UK HealthCare Adult Central Line Insertion Guideline

Introduction:

- The purpose of this guideline is to minimize complications from Central Line insertion and reduce Central Line associated bloodstream infections.
- UK HealthCare recognizes that certain clinical situations might lead to the deviation of the following guideline (e.g. emergent lines). This guideline does not replace the judgment of an experience clinician at the patient’s beside. Any deviations and reasons should be documented appropriately.
- Central Lines placed when these requirements are not met should be replaced as soon as practical.
- A Central Line is defined as a catheter which terminates in the SVC, IVC, Internal Jugular, Subclavian, or Femoral veins.

Scope:

- This guideline covers all percutaneous inserted Central Lines using the Seldinger technique.
- This document does not cover the indications for Central Line insertion, or the Seldinger technique, the choice of Central Line site in neonates, PICC lineplacement technique, or Central Lines inserted by direct surgical access of veins.

Central Venous Catheter Principles:

- A Central Line should only be inserted when there is a clear indication for its use and when the benefits obtained from Central Line access outweighs the risks of insertion.
  - Delivery of caustic or critical medications or hemodynamic monitoring, inability to obtain and/or maintain stable IV access
- The site of Central Line insertion and type of catheter should be determined on the basis of patient/situational factors and the risks inherent in the sites considered. The number of lumens and the catheter diameter should be minimized.
- Ultrasound should be available for Central Line insertions.
- Strict asepsis is required for all Central Line insertions to reduce the risk of local or systemic infection.
Clinicians should be aware of and take appropriate steps to minimize risks associated with Central Line placement.

Dilators should not be inserted into a vessel until it has determined to be a vein and not an artery.

Neither antibiotic prophylaxis nor the routine replacement of Central Lines (i.e., weekly changes) are recommended as a means to reduce CLAB.

Tunneled Central Lines have a lower rate of infection and may be more suitable when long-term (greater than 30 days) access is required.

Appropriate post-insertion care is vital to minimize complications.

The need for ongoing central venous access should be assessed daily. Lines should be removed once the need resolves. See nursing guidelines for maintenance of the catheters.

The following patient factors should be considered before Central Line insertion

- Obesity
- Coagulopathy (platelets < 50,000, INR > 1.5, APTT > 50 seconds)
- Patients on anti platelet medications
- Previous surgery at or near the same central vein location
- Previous Central Line insertion at the same site
- Infected at the insertion site
- If the above risk factors are present, notify the supervising clinician prior to Central Line placement

- Complications and risks inherent to each insertion site and their particular relevance in a given clinical setting (e.g. pneumothorax occurring during mechanical ventilation)

- Risks related to the transmission of blood-borne pathogens (e.g., HIV, hepatitis)

- The likely duration of Central Line placement

- Whether or not the Central Line is intended for outpatient use.

**Training**

- UK HealthCare Providers should be appropriately trained and experienced personnel involved in Central Line placement.

- UK trainees should complete a UK HealthCare training program, including didactic and simulation education. The level of supervision required by a clinician for a particular Central Line insertion should be appropriate for the experience of
the operator and the clinical condition of the patient. An escalation procedure should be followed to minimize patient harm when difficulties arise (e.g. multiple passes, complications).

o A trainee who has completed the didactic and simulation training offered by UK may attempt and/or assist in Central Line placement as long as that individual is accompanied/supervised by an experienced individual.

o To qualify as “experienced”, an individual must complete the didactic & simulation training offered by UK and successfully demonstrate proficiency with the placement of a minimum of five site specific (IJ or SC) Central Lines under supervision with the final line placed under supervision of a faculty member to be approved for that site specific line placement procedure. An individual who has met the requirement for either the IJ or SC site insertion is also cleared to perform femoral site insertion. A proficient resident may supervise a trainee.

o Once an individual has successfully completed the requirements to be considered as experienced, he/she may perform Central Line placement unsupervised.

o With the creation of these updated guidelines, it is necessary to identify individuals who are already proficient.
  - A PGY 3 or higher who demonstrates proficiency in the simulation lab, completes the didactic online module, and can show that they have successfully placed the minimum requirements at the specific sites and are deemed proficient by a faculty member is allowed to place Central Lines unsupervised and also may supervise a trainee.

o Individuals from outside institutions pursuing training at UK (elective rotations, fellowship, etc.) that will involve Central Line placement must complete UK’s didactic & simulation training. They may qualify as “experienced” if they can provide approved documentation of at least five successful Central Line placements and additionally have a minimum of two supervised successful line placements at UK.

**Site Insertion Selection:**

o The “ideal” insertion site is dependent on many factors, a few of which include individual anatomy and body habitus, presence of coagulopathy, previous sites of insertion, etc. Ultimately, the “ideal” site is dependent on the particular clinical situation and is best determined by the clinicians caring for the patient taking into account the above factors as well as the clinicians’ experience with Central Line placement.

o At UK, the majority of lines are placed via the internal jugular vein approach utilizing ultrasound guidance or the subclavian site using clinical landmarks.
The femoral vein under ultrasound guidance is a secondary choice as determined clinically but should be avoided if possible because of increased infection risk. It is highly recommended that femoral lines be removed as soon as possible.

At times, extraordinary clinical circumstances may dictate that nonstandard approaches to Central Line placement be utilized, (i.e., venous cutdown, supraclavicular approach to subclavian vein). It is expected that this will be an unusual occurrence and nonstandard approaches should only be undertaken by individuals with expertise in these approaches under the direct supervision of a faculty member with similar expertise.

Technique

A time out will be performed prior to the procedure.

Full sterile precautions will be observed. The Wildcat bundle should contain all necessary gowns, drapes, etc.

Appropriate antisepsis will be applied:
- Hand washing prior to putting on gloves
- Cleaning skin area with chlorhexidine and allowing to dry a full two minutes prior to procedure
- Maintaining sterile technique throughout procedure.
- Cleaning insertion site following procedure with chlorhexidine, applying chlorhexidene sponge and a clear dressing to cover site.

If greater than three attempts are made by a trainee, then an experienced individual should take over the procedure (see Escalation procedure).

A Fabian test can be considered to confirm venous cannulation.

In the event of intraarterial insertion of a line greater than 7.5 Fr, Vascular Surgery should be consulted prior to removal.

Ultrasound guidance should be used when appropriate. There are situations where ultrasound may not be available or feasible. In this situation, a Central Line placed utilizing clinical anatomic landmarks may be necessary.

A post-insertion CXR is mandatory after all Internal Jugular or Subclavian insertions or attempts, except when fluoroscopic image guidance has been utilized.

During an elective line placement, a CXR should be obtained after an unsuccessful attempt at an IJ or SC line placement before proceeding to the other side.
All patients who are transferred from an outside facility with central venous access should have these lines removed within 24 hours unless the patient’s clinical situation dictates ongoing resuscitation. This also applies to an emergently placed dirty line. A PICC line initially placed at an outside facility should also be removed. A PICC line placed at UK for long-term therapy does not necessarily have to be removed within 24 hours unless the cause for admission is felt to be related to the PICC line itself.

There may be instances when a Central Line needs to be changed over a wire. The reason should be documented. A suspected infected line should be replaced by a new stick at a different site.

A procedure note should be placed in SCM or the chart immediately following insertion or attempt.

**Escalation procedure**

- A trainee who fails to cannulate a vein after three passes or causes an arterial or lung puncture should make no further attempts at cannulation at that site and seek assistance from a more experienced proceduralist before attempting another site.

- The number of passes by an experienced clinician should be governed by clinical judgment (taking into account the experience of the clinician). If insertion failure occurs despite multiple passes, the clinician should consider using an alternate site, the use of ultrasound or radiological guidance, or a change of proceduralist (including seeking insertion by a radiologist or surgeon).

- Other complications should be managed appropriately, documented, and reported.

**SECURING & DRESSING THE CENTRAL LINE**

- The Central Line should be secured at the site of skin insertion by suturing to prevent catheter migration and also at its anchor point (unless they are very close together). A PICC line may use an adhesive securing device.

- After insertion of a Central Line, the site should be re-cleaned using chlorhexidine.

- A chlorhexidene impregnanted sponge dressing should be placed at cannulation site (for patients who are >2 months old) and covered with a transparent dressing (e.g., Tegaderm® dressing).

- Adhesive tape alone should not be used to secure a Central Line.

- Secondary to the quality of the skin at the insertion site, exceptions for securing the line may exist with burn patients.
References:
