

---

## Central Venous Line Placement

---

Version 2.1

### Introduction

This resource sets out the expectations for central venous cannulation and central venous catheter (CVC) placement by members of the St. Vincent's Hospital Department of Anaesthesia. This refers to cannulation via the Internal Jugular, Subclavian and Femoral venous routes.

CVC insertion may be performed unsupervised by Consultants and appropriately accredited trainees. Trainees will be required to demonstrate competency at a level of independent practice for CVC insertion prior to being placed on the Urgent out-of-hours roster.

### Preparation

1. The indication for CVC placement must be established
2. The type of CVC must be determined and available
  - a. Examples include
    - i. Multi-lumen CVC for low-rate fluids, sampling, CVP monitoring and drug administration [triple lumen in GOR; four-lumen in ICU]
    - ii. Large bore sheath for high-rate fluids and Pulmonary artery catheter placement [8.5F sheath or 9.0F MAC sheath]
    - iii. Special purpose CVC eg TPN [coated CVC] or Haemodialysis [Vascath]
    - iv. NOTE: Rapid Infusion Catheters (RIC) are too short for CV placement and should NOT be used as a CVC.
3. The patient must be consented (usually as part of anaesthesia consent) including an explanation of the procedure
4. Fasting is not required for discrete CVC placement unless sedation is to be used
5. Procedures should be done in the operating suite, ICU or ED except in exceptional circumstances.

### Procedure (NOTE this is not a detailed 'how to' but a list of key practice points)

1. Oxygen should be provided and ECG monitoring connected
2. The patient should be positioned appropriately
3. The site should be examined and a landmark-based assessment of the proposed insertion point should be determined and marked on the skin
4. An ultrasound pre-scan on intact skin should be undertaken to confirm or correct the mark indicated by landmark-assessment
5. A determination should be made as to whether ultrasound will be used real-time or reserved for difficulty

6. A small amount of local anaesthetic should be injected into the insertion point and surrounds
7. The insertion site should be widely prepped with alcoholic chlorhexidine
8. Full sterile precautions should be undertaken:
  - a. Gown, mask, gloves
  - b. Full body draping
  - c. Assistants and observers wearing masks
9. The preferred 'blind' approach is to use a seeking needle followed by a cannula technique
10. The preferred ultrasound-guided approach is to use: a cannula-based technique (cannula (IJV) or needle (Subclavian/femoral) to pass the wire, then use the cannula to verify wire position); and to use an anterior approach to the IJV (not an antero-lateral approach)
11. The cannula technique involves:
  - a. Pre-preparation of the guide-wire and a 5mL syringe
  - b. Locating the vein with the needle or cannula. Using the cannula reduces the number of steps involved. If using the cannula to locate the vein, once identified by a flash back, the angle of approach should be lowered, advancing the needle and cannula a further 1-2 cm along the axis of the vein (not medially), fixing the cannula by gripping the hub with your fingers (not sliding the cannula off the needle but withdrawing the needle from the fixed cannula)
  - c. Whilst maintaining fixation of the cannula check free blood aspiration with 5mL syringe
    - i. If aspiration is positive, insert guide wire
    - ii. If aspiration is negative (being cognisant of the respiratory cycle), slowly withdraw the cannula until aspiration is positive, then insert guide wire
  - d. The recommended technique is for cannula verification of the wire site (for all anaesthetists) – to minimise uncertainty regarding arterial versus venous cannulation. This requires advancing the cannula *to its hub* over the guide wire, withdrawal of the guide wire, then checking for two of the following: non-pulsatile flow, appropriate blood colour, appropriate pressure, venous blood gas etc to confirm that the cannula is in the vein. Remember that during cardiac arrest, venous pressure may be very high and arterial blood may be dark.
    - i. Ultrasound visualisation of the wire in the vein does *not* eliminate the possibility of the wire transfixing the vein and actually end within an artery (unless the 'J' is seen in the vein)
    - ii. Should arterial cannulation have occurred in an elective situation, leave the cannula (capped) in situ, use ultrasound to relocate and cannulate the vein (if possible), once the new CVC is in place, remove the 18G cannula and apply firm (but not extreme) pressure for 5 to 10 minutes. Delay any heparin administration for at least 1 hour.
12. Dilate skin and place CVC
  - a. The guide wire must be visible at all times and held firmly during CVC insertion. The guide wire must be specifically passed off the sterile field with confirmation by the assistant.
13. Secure with a loose suture. Use needle holders for curved needles. This is the commonest time for needle stick injuries.
14. Dress the line appropriately
  - a. Use the chlorhexidine pad (blue side up) for all non-sheath CVCs.

Post-procedure:

15. Document the procedure
16. Obtain a check X-ray for patients returning to the ward. This may be done in PACU or on route to the ward. Responsibility for checking the XRay resides with the proceduralist but it may be delegated to unit staff if appropriate.

*This Clinical Guideline is to be used in conjunction with existing St. Vincent's Hospital and ANZCA Policies.*