

MANAGEMENT OF PERCUTANEOUS DEVICES (EG PERIPHERAL CANNULAE, CENTRAL VENOUS CATHETERS, ARTERIAL AND INTRATHECAL DEVICES, ETC)

KEY POINTS

Only trained staff can put in lines and maintain them
Catheters must be adequately fixed to prevent movement at the insertion site
Assessment for line site inflammation must be made every shift and
documented
Infection of a line commands that it must be removed as soon as possible

**Note: This guidance is to be read in conjunction with local detailed policies and training manuals.

INTRODUCTION

Any catheter or device which penetrates the skin allows the opportunity for invasion by saprophytic and pathogenic bacteria and fungi. The longer a device is *in situ*, and the more lumens and stopcocks involved, the graver this risk. Tunnelled long intravenous lines (eg Hickman, Broviac), large bore lines for renal dialysis (eg Permacath) are often a patient's "life-line" and need to be kept free of infection as far as possible. Skin commensals such as *Staphylococcus epidermidis* have a tendency to stick to prosthetic material and are then very difficult to remove. Invasion by virulent strains of *Staphylococcus aureus* may cause septicaemia. Colonisation of any device may lead to chronic blood stream spread which may predispose to endocarditis and endo-luminal arterial colonisation. Invasive organisms may be delivered in infusion fluids and via breaks in the system, such as three-way taps. Therefore strategies for reducing risks to patients and managing infections must be adopted.

AIMS

- Not to contaminate the device on insertion with patient's or staff members bacterial flora.
- To keep infection of percutaneous lines and devices to a minimum

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RESPONSIBILITIES

Those inserting and managing percutaneous devices are accountable for their practice and are responsible for updating their knowledge and maintaining the highest standards of practice. Inserters must not take on this role unless they have been appropriately trained to do so.

No member of staff should handle any percutaneous device (ie flushing, dressing, administering drugs etc) without having been properly trained to do so

The named nurse for a patient with an existing percutaneous device is responsible for:

- Educating the patient as to optimal care of his/her device
- Assessing the patient for any signs of infection on each shift. This may or may not include visualisation of the exit site, depending on the device used. Inflammation is characterised by:
 - Pain/discomfort (initially on movement, or when drip used and then at rest)
 - Local swelling and redness
 - Pus from around the insertion site
 - Phlebitis proximal to the device
 - Distal purpurae or vasculitis
 - Signs of general infection (eg fever, neutrophil leucocytosis, raised CRP and positive blood cultures)

Inflammation of a line site demands removal unless the risks of changing a line (eg in the case of a Permacath or Broviac line) are greater than treating expectantly with antibiotics.

Inflammation at a line site or evidence of line-associated sepsis must be reported immediately to a member of the medical team. A senior qualified nurse may take the responsibility of removing a line **if there is clear inflammation, the patient is in pain and a doctor is not available**. Bacteriological cultures of line sites, line tips and blood cultures should be done when line infection is suspected.

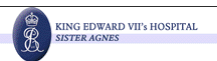


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GENERAL GUIDELINES FOR ALL PERCUTANEOUS LINES INSERTION

- A percutaneous device should only be used if absolutely necessary.
- The lumen diameter, the number of lumens and stopcocks should be kept to the minimum consistent with clinical need.
- Use a Teflon or polyurethane catheter where possible.
- Equipment must be kept in a clean storage area.
- Staff inserting percutaneous devices must be appropriately trained.
- It is good practice to use a properly cleaned and fitted trolley with a Sharps Bin at the bedside rather than carrying individual items and placing them on the patient's bed.
- Effective handwashing and a meticulous **no-touch** aseptic technique is vital when inserting percutaneous devices
- Insertion of a line must be recorded in the patient's and/or nursing notes.
- Lines must be dated.

MANAGEMENT OF ESTABLISHED LINES

- Staff managing percutaneous devices must be appropriately trained.
- Effective handwashing and a meticulous **no-touch** aseptic technique is vital when handling percutaneous devices. Gloves should be worn but these need not be sterile **except where intra-arterial or intra-theal devices are concerned**. Non-sterile gloves can be decontaminated by alcohol gel before touching a site.
- Interruptions to the closed system should be kept to a minimum.
- Use membranes to deliver injections if possible rather than stopcocks.
- Clean membranes, stopcocks and taps with alcohol (eg Sterets) before breaking a connection. (Aqueous or alcoholic chlorhexidine or alcoholic betadine may also be used.)
- Change administration sets as follows:
 - **Blood products:** immediately on completion of each transfusion or every 24 hours, whichever is the sooner.
 - **TPN:** immediately on completion of each bag of infusion or every 24 hours,

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whichever is the sooner.

- **Clear IV fluids/drugs:** no more frequently than every 72 hours unless clinically indicated.
- Consider the use of filters in regularly accessed lines.
- If an administration set is disconnected it must always be replaced with a new line and never re-connected.
- Percutaneous sites must be inspected regularly – see below for frequency.
- Signs of local infection at exit sites as well as systemic infection must be taken seriously and referred to medical staff. Management depends on the device used: see below.

BLOOD PRODUCTS

- Use a separate, dedicated administration set and do not use this for anything other than the blood product in question.
- Change administration set on completion of each transfusion or every 24 hours, whichever is the sooner.

TOTAL PARENTERAL NUTRITION (TPN)

- Use a dedicated lumen and do not use this lumen to give anything other than TPN.
- Do not attach three-way taps.
- Change administration set immediately on completion of each bag of infusion or every 24 hours, whichever is the sooner.
- Type of device depends on the duration of therapy and the concentration of TPN given. Peripheral cannulas may be used for short term nutritional support but the cannula must be changed every 24 hours. A midline catheter may be used for up to 4 weeks. Longer periods of nutritional support require a central venous catheter.

PERIPHERA INTRAVENOUS CANNULAE

Insertion

- Choose a site where patient’s movement will not cause movement of device at the entry site. The forearm provides an ideal site where veins tend to be straight and where the arm provides a natural splint. Avoid the antecubital fossa and the hand unless there are no other options.
- Do not shave the site.
- Clean the skin with alcoholic chlorhexidine or alcoholic povidone iodine

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(check patient is not allergic to iodine), twice, allowing the solution to evaporate to dryness on each occasion.

- Clean hands or put on sterile gloves after preparation of the materials and the skin before inserting the device. Only repalpate the vein if wearing uncontaminated sterile gloves.

Fixing and Dressings

- The catheter must be secured properly to ensure minimal movement of the cannula.
- Always anchor the flexible end of any administration set to the skin so that tension and movement is not applied to the entry site.

Suggestions for dressings for peripheral lines

Suitable for	Anchor/Dressing
Peripheral IV cannulae remaining in place for a few hours only. Where the patient is able to keep their arm still. Continuous inspection required.	Non-sterile tape* only to anchor the cannula.
Peripheral IV cannulae remaining in place for days where patient needs to carry on with other activities.	PREFERRED IV-dedicated transparent occlusive dressing, Or
	Non-sterile tape* to anchor cannula plus IV-dedicated transparent occlusive dressing to cover exit site (plus bandage and splint if desired), Or

Notes: *Non-sterile tape must **not** come into contact with exit site. Bandages must be applied so as to allow inspection of site. Sterile gauze should be replaced at each inspection of the insertion site. Insertion site should be reviewed for symptoms of inflammation and inspected:

- at least every shift
- every time iv infusion is commenced or iv drugs are given
- if there is any discomfort
- if established infusion ceases to function fully
- if the dressing comes adrift

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Ongoing Management

- Lines should be assessed for signs of inflammation each nursing shift. A line dressing may be left if the patient has no discomfort and the drip is flowing freely. If there are any problems, the insertion site **must be** inspected.
- A peripheral iv cannula used for TPN must be changed every 24 hours.
- A peripheral iv cannula used for other drugs and infusions should normally be changed routinely every 72 hours or **immediately** if any of the following occur:
 - Pain on administration of fluids
 - Inflammation at insertion site
 - Phlebitis
 - Leakage of infusion fluids / drugs from exit site
 - Extravasation of fluids / drugs into tissues






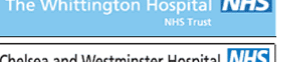
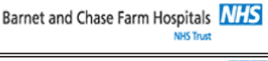
CENTRAL VENOUS CATHETERS

Insertion

- Must be carried out using strict aseptic technique. Operator must use sterile gown, drapes and gloves.
- Do not shave the site.
- Clean the skin with alcoholic chlorhexidine [or alcoholic povidone iodine (check patient is not allergic to iodine)] twice, allowing the solution to evaporate to dryness on each occasion.
- Unless medically contra-indicated choose the subclavian vein in preference to the jugular or femoral veins for non-tunnelled catheters as there is less risk of infection.

Fixing and Dressings

- Central venous catheters must be anchored so as to prevent “to and fro” motion which increases the risk of infection. Different types of central venous catheters are fixed in different ways but, as a general rule, any “dangling” lines must be anchored so that tension and movement is not applied to the line at the entry site. The type of dressing depends on the device used.

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Suggestions for dressings for central lines

Suitable for	Type of dressing	Comments
Any central venous catheter	IV-dedicated occlusive transparent dressing	Allows continuous inspection of the exit site. Change at 7 days or earlier if fluid collects below the dressing or it comes off.
Tunnelled central venous catheters	Sterile gauze-type dressing taped in situ	Should be changed daily (in order that the site may be observed), or earlier if the dressing becomes soiled, wet or detached.
Any central venous catheter but only immediately following insertion and for 3 to 4 days afterwards.	Sterile gauze covered with occlusive transparent dressing	In most cases this will absorb the slight bleeding that follows many central venous catheter insertions but will avoid the need to change the dressing in the 3-4 days following insertion, thus reducing the infection risk. Unless leakage occurs, this dressing should remain in place for 2 – 4 days and then an ongoing dressing regime should be selected from the other options on this table.
Tunnelled central venous catheters but only after 21 days post insertion, once the tissues have fibrosed around the cuff and in the absence of exudate or signs of infection.	No dressing*	“No dressing” performed just as well as 3 types of dressing in one study comparing infection rates in patients with tunnelled central venous catheters. (Haller and Rush 1992).

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Cleaning of exit sites at dressing change

- Routine cleaning of the exit site and surrounding skin at dressing changes may be justified as part of the general hygiene of the patient to avoid odours and discomfort, and to aid dressing adherence.
- Cleaning, when it occurs, should be carried out using sterile gauze and sterile 0.9% saline using an outward "single-swipe" motion to avoid transferring bacteria to the exit site.
- The exit site should be allowed to air dry or may be dried gently using sterile gauze before applying a fresh dressing.

Other ongoing management

Do **not** routinely replace **centrally-inserted** central venous catheters over a guidewire as an infection control precaution (Pratt et al 2001)

INTRA-ARTERIAL LINES

- Proper aseptic precautions should be used as for insertion of central intravenous lines. The notes above on care apply but transparent film dressings should **not** be used on arterial line sites.


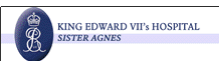



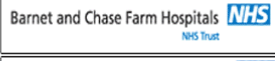




TUNELLED INTRAVENOUS LINES AND INTRATHECAL CANNULAE (EG EPIDURAL LINES/NEUROLOGICAL SHUNTS)

The risk of infection with these devices is so high and the consequences so grave that aseptic insertion and handling are essential. Insertion will normally be done in the operating theatre.

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ROUTINE CHANGE OF EQUIPMENT FOR INTRAVASCULAR LINES

Equipment used in clinical practice	Rationale	Routine interval	Ref.
Dry gauze and adhesive tape	Place on insertion site to absorb exudate and blood	24h	1
Transparent semi-permeable polyurethane dressing, eg: -Opsite iv 3000 -Tegaderm	Inspect without disturbing dressing. An effective barrier to micro-organisms. Permeable to water vapour, prevents build up of condensation. Self adhesive nature of dressing	Leave undisturbed for 5-7 days, unless soiled with blood or exudate, or becomes loose. Redress soiled and wet dressing immediately	1,2 3
3-way taps and connectors	Delivery port used for iv injections.	Change every 3-4 days	4,5
Luer-lock connectors	Reduce accidental disconnection, subsequent contamination or air embolism	Change every 3-4 days	4,5
Administration set for			
Clear fluids	Reduce colonisation	72 hours	6
TPN	Dedicated line	24 hours	7
Blood products	Separate line	After completing transfusion	7
Arterial pressure transducers	Reduce risk of bacterial contamination. Use aseptic technique when handling item	2-5 days	8

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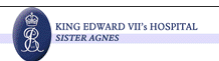





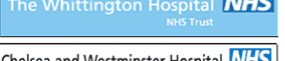

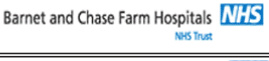
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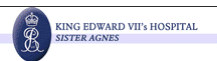





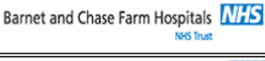


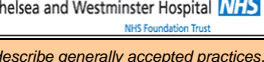
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Equipment


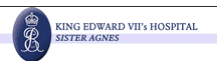



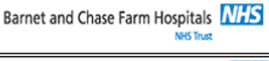




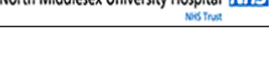
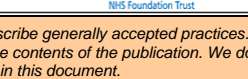
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