

LTHT Infection Control Guidelines

**Guideline for the Prevention of Infection Associated
with Central Venous Catheters (CVCs),**

Guideline No 5 (previously Policy No 19)

CVCs are widely used for pressure monitoring, drug and fluid administration, dialysis and parenteral feeding. Blood stream infections linked with CVCs are amongst the most dangerous complications in health care. For the purposes of these guidelines CVCs include single and multi-lumen central venous catheters and pulmonary artery catheters intended for short-term (<30 days) use. This guideline is based on the best available evidence.

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Scope

This policy applies to:

- All staff employed at LTHT who have responsibility for the insertion or management of patient's with CVCs. All recommendations are endorsed equally and none are considered optional.

Aim

- To minimise the risk of CVC related infections.

Key points

- Selection of an appropriate catheter for the individual patient can minimise the risk of infection. Use a single-lumen catheter unless multiple ports are essential for the management of the patient.
- Where total parenteral nutrition is being administered a dedicated CVC or single dedicated lumen must be used exclusively for that purpose (see section 4).
- Use a tunnelled catheter or an implantable vascular access device for patients in whom long term (>30 days) vascular access is anticipated. (The exception to this would be the insertion of a PICC which would be placed for medium to long term use).
- Selecting the best site for the patient/catheter can minimise the risk of infection.
- Aseptic technique must be used for CVC placement. A standardised pack should be used for every CVC insertion.
- Preparation of the insertion site with 2% Chlorhexidine in 70% isopropyl alcohol will reduce the risk of catheter related infection.
- Choosing the appropriate dressing (see page 4) for CVC sites will minimise the risk of infection.
- When and how CVCs are replaced and/or removed can influence the risk of infection.
- Change intravenous (IV) administration sets at the appropriate frequency (see page 5).

1. Catheter Insertion

- CVCs must be inserted by experienced clinicians with accepted expertise in this area. Clinicians who are not competent may insert CVCs if they do so under the direct supervision and control of a competent individual (See LTH Standards on the Insertion of Central Venous Catheters using the Landmark Technique).
- Insertion should preferably take place in an appropriate designated clinical area; e.g. operating theatre or treatment room. Where this is not possible the environment must be clean, free from extraneous items and be easy to clean in the event of a spillage. Ensure there is sufficient space for the operator and operator's assistant when considering the most appropriate clinical area for insertion.
- The clinician is responsible for selecting the most appropriate insertion site. The insertion site will be determined by clinical need, but for infection control purposes the subclavian site is preferable. Internal jugular vein CVC placement is not ideal for medium or long term placement due to difficulties with keeping the site clean, dressed and firmly secure. Femoral sites should not be used unless there is a good reason why subclavian or jugular sites are unsuitable (for example, access for haemodialysis, for emergency and short term use in Paediatric Intensive Care). Cut down procedures should not be performed routinely. A peripherally inserted central catheter may provide a suitable alternative site for insertion and should be considered.

- An ultrasound locating device should be used for central line insertion within clinical areas where a machine is available, (See NICE guidelines for further information). Doppler ultrasound guidance should not be used for CVC insertion
- Selecting the right catheter for the individual patient can minimise the risk of infection. A Single lumen catheter should be used unless multiple ports are essential for the management of the patient. A tunnelled catheter or an implantable vascular access device must be used for patients in whom long term (>30 days) vascular access is anticipated.
- Before CVC insertion, hands must be washed using either an antiseptic detergent or if physically clean disinfected using an alcohol hand product with a technique that covers all surfaces of the hands and forearms (See LTHT Hand Hygiene Policy).
- **"Maximal sterile barrier precautions"**, i.e. a **minimum** of long sleeved sterile gown, sterile gloves and a large sterile drape, **must be used wherever the insertion takes place**. The LTHT standard pack should be used for every CVC insertion. The large sterile drape should be laid out on a suitable large trolley, with the drape being larger than the trolley itself. The trolley needs to be cleaned prior to use with a disinfectant wipe. It is recognised in an emergency situation it may not be possible to adhere to all the Infection Control precautions. In such cases consideration should be given to removal of the CVC at an appropriate time. Face/eye protection is indicated as there is a risk of contamination from blood or body fluids.
- The patient's skin should be cleaned with soap and water if it is not visibly clean. The insertion site must be disinfected with 2% Chlorhexidine in 70% isopropyl alcohol solution. In patients with Chlorhexidine hypersensitivity use an alcoholic povidone iodine solution. The skin disinfectant should be applied with a single use applicator, sterile gauze/foam sponge(s) and **allowed to dry** before the catheter is inserted.
- These guidelines apply to all adults and children over the age of 1 year. No 2% Chlorhexidine solution has been licensed for the use on neonates under 2 months old, consequently this product must not be used in this age group.
- The skin should not be palpated after disinfecting unless asepsis is maintained.

Note: If a 2% Chlorhexidine solution in isopropyl alcohol is not available pharmacy can be contacted regarding a suitable alternative.

- If it is considered necessary to remove hair, clippers should be used. This should be done immediately prior to insertion because of the risk of causing small abrasions which may become heavily colonised with bacteria. Shaving should be avoided where possible.
- Once skin in appropriately disinfected cover area with sterile fenestrated drapes which are included in the LTHT CVC packs to ensure asepsis.
- Inject sterile local anaesthetic after preparing the skin and drapes are in position.
- Topical antibiotics (ointments/creams) are not recommended and should not be used.
- Systemic antimicrobials should not be used routinely for the prevention of catheter colonisation or bloodstream infection either before insertion or during the use of a central venous catheter.

- Full documentation of the insertion procedure must be recorded on the dedicated care plan or in the medical notes including date, time and place, identification and grade of the inserting clinician, any adverse events and the level of sterile precautions. The procedure and ongoing maintenance should be recorded in the nursing documents and monitored in a specific care plan.
- Antimicrobial coated/impregnated CVCs should be considered for patients who require short-term (1 to 3 weeks) central venous catheterisation or who are at a high risk for catheter-related bloodstream infections (CR-BSI) and when CR-BSI remain high following a comprehensive strategy to reduce infection rates. Such catheters are expensive and therefore should be discussed with infection control.
- As soon as the line is inserted and secured it should be covered with a transparent semi-permeable dedicated IV polyurethane film dressing or gauze and clean tape (discussed in maintenance section below).
- Following insertion any non-single use equipment should be cleaned as per LTHT policy.

2. Maintenance

- The insertion site must be dressed with a sterile, transparent semi-permeable dedicated IV polyurethane film dressing (i.e. a type with a high "moisture vapour permeability") or gauze and clean tape if patient is allergic to semi-permeable dressings or there is a large amount of bleeding e.g. post insertion. Transparent dressings are preferable as they allow clear visibility without having to disturb the site.
- Hands must be decontaminated with soap and water or alcohol gel before dressing changes, sterile gloves and apron should be worn, and an aseptic non-touch technique must be adopted.
- The dressing should be replaced when it becomes loose, soiled or when moisture collects at the site. Routine dressing changes are unnecessary; however specific manufacturer's advice should be followed. Some manufacturers recommend dressings remain in place for up to 7 days providing they remain intact. However, the insertion site should be reviewed daily.
- If a gauze and tape dressing is used it must be replaced when the dressing becomes loose, soiled, wet, when moisture collects at the site and daily following routine inspection of the insertion site .
- The insertion site must be assessed daily for signs of infection, i.e. tenderness, swelling or exudates and documented in the nursing/medical notes. Hands should be washed (Ref. LTHT Hand Hygiene Policy) and sterile gloves and apron worn prior to removing or disturbing the dressing for any reason. Any signs of infection must be reported to the medical staff and recorded in the nursing documents.
- Before accessing any part of the CVC system, hands must be decontaminated using an appropriate technique; alcohol hand rub may be used on physically clean hands.
- Before accessing any part of the CVC system, the external hubs and connections (outer surfaces) must be disinfected using a single use 2% chlorhexidine in 70% alcohol

solution/wipe which is allowed to dry before accessing the system. If this is contraindicated by the manufacturer's recommend an aqueous solution of chlorhexidine gluconate, povidone-iodine or recommended product should be used.

- An occlusive sterile cap/bung must be applied to all unused ports. Needle free devices can be used in order to protect the practitioner, access ports should be decontaminated before and after use with a single patient use 2% chlorhexide in 70% alcohol solution/wipes. Once removed, these must be discarded and replaced with a new, sterile bung/needle free device. Bungs are single use items.

N.B. Frequent manipulation of the hub connection port increases the risk of microbial contamination.

- Frequency of changing administration sets and fluid hang times:
 - For non-lipid, non-blood/blood products 72 hours;
 - For blood or blood products the maximum hang time is 12 hours recommended administration two units of blood per giving set.
 - For lipid containing solutions 24 hours;
 - For intermittent infusions 72 hours providing the system is not disconnected and unless pharmacological reasons indicate more frequent changes.
 - Whenever the administration set is disconnected from the patient it must be discarded and replaced with a new one.

In certain circumstances there may be variations which should be agreed with the Infection Control Team.

- All lines should be labelled with the date and time when changed.
- Note: The administration set includes area from the spike entering the fluid to the CVC hub; however, a small extension tube may be considered as part of the CVC to facilitate maintaining an aseptic technique when changing administration sets.
- Flushing: Sodium Chloride 0.9% is recommended for routine catheter flushing. Flushing CVCs with a heparinised solution for preventing blood stream infections remains controversial and should be reserved for specific implanted ports or open-ended catheter lumens or for those catheters that are infrequently accessed. Some areas may use heparin flush and have there own specific guidelines. All flush solutions must be prescribed. Where a heparin flush is required, the concentration, volume and frequency of these are variable and need to be prescribed and defined locally.
- IV filters are not recommended for infection control purposes.

3. Changing or Removal of CVCs

- CVCs must be removed as soon as they are no longer required. The continual need for a CVC should be assessed on a daily basis.
- CVCs should not be routinely changed for infection control purposes unless indicated by the manufacturer or clinical area.
- CVCs should not be changed over a guide wire if there is clinical suspicion of infection. If a new catheter is required this should be inserted at a different insertion site.
- CVCs should not be routinely changed for infection control purposes unless indicated by clinical area/line manufacturer.
- CVCs should not be removed on clinical suspicion of infection alone, unless there is strong evidence to support this. If CVC associated infection is suspected. Microbiology may be contacted for advice, if required, regarding the need for catheter removal. Following removal of the CVC consideration should be given to delaying the placement of a new catheter where possible.
- Catheter tips should not be sent for culture routinely, only if CVC associated infection is suspected or after consultation with microbiology.
- When infection is suspected both central (i.e. through CVC) and peripheral blood cultures should be collected, plus the CVC tip (when it is clinically indicated to remove the CVC). Consideration should be given to delaying the placement of a new line where possible (LHTH guidance for blood culture sampling in adults Guideline No.4)

4. Parenteral nutrition

- Dedicated parenteral nutrition (TPN) catheters should not be used/accessed for any other purpose than the administration of TPN.
- If multi-lumen catheters are used for TPN administration a single lumen must be dedicated for TPN only. This should be labelled (including date and time) and must not be used for other purposes except in emergency situations.
- The administration set must be changed every 24 hours or at the end of the infusion, whichever is sooner.
- The TPN system must not be accessed/broken unnecessarily (i.e. except to change administration sets/fluid). In practice this means no more frequently than every 24 hours.

References and Further Reading

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2. National Institute for Clinical Excellence, 2002, Guidance on the use of ultrasound locating devices for placing central venous catheters. NICE Technology Appraisal Guidance, **49**.
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Consultation Group

Emer McAteer, Balbir Bhambra, Paul Murphy, Andy Bodenham, Annette Stakes, Stuart Murdoch, Hamish Mclure, Karen Ledgard, Daren Dewhurst, David Jayne, Gillian Hodgson, Hugh McGann, Jane Minton, Mark Wright, Krystina Kozłowska, Kirsten Midgley.

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Lead Director	Director of Infection and Prevention Control
Previous Author(s)	Gillian Hodgson, Nurse Consultant Infection Control, Judy Hall and Sue Whiteley Senior Nurses Infection Control
Current Author	Sue Whiteley, Sian Owens IV Devices Nurse
Contact for further details	Sue Whiteley, Sian Owens
Distribution	Matrons, Chief Nurses Team, Consultants, Clinical Centre Directors, Clinical Directors, Medical Directors and emailed trust wide.

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