Central Venous Catheter Insertion in Critical Care

**Aim:** To provide key points for safe and effective insertion of Central Venous Catheters in Critical Care

**Scope:** All Adult patients in Critical Care. This SOP describes key safety points, assuming the reader is already competent in CVC insertion, so it is not a step by step guide

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**Reducing risk of allergy**
- Confirm no allergy to skin preparation or products impregnated in line

**Reducing task fixation**
- Ensure adequate monitoring – ECG, SpO2, BP as minimum
- Ensure you have another colleague in the bed space during the line insertion. This is necessary to observe the patient, their monitoring and help with procedural tasks

**Reducing the risk of air embolism**
- Patient positioning – bed angle should be < 0 degrees for subclavian or internal jugular lines. Femoral lines should be placed with the patient supine.
- All ports should be flushed prior to line insertion (this will also ensure patency of the lumens)
- All but the distal port, open to permit passage of the guidewire, should be clamped or closed with a sterile bung

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**Sterility and personal protective precautions**
- Hat, mask, gloves, gown, fenestrated drapes and eye protection should be worn
- A fresh site should be used unless urgent requirement
- 2% Chlorhexidine with 70% Isopropyl alcohol preparation from planned insertion point outwards – allow to dry
- Clean blood from site post procedure and apply transparent occlusive dressing

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**Reducing risk of local anaesthetic or chlorhexidine injection**
- Use a closed system for saline flushes. A 100ml bag of normal saline with a blunt fill needle inserted would be ideal.
- Use a sealed Chlorhexidine stick

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**Reducing risk of needle stick**
- Use blunt fill needles for drawing up saline or local anaesthetic
- Never push a suture towards your own fingers
- Ensure you are given undistracted “focus” time when handling any sharps
Reducing risk of arterial puncture/dilation

- Use real time US guidance and consider in plane technique to ensure needle depth clearly seen at point of vein puncture
- Confirm guidewire position in vein with US prior to dilation
- Transduce the CVP before proceduralist leaves the bedspace to ensure not an arterial trace (note we however do not transduce vascaths)

Probable arterial puncture?

**Uncertain after US**

- Do not dilate and do not pass CVC
- Pass 18g cannula over guidewire into vessel and remove guidewire
- Transduce arterial pressure and waveform and/or draw blood sample for gas analysis

**Confirmed on US**

- Remove needle (and guidewire if inserted) and apply firm digital pressure for at least 5 minutes
- Report arterial puncture to bedside nurse and record in CIS notes
- Request non urgent carotid duplex scan to rule out complications

Evidence of arterial puncture?

**NO**

Proceed with venous cannulation

**YES**

If artery dilated and CVC inserted into artery

- Do not remove catheter
- Discuss urgently with vascular surgeons
Reducing risk of retained guidewire
- Retain view of +/- hands on guidewire during procedure
- Guidewire removal should be completed before attempting aspiration or flushing of any ports on an inserted line
- Do not allow yourself to be distracted when exchanging catheter over guidewire
- Confirm guidewire removal verbally with bedside colleague

Reviewing imaging post subclavian or internal jugular line insertion
- Confirm date, time and patient ID to ensure you are reviewing the correct radiograph
- Review for pneumothorax, haemothorax, enlarged cardiac outline and line position
- Tip of CVC should be within in the superior vena cava, just superior to the right atrium — radiographically represented level of the origin of the right main bronchus
- When inserting line from the left side, the tip should not be abutting the side wall of the superior vena cava
- Document line depth at skin at the time of xray to aid future assessment in event of line migration

Ensuring traceability of adverse events
- Document procedure in CIS including lot number of line inserted