric oxide and prostacyclin)

Essentially, you would ask of the PAC, “Why is my patient hypotensive? Should I fill my patient more, or should I try to push the vasopressors? Is there room to move with fluids?”

Contraindications

- Tricuspid or pulmonary valve prosthesis which can be damaged
- Tricuspid or pulmonary valve vegetations which can be dislodged
- Endocarditis in general
- Right heart mass (be it tumor or clot)

Complications

- Same as CVC:
  - Perforation of SVC
  - Hemothorax, pneumothorax
  - Atrial fibrillation
- Unique to PA catheter
  - Ventricular Arrhythmia
  - Thromboembolic events (the catheter is a nidus for clot formation)
  - Mural thrombi in the right heart (up to 30%)
  - Air embolism from ruptured balloon
  - Pulmonary infarction
  - Endocarditis of the pulmonary valve (2%)
  - Right bundle branch block
    - If you already have LBBB, this causes complete heart block
    - If you are lucky, it is a transient phenomenon and you only need to pace them transcutaneously for a brief period. If you are unlucky, you have injured the AV node, and the patient needs prolonged transvenous pacing
  - Knotting on structures or on itself (~1%)
    - If it has gone into the right ventricle by 25-30cm and it’s still not in the pulmonary artery, you start to worry
  - Damage to the valves
    - Never pull the catheter back with the balloon inflated! You could tear the valve leaflets
  - Pulmonary artery rupture: 0.2% risk, 30% mortality
    - Risk factors: pulmonary hypertension, mitral valve disease, anticoagulants and age over 60
    - Management:
      - Lay the patient ruptured side down
      - Intubate them with a double-lumen tube
      - Increase the PEEP to put pressure on the wound
      - Repair in cardiothoracic theatre