

MANAGEMENT OF LINES IN ICU

Common lines you would be required to insert in ICU:

- peripheral lines
- arterial lines
- central venous lines
- pulmonary artery flotation catheter
- dialysis catheter

Arterial Line

Indications:

- monitoring (indicated in patients with unstable haemodynamic status or respiratory status)
- frequent blood sampling

Site of insertion:

- radial
- ulnar (avoid concomitant radial puncture)
- femoral
- dorsalis pedis
- avoid brachial

Method of insertion: refer to FCCS course book

Complications:

- local: infection, bleeding
- digital ischemia etc

Discrepancy between the arterial line and cuff pressure

- check if using the right sized cuff
- check with the ECG monitor for arrhythmia
- check transducer level
- zero arterial line
- under and over-damping are possible factors
- refer to FCCS course book to determine 'true arterial pressure'
- put BP cuff on the limb where the arterial line is situated
- inflate the cuff – eventually the a-line waveform will disappear
- deflate the cuff – the BP where the a-line waveform reappear is the true systolic pressure

Central Venous Line

Indications:

1. monitoring of right atrial pressure
2. infusion of drugs and fluids
3. can be used for sampling of blood

Sites of insertion:

- internal jugular vein
- subclavian vein
- femoral vein

Methods of insertion: refer to FCCS course book

Complications:

- associated with insertion (related to site of insertion)
 - arterial puncture
 - bleeding
 - nerve injury
 - pneumothorax/haemothorax/chylothorax
 - arrhythmia
 - air embolism
- complications occurring when the line is in use:
 - sepsis
 - disconnection leading to bleeding/ air embolism
 - erosion of catheter

Interpretation:

- difficult to interpret isolated readings
- waveform changes sometimes assist clinical diagnosis (e.g. tamponade)
- dynamic changes in CVP more useful

Pulmonary Artery Flotation

Uses:

Provide information on preload, cardiac output and afterload (derived parameters)

Useful for 'diagnostic purpose' in patients with refractory shock and for the optimization of fluid therapy and inotropic therapy.

Sites of insertion:

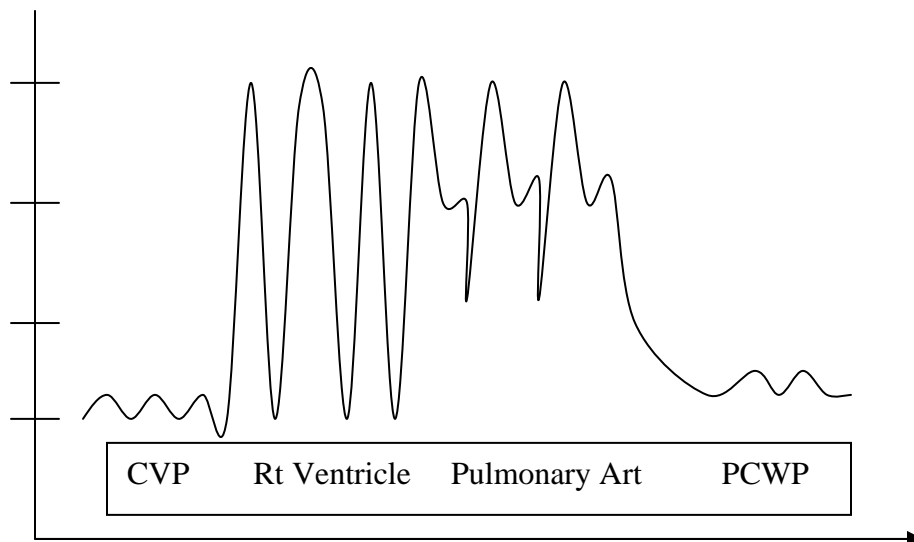
- internal jugular vein
- subclavian vein
- femoral vein

Method of insertion: refer to FCCS course book

Complications

- related to insertion
- intracardiac damage
- arrhythmia
- pulmonary infarction
- pulmonary artery perforation
- balloon rupture
- knotting
- thromboembolic complications
- infections

PA tracing



Measurements:

PCWP

- zero and level transducer
- check dynamic compliance of system by flushing the system
an overdamped system may indicate air bubbles, blood clots, kinking, long tubing, highly compliant tubing
an underdamped system may indicate short or stiff catheter
- the PCWP should be measured at end expiration. This is the highest point in the cyclical waveform when the patient is breathing spontaneously and the lowest point when the patient is mechanically ventilated.
- The PCWP will not reflect LVEDV in patients with pulmonary veno-occlusive disease and patient with mitral stenosis.

Cardiac Output

- we use the thermodilution technique to measure CO in our unit
- 10mls of room temperature D5 solution is injected into the patient
- there must be a difference of <15% between the three CO measurements before the mean is taken
- overestimation of CO can be caused by
disease state e.g. R to L shunt, pulmonary regurgitation
technical problems e.g. warm injectate, less injectate injected, prolonged injection, low flow state (easy recirculation)
- underestimation of CO can be caused by
disease state e.g. L to R shunt
technical problems e.g. cold injectate, rapid injection prior to measurement

Normal values obtained from a PA catheter

CVP	2-8 mmHg
RVP	systolic 20-30 mmHg, diastolic <CVP
PAP	systolic 20-30 mmHg, diastolic 5-10mmHg
PCWP	2-12 mmHg (less than diastolic PAP)
CO	4-6 L/min
CI	2.5-4 L/min
SVR	800-1200 dynes.sec/cm ⁵

