Central Line Insertion guideline

1. Think carefully of risk benefit ratio, check coagulation and platelets, think of the potential complications before choosing a site, eg bad lungs choose IJ over subclavian.
   Asses the patient for suitability, eg obesity, ability to lie flat tilted down

2. For all lines gather everything you will need
   a. Major Anaesthesia Pack
   b. Sterile Gloves
   c. Ultrasound probe cover
   d. scalpel
   e. drawing up and injecting needle for local
   f. lignocaine 1 or 2%
   g. O stitch, (not too thin)
   h. Needle holder forceps
   i. Chlorhexidine 2% in 70% Alcohol
   j. Normal saline 20 ml
   k. Chlorhexidine impregnated dressing
   l. 5 ml syringe (local anaesthetic)
   m. 20 ml syringe (saline flush)
   n. 20 ml syringe (blood cultures)
   o. Additional drape to cover bed
   p. Hat and mask for assistant

3. Position patient before you scrub
   a. Lying flat
   b. Straight in the bed
   c. Close enough to the edge/head of bed, clear wires and tubes to allow access to the optimal position
   d. Clear the area of ng tubes, oxygen mask ties, ETT ties, ECG leads
   e. Tilt bed head down some 15 -30 degrees, very important for 2 reasons
      i. Minimise the risk of air embolism
      ii. Make the vein firmly distended and easier to puncture, without going right through it
   f. **For IJ**
      Head straight not flexed at the neck
      Tilted head 45 degrees to the opposite side
   g. **For SC**
      Arms at the side, pulled down so clavicle roughly 90 degrees to sternum
      Consider rolled towel between shoulder blades

4. Use landmarks and ultrasound as an adjunct

5. **<u>IJ</u>**

    a. Stand at the head of the bed

    b. Mid point of anterior edge of sternomastoid, feel sternal head and mastoid process and start at the mid point, or lateral to the cricoid cartilage
    c. Angle needle 45 degrees to the skin
    d. Once skin is punctured continuously aspirate while advancing the needle
    e. Aim at the **ipsilateral** nipple, this is critical so that you are aiming away from the carotid and central neck structures
    f. Try and get an ultrasound picture with the carotid medial to the internal jugular, the most common error is to transfix the vein and if the carotid is directly behind the vein, the needle will end up in it
    g. Always keep the tip of the needle in view as you advance, there are 3 ways to do this
        i. Continuously slide the ultrasound probe or angle it with the advancing needle tip
        ii. Longitudinal "in plane" imaging, beware of inadvertently moving over the adjacent artery
        iii. Walk the needle tip down the ultrasound field

        The most common error is seeing the shaft of the needle and thinking it is the tip when the tip is way past the plane of ultrasound. Don't advance unless you can see the tip
    h. Once the vessel is cannulated visualise the guidewire in the vien before dilating

6. **<u>Subclavian</u>**

Landmark method

Identify the junction of the medial third and the middle third of the clavical, start there and aim at the sternal notch or 1 cm above it, hugging the underside of the clavical, always aspirate as you are advancing

Ultrasound method

It is actually axillary vein that is seen not the subclavian, identify the vein caudal to the artery

Give enough room to be able to follow the tip of the needle into the vein

Depending on the depth, will need a fairly steep angle to the skin to hit the vein

Remember the vessels lie on the rib cage, so unless you can confidently see the tip of the needle, you are likely to cause a pneumothorax, because of the steep angle and the proximity of the vein to the chest wall.

If you can't confidently identify the tip of the needle don't advance it.

7. You will see many people taking short cuts, with experience it is possible to do things differently, but to minimise risk get everything optimal, position, access, equipment, assistance, and procede cautiously.

Please view this Video

http://www.nejm.org/doi/full/10.1056/NEJMvcm055053