Kent and Medway Cancer Network

Network Guidance Document

Vascular Access Guidelines

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Contents

Acknowledgements

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Approved by the East Kent Hospitals NHS Trust Clinical Governance Steering Group

Approved by the East Kent Hospitals NHS Trust Clinical Practice Group

Adapted with the kind permission of Dr A. Beaumont for use across the Kent and Medway Cancer Network by the Kent and Medway cancer Network nursing working sub group / Network Chemotherapy group.

Infection Control

When using this document reference should be made to:

Saving Lives: reducing infection, delivering clean and safe care which includes a revised assessment and action planning tool based on the Duties contained within the Code of Practice for Prevention and Control of Healthcare Associated Infections (Health Act 2006). The High Impact Interventions (HIIs) based on a "care bundle" concept, integrate the latest evidence-based guidelines and provide a means for staff to measure compliance to key clinical procedures.
These tools set the framework for organisation-wide improvement on infection rates. They are designed to help Trusts ensure that every patient receives the right care, every time.

Updated June 2007

http://www.dh.gov.uk/en/Publichealth/Healthprotection/Healthcareacquiredinfection/Healthcareacquiredgeneralinformation/ThedeliveryprogrammetoreducehealthcareassociatedinfectionsHCAIincludingMRSA/index.htm

The High Impact Interventions (HII) are simple evidence based tools which are at the heart of this programme. They reinforce the practical actions that clinical staff need to undertake every time to significantly reduce HCAI.

Many guidelines and papers are available in the National Resource for Infection Control at www.nric.org.uk

The NHS infection control e-learning package available from www.infectioncontrol.nhs.uk

Introduction to Vascular Access Devices

Vascular access devices are required by many patients across the Network for a variety of reasons. It is important for the patient that:

- The right device is placed.
- The device is placed in the right environment.
- Staff are correctly trained in placement and ongoing maintenance and eventual removal of the device.

The purpose of these guidelines is to provide the basis for evidence based practice in all the areas listed above.

The guidelines currently cover the choice of vascular access devices that are available for adults across the Network. A flow chart is included which will assist in ensuring that the best available device is placed into patients.

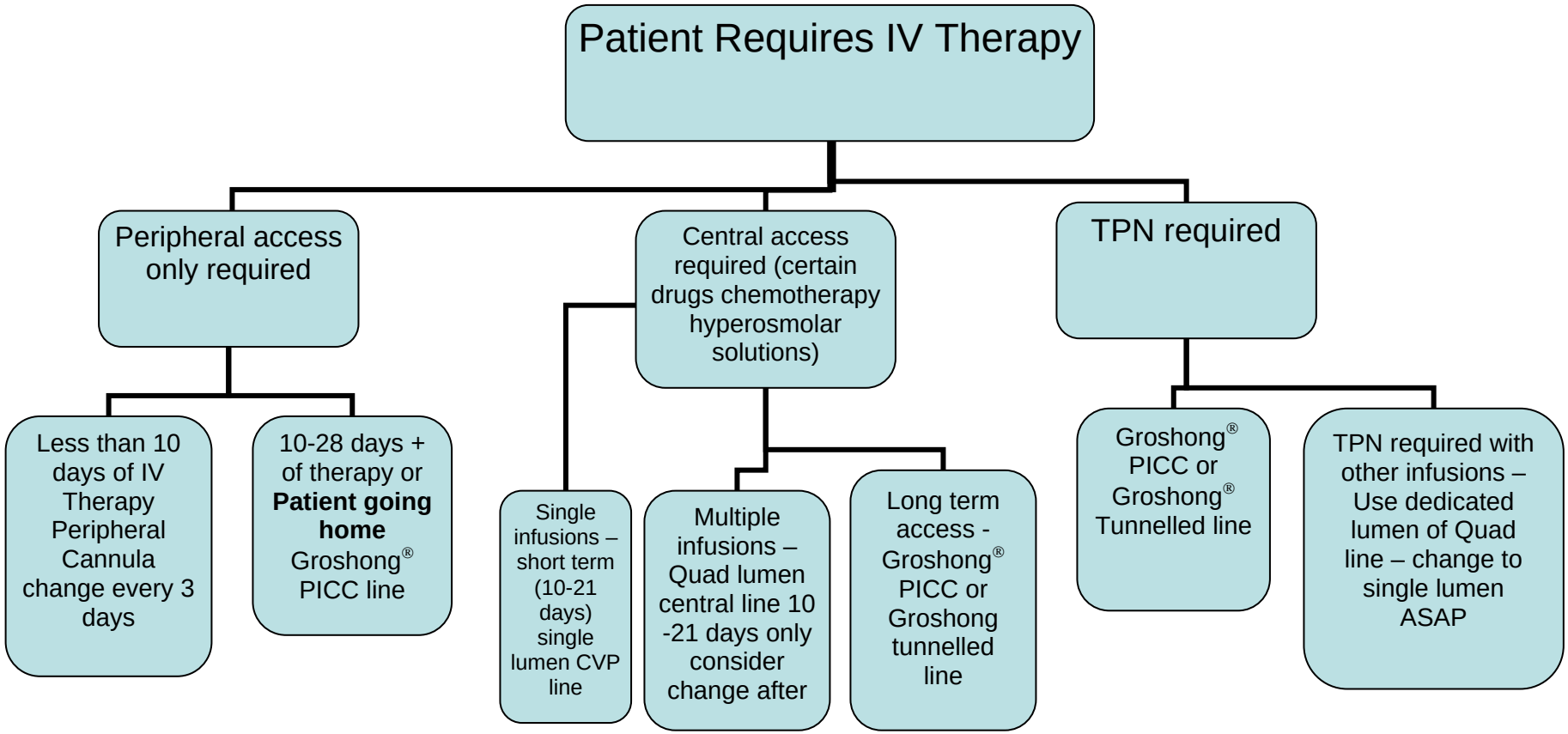
The list of devices that are covered by these guidelines include:

• Peripheral venous cannulas	IV lines.
• Peripherally Inserted Central Catheters	PICC lines.
• Skin tunnelled valved central catheters	Groshong® lines.
• Skin tunnelled non-valved central catheters	Hickman®.
• Acute central venous catheters	CVC lines.
• Implanted ports	Ports.
• Arterial lines (limited to critical care units only)	Arterial lines.

Each device has a section within this document that will give the guidelines of the management of the device, the placement, competency assessments, and a trouble shooting guide.

All staff who are placing or managing patients with vascular access devices should be familiar with these guidelines and the competency assessments are aimed at all staff, medical and nursing.

Within the Network there are a variety of ported and non-ported peripheral lines. There are single and quad lumen central lines. There are valved PICC lines and valved tunnelled central lines made by Bard called Groshong® lines. These are available for use across the Network by any suitably trained staff.
An important change to the management of all vascular devices is the universal use of 2% chlorhexidine in 70% alcohol across theNetwork.



Groshong® Tunnelled catheter – "Hickman" type. Single lumen only – Central access
Groshong® PICC – Peripherally Inserted Central Catheter – single lumen only – Central acces

CLINICAL GUIDELINE

Venous cannulation, management and removal (Adults)

INTRODUCTION:

The purpose of the practice guideline is to ensure that healthcare professionals follow the procedure and principles of care.

DEFINITION AND BACKGROUND EVIDENCE

A venous cannula is a flexible hollow tube containing a needle that is placed in a venous blood vessel (Mallett and Dougherty, 2005). Peripheral insertion is usually in the arm for short-term therapy. They are relatively easy to insert and allow a more comfortable form of therapy for the patient. However, cannulae present a high risk for hospital-acquired infection. Almost two-thirds of bacteraemias of known source are associated with an intravascular device or with device-related infections, such as a catheter-associated urinary tract or ventilator-associated respiratory tract infection. The choice of vein needs to be appropriate for the proposed use of the cannula necessitating knowledge of anatomy and physiology; the smallest gauge cannula that will adequately deliver the desired therapy should be selected (Burke, 2000). All healthcare professionals need to have a working knowledge of the law and how it relates to their actions (Lavery, 2003). Certain conditions such as arterial venous fistulas in renal patients and those with bleeding or haematological disorders may restrict the practice of peripheral venous cannulation by non medically qualified staff (Davies 1998).

Competent practice of this skill requires appropriate training and education followed by opportunity to undertake the skill under supervision, and successful demonstration of competency to ensure safe working practice.

RECOMMENDATIONS FOR PRACTICE

Healthcare professionals identified by their clinical managers as working in an environment where there is a clinical need for them to perform venous cannulation may do so providing they fulfil the following requirements:
Practitioners are required to attend a formal training session e.g. Trust venous cannulation course and carry out a minimum of six successful supervised practices in the work place. Staff who join the Trust need to provide evidence of previous training content and demonstrate competence against the criteria within this guideline for safe insertion procedure.
Supervisors are currently competent practitioners who may be a nurse/midwife/AHP/SHO or more senior doctor. The Intravenous Cannulation competency should be used, with the practitioner taking responsibility for their own competency. Maintenance of competence also remains the responsibility of the practitioner as they are accountable for their actions (NMC 2004, HPC 2003, GMC 2006).

Practitioners may decline to undertake this procedure if the patient refuses consent in non-emergency situations. Practitioners must acknowledge their limitations and should seek appropriate assistance if they deem the patient to be too difficult or inappropriate to cannulate, based on initial observation/assessment, or have made two unsuccessful attempts to cannulate.

CLASSIFICATION OF RECOMMENDATIONS:

Indications for cannulation

Short term administration of intravenous drugs (3-10 days)
Emergency access
Administration of blood
Re-hydration
Nutrition – after discussion with pharmacy and the nutrition team

Unnecessary cannulation should be avoided as peripheral cannulation is associated with an increased risk of bacteraemia and associated complications.

Vein selection

Use veins that feel soft and resilient
Use large veins where possible
Use straight vein suited to cannula length
NB: - For patients receiving chemotherapy please refer to guidelines for the administration of cytotoxics

Equipment for insertion

Always use an aseptic, non-touch technique

Spare cannula of the correct size
Clean examination gloves
Vygon Biovalve Cannulation Pack
Sharps bin
Sterile sodium chloride 0.9% for injection and 10 ml syringe for flushing
Clean tourniquet
Use of 2% Chlorhexidine in 70% alcohol is recommended

CANNULA SELECTION

Gauge (G)	Flow rate (ml/min)	Colour	General uses
14	265	Brown	Used in theatres or emergency for rapid transfusion of blood or viscous fluids
16	170	Grey	As 14 G
18	90	Green	Blood transfusions, stem cell harvesting and cell separation, large volumes of fluids, nutrition
20	55	Pink	Blood transfusions, large volumes of fluids
22	25	Blue	Blood transfusions, most medications and fluids
24	24	Yellow	Medications, short-term infusions, fragile veins, children

INSERTION PROCEDURE	RATIONALE
Identify the patient as per Trust identification policy	To ensure correct patient
Explain the procedure to the patient; ask for preference regarding site and obtain verbal consent and co-operation	To ensure patient understanding
Discuss previous experiences and check for need of local anaesthetic	To establish venous history
Select the correct cannula size (visible through the pack) for patient/infusion needs	To reduce unnecessary trauma to the vein
Decontaminate hands using alcohol hand rub or by hand washing with liquid soap	To minimise risk of cross infection
Check integrity of packaging and expiry date. Open the pack onto clean trolley/surface	To maintain asepsis
Wash and dry patients arm if visibly dirty	To adequately clean skin
Position the patient with arm supported with pillow or if required ensure assistance from a colleague. Place the drape under the patients arm	To ensure patient comfort and safety
Choose site according to patient condition and apply tourniquet at least 10cms above the selected insertion site	To dilate veins by obstructing venous return
Find a suitable PALPABLE vein. Clip hairs using surgical clippers incorporating a single-use disposable head, if necessary	To reduce trauma to the vein
Decontaminate hands using alcohol hand rub and then apply examination gloves	
Disinfect site with chlorhexidine in 70% alcohol for 30-60 seconds (included in the pack). Use an alcoholic povidone-iodine solution for patients with a history of chlorhexidine sensitivity. Allow the antiseptic to dry before inserting the catheter. Allow to air dry. Do not re-palpate the vein or touch the skin	To minimise risk of infection
Fold down wings of cannula and inspect for faults. **DO NOT WITHDRAW THE NEEDLE**	To detect faulty equipment
Anchor the vein by applying tension to skin below site and insert the needle/cannula bevel up at an angle of 10-45 degrees depending on device	To immobilise the vein and ensure a successful cannulation
Level the device and advance the cannula a few mm's into the vein and withdraw needle slightly, observing flashback of blood in shaft. Maintaining anchor tension with one hand and holding the flashback chamber or thumb plate with the other, advance the cannula forward over the needle	To avoid the vein wall and to ensure cannula is in a patent vein To ensure the vein remains immobilised thereby reducing risk of through puncture
Only one vascular access device should be used for each cannulation attempt	To maintain asepsis
Release tourniquet	To decrease pressure in the vein
Apply digital pressure above tip of cannula and remove needle. Discard directly into sharps bin. **NEVER REINSERT THE NEEDLE**	To reduce risk of needlestick injury

Attach an injection cap, needle-less connector or pre-primed solution set	To prevent air entry/protect against contamination
Apply dedicated sterile, vapour permeable, IV cannula dressing.	To minimise risk of infection and to secure the cannula
Flush the cannula with 5-10mls of sterile sodium chloride 0.9% for injection then commence IV fluids if appropriate *** The normal saline (0.9%) should be prescribed on the drug chart. Alternatively a Patient Group Direction (PGD) can be used by a trained and competent PGD user**	To prevent occlusion
Discard gloves and decontaminate hands	
Remove waste into appropriate container	To ensure safe disposal
Document insertion time, date, site, size of cannula, batch number, and name of person inserting the device. Record the review/removal date (Max 72 hours) (use sticky labels supplied in the pack)	To meet legal and patient care requirements

NB: A peripheral cannula inserted in an emergency situation where aseptic technique has been compromised should be replaced within 24 hours.

MANAGEMENT OF THE PERIPHERAL CANNULA WHILST IN SITU

MANAGEMENT OF THE CANNULA	RATIONALE
The number of lines and ports will be kept to an absolute minimum consistent with clinical need	To reduce the risk of cross infection (DH recommendations 2004)
A needle free system should be used for accessing an injection access site	RCN recommendation (2005)
IV administration sets should be changed: – When the vascular device is replaced – At Max 72 hour intervals – At the end of the infusion or within 24 hours of initiating the infusion when administering lipid emulsions Blood transfusion administration sets should be changed: – On completion of transfusion or after two units when multiple units of blood are administered	DH recommendation (2004)
Intermittent administration sets should be changed every 24 hours if remaining connected to the device. Discard after each use if disconnected eg metronidazole infusion bags	To reduce the risk of infection
The maximum expiry date for any infusion prepared in a clinical area is 24 hours or less in accordance with the manufacturer's specification of product characteristics	DH recommendation (2004) – to help avoid the risk of infection
Bandages should be avoided wherever possible. However, if a bandage is used it should be removed at least daily in order to inspect the insertion site	

Devices designed for splinting should be used to facilitate infusion delivery only when the device is placed in or around an area of flexion or it is at risk of dislodgement eg being used in a child – Splints should be removed and the circulatory status of the patients' extremity should be assessed at regular intervals	RCN recommendation (2005)
When manipulating the line/cannula a non-touch technique should be applied. Ensure equipment in contact with the circuit is sterile eg syringes	To prevent cross infection (RCN recommendation 2005)
Prior to accessing the system, disinfect access ports using chlorhexidine in 70% alcohol (single use wipe) unless contraindicated by manufacturer's recommendations in which case use 70% alcohol (steret)	Essential to prevent entry of microorganisms into the system via the portal
The cannula should be flushed at least once daily and pre and post drug administration with 5-10mls normal saline (0.9%) in a 10ml syringe *** The normal saline (0.9%) should be prescribed on the drug chart. Alternatively a Patient Group Direction (PGD) can be used by a trained and competent PGD user**	To maintain patency
The dressing should be changed when it becomes loose, damp or soiled	To reduce the risk of cross infection
An aseptic non-touch technique should be used when changing the dressing. The area should be cleaned with alcohol/chlorhexidine moving from the catheter site outwards, providing it is compatible with the device. The area should be allowed to **dry** and a sterile peripheral dressing applied (use an alcoholic povidone iodine for patients with a history of chlorhexidine sensitivity)	Skin cleansing/antisepsis of the insertion site is one of the most important measures for preventing catheter related infection
A cannula that has migrated externally should not be readvanced prior to restablisation	
The site should be examined to ensure the device has not become dislodged, for signs of infection and extravasation. The Visual Infusion Phlebitis (VIP) score should be recorded three times daily using the Vygon pack VIP scoring tool (sticky label). (See Appendix 1 for the VIP scoring tool) **If the VIP is greater or equal to 2 the cannula should be removed**	To identify mechanical complications and signs of infection
If the site appears infected (VIP score of 2 or greater), a swab should be taken and sent with the tip of the cannula to Microbiology for culture and sensitivity. An example of the form should be completed (Appendix 2) (available from Infection Control)	The microbiology results may indicate which antibiotic is required should the patient develop signs of septicaemia
Any incidence of phlebitis, along with intervention, treatment, and corrective action, should be documented in the patients' nursing notes	To provide evidence of any actions taken and aid communication

Peripheral cannulae should not be used for routine blood sampling. However, if necessary, the cannula can be used to draw blood using a large syringe (larger than 10mls) ONLY ONCE immediately following insertion. Reapply the tourniquet above the cannula, wait for vein engorgement and draw blood SLOWLY using minimal force. Excess force will both haemolyse the sample and cause thrombophlebitis of the vein	RCN recommendation (2005)
If a peripheral venous cannula is not being used/required for access, it should be removed	The longer a peripheral venous cannula remains in situ, the greater the risk of infection

Removal of Peripheral cannula

Equipment

Clean gloves
Sterile gauze and tape
Sharps bins

REMOVAL PROCEDURE	RATIONALE
Peripheral cannula should be re-sited every 72 hours wherever clinically possible	DH recommendation (2004)
Removal of the intravenous cannula should be an aseptic procedure	To prevent cross infection as well as contamination of the catheter tip
Explain procedure to the patient and gain consent	To ensure patient understanding
Decontaminate hands using alcohol hand rub or handwashing with liquid soap	To reduce cross infection
Apply clean examination gloves	To maintain universal precautions
Remove dressing	To expose cannula site
Gently withdraw cannula using a slow, steady movement and keeping hub parallel with skin.	To ease withdrawal and prevent damage to the vein
Check integrity of cannula before disposing into sharps bin	To ensure all removed
Apply pressure for 2-3 minutes with gauze	To prevent haematoma
When bleeding has stopped apply gauze dressing	To aid healing
Document the date and time of removal in the patients notes including the name of the person removing the device	To meet legal requirement
If the site appears infected (VIP score of 2 or more) a swab should be taken and sent with the tip of the cannula to microbiology for culture and sensitivity. The infection control incident form should be completed (appendix 2)	The microbiology result may indicate which antibiotic is required should the patient develop signs of septicaemia.

10 IMPORTANT POINTS FOR THE CARE OF PERIPHERAL IV CANNULAE

1. **Intravenous cannulae present a high risk for hospital acquired infection; the need for an intravenous cannula requires adequate justification**

2. **The insertion procedure should be carried out using an aseptic technique using the Vygon Biovalve Cannulation Pack. Hand decontamination is essential, using alcohol hand rub/ liquid soap and water**

3. **Skin should be disinfected using 2%chlorhexidine in 70% alcohol. Gently rub over the skin for 5 seconds and allow to dry prior to the procedure**

4. **Sterile dedicated IV cannula dressings must be used on all permanent IV cannula sites. Bandages should be avoided where possible**

5. **The date of insertion and site should be recorded in the nursing notes with a review/removal date (72hrs)**

6. **Administration sets should be changed:**
   - **When the vascular device is replaced**
   - **At 72 hour intervals**
   - **At the end of the infusion or within 24 hours of initiating the infusion when administering lipid emulsions**

   Blood transfusion administration sets should be changed:
   - **On completion of transfusion or after two units when multiple units of blood are administered**

7. **The cannulae should be flushed at least daily with a normal saline solution or removed if no longer required**

8. **The site must be observed, at least twice daily and managed according to the VIP score recommendations**

9. **Peripheral cannulae should be re-sited or removed after 72 hours whenever clinically possible**

10. **The injection port should be decontaminated using Chlorhexidine 2% in 70% alcohol before and after access**

PROFESSIONAL, TRUST AND LEGAL REQUIREMENTS

Nurses, Midwives and Allied Health Professionals:

The professional position is that the NMC Code of Professional Conduct (2008) places specific responsibility on registered nurse/midwife practitioners. The registered nurse/midwife is personally accountable for their practice and, in the exercise of professional accountability, must acknowledge any limitations in their knowledge and competence and decline any duties or responsibilities unless able to perform them in a safe and skilled manner.

All AHP's are State Registered with the Health Professions Council and 'will keep their knowledge and skills up to date and act within the limits of their knowledge and experience' (HPC Standards 2003).

Medically Qualified Personnel:

The General Medical Council (GMC) "Good Medical Practice 2006" states that:

In providing care you must recognise and work within the limits of your competence. You must keep your knowledge and skills up to date throughout your working life. You should be familiar with relevant guidelines and developments that affect your work. You should regularly take part in educational activities that maintain and further develop your competence and performance. Note must be made of these points when performing clinical skills.

The Trusts position is that it accepts liability for the action of those practitioners who have completed the identified training for this skill and are able to provide evidence of their competency. This information should be recorded on the competency signatory sheet and sent to the line manager.

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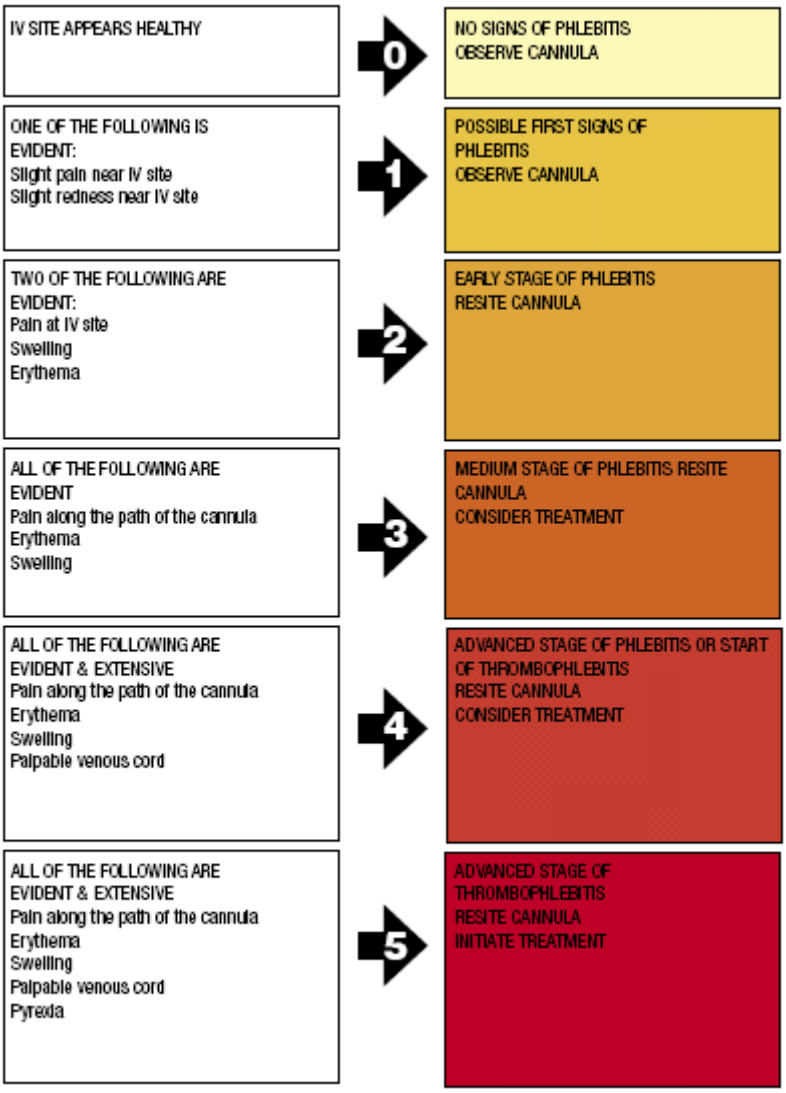
The epic project. Updating the evidence-base for national evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England: a report with recommendations (2004). British Journal of Infection Control.

Surveillance of Hospital-Acquired Bacteraemia in English Hospitals 1997-2001. Nosocomial Infection National Surveillance Service (NINSS).

EPIC2 – National Evidence-Based Guidelines for Preventing Healthcare Associated Infections in NHS Hospitals in England. Thames Valley University

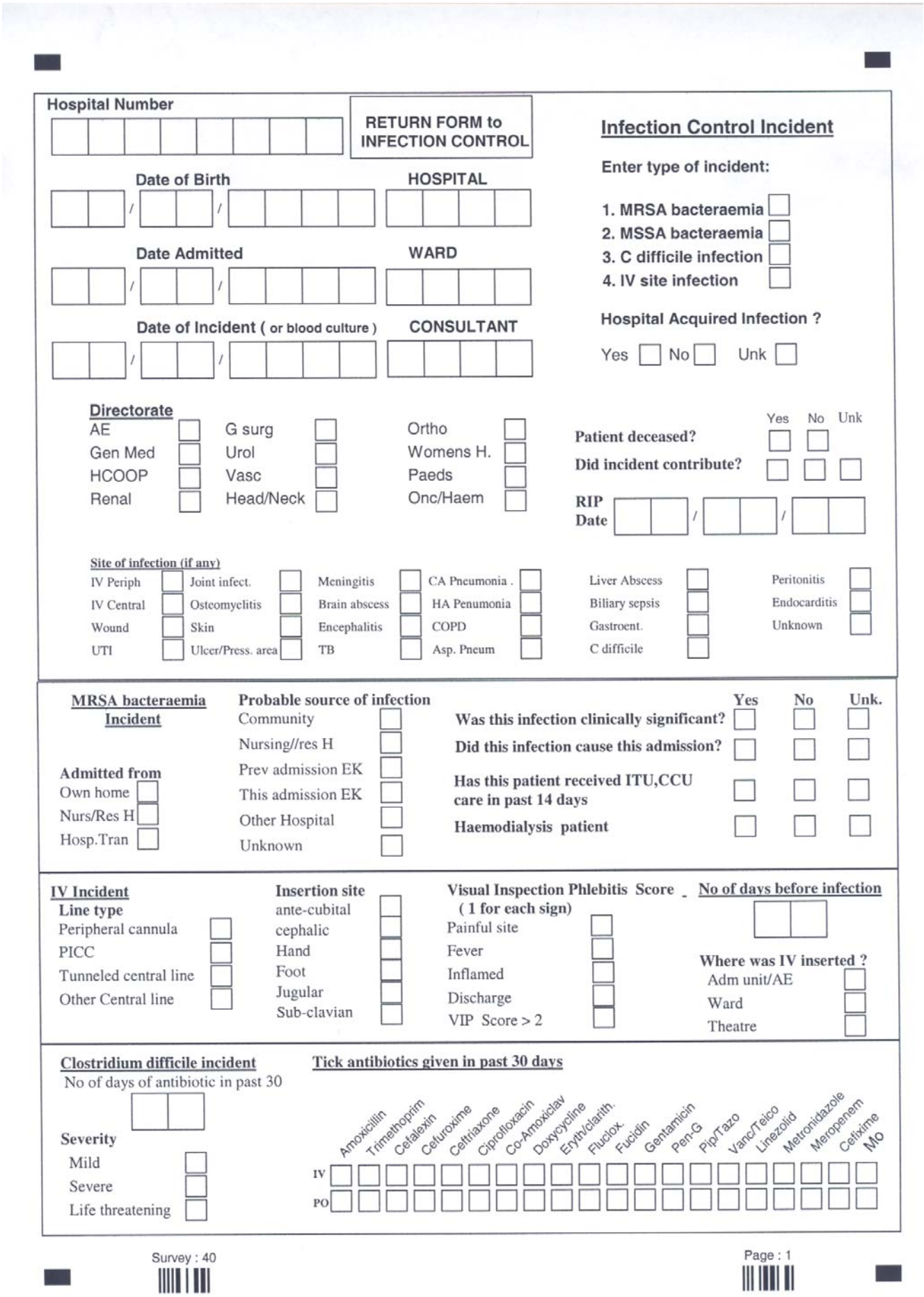
Appendix 1

VISUAL INFUSION PHLEBITIS SCORE



Reproduced by kind permission of Andrew Jackson, Nurse Consultant, Vascular Access, Rotherham District General Hospital

Appendix 2



Hospital Number

RETURN FORM to INFECTION CONTROL

Date of Birth / / HOSPITAL

Date Admitted / / WARD

Date of Incident (or blood culture) / / CONSULTANT

Infection Control Incident

Enter type of incident:

1. MRSA bacteraemia
2. MSSA bacteraemia
3. C difficile infection
4. IV site infection

Hospital Acquired Infection ? Yes No Unk

Directorate

AE	G surg	Ortho
Gen Med	Urol	Womens H.
HCOOP	Vasc	Paeds
Renal	Head/Neck	Onc/Haem

	Yes	No	Unk
Patient deceased?			
Did incident contribute?			

RIP Date / /

Site of infection (if any)

IV Periph	Joint infect.	Meningitis	CA Pneumonia .	Liver Abscess	Peritonitis
IV Central	Osteomyelitis	Brain abscess	HA Penumonia	Biliary sepsis	Endocarditis
Wound	Skin	Encephalitis	COPD	Gastroent.	Unknown
UTI	Ulcer/Press. area	TB	Asp. Pneum	C difficile	

MRSA bacteraemia Incident

Admitted from
- Own home
- Nurs/Res H
- Hosp.Tran

Probable source of infection
- Community
- Nursing//res H
- Prev admission EK
- This admission EK
- Other Hospital
- Unknown

	Yes	No	Unk.
Was this infection clinically significant?			
Did this infection cause this admission?			
Has this patient received ITU,CCU care in past 14 days			
Haemodialysis patient			

IV Incident

Line type
- Peripheral cannula
- PICC
- Tunneled central line
- Other Central line

Insertion site
- ante-cubital
- cephalic
- Hand
- Foot
- Jugular
- Sub-clavian

Visual Inspection Phlebitis Score (1 for each sign)
- Painful site
- Fever
- Inflamed
- Discharge
- VIP Score > 2

No of days before infection

Where was IV inserted ?
- Adm unit/AE
- Ward
- Theatre

Clostridium difficile incident

No of days of antibiotic in past 30

Severity
- Mild
- Severe
- Life threatening

Tick antibiotics given in past 30 days

	Amoxicillin	Trimethoprim	Cefalexin	Cefuroxime	Ceftriaxone	Ciprofloxacin	Co-Amoxiclav	Doxycycline	Eryth/clarith.	Fluclox.	Fucidin	Gentamicin	Pen-G	Pip/Tazo	Vanc/Teico	Linezolid	Metronidazole	Meropenem	Cefixime	Mo
IV																				
PO																				

Survey : 40

Page : 1

Infection Control incident V 2.0 Aug 2006

COMPETENCY SIGNATORY SHEET Cannulation (adult)

Name:

Job Title:

Directorate:

Ward / Site:

Training – Including theory, including demonstration of technique and practice on artificial arm

Date	Training session attended	Signature of trainer

Training elsewhere other than Base Hospital – Content verified as equivalent to above

Date training undertaken	Place where training undertaken	Signature of line manager

Supervised practice

Date	No	Competency level achieved	Supervisor signature	Practitioner signature
	1			
	2			
	3			
	4			
	5			
	6			

Please:

- send one copy of this competency signatory sheet once completed to your line manager for Clinical Governance purposes
- Retain the other for inclusion in your professional profile

COMPETENCY ASSESSMENT FOR INTRAVENOUS CANNULATION FOR ADULT PATIENTS (peripheral)

KSF dimension to which this Competency applies – (HWB 5)

Education / training required: To have attended a formal training session	**Minimum times skill to be performed under supervision: (6)**

Component	Statement of Competence	Performance evidence source	Minimal required competency level	Signature / date of Competent Practitioner acting as Supervisor	Self assessment by Practitioner confirming achievement of required competency level Signature / date Practitioner
Interpersonal skills / behavioural	• Introduces self to patient • Thoroughly explains procedure to patient ensuring patient's understanding and verbal consent • Ensures patient comfort and dignity by exposing only relevant area • Asks for assistance as required / recognises own limitations	**Trust guideline**	**2** **Competent**		
Performance of procedure (skill)	• Positively identifies patient by asking patient to identify him/herself and by checking name band • Ascertains that cannulation is necessary to deliver appropriate care Demonstrates correct: • Hand washing technique and application of gloves • Correct vein identification and preparation of skin • Aseptic technique • Insertion technique • Selection of appropriate dressing and correct application • Disposal of equipment and sharps				
Related knowledge	• Demonstrates understanding of Code of Conduct • Able to identify own individual responsibility/accountability re cannulation • Can describe different types of cannulae and their uses in relation to size of vein, amount and type of fluid to be administered with reference to contemporary evidence • Aware of 10 important points for the care of a patient with a peripheral intravenous cannula • Can describe criteria for appropriate vein selection • Can discuss potential complications on insertion or subsequently • Can discuss action in the event of body fluid spillage or needle stick injury • Able to outline action to be taken in the event of adverse reaction • Describes action if cannulation is unsuccessful				
Documentation	• Documents date, type, site and size of cannula, with review date, and signs legibly				

REGISTERED STAFF

Name:	Job Title:	Directorate:	Ward:

CLINICAL GUIDELINE

The Placement and Management of Adult Valved (Groshong®) Peripherally Inserted Central Catheters (PICCs)

INTRODUCTION:

The aims of these guidelines are:

- To provide comprehensive guidance in the application and management of Groshong® PICCs in adult patients.
- To support and encourage the use of PICCs as an alternative to traditional central vascular access devices.

DEFINITION AND BACKGROUND EVIDENCE

The Peripherally Inserted Central Catheter (PICC) is a central vascular access device (CVAD) which is placed via the antecubital fossa using either the basilic or cephalic vein, the tip of the catheter must lie in superior vena cava (preferably lower third). PICCs are usually manufactured from silicone or polyurethane, measure 50-60cm (which can be shortened to suit the size of the patient) and range in diameter from 2 to 5 French. PICCs can be open-ended or valved and management of the catheter is different in both cases, these guidelines will focus on the management of valved (Groshong®) catheters. Using correct management techniques the catheter can remain insitu for many months.

PICCs are rapidly becoming an acceptable alternative to traditional central venous catheters and tunneled catheters, with advantages of patient comfort, reduced insertion complications, reduced associated infection risks and ease of placement. PICCs have the potential to provide continuous venous access for patients throughout the duration of the treatment episode, thus avoiding delays in both recovery and discharge from hospital. Where possible patients should be considered and assessed for PICC suitability at the earliest opportunity when optimum peripheral vein integrity is available. PICCs are also suitable for outpatient and home intravenous therapy services.

The most common complications associated with PICCs are:

- Mechanical phlebitis
- Infective phlebitis
- Thrombophlebitis
- Thrombosis
- Occlusion
- Migration
- Damage / fracture of line

The placement of PICCs by nurses has, over the last 10 years, been well demonstrated nationally within the oncology specialty. The practice of nurse-led placement with acute inpatients is seen more widely in the USA and is becoming rapidly adopted in the UK.

For access to this service, patients meeting the criteria can be referred to approved clinicians for assessment of suitability.

RECOMMENDATIONS FOR PRACTICE

- Referral for PICC placement by any health care professional who has recognised the need.
- Patient assessed by PICC placer for suitability of PICC placement, with consideration for patients' physical status and intravenous therapy requirements.
- Informed consent obtained from patient.
- Suitable time for PICC placement agreed with placer, patient and clinical department.
- Chest x-ray post insertion to establish tip of PICC in Superior Vena Cava (preferably lower third) before PICC is used.
- Full documentation of procedure in patient medical records, which should include internal and external length of PICC.
- Completion of PICC Placement Request and Record form.
- Educational information for patient or family where appropriate.

CLASSIFICATION OF RECOMMENDATIONS

Placement of a PICC should be considered for patients who meet the following criteria:

- Delivery of intravenous therapy with a duration of more than 2 weeks
- Delivery of chemotherapy
- Delivery of irritant or vesicant intravenous therapy
- Delivery of Total Parental Nutrition (TPN)

PROFESSIONAL, TRUST AND LEGAL REQUIREMENTS

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All AHP's are State Registered with the Health Professions Council and 'will keep their knowledge and skills up to date and act within the limits of their knowledge and experience' (HPC Standards 2003).

Medically Qualified Personnel:

The General Medical Council (GMC) "Good Medical Practice 2006" states that:

In providing care you must recognise and work within the limits of your competence (3a)
You must keep your knowledge and skills up to date throughout your working life. You should be familiar with relevant guidelines and developments that affect your work. You should regularly take part in educational activities that maintain and further develop your competence and performance (12).

Note must be made of these points when performing clinical skills.
The Trusts position is that it accepts liability for the action of those practitioners who have completed the identified training for this skill and are able to provide evidence of their competency. This information should be recorded on the competency signatory sheet and sent to the line manager.

Groshong ® PICC Placement Procedure

Equipment

Cleaned dressing trolley with yellow bag attached
Ametop anaesthetic cream/subcutaneous intradermal Lidocaine 1%
1 x 2ml syringe
1 x orange needle
Tape measure
Tourniquet or sphigmamometer cuff
Sterile PICC placement pack
Bard PICC 4 French
250mls – 500mls 0.9% saline
3 x 10ml leur slip syringes
2 x packs sterile gloves
Sterile gown
2% Chlorhexidine in 70% alcohol (Chloraprep applicator 1-2 3ml applicators)
Microintroducer or 14-gauge cannula (spare)
2 Transparent semi-permeable dressing (e.g. IV3000)
Bandage

PROCEDURE	RATIONALE
1. Perform procedure in a designated clean area e.g. operating theatre clinical room	To facilitate optimum infection control practice
2. Check patient identity	Ensure correct patient
3. Check patient and veins suitable for PICC placement using Groshong® insertion and placement record	Is this the most appropriate device for the patient?
4. Explain and discuss procedure to patient. Assess the patient's level of anxiety and give appropriate reassurance. Obtain written informed consent	To help relieve patient's anxiety and satisfy medico – legal requirements
5.Apply local anaesthetic cream or inject intra-dermal Lidocaine	Minimise pain of insertion
6. When the anaesthetic cream has been on for the desired time, position the patient comfortably on the bed and remove the cream. Ensure screens are drawn and doors are shut. The patient does not have to lie flat at this time	Maintain patient's privacy and ensure comfort
7. Extend the patient's arm 90 degrees to their body and measure the distance from the insertion site to the head of humerus across to the sternoclavicular junction. Note this measurement	This gives the approximate length of catheter to be inserted
8. Position the tourniquet loosely and/or sphig cuff ready to tighten	

9. Hands should be thoroughly washed, using a technique, which aims to cover all surfaces of the hands. The use of a surgical scrub is recommended. Hands should be rinsed in running water before and after applying the cleansing agent and dried well with a sterile towel. Alternatively, an alcohol hand rub can be used on visibly clean hands	To comply with EPIC guidelines on hand hygiene
10. Open insertion pack and create sterile field using drop technique. Open other equipment required using the same technique unless "dirty Nurse" available.	To prevent contamination of sterile field and maintain asepsis
11. Put on sterile gown and apply well fitting sterile gloves	To comply with EPIC guidelines
12. Arrange sterile supplies and draw up 10mls 0.9% sterile saline solution into 2 x 10ml syringe	To maintain sterile environment
13. Ask patient to raise arm to enable sterile towel to be placed under arm	
14. Clean 10-15cms around the intended insertion site in concentric circles with 2% Chlorhexidine in 70% alcohol. Clean in circular motion working outwards. Allow solution to dry. For patients with a history of chlorhexidine sensitivity povidone iodine with an alcohol base of at least 70% is recommended	To comply with EPIC 2 guidelines on CVC insertion
15. Place fenestrated drape over top of patient's arm	To create a sterile field
16. Palpate the vein and perform the venepuncture using 14 gauge cannula or microintroducer	To gain venous access
17. Release tourniquet	To release pressure within the vein
18. Remove the stylet leaving the introducer in situ. Place thumb over the end of the introducer or use bung	To reduce blood loss
19. Ask assistant to open PICC line and drop sterile inner pack onto sterile field	
20. Prime the PICC with 0.9% saline	To lubricate the hydophobic stylet in the catheter
21. Hold the catheter 1cm from the tip and insert the catheter gently into the introducer for 15cm	To prevent collapse of vein
22. Aspirate for blood return	To check patency of device
23. Apply gentle pressure on catheter and remove the guide wire slowly	Removing guide wire fast may damage catheter
24. Remove the introducer over the catheter	
25. Fix the catheter in place using the fixation method of choice, e.g Stat-lock	Ensure the catheter does not move and prevent damage to the catheter
26. Trim the catheter to the required length and assemble the end connector	

27. Attempt to aspirate blood from the catheter and turbulent flush with 0.9% Sodium Chloride	Ensure continued blood return with end connector on
28. Attach end cap	
29. Place a gauze swab over the insertion site and cover with a transparent semi-permeable occlusive dressing	Gauze is used for the first dressing only as there will be a small amount of oozing of blood from the venepuncture site
30. Dispose of equipment appropriately	Dispose of sharps and clinical waste in accordance with Trust policy to maintain safe environment for patients/colleagues
31. Document the procedure in the patients notes	To meet medico-legal and NMC requirements
32. Send Patient for X-Ray. NB: Do not use line until position checked and authorised.	To check tip position
33. Ensure patient is booked for renewal of dressing an line check 24 hours post insertion.	

NOTES OF DUAL LUMEN GROSHONG® PICC'S

A dual Groshong® PICC is placed as above but a peel-apart sheath is used. The sheath is withdrawn from the exit site and then removed from the catheter by grasping the wings and flexing to split the introducer, which can then be peeled apart.

Potential complications during PICC line Placement

Nursing assessment	Nursing interventions
Air Embolus (very rare) *Symptoms*: Chest pain, dyspnoea, air hunger, tachycardia, hypotension, confusion, restlessness.	Immediately place patient into a left lateral, steep Trendelenburg position. Notify doctor, initiate oxygen and remain with the patient. Attach cardiac monitor and pulse occimeter if available. BP, pulse and respiration rate every 15 minutes. If an outpatient, transfer patient to ward as soon as possible.
Arterial Puncture *Symptoms*: Bright red colour blood flashback, pulsatile blood flow.	Withdraw cannula immediately, apply pressure at cannulation site for at least 5 minutes, elevate limb and observe for haematoma. Refer to doctor to assess if further action needed.
Bleeding	Excessive bleeding for more than 24 hours after PICC catheter insertion requires further investigation for coagulation status. Apply moderate pressure dressing and change sterile dressing when applicable.
Cardiac Arrhythmia *Symptom*: chest pain, palpitations, dyspnoea. On checking, patient demonstrates irregular heart rate.	Potential need to reposition PICC tip to middle to lower third of superior vena cava to allow normal arm movements. Confirm tip placement by X- ray. Secure catheter securely to prevent internal and external migration of line. Check pulse and BP every 15 minutes. Attach cardiac monitor if available.
Catheter Malposition or Migration *Symptoms*: Referred pain in jaw, ear, teeth or shoulder.	During catheter placement, turning the patient's head toward the insertion side while advancing the catheter can reduce the risk of entry into the internal jugular vein. Spontaneous migration may occur during coughing, sneezing or vomiting. PICC tip verification by x-ray should be obtained before using catheter.
Venous Spasm *Symptoms:* Inability to advance catheter despite successful cannulation.	Venous spasm can be avoided by ensuring that arm & axilla are warm, patient is well hydrated and comfortable. Consider use of mild sedative for anxious patient. In the event of spasm during placement, application of heat to the arm can reduce venous spasm. Flushing line with 0.9% normal saline whilst placing line.
Catheter in incorrect position on CXR	Leave catheter insitu. Do not use catheter. Re X-Ray in 24hrs time to see if catheter has migrated into correct position.

Troubleshooting tips for Management of PICC lines

Nursing assessment	Nursing intervention
Accidental catheter removal	Apply pressure dressing at the insertion site for at least 5 minutes, elevate limb and notify clinician.
Increased External length of PICC. Possible partial removal of PICC	External length should be documented in notes and checked at each access. Measure the catheter length to determine if measurements coincide with catheter insertion measurements.
Fluid leak at insertion site	May be related to a hole or tear in the catheter or a loose connection between catheter and connection tubing. Follow guidelines for repair of catheter. Check connections using sterile technique. Never use scissors to remove tape or dressing.
Pain, redness, drainage at insertion site	May be related to movement of the PICC, skin irritation or infection. Reposition the catheter hub, check statlock applied correctly, swab site, apply sterile dressing. Monitor skin irritation or infection and check cultures results. Consult with doctor for antibiotics. Follow infection guidelines. Review in 3 days or if symptoms worsen.
Pain in arm, ear, shoulder	May be due to thrombosis of the superior vena cava, misplacement of the PICC in the internal jugular vein or internal PICC leak. Check if able to aspirate blood. Follow flow chart (appendix 4). May require to be re x-rayed or venogram performed to determine if DVT or PICC migration.
Pump occlusion alarm	Assess for kink in IV tubing or in PICC at dressing site and for occlusion in catheter. If unable to aspirate blood from line follow the flow chart (Appendix 4)
Unable to aspirate blood from PICC	See Appendix 4
"Stuck catheter" (on removal)	Catheter will appear to be firmly held within the vessel - potential causes are vasospasm, vasoconstriction and thrombophlebitis. Remove the PICC/PIC dressing, apply moderate tension on the catheter with tape below the insertion site and apply a sterile dressing. Apply warm compresses and attempt catheter removal in 8, 12 and 24 hours.
Mechanical phlebitis Generalised inflammation / swelling of arm above insertion site	Related to sensitivity of PICC insertion. Elevate extremity, apply warm compress 3 times daily for 72 hours. Consult with doctor for prescription of anti-inflammatory drugs. Review and consider catheter removal if not resolved within 3 days.

COMPETENCY ASSESSMENT FOR GROSHONG® PICC PLACEMENT

KSF dimension to which this Competency applies HWB5/6/7

Education / training required: One day theoretical training programme provided by the PICC manufacturer and facilitated by PICC experts.	**Minimum times skill to be performed under supervision: 10**

Component	Statement of Competence	Performance evidence source	Minimal required competency level	Signature / date of Competent Practitioner acting as Supervisor	Self assessment by Practitioner confirming achievement of required competency level Signature / date Practitioner
Interpersonal skills / behavioural	• Introduces self to patient • Thoroughly explains procedure to patient ensuring patient's understanding and written consent • Ensures patient comfort and dignity by exposing only relevant area, and taking action to reduce anxiety • Asks for assistance as required / recognises own limitations	**Trust Clinical Guidelines**	**3**		
Performance of procedure (skill)	• Positively identifies the patient verbally and by checking name band • Assesses patient suitability for PICC recognising and contraindications • Applies local anaesthetic demonstrating correct vein selection • Thoroughly assembles all required equipment for the procedure • Correctly positions the patient with the arm at a 90° angle • Measures the patient for approximate PICC length Demonstrates: • Correct hand washing technique, preparation of equipment, application of sterile gown, gloves and sterile field • Correct preparation of skin site • Accurate venepuncture with introducer needle • Correct advancement of catheter with head turn at correct stage • Removal of guidewire and aspiration of blood • Catheter flush and application of cap • Securement of PICC and application of sterile dressing • Disposal of equipment and sharps				

Related knowledge	Pre-requisites qualifications • Registered nurse with minimum 2 years experience. • Employed in an environment where various aspects of intravenous and central venous therapy are undertaken. • At least one year experience in cannulation and regularly cannulates patients. • Competent in the administration of intravenous therapy. • Competent in patient group directions (PGD) should the use of lidocaine be required for insertion. Related procedure knowledge • Demonstrates understanding of Code of Conduct / GMC guidance • Able to identify own responsibility, accountability, legal and ethical implications of the procedure. • Demonstrates knowledge of anatomy and physiology of the central venous system • Can discuss potential complications/risks of insertion and required actions • Has knowledge of PICC complications and required management • Is competent in all aspect of PICC management including repair and removal • Is able to provide information and teaching to other staff, patient and relatives about PICC management • Can discuss action in the event of body fluid spillage or needle stick injury • Able to outline action to be taken in the event of adverse reaction				
Documentation	• Full documentation of procedure in medical records • Completion of PICC record form • Written informed consent				

COMPETENCY SIGNATORY SHEET PICC Placement (adult)

Name:

Job Title:

Directorate:

Ward / Site:

Training – Including theory, including demonstration of technique and practice on artificial arm

Date	Training session attended	Signature of trainer

Training elsewhere– Content verified as equivalent to above

Date training undertaken	Place where training undertaken	Signature of line manager

Supervised practice

Date	No	Competency level achieved	Supervisor signature	Practitioner signature
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			

Please: send one copy of this competency signatory sheet once completed to your line manager for Clinical Governance purposes retain the other for inclusion in your professional profile

GROSHONG® PICC Management

Accessing PICC line

Basic Equipment to access line steps 1 – 9, 24 -28

Cleaned dressing trolley with yellow bag attached
Sterile basic procedure pack
Plastic apron
Sterile gloves of the correct size
Chlorhexidine 2% in 70% alcohol
Stat-Lock

PLUS

Take blood sample and flush Groshong® PICC steps10 - 14

2 x 10ml leur slip syringe
Blue needles x 2
10 mls 0.9% Sodium Chloride
The required sample bottles
A blue vacutainer adaptor and hub if being used OR extra 10ml or larger syringe and blood transfer device
Either Needle-free access device (bung) if needs changing (refer to manufacturers recommendation)
Or single use bung if line is only accessed once a week

Flush Groshong® PICC only steps 15 -18

2 x 10ml leur slip syringe
10mls 0.9% Sodium Chloride
Needle-free access device
Either Needle-free access device (bung) if needs changing (refer to manufacturers recommendation)
Or single use bung if line is only accessed once a week

Dressing change of a Groshong® PICC steps 19 - 23

Transparent semi-permeable occlusive dressing (e.g. IV 3000)
Statlock

ACCESSING CATHETER

PROCEDURE	RATIONALE
1. Check patient identity	Ensure correct patient
2. Explain the procedure to the patient giving the opportunity for questioning	To ensure patients understanding and obtain informed consent
3. Establish appropriate positioning, ensuring that there is adequate lighting and ventilation	Ensuring comfort and safety for patient and nurse
4. If necessary, carefully lift the edge of the dressing without removing it or exposing the exit site	To allow access to the bung
5. Decontaminate hands using: • alcohol hand rub for visibly clean hands • otherwise wash hands then apply alcohol rub	To minimise the risk of cross infection
6. Observe external measurement of PICC (exit to distal end of grey hub)	The PICC length should be measured and checked against documented length to ensure that it has not migrated
7. Open out sterile pack. Open all required sterile equipment onto pack with a drop technique	To maintain asepsis
8. Decontaminate hands with alcohol rub and apply well fitting sterile gloves	To minimise risk of infection and maintain asepsis
9. Place sterile sheet under end of line	To maintain asepsis

And/Or if taking blood and flushing

10. Draw up 10mls 0.9% sterile saline solution into 1 x 10ml syringe without handling ampoule and avoid contaminating gloves.	To maintain asepsis
11. Holding line with sterile gauze, Either • Remove single use bung or needle free access device (if it has been in situ for more than one week) • Clean end of line with Chlorhexadine 2% in 70% alcohol for 30 seconds and allow to dry, Or Clean bung with Chlorhexadine 2% in 70% alcohol for 30 seconds and allow to dry.	To maintain asepsis

12. Insert empty syringe into bung and gently aspirate, allowing a few seconds for valve to open. Withdraw 5mls blood and discard	To ensure catheter patency
13.Withdraw the amount of blood required using either: • a blue vacutainer adapter and required bottles. Or • a syringe of the correct volume for the blood to be transferred into the correct bottles	To obtain the correct volume of blood
14. Flush with 10mls normal saline 0.9% using a push pause technique. Before the last 1 – 2 mls goes in, start to remove the syringe while still pushing in the saline	To remove blood from the line. To ensure positive pressure is maintained in the line and prevent backflow into the line

Or if flushing only

15. Draw up 10mls 0.9% sterile saline solution into 1 x 10ml syringe without handling ampoule	
16. Holding line with sterile gauze, Either • Remove single use bung or needle free access device (if it has been in situ for more than one week) • Clean end of line with Chlorhexadine in 70% alcohol for 30 seconds and allow to dry, Or Clean bung with Chlorhexadine 2% in 70% alcohol for 30 seconds and allow to dry	To maintain asepsis
17. Insert empty syringe into bung and gently aspirate, allowing a few seconds for valve to open. Withdraw 5mls blood and discard	To ensure catheter patency
18. Flush with 10mls normal saline 0.9% using a push pause technique. Before the last 1 – 2 mls is inserted, start to remove the syringe while still pushing in the saline	To remove blood from the line. To ensure positive pressure is maintained in the line and prevent backflow into the line

And/Or if changing dressing

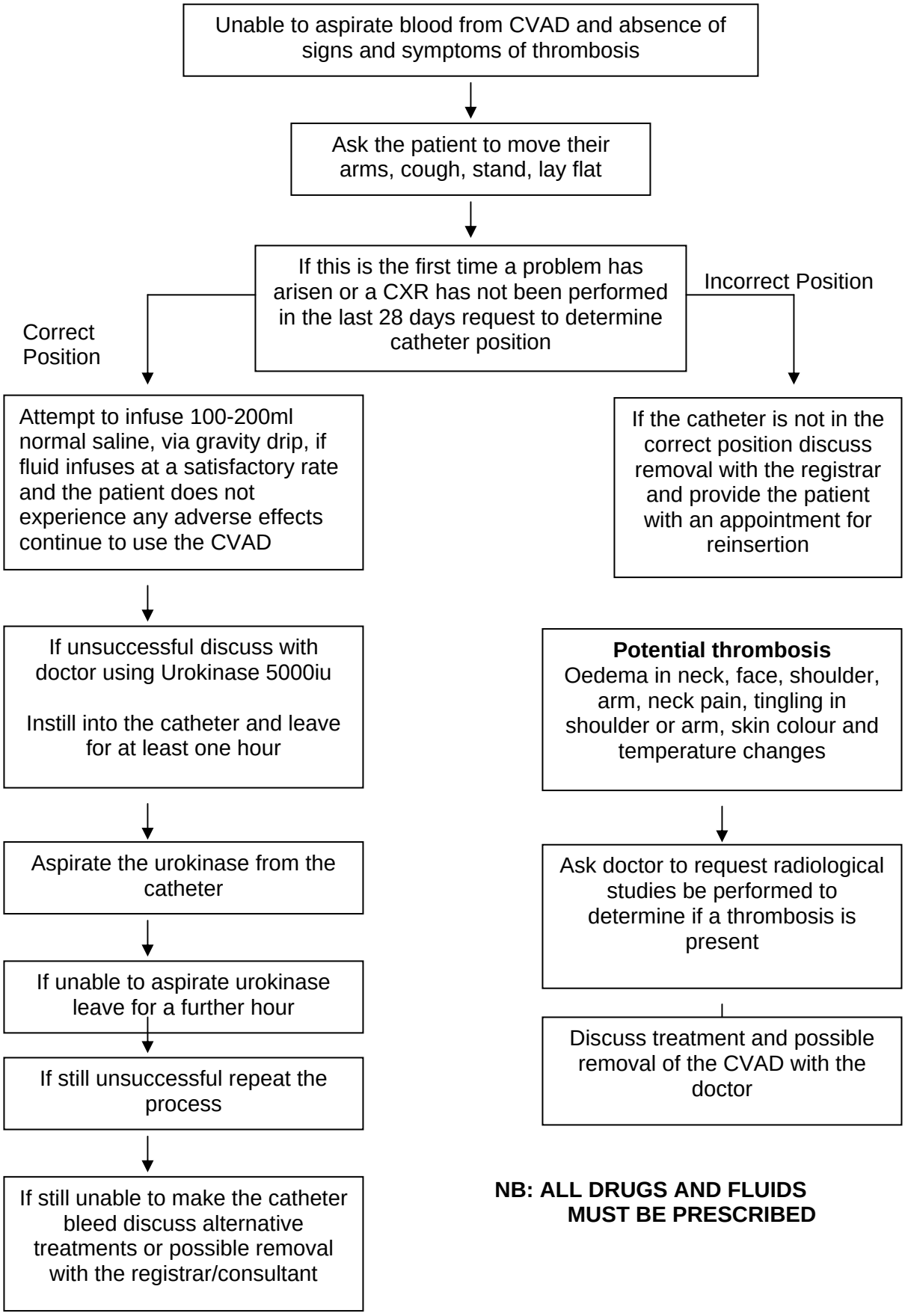
19. Remove transparent semi-permeable dressing to uncover exit site, making sure the dressing is removed from the bottom upwards	To ensure PICC is not pulled out
20. If statlock securing dressing requires changing do so extremely carefully using chlorhexidine solution	To prevent dislodgement of the catheter
21. Clean exit site with the chlorhexidine solution using a circular technique working from the centre outwards	To minimise contamination of exit site
22. Allow to dry for 30 seconds	To minimise the risk of contamination and destroy skin flora
23. Apply statlock dressing if necessary and new transparent semi-permeable dressing, making sure the exit and the whole of the line is covered	To provide complete occlusion and prevent movement of the line during further interventions

FINALLY

24. Position a piece of gauze under the bung	To prevent pressure on the skin from the bung and the line
25. Remove gloves and decontaminate hands	To reduce the risk of infection
26. Apply tubifast/light bandage to patient's arm (optional for outpatients)	To prevent excessive movement of the line
27. Dispose of sharps and other waste correctly	To prevent needle-stick injury and comply with Trust policy
28. Document date and time of this procedure in the nursing notes along with any problems	Maintain accountability

Central Venous Catheter Action Flow Chart

Problem: Unable to aspirate blood from CVAD



NB: ALL DRUGS AND FLUIDS MUST BE PRESCRIBED

CLEARING AN OCCLUSION LINE USING A 'NEGATIVE PRESSURE' PROCEDURE

This should only be attempted after consultation with a doctor, having followed the flowchart in Appendix 4

Equipment

Step one

Cleaned dressing trolley with yellow bag attached
Sterile basic procedure pack
Plastic apron
Sterile gloves of the correct size
Chlorhexidine 2% in 70% alcohol
2 x 10ml leur lock syringes
5000iu Urokinase in 1ml (**PRESCRIBED**)
Three way tap
2 x single use bungs

Step Two

Cleaned dressing trolley with yellow bag attached
Sterile basic procedure pack
Plastic apron
Sterile gloves of the correct size
Chlorhexidine 2% in 70% alcohol
2 x 10ml leur lock syringes
10ml 0.9% normal Saline for Injection
Transparent semi-permeable occlusive dressing (e.g. IV 3000)
Statlock dressing (if needed)
Steristrips (if needed
Tubifast or light bandage (optional)

STEP ONE

PROCEDURE	RATIONALE
1. Check patient identity	Ensure correct patient
2. Explain the procedure to the patient giving the opportunity for questioning	To ensure patients understanding and obtain informed consent
3. Establish appropriate positioning, ensuring that there is adequate lighting and ventilation	Ensuring comfort and safety for patient and nurse
4. If necessary, carefully lift the edge of the dressing without removing it or exposing the exit site	To allow access to the bung
5. Observe external measurement of PICC (exit to distal end of grey hub)	The PICC length should be measured and checked against documented length to ensure that it has not migrated

6. Open out sterile pack. Open all required sterile equipment onto pack with a drop technique	To maintain asepsis
7. Decontaminate hands with alcohol rub and apply well fitting sterile gloves	To minimise risk of infection and maintain asepsis
8. Place sterile sheet under end of line	To maintain asepsis
9. Draw up 1ml Urokinase 5000iu solution into 1 x 10ml syringe without handling ampoule	
10. Holding line with sterile gauze, remove bung and clean end of line with Chlorhexidine 2% in 70% alcohol for 30 seconds and allow to dry	To maintain asepsis
11. Attach the 3-way tap	
12. Connect the empty syringe to one port of the 3-way tap and to the other port, the syringe containing the Urokinase	
13. Turn the tap so that it is closed to the Urokinase filled syringe (Figure 1) and draw back on the empty syringe	Creates negative pressure within the catheter
14. While maintaining this pressure, turn the tap so that it is open to the heparin filled syringe and closed to the vacuumed empty syringe (Figure 2)	The negative pressure will draw the Urokinase into the catheter
15. Leave three-way tap on line and place sterile bung on each connection. Leave Urokinase in situ for one hour	To allow the anticoagulant to take effect

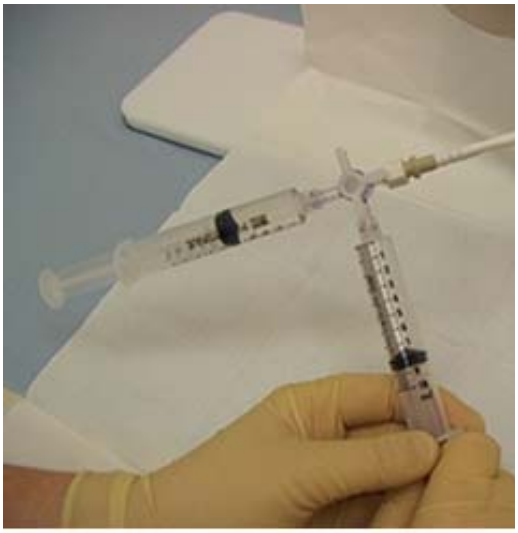


Figure 1: Tap open to empty syringe.

In Figure 1 the Urokinase filled syringe is on the left, and the empty syringe, on the right, is drawn back to create a vacuum. **Please note the syringe in picture shows 5ml liquid, 1ml only is needed for PICC lines.**

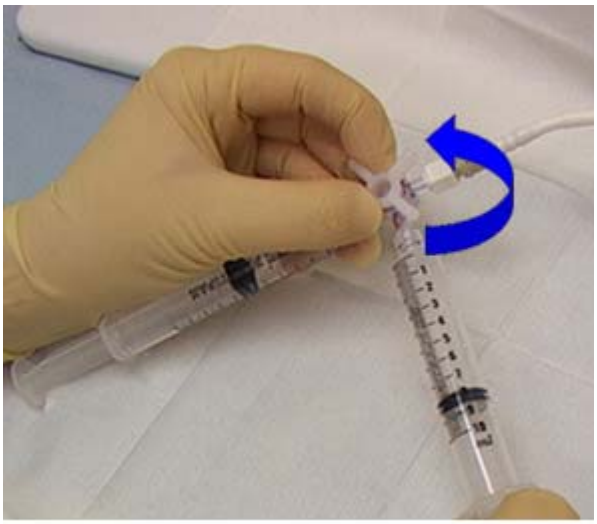


Figure 2: Turning tap to open Urokinase filled syringe.

In Figure 2 the Urokinase filled syringe is on the left, and the empty syringe on the right. **Please note the syringe in picture shows 5ml liquid, 1ml only is needed for PICC lines.**

STEP TWO

Follow procedure 1-9

10. Draw up 10mls 0.9% sterile saline solution into 1 x 10ml syringe without handling ampoule	
11. Holding line with sterile gauze, remove single use bungs. Clean end of line with Chlorhexadine 2% in 70% alcohol for 30 seconds and allow to dry	To maintain asepsis
12. Insert empty syringe into bung and gently aspirate, allowing a few seconds for valve to open. Withdraw Urokinase and 5mls blood and discard	To ensure catheter is now patent and remove Urokinase from line
13. Flush with 10mls normal saline 0.9% using a push pause technique. Before the last 1 – 2 mls is inserted, start to remove the syringe while still pushing in the saline	To remove blood from the line. To ensure positive pressure is maintained in the line and prevent backflow into the line
14. Replace steristrips and statlock securing dressing	To prevent dislodgement of the catheter
15. Apply new transparent semi-permeable dressing, making sure the exit and the whole of the line is covered	To provide complete occlusion and prevent movement of the line during further interventions
16. Position a piece of gauze under the bung	To prevent pressure on the skin from the bung and the line
17. Remove gloves and decontaminate hands	To reduce the risk of infection
18. Apply tubifast / light bandage to patient's arm (optional for outpatients)	To prevent excessive movement of the line
19. Dispose of sharps and other waste correctly	To prevent needle-stick injury and comply with Trust policy
20. Document date and time of this procedure in the nursing notes along with any problems	Maintain accountability

If, following this procedure, blood can still not be aspirated, medical opinion should be obtained. Management will depend on what the cause of the occlusion is thought to be and may involve radiological intervention.

COMPETENCY SIGNATORY SHEET PICC Management

Name:

Job Title:

Directorate:

Ward / Site:

Training – Including theory, including demonstration of technique and supervised practice

Date	Training session attended	Signature of trainer

Training elsewhere– Content verified as equivalent to above

Date training undertaken	Place where training undertaken	Signature of line manager

Supervised practice

Date	No	Competency level achieved	Supervisor signature	Practitioner signature
	1			
	2			
	3			
	4			

Please:

- send one copy of this competency signatory sheet once completed to your line manager for Clinical Governance purposes
- Retain the other for inclusion in your professional profile

COMPETENCY ASSESSMENT FOR MANAGEMENT OF VALVED PERIPHERALY INSERTED CENTRAL CATHETER (PICC)

KSF dimension to which this Competency applies HWB5/6/7

Education / training required: Local training and supervised practice with a competent practitioner.	**Minimum times skill to be performed under supervision: 4**

Component	Statement of Competence	Performance evidence source	Minimal required competency level	Signature / date of Competent Practitioner acting as Supervisor	Self assessment by Practitioner confirming achievement of required competency level Signature / date Practitioner
Interpersonal skills / behavioural	• Introduces self to patient • Thoroughly explains procedure to patient ensuring patient's understanding and verbal consent obtained • Ensures patient comfort and dignity by exposing only relevant area Asks for assistance as required / recognises own limitations	**Trust policy**	**2**		

Performance of procedure (skill)	• Positively identifies verbally and by checking name band
	• Prepare patient and environment for procedure
	• Correct preparation of trolley and equipment for procedure
	• Decontaminate hands
	• Performs procedures in accordance with Trust policy and clinical practice guidelines:
	  • Taking blood
	  • Accessing the line for treatment
	  • Turbulent flushing of the line
	  • Dressing change
	• Correct disposal of equipment and sharps				

Related knowledge	• Demonstrates understanding of Code of Conduct, be able to identify own individual accountability and have a knowledge of Trust vicarious liability in relation to the management of PICC's • Competency in administration of intravenous drugs. • Have managers approval and support • A working knowledge of related Trust policies e.g. Sharps, infection control guidelines • Can discuss potential complications • Able to outline action to be taken in the event of adverse reaction • Have a working knowledge of all related guidelines and policies				
Documentation	• Document all interventions in appropriate nursing notes.				

GROSHONG® PICC Removal

PICC's must only be removed by a **competent practitioner**

Equipment

Cleaned dressing trolley with yellow bag attached
Sterile basic procedure pack
Plastic apron
Sterile gloves of the correct size
Chlorhexidine 2% in 70% alcohol
Transparent semi-permeable occlusive dressing (e.g. IV 3000)
Bandage

REMOVAL OF CATHETER;

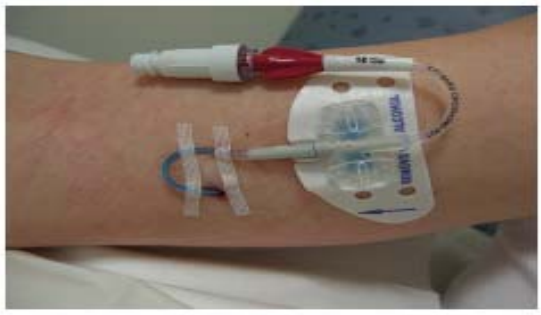
PROCEDURE	RATIONALE
1. Check patient identity	Ensure correct patient
2. Explain the procedure to the patient giving the opportunity for questioning	To ensure patients understanding and obtain informed consent
3. Establish appropriate positioning; make the patient comfortable, with the arm supported on a pillow and the insertion site below the level of the heart. Ensure that there is adequate lighting and ventilation	Ensuring comfort and safety for patient and nurse Arm position minimises the risk of air embolus
4. Carefully lift the edge of the dressing without removing it or exposing the exit site	To allow access to the line
5. Decontaminate hands using: • alcohol hand rub for visibly clean hands • otherwise wash hands then apply alcohol rub	To minimise the risk of cross infection
6. Open out sterile pack. Open all required sterile equipment onto pack with a drop technique	To maintain asepsis
7. Decontaminate hands with alcohol rub and apply well fitting sterile gloves	To minimise risk of infection and maintain asepsis
8. Place sterile sheet under end of line	To maintain asepsis
9. Remove all dressings	
10. Clean exit site with the chlorhexidine solution using a circular technique working from the centre outwards	To minimise contamination of exit site
11. Allow to dry for 30 seconds	To minimise the risk of contamination and destroy skin flora

12. Hold a piece of gauze above the insertion site to support the surrounding skin	
13. Apply traction on the PICC and gently pull the catheter in a steady even manner moving the hand along the length of the PICC and pulling from near the insertion point	
14. When the line is completely removed, sterile gauze should be held over the insertion point applying gentle finger pressure until any bleeding has stopped	To prevent blood loss If clinically indicated the tip should be sent for culture. In this case, cut off 5cm of the distal catheter tip with sterile scissors and place directly into a sterile universal container. Complete the microbiology form and label the container before sending to Microbiology for MC+S
15. Once any bleeding has stopped replace the gauze with further sterile gauze, apply transparent dressing and then apply a bandage around and over the site to act as a gentle pressure dressing	To minimise blood loss and prevent formation of haematoma
16. Remove gloves and decontaminate hands	To reduce the risk of infection
17. Dispose of sharps and other waste correctly	To prevent needle-stick injury and comply with Trust policy
18. Document date and time of this procedure in the nursing notes along with any problems	Maintain accountability

If resistance is encountered when removing the line then it is usually due to venospasm within the arm. Stop traction on the catheter. Apply a warm compress to the arm for 20min to encourage venous dilation. Again attempt to remove the line. Do not stretch the PICC or apply undue force; the PICC may break. Always inspect the PICC after removal and ensure it is the same length as that documented. If any problems are suspected or cannot be resolved, then a PICC specialist clinician should be contacted.

10 IMPORTANT POINTS FOR THE CARE OF Groshong® PICC Lines

- **A Groshong® PICC line is a closed valve line which is placed centrally into the lower third of the Superior Vena Cava**
- **Only individuals who are competent as per the Trust IV Access guidelines should insert or access PICC Catheters.**
- **Catheters should be placed in a clean environment using maximal barrier precautions**
- **Chest radiography should be performed to check tip position post insertion.**
- **For five to seven days after placement, heat should be applied to the area above the exit site (TDS -15mins). This promotes venous dilation and helps prevent mechanical phlebitis.**
- **The line should be dressed with IV3000 and flushed weekly as described in IV Guidelines.**
- **Cleaning of the insertion site during dressing change should be with 2% Chlorhexidine in 70% alcohol**
- **The line should be flushed with normal saline using a turbulent push / pause technique with a 10ml leur slip syringe, finishing with positive pressure.**
- **If unable to flush due to resistance, follow the guidelines to exclude complications (i.e. migration of the line, DVT)**
- **Lines can often be repaired: If an external fracture occurs, secure the line and contact the a local advisor as soon as possible. (See policy document on advisors and placers).**



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CLINICAL GUIDELINE

Guidelines for insertion, management and removal of short term central venous catheters (CVC) (Adults)

INTRODUCTION

In 2001, the Department of Health published the first phase of National Evidence Based Guidelines for Preventing Healthcare Associated Infection including 'Guidelines for Preventing Hospital Acquired Infection Associated with the Use of Central Venous Catheters in Acute Care'. This initiative was known as the Epic Project and is based on the best critically appraised evidence currently available. These Guidelines were reviewed and updated in 2006 www.epic.guidelines. The following Trust Guidelines are based largely on this Guidance.

The aims of these Guidelines are:

- To minimise intravascular device-related infections by identifying potential sources and ports of entry of organisms and taking the necessary precautions.
- To set standards which can be the subject(s) of audit in order to improve the quality of care.

INCLUSION CRITERIA

These guidelines apply to caring for all adults and children with CVC which are being used for the administration of fluids, medications, blood components and/or total parenteral nutrition (TPN).

DEFINITION AND BACKGROUND

Bloodstream infections associated with the insertion and maintenance of central venous catheters (CVC) are among the most dangerous complications that can occur, worsening the severity of the patients' underlying ill health, prolonging the period of hospitalisation and increasing the cost of care. Every year, almost 6,000 patients in the UK acquire a catheter-related bloodstream infection.

Catheter-related bloodstream infection (CR-BSI) involves the presence of systemic infection and evidence implicating the CVC as its source, ie the isolation of the same microorganism from blood cultures as that shown to be significantly colonising the CVC of a patient with clinical features of bacteraemia. Colonisation of the catheter, or catheter-related infection (CR-infection), refers to a significant growth of microorganisms on either the endoluminal of the external catheter surface beneath the skin in the absence of systemic infection.

The microorganisms that colonise catheter hubs and the skin adjacent to the insertion site are the source of most CR-BSI. Coagulase-negative staphylococci, particularly *Staphylococcus epidermidis*, are the most frequently implicated microorganisms associated with CR-BSI. Other microorganisms commonly involved include *Staphylococcus aureus, Candida* species and enterococci.

CR-BSI is generally caused either by skin microorgansims at the insertion site that contaminate the catheter during insertion or migrate along the cutaneous catheter track, or microorganisms from the hands of health care workers that contaminate and colonise the catheter hub during care interventions.

Important points to be aware of

Because the potential consequences of catheter related infections are so serious, enhanced efforts are needed to reduce the risk of infection to the absolute minimum. For this reason, hand antisepsis and proper aseptic technique are required for changing catheter dressings and for accessing the system.

A comprehensive strategy should include the following four components:

- Educating persons who insert and maintain catheters
- Use of maximal sterile barrier precautions
- The use of 2% Chlorhexidine in 70% alcohol preparation for skin antisepsis for CVC insertion
- An aseptic technique must be used for catheter insertion, site care and for accessing the system.

Catheter material

Although catheter material may be an important determinant in the risk of infection associated with CVC, there is no evidence that demonstrates conclusively that CR-infection rates vary with different materials. Short-term CVC are almost always made of polyurethane and long-term tunnelled catheters are usually made of silicone.

Number of catheter lumens

- Use a single-lumen catheter unless multiple ports are essential for the management of the patient
- If total parenteral nutrition is being administered, use a tunnelled central line/PICC line or dedicated lumen of Quad lumen central line exclusively for that purpose. (As per access choice chart.)

Antimicrobial impregnated CVC

- The use of antimicrobial impregnated central venous catheters is recommended for adults
- Catheters may be left insitu for 3 weeks only if there is no evidence of infection
- Within the Trust the use of sliver sulfadiazine and chlorhexidine acetate coated catheters is recommended.

Length of time for use

- Short term CVC lines should be used for no longer than 21 days. Remove lines as soon as possible. Lines must be removed if there is evidence of catheter related infection (unexplained raise in infection markers, unexplained fever etc). Patients should be assessed daily for evidence of line related infection. For lines lasting longer than 21 days see the access choice chart.

Flushing of lumens

- Lumens that are in frequent use should be flushed with 10cc of Normal saline (0.9%) after each use, and between each drug being administered. The use of a needle free access bung should be considered and changed according to the manufactured instructions
- Lumens that are not in use should be flushed three times daily with 10cc of normal saline (0.9%) using a turbulent push/pause technique. The end of the catheter should be capped off with a single use bung. Normal saline should be prescribed on the drug chart
- The use of Heparin flush solutions is not recommended.

Selection of catheter insertion site

Selecting the best insertion site for the patient can minimise the risk of infection.

Several factors need to be assessed when determining the site of catheter placement, including:

- Patient-specific factors (eg pre-existing catheters, anatomic deformity, bleeding diathesis, some types of positive pressure ventilation)
- Relative risk of mechanical complications (eg bleeding, pneumothorax, thrombosis)
- The risk of infection.

The site at which a catheter is placed can influence the subsequent risk of CR-infection.

- In selecting an appropriate insertion site, assess the risks for infection against the risks of mechanical complications
- Unless medically contraindicated, use the subclavian site in preference to the jugular or femoral sites for non-tunneled catheter placement.

Guidance on the use of ultrasound locating devices for placing central venous catheters:

- Two-dimensional (2-D) imaging ultrasound guidance is recommended as the preferred method for insertion of central venous catheters (CVCs) into the internal jugular vein (IJV) in adults and children in elective situations
- The use of two-dimensional (2-D) imaging ultrasound guidance should be considered in most clinical circumstances where CVC insertion is necessary either electively or in an emergency situation
- It is recommended that all those involved in placing CVCs using two-dimensional (2-D) imaging ultrasound guidance should undertake appropriate training to achieve competence.

Replacement strategies:

- Do not routinely replace non-tunnelled CVC as a method to prevent catheter-related infection
- Use guide wire assisted catheter exchange to replace a malfunctioning catheter, or to exchange an existing catheter *only* if there is no evidence of infection at the catheter site or proven CR-BSI
- If CR-infection is suspected, but there is no evidence of infection at the catheter site, remove the existing catheter and insert a new catheter over a guide wire; if tests reveal CR-infection, the newly inserted catheter should be removed and, if still required, a new catheter inserted at a different site
- Do not use guide wire assisted catheter exchange for patients with CR-infection. If continued vascular access is required, remove the implicated catheter, and replace it with another catheter at a different insertion site
- Replace all fluid administration tubing and connectors when the vascular device is replaced
- When adherence to aseptic technique cannot be assured ie when catheters are inserted during a medical emergency, replace all catheters as soon as possible and after no longer than **48 hours**.

Antibiotic prophylaxis

- Oral *or* systemic antimicrobials are not recommended routinely before insertion or during use of a central venous catheter to prevent catheter colonisation or bloodstream infection
- Do not routinely apply antimicrobial ointment to the catheter placement site prior to or following insertion.

PROFESSIONAL, TRUST AND LEGAL REQUIREMENTS

Nurses, Midwives and Allied Health Professionals:

The professional position is that the NMC Code of Professional Conduct (2008) places specific responsibility on registered nurse/midwife practitioners. The registered nurse/midwife is personally accountable for their practice and, in the exercise of professional accountability, must acknowledge any limitations in their knowledge and competence and decline any duties or responsibilities unless able to perform them in a safe and skilled manner.

All AHP's are State Registered with the Health Professions Council and 'will keep their knowledge and skills up to date and act within the limits of their knowledge and experience' (HPC Standards 2003).

Medically Qualified Personnel:

The General Medical Council (GMC) "Good Medical Practice 2006" states that:
In providing care you must recognise and work within the limits of your competence. You must keep your knowledge and skills up to date throughout your working life. You should be familiar with relevant guidelines and developments that affect your work. You should regularly take part in educational activities that maintain and further develop your competence and performance.

Note must be made of these points when performing clinical skills.

The Trusts position is that it accepts liability for the action of those practitioners who have completed the identified training for this skill and are able to provide evidence of their competency. This information should be recorded on the competency signatory sheet and sent to the line manager.

INSERTION PROCEDURE	RATIONALE
Healthcare personnel caring for a patient with a central venous catheter should be trained and assessed as competent in using and consistently adhering to the infection prevention practices described in this guideline	
It is strongly recommended that CVCs should be inserted in designated clean areas, eg treatment rooms, critical care units, operating theatres. **Insertion should be performed by trained and competent staff**	To reduce the mechanical and infection risks associated with insertion
Hands should be decontaminated using alcohol hand rub on visibly clean hands (apply 1 shot, cover all surfaces, rub hands together until dry). Alternatively, using an antimicrobial liquid soap eg Hibiscrub, Povidone iodine, hands should be thoroughly washed, using a technique, which aims to cover all surfaces of the hands. Hands should be rinsed in running water before and after applying the cleansing agent and dried well	To reduce the risk of cross infection from the operators hands during the procedure
Use optimum aseptic technique, including a sterile gown, gloves and a large sterile drape (dedicated CVP insertion packs must be used)	Evidence has identified that using maximal barrier precautions reduces the risk of subsequent CVC related infection
Effective skin preparation will remove bacteria from both hair and skin, avoiding the need for shaving, which can result in microscopic damage and thus microbial colonisation. If hair removal is considered necessary, **clipping** is the preferred option using a disposable clipper head	Evidence suggests that shaving results in microscopic damage and thus microbial colonisation of the skin
Using Chlorhexidine 2% in 70% alcohol (1-2 applicators of Chloraprep 3mls) applying gentle friction, disinfect the skin insertion site for 30 seconds. Allow the antiseptic **to dry** before inserting the catheter. Use an alcoholic povidone-iodine solution for patients with a history of chlorhexidine sensitivity	Skin cleansing/antisepsis of the insertion site is one of the most important measures for preventing catheter related infection. EPIC (2006) recommends an alcoholic solution of chlorhexidine gluconate 2% as this combines the benefits of rapid action and excellent residual (ongoing) activity
The CVC should be firmly anchored to prevent movement using a mono filament suture	CVCs readily become colonised and carry micro-organisms from the skin into the insertion tract
Use a sterile, transparent, semi permeable polyurethane dressing CVC dressing ie IV 3000	To allow for continuous inspection of the site
If total parenteral nutrition is being administered use one central venous catheter or lumen exclusively for that purpose	
The procedure must be documented in the nursing and medical records, stating the name of the person inserting the CVC, the date of insertion, site, catheter size and reason for insertion (insert product label into patient's notes)	To meet legal and patient care requirements/facilitate audit
Radiological confirmation of the position of the catheter tip must be undertaken	To confirm precise location of the catheter tip

MAINTENANCE OF CVC	RATIONALE
The number of access points should be kept to a minimum	To reduce the risk of infection
IV administration sets should be changed: – When the vascular device is replaced – At 72 hour intervals (unless disconnected) – At the end of the infusion or within 24 hours of initiating the infusion when administering lipid emulsions. If the solution only includes glucose and amino acids, administration sets in continuous use do not need to be replaced more frequently than every 72 hours Blood transfusion administration sets should be changed: – On completion of transfusion or after two units when multiple units of blood are administered (excepting emergency blood transfusions)	To reduce the risk of infection
Intermittent administration sets should be changed every 24 hours, if remaining connected to the device or discarded after each use if disconnected eg flagyl bags	To reduce the risk of infection
The maximum expiry date for any infusion prepared in a clinical area is 24 hours or less in accordance with the manufacturer's specification of product characteristics	DH recommendation (2004) – to help avoid the risk of infection
Administration sets should be labelled with the date of commencement and anticipated change	To ensure that administration sets are changed according to policy
Catheters should be flushed at least once daily and pre and post drug administration with 5-10mls normal saline (0.9%) in a 10ml syringe. Flushing with normal saline between drug administration should be performed *** The normal saline (0.9%) should be prescribed on the drug chart. Alternatively a Patient Group Direction (PGD) can be used by a trained and competent PGD user**	To check patency pre infusion, to ensure no mixing of drugs occurs and to ensure no drug is left in the lumen of the line post drug infusion
The use of needleless connectors are recommended and should be used according to the manufacturers' instructions	Catheter hubs/ports are a potential source of entry for micro organisms

(recommendations for the frequency of change of needleless components). When needleless devices are used, healthcare personnel should ensure that all components of the system are compatible and secured, to minimise leaks and breaks in the system. When needleless devices are used, the risk of contamination should be minimised by decontaminating the access port with 2% Chlorhexidine in 70% alcohol unless contraindicated by the manufacturer's recommendations, in which case aqueous povidone iodine should be used	
The insertion site should be visually inspected at least daily for signs of local infection, eg heat, pain, tenderness, erythema, purulent discharge. The observation should be recorded in the nursing notes. Signs of infection should be reported immediately to the medical team who should consider removing the device	To detect signs of infection that are apparent at the insertion site
Using a aseptic technique, the dressing should be changed when no longer intact, or when moisture collects at the site (must be changed at least every 7 days) DH Guidance (2004)	To reduce the risk of infection
Hands should be decontaminated ideally using alcohol rub or washed using liquid soap and water	To reduce the risk of cross infection from the operators hands
Clean examination gloves may be used for undertaking dressings using a non-touch technique	
A sterile dressing pack must be used when changing the dressing. The area should be cleaned using 2% Chlorhexidine in 70% alcohol, clean the skin moving from the catheter insertion site outwards. The area should be allowed to dry. A sterile CVC dressing should be applied (use alcohol povidone iodine for patients with a history of chlorhexidine sensitivity). An aqueous solution of chlorhexidine gluconate should be used if the manufacturer's recommendations prohibit the use of alcohol with their product.	Skin cleansing/antisepsis of the insertion site is one of the most important measures for preventing catheter related infection. EPIC (2006) recommends an alcoholic solution of chlorhexidine gluconate 2% as this combines the benefits of rapid action and excellent residual (ongoing) activity
An aseptic technique should be applied for accessing the system, decontaminate hands, disinfect the external surfaces of the catheter hub before and after use, with 2% chlorhexidine in 70% alcohol, unless contraindicated by the manufacturer's recommendations when an aqueous povidone iodine solution should be used	Essential requirement to prevent cross infection

REMOVAL OF THE CVC	RATIONALE
Assess the need for continuing venous access on a regular basis and remove the CVC as soon as clinically possible	Evidence suggests that the longer a CVC remains in situ, the greater the risk of infection
Clean the skin with chlorhexidine 2% in 70% alcohol and allow to dry fully prior to removing the device	To ensure the catheter tip is obtained aseptically
Lie patient flat in bed (if patient will tolerate). Remove sutures. Ask patient to take a breath in, hold breath and remove CVC line	Prevent the possibility of air embolism
Avoid accidental contamination of the tip, if culture is clinically indicated, ie signs of infection, pyrexia, high WCC etc. In this case, cut off 5cm of the distal catheter tip with sterile scissors and place in a sterile container and send for Microscopy, culture and sensitivity (MC+S)	To ensure the catheter tip is obtained aseptically
Apply a sterile occlusive dressing to the site	To protect the insertion site whilst healing
The date of catheter removal should be documented in the nursing and medical records	To meet legal and patient care requirements

COMPETENCY ASSESSMENT FOR MANAGEMENT OF CENTRAL VEONUS CATHETER (CVC)

KSF dimension to which this Competency applies HWB5/6/7

Education / training required: Local training and supervised practice with a competent practitioner.

Minimum times skill to be performed under supervision: 5

Component	Statement of Competence	Performance evidence source	Minimal required competency level	Signature / date of Competent Practitioner acting as Supervisor	Self assessment by Practitioner confirming achievement of required competency level Signature / date Practitioner
Interpersonal skills / behavioural	• Introduces self to patient • Thoroughly explains procedure to patient ensuring patient's understanding and verbal consent obtained • Ensures patient comfort and dignity by exposing only relevant area Asks for assistance as required / recognises own limitations	**Trust policy**	**2**		

Performance of procedure (skill)	• Positively identifies verbally and by checking name band
	• Prepare patient and environment for procedure
	• Correct preparation of trolley and equipment for procedure
	• Decontaminate hands
	• Performs procedures in accordance with Trust policy and clinical practice guidelines:
	  • Accessing the line for treatment
	  • Correct administration of drugs with flushing between drugs
	  • Turbulent flushing of the line
	  • Dressing change
	  • Removal of CVC line
	• Correct disposal of equipment and sharps				

Related knowledge	• Demonstrates understanding of Code of Conduct, be able to identify own individual accountability and have a knowledge of Trust vicarious liability in relation to the management of CVC's • Competency in administration of intravenous drugs. • Have managers approval and support • A working knowledge of related Trust policies e.g. Sharps, infection control guidelines • Can discuss potential complications • Able to outline action to be taken in the event of adverse reaction • Have a working knowledge of all related guidelines and policies • Can use the patients observations to ascertain the possibility of a line related infection				
Documentation	• Document all interventions in appropriate nursing notes.				

COMPETENCY SIGNATORY SHEET CVC Management

Name:

Job Title:

Directorate:

Ward / Site:

Training – Including theory, including demonstration of technique and supervised practice

Date	Training session attended	Signature of trainer

Training elsewhere – Content verified as equivalent to above

Date training undertaken	Place where training undertaken	Signature of line manager

Supervised practice

Date	No	Competency level achieved	Supervisor signature	Practitioner signature
	1			
	2			
	3			
	4			
	5			

Please:

- send one copy of this competency signatory sheet once completed to your line manager for Clinical Governance purposes
- Retain the other for inclusion in your professional profile

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10 IMPORTANT POINTS FOR THE CARE OF SHORT TERM CENTRAL VENOUS CATHETERS (CVC's)

1. **CVC's are the commonest source of hospital-acquired bacteraemia and should therefore be removed at the earliest opportunity when no longer clinically required. Assess, and document, daily the need for continued use of the CVC**

2. **The insertion procedure should be performed in a clean area by a competent practitioner using an aseptic technique (including maximal barrier precautions sterile gloves, gowns and large drapes)**

3. **Prior to CVC insertion clean skin with 2% alcoholic chlorhexidine gluconate solution. (Chloraprep) Use an alcoholic providone-iodine solution for patients with a history of chlorhexidine sensitivity. Allow to dry**

4. **A sterile field must be maintained when disconnecting or manipulating any part of the system. Before accessing the system, disinfect the external surfaces with 2% Chlorhexidine in 70% Alcohol. Allow to dry**

5. **The insertion site should be visually inspected at least daily for signs of infection; the observation should be recorded in the nursing notes. Signs of infection should be reported to the medical staff**

6. **The number of access points should be kept to a minimum. The use of needleless connectors are recommended and it is essential to disinfect ports with 2% Chlorhexidine in 70% Alcohol prior to use**

7. **Dressings should be changed when no longer intact or when moisture collects at the site (at least every 7 days)**

8. **A sterile dressing pack must be used when changing the dressing. The area should be cleaned with 2% Chlorhexidine in 70% Alcohol moving from the catheter site outwards. using gauze swabs (providing it is compatible with the device). Allow to dry. Apply a sterile transparent CVC dressing (i.e IV 3000)**

9. **IV administration sets should be changed:**

- **When the vascular device is replaced**
- **At 72 hour intervals (unless disconnected)**
- **At the end of the infusion or within 24 hours of initiating the infusion when administering lipid emulsions**

Blood transfusion administration sets should be changed:

- **On completion of transfusion or after two units when multiple units of blood are administered (except in emergency situations)**

10. **IV infusion fluids should be renewed at least every 24 hours and whenever the administration set and/or catheter is changed**

Ref: Guidelines for the prevention of infections associated with intravascular devices (2002). (East Kent Hospitals NHS Trust)

CLINICAL GUIDELINE

The Placement and Management of Adult Valved (Groshong®) Skin Tunnelled Central Venous Catheters (T-CVC)

INTRODUCTION

The aims of these guidelines are:

- To provide comprehensive guidance in the application and management of Groshong® T-CVC in adult patients.

DEFINITION AND BACKGROUND EVIDENCE

A tunnelled central venous catheter is an indwelling catheter within the superior vena cava. These catheters are tunnelled via an incision to distance the entry site into the vein from the exit site on the skin, so providing a barrier to infection. They have a cuff part way along their length which is positioned inside the subcutaneous tunnel and tissue will granulate around this so reinforcing the barrier to infection (as well as stabilising the catheter).

The most common complications associated with T-CVC's are:

- Infection
- Thrombosis
- Occlusion
- Migration
- Damage/fracture of line

Unlike the traditional open-ended catheters, the Groshong ® catheter has a rounded, closed tip and features the patented Groshong valve.

The Groshong® valve opens inward for blood aspiration and outward for infusion, but remains closed when not in use. Because the valve remains closed when not in use, it literally seals the fluid inside the catheter and prevents it from becoming in contact with the patient's blood. Thus, weekly flushing with saline is all that is required to keep the catheter patent.

RECOMMENDATIONS FOR PRACTICE

- Referral for T-CVC placement by any health care professional who has recognised the need.
- Patient assessed by T-CVC placer for suitability of T-CVC placement, with consideration for patients' physical status and intravenous therapy requirements.
- Consent of consultant, or SPR in the consultant's absence.
- Written informed consent obtained from patient.
- Suitable time for T-CVC placement agreed with placer, patient and clinical department.
- Two-dimensional (2-D) imaging ultrasound guidance is recommended as the preferred method for insertion of tunnelled central venous catheters (T-CVC's).
- It is recommended that all those involved in placing T-CVCs using two-dimensional (2-D) imaging ultrasound guidance should undertake appropriate training to achieve competence.
- Chest x-ray post insertion to establish tip of T-CVC in Superior Vena Cava (preferably lower third) before T-CVC is used.
- Full documentation of procedure in patient medical records, which should include internal and external length of T-CVC.
- Completion of T-CVC record form.
- Educational information for patient or family where appropriate.

INDICATIONS FOR USE

Placement of a T-CVC should be considered for patients who meet the following criteria:

- Delivery of Total Parental Nutrition (TPN)
- Delivery of intravenous therapy with a duration of more than 2 weeks
- Delivery of chemotherapy
- Delivery of irritant or vesicant intravenous therapy
- When PICC contraindicated (see assessment tool).

PROFESSIONAL, TRUST AND LEGAL REQUIREMENTS

Nurses, Midwives and Allied Health Professionals:

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All AHP's are State Registered with the Health Professions Council and 'will keep their knowledge and skills up to date and act within the limits of their knowledge and experience' (HPC Standards 2003).

Medically Qualified Personnel:

The General Medical Council (GMC) "Good Medical Practice 2006" states that:

In providing care you must recognise and work within the limits of your competence (3a). You must keep your knowledge and skills up to date throughout your working life. You should be familiar with relevant guidelines and developments that affect your work. You should regularly take part in educational activities that maintain and further develop your competence and performance (12).

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GROSHONG® T-CVC MANAGEMENT

Basic Equipment to Access Line Steps 1 - 8, 22 - 25

Cleaned dressing trolley with yellow bag attached
Sterile basic procedure pack
Plastic apron
Sterile gloves of the correct size
Chlorhexidine 2% in 70% alcohol
Sharps bin
PLUS

Take blood sample from Groshong® T-CVC steps 9 -12

2 x 10ml leur slip syringe
Blue needles x2
10 mls 0.9% Sodium Chloride
Required sample bottles
A blue vacutainer adaptor and hub or extra 10ml or larger syringe & blood transfer device
Either Needle-free access device (bung) if needs changing (refer to manufacturers recommendation)
Or single use bung if line is only accessed once a week

Flush Groshong® T-CVC steps 13 - 17

2 x 10ml leur slip syringe
10mls 0.9% Sodium Chloride
Either Needle-free access device (bung) if needs changing (refer to manufacturers recommendation)
Or single use bung if line is only accessed once a week

Dressing change of a Groshong® T-CVC steps 18 -21

Transparent semi-permeable occlusive dressing (e.g. IV 3000)

ACCESSING CATHETER:

PROCEDURE	RATIONALE
1. Check patient identity	**Ensure correct patient**
2. Explain the procedure to the patient giving the opportunity for questioning	**To ensure patients understanding and obtain informed consent**
3. Establish appropriate positioning, ensuring that there is adequate lighting and ventilation	**Ensuring comfort and safety for patient and nurse**
4. Decontaminate hands using: • alcohol hand rub for visibly clean hands • **otherwise wash hands then apply alcohol rub**	**To minimise the risk of cross infection. To comply with EPIC guidelines for hand washing**
5. Open out sterile pack. Open all required sterile equipment onto pack with a drop technique	**To maintain asepsis following EPIC guidelines**
6. Decontaminate hands with alcohol rub and don sterile gloves	**To minimise risk of infection and maintain asepsis**

And/Or if taking blood and flushing

7. Draw up 10mls 0.9% sterile saline solution into 1 x 10ml syringe without handling ampoule	
8. Place sterile sheet across chest	**To maintain asepsis**
9. Holding line with sterile gauze **Either** • **Remove single use bung or needle free access device (if it has been in situ for more than one week)** • **Clean end of line with Chlorhexadine 2% in 70% alcohol for 30 seconds and allow to dry** • **Drop end of line onto sterile sheet** **Or** • **Clean bung with Chlorhexadine 2% in 70% alcohol for 30 seconds and allow to dry** • **Drop end of line onto sterile sheet**	**To maintain asepsis following EPIC guidelines**
10. Insert empty syringe into bung and gently aspirate, allowing a few seconds for valve to open. Withdraw 5mls blood and discard	**To ensure catheter patency**
11.Withdraw the amount of blood required using either: • **blue vacutainer adapter and required bottles. Or** • **a syringe of the correct volume for the blood to be transferred into the correct bottles using sterile transfer device**	**To obtain the correct volume of blood**
12. Flush with 10mls normal saline 0.9% using a push pause technique. Before the last 1 – 2 mls goes in, start to remove the syringe while still pushing in the saline	**To remove blood from the line. To ensure positive pressure is maintained in the line and prevent backflow into the line**

Or if flushing only

13. Draw up 10mls 0.9% sterile saline solution into 1 x 10ml syringe without handling ampoule	
14. Place sterile sheet under bung	
15. Holding line with sterile gauze, Either	**To maintain asepsis following EPIC guidelines**

• Remove single use bung or needle free access device (if it has been in situ for more than one week) • Clean end of line with Chlorhexadine 2% in 70% alcohol for 30 seconds and allow to dry • Drop end of line onto sterile sheet **Or** • Clean bung with Chlorhexadine 2% in 70% alcohol for 30 seconds and allow to dry. • Drop end of line onto sterile sheet	
16. Insert empty syringe into bung and gently aspirate, allowing a few seconds for valve to open. Withdraw 5mls blood and discard	**To ensure catheter patency**
17. Flush with 10mls normal saline 0.9% using a push pause technique. Before the last 1 – 2 mls goes in, start to remove the syringe while still pushing in the saline	**To remove blood from the line. To ensure positive pressure is maintained in the line and prevent backflow into the line**

And/Or if changing dressing

18. Remove transparent semi-permeable dressing, making sure the dressing is removed from the bottom upwards	**To ensure T-CVC is not pulled out**
19. Clean exit site with the Chlorhexadine 2% in 70% alcohol using a circular technique working from the centre outwards	**To minimise contamination of exit site**
20. Allow to dry for 30 seconds	**To minimise the risk of contamination and destroy skin flora**
21. Apply new transparent semi-permeable dressing if necessary, making sure the exit site is covered (see notes)	**To provide complete occlusion until site healed and to follow patient preference**

FINALLY steps 22-25

22. Position a piece of gauze under the bung	**To prevent pressure on the skin from the bung and the line**
23. Remove gloves and decontaminate hands	**To reduce the risk of infection**
24. Dispose of sharps and other waste correctly	**To prevent needle-stick injury and comply with Trust policy**
25. Document date and time of this procedure in the nursing notes along with any problems	**Maintain accountability**

NOTES

Refer to the troubleshooting section for management of suspected problems.

Whilst in hospital and regularly thereafter, the exit site should be observed at least daily for signs of infection e.g. redness or swelling around catheter. Patients should be instructed to report discomfort/redness.

SUTURES

Any sutures around the insertion site (usually in the neck) will need to be removed 7 days following incision. The wound should be cleaned and redressed with a dry dressing if necessary.

The suture at the exit site, securing the catheter in place, should remain in place for 6 weeks. The area should be cleaned with Chlorhexadine 2% in 70% alcohol.

DRESSINGS

It is not necessary to dress the site once it is healed. If the patient prefers to have the site covered use a transparent semi-permeable dressing (e.g. IV3000).

BUNGS

If line is accessed once a week only, a single use bung may be used and replaced at steps 9 or 14.

Follow the manufacturer's instructions relating to replacement of needle free access bungs.

REMOVAL of t-cvc

1. Tunnelled central venous catheters must only be removed by staff **trained in this technique.**

2. **If clinically indicated** the tip should be sent for culture. In this case, cut off 5cm of the distal catheter tip with **sterile** scissors and place directly into a sterile universal container. Complete the microbiology form and label the container before sending to Microbiology for MC+S.

3. **The date of catheter removal must be documented in the nursing and medical notes**.

COMPETENCY ASSESSMENT FOR MANAGEMENT OF VALVED SKIN-TUNNELLED CENTRAL CATHETER (T-CVC)

KSF dimension to which this Competency applies HWB5/6/7

Education / training required: Local training and supervised practice with a competent practitioner.	**Minimum times skill to be performed under supervision: 4**

Component	Statement of Competence	Performance evidence source	Minimal required competency level	Signature / date of Competent Practitioner acting as Supervisor	Self assessment by Practitioner confirming achievement of required competency level Signature / date Practitioner
Interpersonal skills / behavioural	• Introduces self to patient • Thoroughly explains procedure to patient ensuring patient's understanding and verbal consent obtained • Ensures patient comfort and dignity by exposing only relevant area Asks for assistance as required / recognises own limitations	**Trust policy**	**2**		

Performance of procedure (skill)	• Positively identifies verbally and by checking name band
	• Prepare patient and environment for procedure
	• Correct preparation of trolley and equipment for procedure
	• Decontaminate hands
	• Performs procedures in accordance with Trust policy and clinical practice guidelines:
	  • Taking blood
	  • Accessing the line for treatment
	  • Turbulent flushing of the line
	  • Dressing change
	• Correct disposal of equipment and sharps				

Related knowledge	• Demonstrates understanding of Code of Conduct, be able to identify own individual accountability and have a knowledge of Trust vicarious liability in relation to the management of T-CVC's • Competency in administration of intravenous drugs. • Have managers approval and support • A working knowledge of related Trust policies e.g. Sharps, infection control guidelines • Can discuss potential complications • Able to outline action to be taken in the event of adverse reaction • Have a working knowledge of all related guidelines and policies				
Documentation	• Document all interventions in appropriate nursing notes.				

COMPETENCY SIGNATORY SHEET T-CVC Management

Name:

Job Title:

Directorate:

Ward / Site:

Training – Including theory, including demonstration of technique and supervised practice

Date	Training session attended	Signature of trainer

Training elsewhere – Content verified as equivalent to above

Date training undertaken	Place where training undertaken	Signature of line manager

Supervised practice

Date	No	Competency level achieved	Supervisor signature	Practitioner signature
	1			
	2			
	3			
	4			

Please:

- send one copy of this competency signatory sheet once completed to your line manager for Clinical Governance purposes
- Retain the other for inclusion in your professional profile

TROUBLESHOOTING TIPS FOR ADULT VALVED (GROSHONG®) SKIN TUNNELLED CENTRAL VENOUS CATHETERS (T-CVC)

Nursing assessment	Nursing intervention
Accidental catheter removal	If witnessed apply pressure dressing at the neck insertion site for at least 5 minutes and notify clinician. If un-witnessed check for haemorrhage.
Apparent increase in external length of T-CVC. Possible partial removal of T-CVC	External length should be documented in notes and checked at each access. Measure the catheter length to determine if measurements coincide with catheter insertion measurements.
Fluid leak at insertion site	May be related to a hole or tear in the catheter or a loose connection between catheter and connection tubing. Repairs can be made; discuss with competent clinician. Check connections using sterile technique. Never use scissors to remove tape or dressing.
Pain, redness, drainage at insertion site	May be related to movement of the T-CVC, skin irritation or infection. Ensure sutures removed after 6 weeks. Reposition the catheter hub, check statlock applied correctly, swab site, apply sterile dressing. Monitor skin irritation or infection and check cultures results. Consult with doctor for antibiotics. Follow infection guidelines. Review in 3 days or if symptoms worsen.
Pain in arm, ear, shoulder	May be due to thrombosis of the superior vena cava, misplacement of the T-CVC in the internal jugular vein or internal T-CVC leak. Check if able to aspirate blood. Follow flow chart (appendix 4). May require further CXR or venogram performed to determine if DVT or T-CVC migration.
Pump occlusion alarm	Assess for kink in IV tubing or in T-CVC at dressing site and for occlusion in catheter. If unable to aspirate blood from line follow the flow chart (Appendix 4).
Unable to aspirate blood from T-CVC	See Appendix 4

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CLINICAL GUIDELINE

The Placement and Management of Adult Non-valved T-CVC (HICKMAN®) Skin Tunnelled Central Catheters

INTRODUCTION

The aims of these guidelines are:

- To provide comprehensive guidance in the application and management of Hickman® non-valved T-CVC in adult patients.

DEFINITION AND BACKGROUND EVIDENCE

A tunnelled central venous catheter is an indwelling catheter within the superior vena cava. These catheters are tunnelled via an incision to distance the entry site into the vein from the exit site on the skin, so providing a barrier to infection. They have a cuff part way along their length which is positioned inside the subcutaneous tunnel and tissue will granulate around this so reinforcing the barrier to infection (as well as stabilising the catheter).

Non-valved Hickman® Lines are used primarily within the Haematology setting. Double lumen lines are used for general haematology. Triple Lumen lines are required for patients undergoing stem cell/bone marrow transplant at a specialist hospital.

The most common complications associated with non-valved T-CVCs are:

- Infection
- Thrombosis
- Occlusion
- Migration
- Damage/fracture of line

In 2003, the Department of Health commissioned National Guidance for preventing hospital acquired infections (HAI) in primary and community care services from the NICE. The following guidelines incorporate this guidance.

RECOMMENDATIONS FOR PRACTICE

- Referral for non-valved T-CVC placement by any health care professional who has recognised the need.
- Patient assessed by non-valved T-CVC placer for suitability of non-valved T-CVC placement, with consideration for patients' physical status and intravenous therapy requirements.
- Consent of consultant, or SpR in the consultant's absence.
- Informed consent obtained from patient.
- Suitable time for non-valved T-CVC placement agreed with placer, patient and clinical department.

- Two-dimensional (2-D) imaging ultrasound guidance is recommended as the preferred method for insertion of tunnelled central venous catheters (non-valved T-CVCs).
- It is recommended that all those involved in placing non-valved T-CVCs using two-dimensional (2-D) imaging ultrasound guidance should undertake appropriate training to achieve competence.
- Chest x-ray post insertion to establish tip of non-valved T-CVC in Superior Vena Cava (preferably lower third) before non-valved T-CVC is used.
- Full documentation of procedure in patient medical records, which should include internal and external length of non-valved T-CVC.
- Completion of non-valved T-CVC record form.
- Educational information for patient or family where appropriate.

INDICATIONS FOR USE

Placement of a non-valved T-CVC should be considered for patients who meet the following criteria:

Double Lumen:

- Delivery of inpatient chemotherapy for Acute Leukaemia or relapsed Lymphomas prior to Autologous Stem cell transplant

Triple Lumen:

- For patients potentially undergoing Allogenic Stem cell transplant at a Specialist centre

PROFESSIONAL, TRUST AND LEGAL REQUIREMENTS

Nurses, Midwives and Allied Health Professionals:

The professional position is that the NMC Code of Professional Conduct (2008) places specific responsibility on registered nurse/midwife practitioners. The registered nurse/midwife is personally accountable for their practice and, in the exercise of professional accountability, must acknowledge any limitations in their knowledge and competence and decline any duties or responsibilities unless able to perform them in a safe and skilled manner.

All AHP's are State Registered with the Health Professions Council and 'will keep their knowledge and skills up to date and act within the limits of their knowledge and experience' (HPC Standards 2003).

Medically Qualified Personnel:

The General Medical Council (GMC) "Good Medical Practice 2006" states that:

In providing care you must recognise and work within the limits of your competence (3a). You must keep your knowledge and skills up to date throughout your working life. You should be familiar with relevant guidelines and developments that affect your work. You should regularly take part in educational activities that maintain and further develop your competence and performance (12).

Note must be made of these points when performing clinical skills.

The Trusts position is that it accepts liability for the action of those practitioners who have completed the identified training for this skill and are able to provide evidence of their competency. This information should be recorded on the competency signatory sheet and sent to the line manager.

COMPETENCY ASSESSMENT FOR MANAGEMENT OF NON - VALVED SKIN-TUNNELLED CENTRAL CATHETER

KSF dimension to which this Competency applies HWB5/6/7

Education / training required: Local training and supervised practice with a competent practitioner.

Minimum times skill to be performed under supervision: 4

Component	Statement of Competence	Performance evidence source	Minimal required competency level	Signature / date of Competent Practitioner acting as Supervisor	Self assessment by Practitioner confirming achievement of required competency level Signature / date Practitioner
Interpersonal skills / behavioural	• Introduces self to patient • Thoroughly explains procedure to patient ensuring patient's understanding and verbal consent obtained • Ensures patient comfort and dignity by exposing only relevant area Asks for assistance as required / recognises own limitations	**Trust policy**	**2**		

Performance of procedure (skill)	• Positively identifies patient by verifying patients name, date of birth and photograph.
	• Prepare patient and environment for procedure
	• Correct preparation of trolley and equipment for procedure
	• Decontaminate hands
	• Performs procedures in accordance with Trust policy and clinical practice guidelines:
	  • Taking blood
	  • Accessing the line for treatment
	  • Turbulent flushing of each lumen
	  • Flushing each lumen with 50iu of hepsal
	  • Dressing change
	• Correct disposal of equipment and sharps				

Related knowledge	• Demonstrates understanding of Code of Conduct, be able to identify own individual accountability and have a knowledge of Trust vicarious liability in relation to the management of T-CVC's • Competency in administration of intravenous drugs. • Have managers approval and support • A working knowledge of related Trust policies e.g. Sharps, infection control guidelines • Can discuss potential complications • Able to outline action to be taken in the event of adverse reaction • Have a working knowledge of all related guidelines and policies				
Documentation	• Document all interventions in appropriate nursing notes.				

COMPETENCY SIGNATORY SHEET T-CVC Management

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Date	No	Competency level achieved	Supervisor signature	Practitioner signature
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	2			
	3			
	4			

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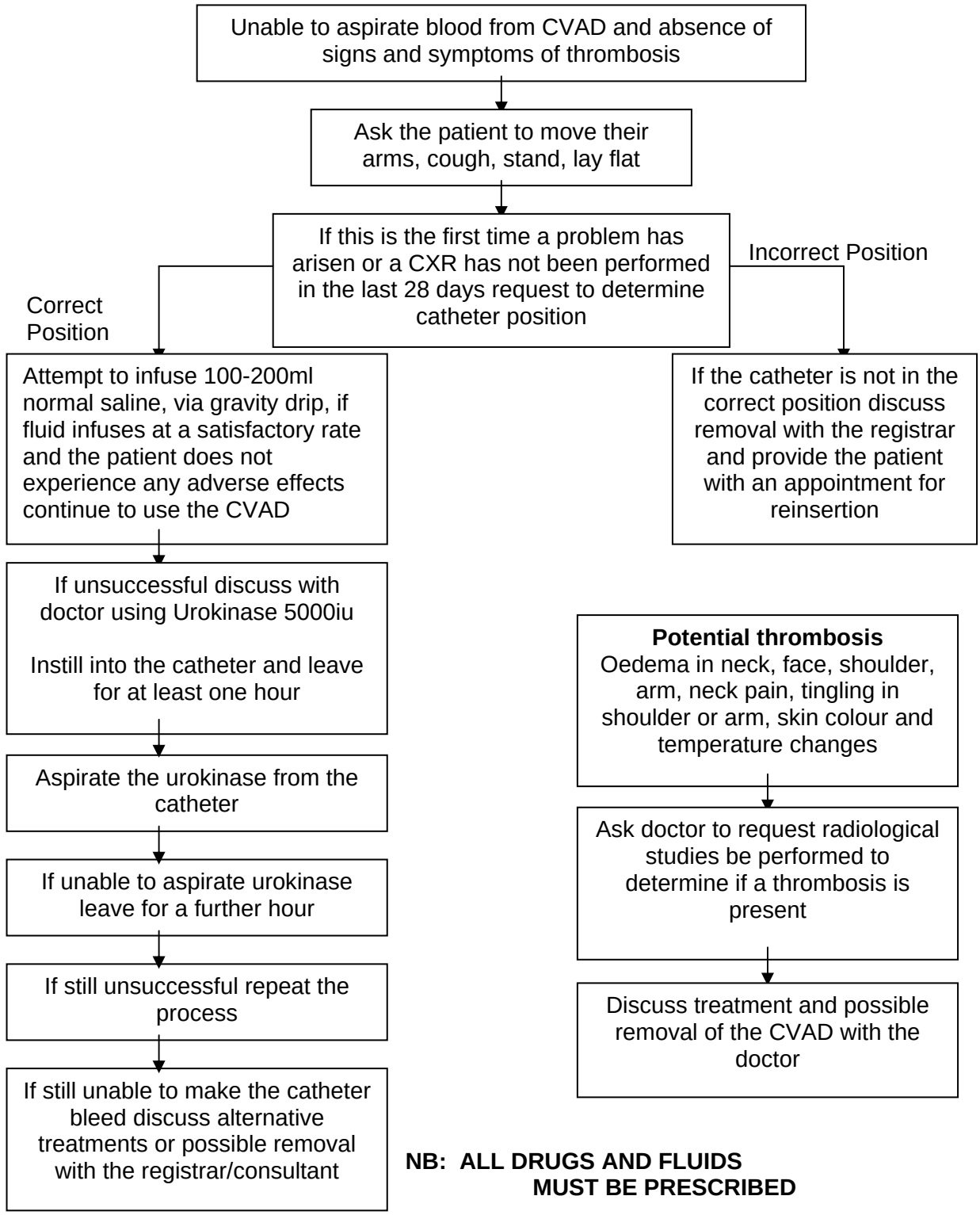
Central Venous Catheter Action Flow Chart - Problem: Unable to aspirate blood from CVAD



NB: ALL DRUGS AND FLUIDS MUST BE PRESCRIBED

TROUBLESHOOTING TIPS FOR ADULT NON-VALVED SKIN TUNNELLED CENTRAL VENOUS CATHETERS (T-CVC)

Nursing assessment	Nursing intervention
Accidental catheter removal	Apply pressure dressing at the neck insertion site for at least 5 minutes and notify clinician.
Apparent increase in external length of T-CVC. Possible partial removal of T-CVC	External length should be documented in notes and checked at each access. Measure the catheter length to determine if measurements coincide with catheter insertion measurements.
Fluid leak at insertion site	May be related to a hole or tear in the catheter or a loose connection between catheter and connection tubing. Repairs can be made; discuss with competent clinician. Check connections using sterile technique. Never use scissors to remove tape or dressing.
Pain, redness, drainage at insertion site	May be related to movement of the T-CVC, skin irritation or infection. Ensure sutures removed after 6 weeks. Reposition the catheter hub, check statlock applied correctly, swab site, apply sterile dressing. Monitor skin irritation or infection and check cultures results. Consult with doctor for antibiotics. Follow infection guidelines. Review in 3 days or if symptoms worsen.
Pain in arm, ear, shoulder	May be due to thrombosis of the superior vena cava, misplacement of the T-CVC in the internal jugular vein or internal T-CVC leak. Check if able to aspirate blood. Follow flow chart. May require further CXR or venogram performed to determine if DVT or T-CVC migration.
Pump occlusion alarm	Assess for kink in IV tubing or in T-CVC at dressing site and for occlusion in catheter. If unable to aspirate blood from line follow the flow chart (Appendix 4)
Unable to aspirate blood from T-CVC	See above flow diagram

References:

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Wilson J. Infection Control in clinical practice. USA: Baillierre Tindal, 1995

CLINICAL GUIDELINE

The placement and management of adult, arterial lines within Critical Care areas

INTRODUCTION

The aims of these guidelines are:

- To provide guidance in the placement and management of arterial lines in adult patients
- To provide competency based guidance in the ongoing care and management of arterial lines

DEFINITION AND BACKGROUND EVIDENCE

An arterial line is a small cannula. It is inserted in to an artery and through its connection with specific monitoring tubing, can continuously monitor blood pressure. As blood flows past the catheter tip, the pressure generated by that flow is sensed by a section of the tubing known as a transducer. The transducer conveys this information to the bedside monitor, which in turn converts it into useable and recognisable data, in the form of arterial pressure waveforms and numerical BP readings. In addition to BP recording it can be used to obtain arterial blood samples, essential for analysing arterial blood gases. It is also a useful way of obtaining regular blood samples for investigations avoiding continuous discomfort to the patient.

Arterial lines can be used in patients with any condition that necessitates continuous or very frequent BP monitoring. Some of the most common indications are fluctuating BP in critically ill patients. Those patients with sepsis and hypotension, receiving vasocative drugs require continuous BP monitoring. Hence the use of arterial lines is restricted to Critical Care areas and theatres where patients can be closely observed.

The placement of arterial lines is undertaken in normal circumstances by a doctor and typically by intensivists. However it is essential for nurses involved in managing these patients to be familiar with the insertion procedure so that she/he can anticipate problems or patient needs.

CLASSIFICATION OF RECOMMENDATIONS

Placement of an arterial line should be considered for patients who meet the following criteria:

- **The patient is being nursed in a Critical Care area where appropriate observation and supervision is available.**
- **The patient is undergoing a surgical procedure/general anaesthetic where haemodynamic and blood gas monitoring would aid intra-operative and post operative management.**
- **The patient requires continuous or regular blood pressure recordings.**
- **The patient requires frequent arterial blood sampling.**

PROFESSIONAL, TRUST AND LEGAL REQUIREMENTS

The professional position is the NMC Code of Professional Conduct (2008) places specific responsibility on registered nurse/midwife practitioners. The registered nurse/midwife is personally accountable for their practice and in the exercise of his/her professional accountability must acknowledge any limitations in their knowledge and competence and decline and duties or responsibilities unless able to perform them in a safe and skilled manner. Doctors are personally accountable for their practice and have specific responsibilities follow the GMC guidelines.

The Trusts position is that it accepts liability for the action of those practitioners who have completed the identified training for this skill and are deemed competent by their clinical supervisor and who have updated their skills according to this clinical guideline.

Vessels used for cannulation

By definition an arterial line is inserted into an artery. The most common vessel chosen for arterial cannulation is the radial artery (Allan 1989, Stein 1983), because of ease of use, accessibility and a decreased risk of complications when compared to larger vessels such as the femoral artery. In addition, the radial artery is considered to be a safe site for cannulation due to the collateral hand circulation supplied by the ulnar artery (Barbers 1994). An arterial line can also be inserted into other arteries such as the brachial and dorsalis pedis in the foot however this is usually because radial artery cannulation is unsuccessful and not because it is the first vessel of choice. The dorsalisis pedis artery should be avoided in cases of perhperial vascular disease and advanced diabetes (Stein 1983). The femoral artery cannulation should be considered carefully because of the positioning and comfort of the patient. These cannula/s can become easily displaced and it is very difficult to observe the placement without compromising patient dignity.

The radial artery is a common site for cannulation and line placement in the critically ill patient. Placement in the radial artery is favored for several reasons. First this vessel serves areas that are well supplied with collateral circulation which minimises the risk of ischemic complications if the vessel occludes. Secondly this artery is superficial and easily located. The location is easily observed and can be maintained with the use of the thumb as an anchor for the line. Finally, this site location is anatomically stable because the radius acts as a natural splint to stabilize the radial artery.

The radial artery is a branch of the brachial artery. It extends down the anterior aspect of the forearm, where it interconnects with the ulnar artery by two vascular arches within the hand. The ulnar artery extends down the ulnar aspect of the forearm to the wrist providing excellent collateral circulation.

Nerve supply to the wrist area is provided by a number of nerves. The median nerve is the closest nerve to the radial artery. It stimulates the motor functions of the forearm and three lateral digits of the hand. It also provides sensory function to the four lateral digits of the hand.

Collateral Circulation

To ensure continued viability of the hand the assessment for collateral circulation must be established. Radial artery thrombosis will result in ischemic injury to the hand if collateral circulation is incomplete or absent. It is essential before cannulation of the radial artery that collateral flow is demonstrated. Collateral circulation to the hand is provided by the palmar arches should the radial or ulnar arteries become obstructed. The Modified Allen test is the most frequently used and practical method for assessing collateral circulation.

Modified Allen Test

While the patient's hand is held overhead or out in front, ask them to clench their fist, while the radial and ulnar arteries are compressed. Open and close the fist to exanguinate the hand. If your patient is unconscious or under anesthesia, clench their fist passively for them. Have the patient open their hand, release the pressure over the ulnar artery and observe the open palm for return of colour. Return should occur within six seconds. Any delay indicates that collateral blood flow is marginal and the radial artery should not be used unless there is no alternative.
Note: If colour does not occur for over 15 seconds, the radial artery must not be cannulated.

Equipment needed to insert arterial catheters

Arterial cannula of choice

Sterile gloves

Clean dressing trolley

Alcoholic Chlorhexidine for skin disinfection

A pre prepared, fully primed transducer set (described below)

Sterile gloves

Lignocaine 1%

2ml syringe with needle

Transparent semi-permeable dressing

Gauze swabs

Procedure for priming the transducer set

1. **Collect equipment**
2. **Wash hands**
3. **Insert fluid bag (500mls Normal saline) into the pressure infuser securing hanging loop through the fluid bag. Hang on drip stand**
4. **Open transducer tubing and ensure all connections are tight (McGhee and Bridges 2002)**
5. **Take the fluid spike and insert it into the IV tubing post on the fluid bag, being careful not to puncture the bag. Inflate pressure bag to 300mmHg using the attached hand pump**
6. **Holding the end connection over a clean collection pot and being careful not to contaminate it, prime the transducer catheter and the stopcock ports with fluid until all air has been removed from the system. The type of flush mechanism will vary depending on the manufacturer of the transducer system. It is important to ensure that all air bubbles are primed from the system as their presence can lead to errors in measurement (McGhee and Bridges 2002)**
7. **Transducer tubing comes assembled with open-ended/priming caps in place, which allow the user to purge the system of air without removing the caps. However, once the system has been primed the open-ended caps should be removed and the separate dead-end cap should be applied to all ports. Not applying dead-end caps can pose an infection risk**
8. **Attach transducer cable to transducer tubing and to the bedside monitor**
9. **Finally, the transducer needs to be zeroed to atmospheric pressure. Known as re-zeroing this procedure promotes accuracy (Imperial-Perez and McRae 2002, Smith et al 2004). The zeroing procedure should be followed as directed by the manufacturer's instructions, but should always be performed at the level of the fourth intercostals space or mid-axillary's line**
10. **The transducer set is now complete and the tubing is ready to connect to the arterial catheter once it has been inserted.**

Adapted from Garretson S (2005) Haemodynamic monitoring: arterial catheters. Nursing Standard. 19, 31, 55-64

Insertion Procedure

Procedure	Rationale
Explain procedure to patient	**Where the patient is awake and cooperative he/she allows the procedure to take place with an understanding of the potential complications and benefits of the procedure**
Ask patient if he/she has any allergies to skin preparation or Lignocaine	**To avoid allergic reactions**
Assess patient for contraindications for procedure (e.g. Coagulopathy; thrombolytics; high dose/IV anticoagulants)	**To avoid potential bleeding complications**
Use an aseptic, non touch technique	**To reduce the risk of infection**
Decontaminate hands using alcohol hand rub or handwashing with liquid soap	**To minimise risk of cross infection**
Prepare all equipment required for the procedure	**To ensure a smooth procedure and sterile technique**
Perform the modified Allen's test on both of the patient's hands	**It is a simple clinically reliable manoeuvre for assessing collateral circulation to the hand before radial artery puncture** **It will assess the ulnar artery collateral flow to the hand** **Reperfusion of the hand within 6 seconds of release of the ulnar artery, identifies that the radial artery is capable of supplying the entire hand while the radial artery is occluded**
Limitations to the Allen test	**It cannot be performed properly in an uncooperative or unconscious patient** **Previous radial artery cannulation frequently obliterates the pulse** **Patients in shock with circulatory insufficiency, present a particularly difficulty in assessment** **Wrist or palm burns or injuries make assessment impossible** **The test is inconclusive if the reperfusion is greater than 10 to 15 seconds**

Examine the wrist and position the patient so the hand is dorsi flexed at the wrist approximately 60^{o} and palpate the artery	**Ensure that the position is not uncomfortable for the patient** **A rolled or folded towel placed under the wrist and securing the fingers with tape, will help maintain wrist hyperextension** **Identify abnormalities that may eliminate the site for needle puncture**
Decontaminate hands using alcohol hand rub and then apply examination gloves	
Disinfect site with chlorhexidine and alcohol solution for 30-60 seconds (included in the pack). Use an alcoholic povidone-iodine solution for patients with a history of chlorhexidine sensitivity. Allow the antiseptic to dry before inserting the catheter. Allow to air dry. Do not re-palpate the vein or touch the skin	**To minimise risk of infection**
Draw up 0.5 - 2.0 ml of 1% Lignocaine. Locate the artery by palpation. Inject in the area of anticipated puncture site until a small wheal is seen (after first withdrawing and ruling out venous/arterial puncture) **(*Lignocaine should be prescribed by a doctor or by a patient group direction*)**	**To anaesthetise the area of insertion, local anaesthetic can prevent arterial vasospasm, which can complicate insertion** **Excessive anaesthetic may obscure the anatomy** **After needle is inserted, draw back on the syringe to ensure you are in the subcutaneous space and not in a blood vessel**
Insert the catheter 	**The artery is palpated with one hand and the catheter is in the other** **Hold the catheter like a pencil with the bevel up when inserting the needle** **Insert the needle at an angle 3-45^{o} to the skin and advance the needle into until blood appears in the hub of the needle** **When there is a blood flash indicating puncture of the artery attach the newly zeroed transducer system** **Maximum number of attempts 2-3**

Apply dedicated sterile, vapour permeable, sterile IV cannula dressing	**To minimise risk of infection and to secure the cannula**
Attachment to the monitor assembly and securing	**The hand and wrist are cleaned and dried following the attachment to the monitoring assembly** **Check monitor for acceptable waveform**
Document insertion time, date, site, size of cannula, batch number, and name of person inserting the device	**To meet legal and patient care requirements**

Management of an arterial line

IV administration sets should be changed: – When the vascular device is replaced – At 72 hour intervals	DH recommendation (2004)
When manipulating the line/cannula a non-touch technique should be applied. Ensure equipment in contact with the circuit is sterile eg syringes	To prevent cross infection (RCN recommendation 2005)
Prior to accessing the system, disinfect access ports using Chlorhexidine 2% in 70% Alcohol unless contraindicated by manufacturer's recommendations. Use 70% alcohol in this case	Essential to prevent entry of microorganisms into the system via the portal
The dressing should be changed when it becomes loose, damp or soiled	To reduce the risk of cross infection
An aseptic non-touch technique should be used when changing the dressing. The area should be cleaned with alcohol chlorhexidine moving from the catheter site outwards, providing it is compatible with the device. The area should be allowed to **dry** and a sterile dressing applied (use an alcoholic povidone iodine for patients with a history of chlorhexidine sensitivity)	Skin cleansing/antisepsis of the insertion site is one of the most important measures for preventing catheter related infection
A cannula that has migrated externally should not be readvanced prior to restablisation	
The site should be examined at least daily to ensure the device has not become dislodged, for signs of infection and extravasation. This must be recorded	To identify mechanical complications and signs of infection
If the site appears infected, a swab should be taken and sent with the tip of the cannula to Microbiology for culture and sensitivity. Complete infection incident form	The microbiology results may indicate which antibiotic is required should the patient develop signs of septicaemia
Any incidence of phlebitis, along with intervention, treatment, and corrective action, should be documented in the patients' nursing notes	To provide evidence of any actions taken and aid communication
Arterial cannula should be removed as soon as clinically possible	The longer an arterial cannula remains in situ, the greater the risk of infection

Preventing and Managing Complications

In order that risks to patients are minimised the procedure will only be performed on individuals who are patients within the ICU, HDU, CCU or Operating Department

Complication	Signs and Symptoms	Possible Causes	Intervention/Prevention
Thrombosis	loss or weaker pulse below the site loss of warmth, sensation, mobility no waveform	Damage to artery during or after insertion failure to flush catheter occurs in 40-50% of all radial artery cannulation	monitor patient pulse post insertion proper securing and support of the limb
Exsanguination	blood around the insertion site blood leakage from connectors	disconnected line or dislodged catheter	stop bleeding by removing catheter and applying pressure check all connections when initially setting up keep arm visual and lines untangled to prevent accidentally dislodging or disconnection
Embolism (air)	dampened wave form change in vital signs, tachycardia cyanosis, loss of consciousness	air in tubing, loose connections less common than thrombosis	ensure all air is removed from the line before connecting check line for secure connections frequently, especially after transferring patient to another bed etc.
Haematoma	swelling of limb or site	leakage of blood at site following insertion failure to apply pressure at the site following removal	tape and secure line properly if haematoma appears within 30 minutes of insertion, remove and apply pressure for 10 minutes when removing the line ensure pressure is applied followed by a pressure dressing
Arterial Spasm	irregular or dampened waveform on the monitor loss of pulse or weakening below the insertion site	trauma to the artery by the catheter irritation of the artery by the catheter	secure the catheter properly to prevent the catheter movement splint the patients limb to assist in stabilization
Infection	Redness, pain , inflammation at insertion site increase temperature and pulse rate	poor aseptic technique contamination of the line with dressing change	care of line to prevent contamination improve aseptic technique

Adverse incidents and complications that arise as a result of arterial cannulation will be reported and investigated through the adverse incident reporting system within the Trust. Through this process changes in practice to safeguard the patient and minimise risks will be expedited.

Removal of arterial cannula

Equipment

Clean gloves
Sterile gauze and tape
Sharps bins

PROCEDURE	RATIONALE
Removal of the intravenous cannula should be an aseptic procedure	To prevent cross infection as well as contamination of the catheter tip
Explain procedure to the patient and gain consent	To ensure patient understanding
Decontaminate hands using alcohol hand rub or by handwashing with liquid soap	To reduce cross infection
Apply clean examination gloves	To maintain universal precautions
Remove dressing	To expose cannula site
Gently withdraw cannula applying pressure on the insertion site. This should be maintained for at 5 minutes	To ease withdrawal and prevent haematoma formation
Check integrity of cannula before disposing into sharps bin	To ensure all removed
When bleeding has stopped apply gauze dressing	To aid healing
Document the date and time of removal in the patients notes including the name of the person removing the device	To meet legal requirements

Guidelines for Supervision and Assessment

Supervisors and assessors must be competent to practice the arterial cannulation.

In order to be deemed competent, and before arterial cannulation may be performed independently, it is mandatory that the learner demonstrate skill and understanding in four separate clinical assessments during the formal assessment.

If possible you should be supervised by the same person each time, although it is recognised that this may not always be possible. Before commencing supervised practice, every effort should be made to identify a named supervisor / assessor.

The 'Record of Training and Supervised Practice' sheets should be completed each time the skill is practiced during training. The 'Competence Assessment Record' should be used as a teaching and assessment framework, and should be completed after the learner is deemed competent to perform the skill independently.

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CLINICAL GUIDELINE

The Placement and Management of Implanted Ports

INTRODUCTION

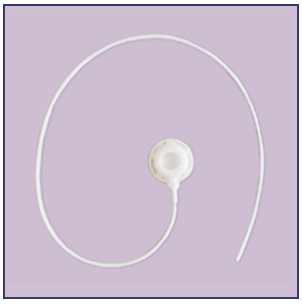
The aims of these guidelines are:

- To provide comprehensive guidance in the application and management of implanted ports in adult patients

DEFINITION AND BACKGROUND EVIDENCE

Implantable Ports are totally implantable venous access devices designed to provide repeated access to the venous system for the delivery of intravenous therapy and blood sampling. Ports are particularly suitable for outpatient and home intravenous therapy services.

Implantable Ports are accessed by the percutaneous insertion of a non-coring needle. This system consists of a two primary components; a port reservoir (titanium or non metallic) with a self sealing silicone septum and a radiopaque (silicone or polyurethane) central venous catheter which can be open ended or valved. In the KMCN open-ended ports are used.



Ports are designed to deliver IV therapy centrally and the tip resides in the lower 3rd of the Superior Vena Cava (SVC). Using correct management techniques the port can remain in situ indefinitely. Patients can be referred to approved KMCN clinicians for assessment of suitability for a port placement using the Long Term Central Venous Access Device Selection Flowchart at the beginning of these guidelines.

The most common complications associated with Ports are:

- Infection
- Thrombosis
- Occlusion
- Migration
- Damage / fracture of line

RECOMMENDATIONS FOR PRACTICE

- Referral for Implantable Port placement by any health care professional who has recognised the need.
- Patient assessed by Port placer for suitability of Port placement, with consideration for patients' physical status and intravenous therapy requirements.
- Consent of referring consultant, or SPR in the consultant's absence.
- Informed consent obtained from patient.
- Suitable time for Port placement agreed with placer, patient and clinical department.
- Chest x-ray post insertion to establish tip of Port in Superior Vena Cava (preferably lower third) before Port is used.
- Full documentation of procedure in patient medical records.
- Educational information for patient or family where appropriate.

INDICATIONS FOR USE

Placement of a Port should be considered for patients who meet the following criteria:

- Delivery of intravenous therapy with a duration of more than 6 months.
- Chronic illness requiring frequent delivery of intravenous therapy. For example cystic fibrosis, bronchiectasis.
- Delivery of chemotherapy for more than 6 months where lifestyle / body image indicates a port is the best option.
- Patients who wish to carry out activities of daily living that is impossible with other forms of vascular access. For example swimming.
- Patient request.

PROFESSIONAL, TRUST AND LEGAL REQUIREMENTS

Nurses, Midwives and Allied Health Professionals:

The professional position is that the NMC Code of Professional Conduct (2008) places specific responsibility on registered nurse/midwife practitioners. The registered nurse/midwife is personally accountable for their practice and, in the exercise of professional accountability, must acknowledge any limitations in their knowledge and competence and decline any duties or responsibilities unless able to perform them in a safe and skilled manner.

All AHP's are State Registered with the Health Professions Council and 'will keep their knowledge and skills up to date and act within the limits of their knowledge and experience' (HPC Standards 2003).

Medically Qualified Personnel:

The General Medical Council (GMC) “Good Medical Practice 2006” states that:

In providing care you must recognise and work within the limits of your competence (3a). You must keep your knowledge and skills up to date throughout your working life. You should be familiar with relevant guidelines and developments that affect your work. You should regularly take part in educational activities that maintain and further develop your competence and performance (12).

Note must be made of these points when performing clinical skills.

The Trusts position is that it accepts liability for the action of those practitioners who have completed the identified training for this skill and are able to provide evidence of their competency. This information should be recorded on the competency signatory sheet and sent to the line manager.

IMPLANTED PORT PROCEDURES

Basic Equipment steps 1- 12 and 23 - 28

Cleaned dressing trolley with yellow bag attached
Sterile basic procedure pack
Plastic apron
Sterile gloves of the correct size
Chlorhexadine 2% in 70% alcohol
Sharps bin
Non-coring needle with extension set (e.g. Huber)
1 x 10ml syringe
10ml 0.9% saline
Adhesive dressing (if needed)

PLUS

Take blood sample from Implanted Port steps 13 - 18

3 x 10ml syringe
Blue needles x2
10 mls 0.9% Sodium Chloride
Required sample bottles
A blue vacutainer adaptor and hub or extra 10ml syringe & blood transfer device
Either Needle-free access device (bung) if needs changing (refer to manufacturers recommendation)
Or single use bung if line is only accessed once a week
5ml heparanised saline
Blue needle

Flush Implanted Port steps 19 -22

3 x 10ml syringe
10mls 0.9% Sodium Chloride
Either Needle-free access device (bung) if needs changing (refer to manufacturers recommendation)
Or single use bung if line is only accessed once a week
5ml heparanised saline
Blue needle

ACCESSING PORT:

Procedure	Rationale
1. Check patient identity	**Ensure correct patient**
2. Explain the procedure to the patient giving the opportunity for questioning	**To ensure patients understanding and obtain informed consent**
3. Place the patient in a comfortable position, eg on side with arm raised or sitting up leaning against a firm surface	**Ensuring comfort and safety for patient and to reduce the risk of movement when pushing to insert needle**
4. Decontaminate hands using: • alcohol hand rub for visibly clean hands • **otherwise wash hands then apply alcohol rub**	**To minimise the risk of cross infection. EPIC guidelines for hand washing**
5. Open out sterile pack. Open all required sterile equipment onto pack with a drop technique	**To maintain asepsis following EPIC guidelines**
6. Decontaminate hands with alcohol rub and don sterile gloves	**To minimise risk of infection and maintain asepsis**
7. Clean entire site with the Chlorhexidine 2% in 70% alcohol using a circular technique working from the centre outwards	**To minimise contamination of exit site**
8. Allow to dry for 30 seconds	**To minimise the risk of contamination and destroy skin flora**
9. Place sterile sheet under the port site	
10. Draw up 10mls 0.9% sterile saline solution into 1 x 10ml syringe without handling ampoule and prime extension set and close clamp	**Check patency of needle and extension set**
11. Locate port septum by palpation • **Locate base of port with non-dominant hand** • **Triangulate port between thumb and first two fingers of non-dominant hand. Aim for the centre of the port between these three fingers**	**To minimise skin trauma and to ensure needle placed into centre of port**
12. Insert needle perpendicular to the port septum. Advance needle through the skin until reaching bottom of reservoir	**To ensure the needle is well inserted into portal septum**

And/Or if taking blood sample

13. Draw up 10mls 0.9% sterile saline solution into a 10 mls syringe and 5ml heparinised saline into 10ml syringe without handling ampoules	
14. If extension set has been in situ already: **Holding line with sterile gauze, clean end of line with Chlorhexidine 2% in 70% alcohol for 30 seconds and allow to dry. Drop end of extension onto sterile sheet**	**To maintain asepsis**
15. Attach empty syringe to end of extension set, open clamp, aspirate blood (5mls) and discard	**To check needle is correctly placed, and discard any fluid in port as it will be contaminated with heparinised saline**
16. Withdraw the amount of blood required using either: • **Blue vacutainer adapter and required bottles. Or** • **A syringe of the correct volume for the blood to be transferred into the correct bottles using sterile transfer device**	**To obtain the correct volume of blood**
17. Flush with 10mls normal saline 0.9% using a push pause technique. Before the last 1 – 2 mls goes in, start to remove the syringe while still pushing in the saline	**To remove blood from the line. To ensure positive pressure is maintained in the line and prevent backflow into the line**
18. Flush with 5ml heparinised saline using push pause technique. Before the last 1 – 2 mls goes in, clamp extension set while still pushing in the heparin	**To ensure positive pressure is maintained in the line and prevent backflow of blood into the port**

Or if flushing only

19. Attach empty syringe, open clamp and aspirate blood (2-3mls)	**To check needle is correctly placed, and discard any fluid in port as it will be contaminated with heparinised saline**
20. Draw up 10mls 0.9% sterile saline solution into 1 x 10ml syringe and 5ml heparinised saline into 1 x 10ml syringe without handling ampoules	
21. Flush with 10mls normal saline 0.9% using a push pause technique	**To remove blood from the line by creating turbulence**
22. Flush with 5ml heparinised saline using push pause technique. Before the last 1 – 2 mls goes in, clamp extension set while still pushing in the heparin	**To ensure positive pressure is maintained in the line and prevent backflow of blood into the port**

FINALLY Steps 23-27

23. Withdraw needle using slow traction	**To prevent trauma to the skin**
24. Apply pressure with sterile gauze for approx 2 minutes (may require longer if on anti-coagulant)	**To reduce bruising**
25. Apply adhesive dressing if needed	**To prevent oozing from site**
26. Remove gloves and decontaminate hands	**To reduce the risk of infection**
27. Dispose of sharps and other waste correctly	**To prevent needle-stick injury and comply with Trust policy**
28. Document date and time of this procedure in the nursing notes along with any problems	**Maintain accountability and NMC regulations**

NOTES

Refer to the troubleshooting section for management of suspected problems

Whilst in hospital and regularly thereafter, the site should be observed at least daily for signs of infection eg redness or swelling around the insertion site. Patients should be instructed to report discomfort / redness.

SUTURES

Any sutures around the insertion site will need to be removed 7-10 days following insertion. The wound should be cleaned and redressed with a dry dressing if necessary. Current practice is to use absorbable sub-cuticular sutures that do not need removal.

DRESSINGS

It is not necessary to dress the site once sutures are removed and the scar has healed.

FLUSHING

If not in regular use the port should be flushed every four weeks with heparanised saline.

For multiple drug injections the port should be flushed with 10ml 0.9% saline following each drug to lessen the risk of drug interaction.

NEEDLES

Needles should usually be changed every seven days (check manufacturers instructions).

COMPETENCY ASSESSMENT FOR MANAGEMENT OF IMPLANTED PORT

KSF dimension to which this Competency applies HWB5/6/7

Education / training required: Local training and supervised practice with a competent practitioner.	**Minimum times skill to be performed under supervision: 4**

Component	Statement of Competence	Performance evidence source	Minimal required competency level	Signature / date of Competent Practitioner acting as Supervisor	Self assessment by Practitioner confirming achievement of required competency level Signature / date Practitioner
Interpersonal skills / behavioural	• Introduces self to patient • Thoroughly explains procedure to patient ensuring patient's understanding and verbal consent obtained • Ensures patient comfort and dignity by exposing only relevant area Asks for assistance as required / recognises own limitations	**Trust policy**	**2**		

Performance of procedure (skill)	• Positively identifies verbally and by checking name band
	• Prepare patient and environment for procedure
	• Correct preparation of trolley and equipment for procedure
	• Decontaminate hands
	• Performs procedures in accordance with Trust policy and clinical practice guidelines:
	  • Taking blood
	  • Accessing the line for treatment
	  • Turbulent flushing of the line with Heparinised Saline
	  • Dressing change
	• Correct disposal of equipment and sharps				

Related knowledge	• Demonstrates understanding of Code of Conduct, be able to identify own individual accountability and have a knowledge of Trust vicarious liability in relation to the management of Implanted Ports • Competency in administration of intravenous drugs. • Have managers approval and support • A working knowledge of related Trust policies e.g. Sharps, infection control guidelines • Can discuss potential complications • Able to outline action to be taken in the event of adverse reaction • Have a working knowledge of all related guidelines and policies				
Documentation	• Document all interventions in appropriate nursing notes.				

COMPETENCY SIGNATORY SHEET - Implanted Port Management

Name:

Job Title:

Directorate:

Ward / Site:

Training – Including theory, including demonstration of technique and supervised practice

Date	Training session attended	Signature of trainer

Training elsewhere– Content verified as equivalent to above

Date training undertaken	Place where training undertaken	Signature of line manager

Supervised practice

Date	No	Competency level achieved	Supervisor signature	Practitioner signature
	1			
	2			
	3			
	4			
	5			

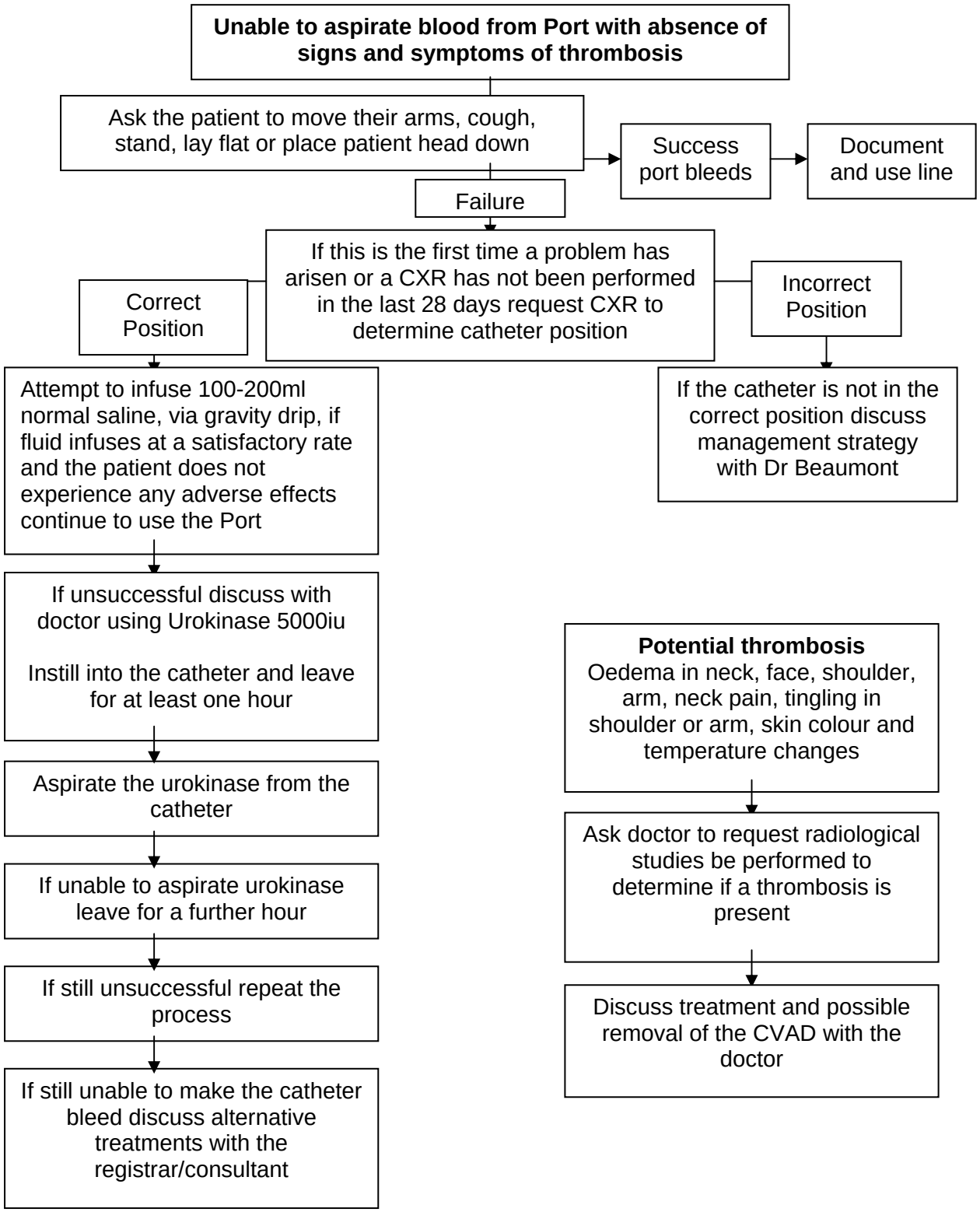
Please:

- send one copy of this competency signatory sheet once completed to your line manager for Clinical Governance purposes
- Retain the other for inclusion in your professional profile

Troubleshooting tips for Management of Implantable Ports

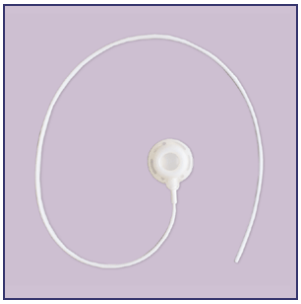
Nursing assessment	Nursing intervention
Fluid leak at insertion site	May be related to incorrect needle placement. May be related to loose connections. Discuss with competent clinician. Check connections using sterile technique. Never use scissors to remove tape or dressing. Check for correct insertion of the needle into the port
Pain, redness, pus drainage at insertion site	May be related to skin irritation or infection. Swab site, apply sterile dressing. Take blood cultures from port and peripherally. Monitor skin irritation or infection and check cultures results. **Consult with doctor for antibiotics**. **Follow port infection guidelines.** Review in 3 days or if symptoms worsen
Pain in arm, ear, shoulder	May be due to thrombosis of the superior vena cava, misplacement of the Port in the internal jugular vein or internal Port leak. Check if able to aspirate blood. Follow flow chart (appendix 4). May require CXR or venogram performed to determine if DVT or Port migration
Pump occlusion alarm	Assess for kink in IV tubing or at dressing site. Check that needle is correctly inserted into the Port. If unable to aspirate blood from line follow the flow chart
Unable to aspirate blood from Port	Ensure that the Port access needle is correctly placed

Problem: Unable to aspirate blood from Port



10 Important points for the Care of Implanted Ports

- An Implanted Port is an open ended non-valved line, which is placed centrally into the lower third of the Superior Vena Cava.
- Access of Ports must be under strict aseptic conditions. The use of **Chlorhexidine 2% in 70% alcohol** is recommended.
- The line should be flushed four weekly with heparinised saline as described in the IV Guidelines.
- The port is accessed with a specialised non-coring needles and extension sets (i.e. Huber)
- It should be flushed with 5 ml heparinised saline using a turbulent push / pause technique with a 10ml leur slip syringe, finishing and clamping the line with positive pressure.
- If unable to flush due to resistance, follow the guidelines to exclude complications (i.e. migration of the line, DVT) and for suggested action
- If an infection is suspected, refer to the guidelines for action. Please seek microbiological advice asap and discuss with placer.
- Only individuals deemed to be competent as described in the IV protocol should access Implanted Ports.
- If in doubt please seek advice and leave the port alone.



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www.accessabilitybybard.com website

CLINICAL GUIDELINE

Management of suspected infections in tunnelled lines valved or non-valved lines

These guidelines are not intended for use with Port related infections. Please use the Port infection guidelines.

INTRODUCTION

There are four categories of catheter-related infections.

Catheter-related bacteraemia

Definition: At least two positive blood cultures with the same organism obtained from at least two separate sites at different times, in association with evidence of positive cultures from the catheter with the same organism. Multi lumen catheters should have aspiration blood cultures sent from each lumen.

The latter part of the definition may only be strictly fulfilled by removing the catheter.

Exit site infection

Presents with erythema, tenderness and occasionally a discharge at the insertion site. A swab should be sent to the laboratory for culture.

Tunnel infection

Is characterised by pain and induration along the track of the catheter.

Cuff infection

Is characterised by pain and induration over the cuff site. Occasionally the skin will break down and pus discharge. A swab should be taken for culture.

The current evidence does not support routine endoluminal brushing for detection of central venous catheter colonisation.

The most common organisms are coagulase-negative staphylococci, and *Staphylococcus aureus*. The chosen antibiotics should reflect these organisms.

Recommendations for the management of catheter-related infections

<table>
<tr><th>Category of Infection</th><th>Neutropenic patient</th><th>Non-neutropenic patient</th></tr>
<tr><td rowspan="2">Presumed catheter-related Bacteraemia / fungaemia</td><td>Initial empirical antibiotic therapy; modify according to isolates. Treat for at least 10-14d (consider longer if still neutropenic)</td><td>Remove catheter if no longer needed.
Treat with antibiotic targeted against isolates</td></tr>
<tr><td colspan="2">Remove catheter is cultures remain positive after 48h of therapy or if proven catheter-related infection with Staphylococcus aureus, Bacillus spp., pseudomonads, Mycobacterium spp. or fungi.</td></tr>
<tr><td rowspan="2">Exit site infection</td><td>Initial empirical therapy including glycopeptide – Teicoplanin or Vancomycin + Meropenem
Treat for at least 10-14d or longer until infection resolved</td><td>Remove catheter if no longer needed.
Treat empirically with Flucloxacillin</td></tr>
<tr><td colspan="2">Modify according to isolates. Remove catheter if evidence of progression or if blood cultures positive for Staphylococcus aureus, Bacillus spp., pseudomonads, Mycobacterium spp. or fungi.
Line may be salvaged by surgical incision and drainage
Remove catheter and drain pus</td></tr>
<tr><td rowspan="2">Tunnel infection / cuff infections</td><td>Initial empirical therapy including Glycopeptide
Treat for at least 10-14d or until resolution of soft tissue infection</td><td>Treat empirically with Flucloxacillin</td></tr>
<tr><td>Modify according to isolates</td><td></td></tr>
</table>

If in doubt, seek advice from the Consultant Microbiologist

Management of suspected infections in portacaths

There are two categories of port-related infections.

Port-related bacteraemia

Definition: At least two positive blood cultures with the same organism obtained from at least two separate sites at different times, in association with evidence of positive cultures from the port with the same organism.

The latter part of the definition may only be strictly fulfilled by removing the port.

Peri-port infection

Is characterised by pain, redness and induration over the port, with or without pain, redness and induration along the track of the catheter.

Recommendations for the management of port related infections.

All cases **must** be discussed with a Consultant Microbiologist, and with the Port Placer

The usual organism will be *Staphylococcus epidermidis or Staphylococcus aureus*. The antibiotic of choice should be effective against these organisms.

Ports can often be “salvaged” by the use of antibiotics given systemically through the port or via another parenteral route and/or orally.

If ports need to be removed as a surgical emergency the “on call” surgical team should be contacted and they will remove the port.

REFERENCES:

Department of Health (2001) The epic project: Developing National Evidence-based Guidelines for Preventing Healthcare Associated Infections. Journal of Hospital Infection 47 (Supplement)

Elliott, T et al (1997) A Guide to the Care and Maintenance of Central Venous Catheters in Adults OHMEDA.

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Public Health Laboratory Service and The London School of Tropical Medicine and Hygiene, 1999. The Socio-economic burden of Hospital Acquired Infection, PHLS.

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GROSHONG ® SKIN TUNNELLED CATHETER PLACEMENT REQUEST & RECORD

PLACE ONE COPY HOSPITAL NOTES, NURSING NOTES & ONE TO DISTRICT NURS

DATE OF REQUEST	CONSULTANT WARD	Patient Sticker Name Hospital Number D.o.B Sex
DIAGNOSIS		
PURPOSE OF CATHETER		
CHEMO REGIME		

PRE-INSERTION BLOOD RESULTS HB…….. WBC ……. PLTS ……. INR …….

PRE-INSERTION CHECKLIST CIRCLE ANSWER / COMPLETE AS APPROPRIATE

Is patient taking anti-coagulants? y / n ……

Previous cvad? y / n

Which side? l /r / not known / n/a

Which vein? ……/ not known / n/a

Type of catheter? …… / not known

History of fractured clavicle? y / n

History of radiotherapy or surgery to chest? y / n

Pacemaker? n / y which side? l / r

Other relevant information? SIGNED……. Print name……

INSERTION DETAILS: CONSENTED & INSERTED BY …… DATE……..

SIZE? …… SINGLE / DOUBLE LUMEN	INSERTION STICKER
LENGTH INSERTED ……CM INTERNAL …… CM EXTERNAL (EXIT TO HUB)	
BLOOD ASPIRATED Y/ N SPECIMEN TAKEN Y/N	
CHEST X-RAY; SATISFACTORY / UNSATISFACTORY INSERTED UNDER XRAY GUIDANCE CHECKED BY: ……	
INSERTION RECORD	
DATE REMOVED ……../……../…….. REASON FOR REMOVAL	

Information Sources

This guidance has been informed by the Human Resources Good Practice Resource Pack designed by the National Institute for Health Research which has been developed with extensive support from the NHS R&D Forum working with partners in the UK Clinical Research Collaboration (UKCRC).

The following link provides access to the full resource pack and example documents:

DOCUMENTATION

Document Location

The document is located in the Kent and Medway Cancer Network office, in hardcopy and electronic format.

It is also located on the Kent & Medway Cancer Network Intranet (http://www.kentmedwaycancernetwork.nhs.uk)

Revision History

Date	Version	Status	Author	Consultation with	Summary of changes
June 2008	0.1	Initial Draft	Stewart Dicker		• Adapted from East kent Hospitrals NHS Trust documents with permission of the chair of EKHT Vascular Access Group Dr Tony Beumont
	0.2		Stewart Dicker		

Approvals Record

This document requires approval by:

Approval Record		
Date	**Name / Title**	**Signature**

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