University Hospitals of Derby and Burton NHS Foundation Trust

TRUST POLICY AND PROCEDURES FOR THE CARE AND MAINTENANCE OF MIDLINE & CENTRAL VENOUS ACCESS DEVICES

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Version / Amendment History	Version	Date	Author	Reason
	1	July 2010	Tracy Meynell	Change from Guidelines and reformatted to Trust standard
	2	Oct 2010	Tracy Meynell	Review and amendments
	2.1	Nov 2011	Tracy Meynell	Appendices updated
	3	June 2015	Tracy Meynell	Review and update- minor changes
	3.1	Dec 2017	Tracy Meynell Shaun Edwards	Review and update - Minor changes & Neonatal (appendix 11)
	3.2	May 2018	Tracy Meynell	Minor change section 5.2
	4	Nov 2018	Tracy Meynell Charlotte Dowson	Implementation and amendments for SecurAcath Device
	5	Jan 2021	Tracy Meynell Bill Scroggs PDU	Amalgamation of Burton and Derby policies

Intended Recipients: All clinical and Medical Staff

Training and Dissemination: Dissemination will be via the Intranet

To be read in conjunction with:

Aseptic Non Touch Technique (ANTT) policy
Infection Control Manual
Blood Culture Policy
Blood Products Transfusion Policy (Burton & Derby)
Vascular Access Team policy (Burton)

In consultation with and Date: Central Venous Access Device (CVAD) Task and Finish Group, Joint Professionals Advisory Committee (JPAC), Medical Advisory Committee(MAC), Chief Nurses, Infection Control Committee, Matrons, PICC team, VAD team.

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Contact for Review	Professional & Practice Development Team
Executive Lead Signature	Executive Chief Nurse
Approving Executive Signature	Executive Chief Nurse

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TRUST POLICY AND PROCEDURES FOR THE CARE AND MAINTAINANCE OF MIDLINE AND CENTRAL VENOUS ACCESS DEVICES

1. Introduction

There are a wide range of peripheral and central lines used in the treatment of patients as inpatients and outpatients at UHDB. Care of patient peripheral access devices is an integral part of professional practice for any health care practitioner who has undertaking intravenous therapy training and is a crucial and frequent clinical intervention in modern, acute patient care.

There are distinct differences in devices and lines, this policy intends to signpost colleagues inserting, caring for and removing these lines with the best evidence based practice.

1.1 Central Line

For the purpose of this policy and recommended practice a central line is a temporary or long term intravenous catheter inserted into one of the major veins.
The majority of inserted devices catheter tips are located in the superior vena cava.

The Procedure section will cover the following central venous access devices:

- Short term central venous catheter (CVC)
- Peripherally inserted central catheter (PICC)
- Tunnelled cuffed catheter (Hickman line)
- Permacath
- Implanted port
- Umbilical Venous Catheter (UVC) and Umbilical Arterial Catheter (UAC)

Indications for use

- Total Parenteral Nutrition Fluid replacement
- Administration of medications (especially indicated for irritant medications)
- Blood sampling and administration of transfusions
- Long term intravenous therapy
- Measurement of Central Venous Pressure (CVP)
- Haemodialysis and related therapies

1.2 Midline

For the purpose of this policy and recommended practice a midline is a peripheral catheter which is longer than a standard cannula but shorter than a central venous access device. It is inserted, normally under ultrasound guidance, through the large veins in the upper arm and advanced into or towards the axillary vein.

The Midline catheter is similar in appearance to a PICC line but the tip resides in the axillary region and does not advance into the Superior Vena Cava. Some Midlines can remain in place for up to one year or longer if clinically required but is dependent on the specific device (please refer to manufacturer's instructions).

Indications for use

- Patients who are requiring IV therapy for longer than 72 hours
- Patients who present with poor peripheral access

- Patients who require access for Parenteral nutrition for short to mid-term treatment with no other viable options (at QHB)

1.3 Lines used for Parenteral Nutrition

For lines used for parenteral nutrition then this line if single line or lumen should be dedicated to this use unless there is a Multidisciplinary risk assessment documented in the notes.

Note: If used for parenteral nutrition, once this treatment has ceased, the line can be used for other treatment up to the dedicated time allowed (as per device / manufacturer's instructions)

2. Purpose and Outcomes

The purpose of this policy is to ensure safe and effective practice with regards to all Midline and Central Venous Access Devices, to prevent infection and standardise practice throughout the Trust.

Bloodstream infections associated with the insertion and maintenance of these devices are amongst the most dangerous complications that can occur. The period of hospitalisation for the patient will be prolonged, thus increasing the cost of their care and the worsening of their underlying ill health. Most catheter related blood stream infections (CR-BSI) are related to the micro-organisms that colonise on catheter hubs and around the adjacent skin insertion sites.

CR-BSI is caused by micro-organisms that contaminate the catheter either by migration along the catheter track or during the insertion. This can be from the hands of personnel handling the line e.g. patient's, carers or health care workers.

3. Definitions Used

ANTT:
A practical aseptic non touch technique used for all invasive interventions, to reduce the risk of health care associated [HCAI] infection.
This is an aseptic technique whereby the key parts of the intravenous system or CVAD are identified and protected e.g. syringe tips, line connections, exposed CVAD/ Midline lumen or hub.

"Breaking" the Line:
Any instance where the catheter integrity is compromised or the catheter lumen hub is open. E.g. administration set or needle free access device changes at the lumen hub or accidental disconnection at the lumen hub.

CR-BSI: Catheter Related Blood Stream Infections

CVAD: Central Venous Access Device

CVC: Short Term Central Venous Catheter

CVP: Central Venous Pressure

Heplock:
The instillation of Heparin sodium flushing solution 50i.u./5mls or a concentrated dose of Heparin 25,000i.u/5mls into the CVAD lumen, using a positive pressure technique, whenever a CVAD is not in use for a specific amount of time. Refer to individual line care section.

UAC:
Umbilical Arterial Catheter-Neonatal

UVC:
Umbilical Venous Catheter-Neonatal

PICC:
Peripherally Inserted Central Catheter

Positive Pressure Flush Technique:
Flush using a pulsatile technique [see definition below]
A positive pressure technique should be used for flushing of all lines (except for internal valved catheters such as Groshong). This is achieved by maintaining a forward motion on the syringe whilst clamping the catheter and simultaneously injecting the last 1-2mls of solution.

Recommended Cleaning Solution
Chlorhexidine gluconate 2% and 70% Isopropyl alcohol for skin cleansing prior to line insertion, for skin cleansing at dressing changes and for the cleansing of access points. In the case of chlorhexidine sensitivity 10% povidone-iodine solution should be used (Pratt et al, 2007).

The use of Chlorhexidine gluconate 2% and 70% Isopropyl alcohol is contraindicated in neonates of less than 28 weeks gestation and less than seven days of age: disproportionately increased absorption may occur due to the immaturity of the epidermal permeability barrier (Mancini 2004).

Removal of Heplock:
Do not routinely withdraw and discard blood from the catheter before flushing. There is no evidence that withdrawing Heparin sodium flushing solution 50i.u./5mls prior to flushing reduces the risk of embolism or infection.

Note: If a concentrated solution of heparin 25,000i.u./5mls is used to lock the catheter (usually in aphaeresis/haemodialysis lines) always remove indwelling heparin by withdrawing and discarding at least the volume of the lumen before accessing the catheter.

Saline Pulsatile Flush:
A 'push pause push' technique used whilst flushing a line with 0.9% sodium chloride. It is to be used following administration of a medication, before connection of an administration set, following the withdrawal of a blood sample and before locking. This technique creates turbulence inside the line, which helps to remove fibrin and medication deposits from within the line.

VIP:

Visual Infusion Phlebitis Score

MIDLINE:
Is also referred to as an extended life cannula. This device is a peripheral catheter which is longer than a normal cannula but shorter than a central venous access device. It is inserted, normally under ultrasound guidance, through the large veins in the upper arm and advanced into or towards the axillary vein. There are two types of Midlines used at UHDB.

CVAD:

A central venous access device is a central intravenous catheter that is inserted into a major vein such as the basilic, cephalic, subclavian, internal or external jugular or femoral vein. The majority of inserted device catheter tips are located in the superior vena cava.

Health Care Associated Infection (HCAI):

These are infections that occur in a healthcare setting (such as a hospital) that a patient didn't have before they came in. Factors such as illness, age and treatment being received can all make patients more vulnerable to infection.

ODP Operating Department Practitioner:

In relation to this policy the ODP's are the Vascular Access Service team.

PWO:

Persistent Withdrawal Occlusion

TKO :

To keep open valve: This is a device that should be used if the line clamp is broken or has been removed. These are not recommended when a line clamp and pulsatile flush technique can be used.

"flash back":

The term used to describe the withdrawal of blood from the vein into the device.

4. Key Responsibilities

Executive Chief Nurse

The Executive Chief Nurse is the Executive Lead for Infection Control and is responsible for the implementation of this policy within the Trust.

The Professional and Practice Development Team:

The team will provide training to support health care practitioners become competent practitioners in caring for Peripheral & Central Venous Access Devices.

They will act as a resource to provide training, guidance, interpretation and support on issues with line and device care & maintenance.

Infection Prevention & Control

The Infection Control Team will act as an expert group to provide guidance, interpretation and support on infection prevention and control issues relating to bacteraemia from lines.

Infection Control Committee

The Infection Control Committee (ICC) is directly accountable to the Trust Board via the Quality Assurance Committee (QAC) and will provide advice and support on the implementation and monitoring of this policy as part of the Annual Infection Control Programme.

Parenteral Therapy & Vascular Access Practitioners

The Parenteral Therapy Practitioners (RDH) & Vascular Access team (QHB) are available to assist, support, and advise staff within the Secondary and Primary Care Trusts on all issues relating to Midline & CVADs. The teams are responsible for developing and disseminating best practice, for staff training and reporting relevant issues to the Infection Control Group (ICOG).

Senior Matrons/ Ward Matrons
These are responsible for ensuring the dissemination and implementation of this policy within their Divisions and for demonstrating compliance to infection prevention with regard to these devices.

Registered Nursing Staff
Registered practitioners are responsible for ensuring compliance with this policy as part of the Trust Infection Control Strategy.

Be registered with appropriate professional bodies and adhere to their Professional Codes of Conduct.

Adhere to the points within this policy including ANTT policy, Intravenous Infusions Guideline. Undertake the relevant training and assessment.

Exceptions to the above
Assistant Practitioners, Registered Nurse Associates, Student Nurses and Health Care Support Workers can ONLY record Visual Infusion Phlebitis scores (VIP) associated with short peripheral cannulas and remove peripheral cannulas.

5. Implementation of the Insertion, Care and Maintenance of Mid and Central Venous Access Devices.

5.1 Training

All non-medical registered practitioners involved in the management and care of midlines and central lines must;

- Attend Trust approved Infusion Therapy Training.
- Attend Trust approved Mid & CVAD Training
- Achieve competence in Intravenous / Infusion therapy.
- Achieve competence in Mid & Central Venous Access Device care.
- Achieve competence in Aseptic Non Touch Technique (ANTT).
- Have cared for a mid or central venous access device within the preceding six month period or demonstrated competency through use of training or updates.
- Maintain evidence of continued practice and updated knowledge.

The Training programme consists of a formal training sessions which includes;

- Legal issues and accountability
- Vascular access device selection criteria
- Definition and selection of a CVAD
- Definition and selection of a Midline
- Practical workshops covering Dressings, IV Therapy and Blood Sampling
- Common complications and trouble shooting

There is also a compulsory requirement that colleagues attend a training update at a minimum of every 3 years, a record will be kept on the Trust Training database. For colleagues who access these devices less frequently they may access a refresher more frequently.

5.2 Device Selection

Consideration should be given to the device selection for patients requiring IV therapy for longer than 7 days. This should be dictated by the individual clinical needs of the patient and agreed with the medical team and patient (please refer to Appendix 1 UK Vessel Health & Preservation 2020).

5.3 Insertion

There is specific training that is required for any practitioner to be able to insert a midline or central venous access device. There is a dedicated vascular access team at QHB & PICC team at RDH. The team consists of specially trained ODP's & Registered Nurses.

Any member of the patients' care team is able to make a referral to the site specific team for this type of device and they will come and assess the patient for suitability following this referral.

For QHB please refer to the Vascular Access Service Policy for further details or bleep 584 to speak to a member of the team alternatively use bleep 362.

For RDH please refer to the PICC team via Lorenzo and document in the medical notes.
The professional inserting the device will need to identify on insertion what 'type' of device is inserted using the labels in the device packaging.

5.4 Principles for the care of a Mid & Central venous access devices

Before using any device it is essential to know the manufacturer's guidance to determine whether the device is a valved or a non-valved device and the manufacturer's recommended care of the device. This will ensure that the device can be accessed and cared for safely. Only colleagues that have received training and deemed competent can access these devices.

Should a patient attend a clinical area with a device that a registered colleague is not competent to access and care for, specific training and competency assessment for key individuals can be arranged with the Parenteral Therapy and Professional & Practice Development Teams.

Devices and lines should be cared for using the procedural care guidelines in Appendices 4-10. This is based on best evidence based practice for the care and maintenance of these devices.

Procedural care of each device can be found in the Procedures section.

5.5 Monitoring of devices

Device monitoring should occur at a minimum of 8 hourly in line with the VIP guidelines, or at each access time. The reason for this is to check the device remains in good working order and is patent and to identify any concerns in the integrity of device and infection prevention. The Trust approved monitoring document can be found in **appendix 2.** This can be used in paper document format.

5.6 Types of Devices:

5.6.1 Midlines:

A ***Lifecath Midline*** is a 4 French catheter designed for Mid - Long Term use (duration of therapy). It is placed in to a deep vein either cephalic or basilic vein (upper arm NOT ACF), its tip lies in the axillary vein . This device is for patients requiring access for peripheral IV infusion therapy of greater than 7 days. Blood samples can be obtained from this device for a period of time.

Note: Although Lifecath Midlines are not central lines as they sit within the axillary vein they are still cared for in the same manner as a PICC line.

5.6.2 *A* ***Leaderflex long dwell cannula*** is a 22 gauge catheter designed for short term use max: 28 days. It is available in several lengths and can be placed in any vein. At QHB it is often inserted for pre made peripheral parenteral nutrition and other midterm use. Blood samples **cannot** be obtained from this device.

5.6.3 Short Term Central Venous Catheters (CVCs)

Short term CVCs are percutaneous catheters placed using an ultrasound guided approach (NICE 2002, 2005) through the internal jugular vein or subclavian vein, and secured by suturing. The catheter may remain in place for a few days to several weeks (please refer to manufacturer's instructions).

CVC's are inserted by appropriately trained or supervised medical practitioners. This can be done at the bedside or in a designated treatment area.

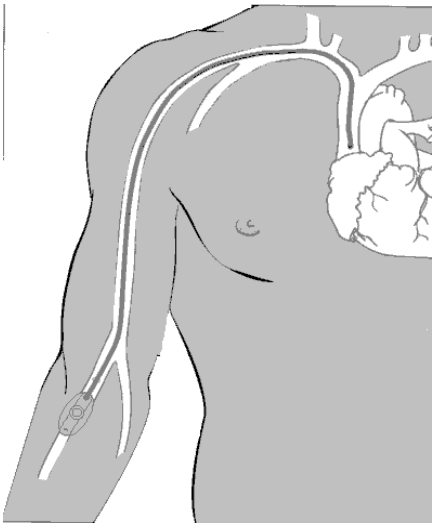
CVC's can have up to 5 separate lumens; hence incompatible medications can be administered through different lumens at the same time.

5.6.4 Peripherally Inserted Central Catheters (PICC)

The peripheral catheter is inserted into the cephalic or basilic vein and in Paediatrics and Neonates Long Saphenous, Femoral or Dorsal and advanced into the Superior Vena Cava. PICC's are inserted by medical staff or specialist Professional, regulated colleagues (nursing, ODP) that have been specifically trained in the procedure.

PICC lines can remain in place for up to one year or longer if clinically required (please refer to manufacturer's instructions).

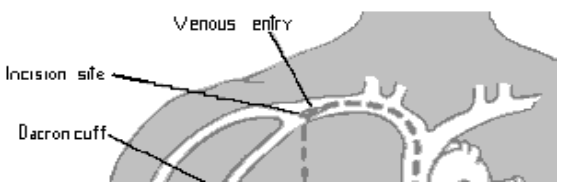
Figure 1: Peripherally Inserted Central Catheter (PICC)



5.6.5 Tunnelled Cuffed Catheters e.g. Hickman Line

These lines are usually inserted using an ultrasound guided percutaneous puncture and seldinger technique to access the internal jugular vein. After insertion in a central vein the catheter is tunnelled several centimetres under the skin and brought out through the skin to a suitable exit site (anterior chest between sternum and nipple). Tunnelled catheters have a dacron cuff near the subcutaneous exit site of the catheter that anchors it in place and serves as a microbial barrier. Tunnelled catheters are inserted in Radiology under local anaesthetic by Radiologists and can remain in place long term (refer to manufacturer's instructions). Paediatric and neonates lines are inserted in theatre under a general anaesthetic.

Figure 2: Tunnelled Cuffed Catheter (Hickman)



5.6.6 Permacaths

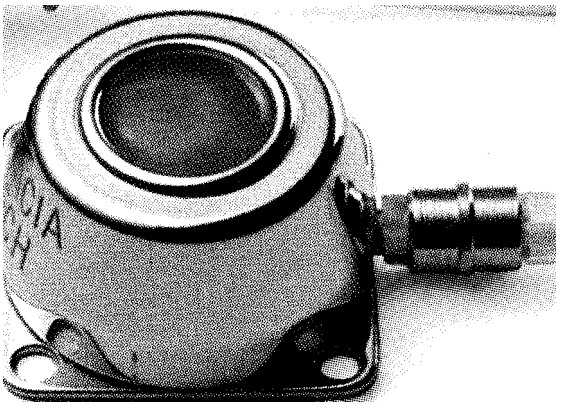
A Permacath is a long term dialysis catheter and temporary CVC with wide bore lumens to allow high blood flow rates required for dialysis treatments. These lines are normally single or dual lumen; however temporary lines may have extra lumens to allow access for CVP monitoring or drug administration in a high dependency area.

5.6.7 Implanted Ports

Implanted ports are mainly used within Paediatrics however there may be some adult patients within the Trust with this device in situ.

This is a completely closed system consisting of an implantable device with a drug reservoir, or port, with a self-sealing system connected to an outlet catheter. This device is surgically implanted under the skin. A subcutaneous pocket is created to hold the port. The device is usually placed under the pectoral muscles, or skin in the anterior chest wall below the clavicle. The catheter is then inserted into the desired vessel, the port and catheter are then connected and the skin is closed. The self-sealing septum can withstand up to 2000 non coring needle punctures. Implanted ports can remain in situ indefinitely (refer to manufacturer's instruction)

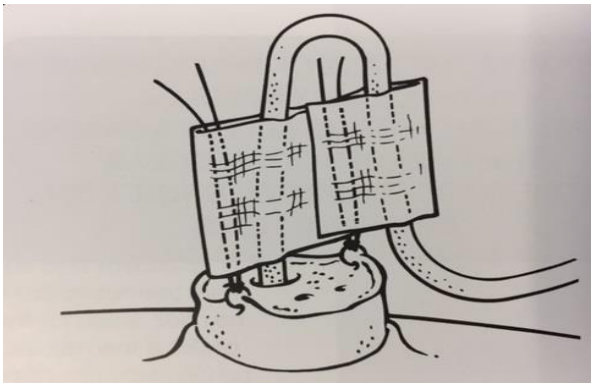
Figure 3 Implanted Port Device



5.6.8 Umbilical Venous Catheters (UVC AND UAC)

This fine bore (UVC) catheter is aseptically inserted into the umbilical vein. It is advanced until the tip ideally lies in the superior or inferior vena cava. It has a double lumen for infusion of simultaneous fluids. The UAC is inserted into the umbilical artery this is single lumen.

Figure 4 Umbilical Catheter



6. Monitoring Compliance and Effectiveness

The key requirements will be monitored in a composite report presented on the Trusts Monitoring Report Template:

Monitoring Requirement :	Infection control, training records and competencies, incident analysis.
Monitoring Method:	Audit, incident analysis, review of training records held in the Trust Learning Management System
Report Prepared by:	Lead Parenteral Therapy Practitioner
Monitoring Report presented to:	Infection Control Committee
Frequency of Report	Six Monthly

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UK VESSEL HEALTH AND PRESERVATION 2020

INTRODUCTION

This revised UKVHP framework is based on published evidence and guidelines (Moureau et al, 2012, Hallam et al, 2016). Evaluation studies of the original VHP Framework to date have included the uptake of the VHP Framework (Burnett et al, 2018) and a small-scale pilot study exploring the impact of using the framework on the insertion and management of VADs (Weston et al, 2017).

The framework has been developed to facilitate a complex adaptive systems approach to VAD insertion and management and is intended for adult vascular access in acute or planned settings. Whilst the principles of VHP should be incorporated into any emergency situation, it is recognised that other issues may take priority dependent on the condition of the patient and availability vascular access expertise therefore other immediate routes of access may be more appropriate e.g. intraosseous access.

The evidence for each of the sections with references and signposting to further information can be accessed via the Quick Response (QR) code.

Vessel Health and Preservation: The Right Approach for Vascular Access edited by Nancy Moureau, is available on open access https://www.springer.com/f-book/9783030031480

GLOSSARY OF TERMS

CVAD – Central vascular access device
CVC – Central venous catheter
Midline - Long venous catheter inserted into arm veins which does not extend centrally
IV - Intravenous route of access
PICC – Peripherally inserted central venous catheter
PIVC – Peripheral intravenous catheter
Tunnelled CVC - central venous catheter which is tunnelled away from exit site and has anchoring cuff
VAD - Vascular access device
VIP - Visual Infusion Phlebitis Score
VHP - Vessel health and preservation

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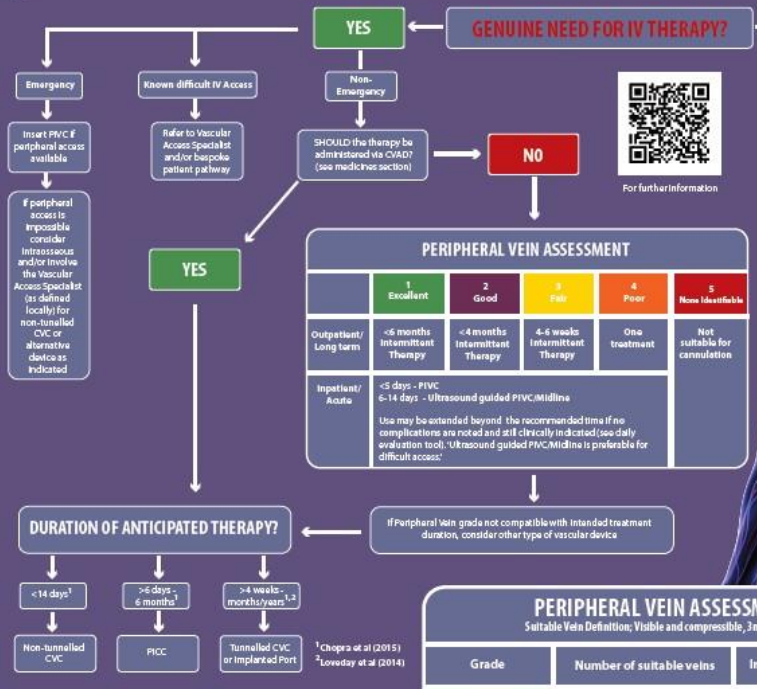
RIGHT LINE DECISION TOOL



SECONDARY QUESTIONS

Secondary questions which may refine line choice in individual patients:

- Patient preference: lifestyle issues and/or body image.
- Known abnormalities of vascular anatomy which limit access site.
- Therapy specifics: e.g. intermittent vs continuous therapy, extreme duration of therapy (months-years) specific indications (e.g. bone marrow transplant).
- Local availability of vascular competency.
- Need for long term dialysis with: AV fistula, avoid vein damage from PICC or Axillary/Subclavian catheters.
- Relevant past medical history: coagulopathy, severe respiratory dysfunction and other contra-indications to central access.
- Patient factors: e.g. cognitive function.

The risk benefits of individual device choice are starting to be challenged in large clinical trials[3] with other studies in progress

[3]Taxbro et al (2019)

PERIPHERAL VEIN ASSESSMENT

Suitable Vein Definition; Visible and compressible, 3mm or larger[4]

Grade	Number of suitable veins	Insertion Management
1	4-5 Veins	Insertion by trained competent healthcare practicioner (HCP)
2	2-3 Veins	Insertion by trained competent HCP
3	1-2 Veins	Insertion by trained competent HCP
4	No palpable visible veins	Ultrasound guided cannulation, by trained competent HCP, once only cannulation
5	No suitable veins with ultrasound	Refer for alternative vascular access device

Known difficult IV access patient must be referred to an IV specialist and will require an individualised pathway
[4]van Loon et al (2019)
[5]The number of attempts for cannulation before escalation should be reflected in local policy
[6]Referal process to be determined locally

SUITABILITY OF MEDICINES

The most important principle to use when assessing suitability for an infusion to be administered via a peripheral intravenous catheter (PIVC) is that **ALL** intravenous medicines potentially pose a threat to vessel health.

In broad terms the safety of a medicine infusion to prevent damage to the vessel will relate to factors such as:

- pH
- Osmolarity
- Viscosity
- Volume of dilution
- Speed of infusion
- Size and fragility of the peripheral vein

A central vascular access device (CVAD) should be the preferred device to administer infusions of vesicant chemotherapy and parenteral nutrition.

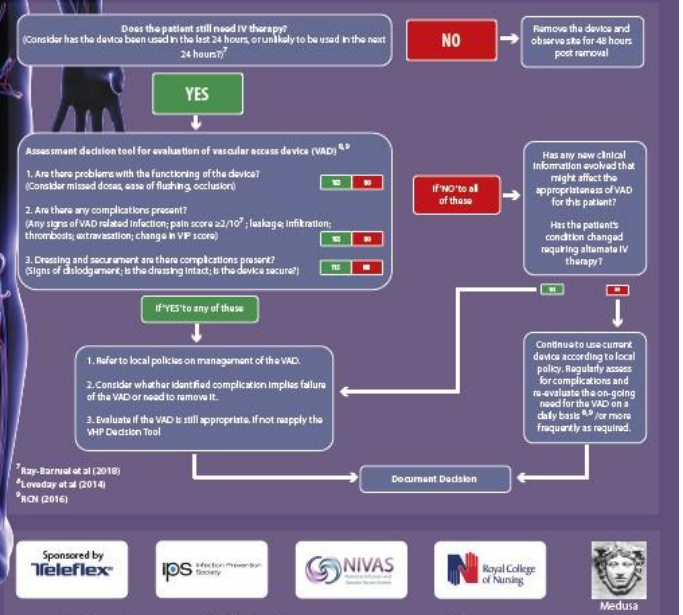
For some infusions, use of a CVAD is the preferred or essential route, for example, vasoconstrictor medicines (e.g. adrenaline and noradrenaline).

Many medicines administered by IV injection have a high osmolarity. Diluting the injection with sodium chloride 0.9% or glucose 5% before administration will reduce the osmolarity).

Note: The use of a CVAD is specified for some medicines in the Summary of Medicine Product Characteristics (SmPC). Where this is the case the recommendation should be followed.

See the Medusa website for more information http://medusa.wales.nhs.uk/Home.asp

DAILY EVALUATION



Sponsored by Teleflex

Medusa

VHP 2020 to be reviewed December 2022. Please forward feedback to VHP@ips.uk.net

PDF Version

Please affix patient's sticker here
CVAD V4
(if available)
To include name, address, D.O.B and
hospital / B number

ACCESS DEVICE INSERTION & OBSERVATION CHART

NHS
University Hospitals of Derby and Burton
NHS Foundation Trust

Hospital site…… Ward / Department……

Site appears to be healthy	0	**No Signs of Phlebitis** Observe Device
One of the following is evident: • Slight pain near site • slight redness near site	1	**Possible first signs of phlebitis** Close Observation Ensure dressing intact Document findings
Two or more of the following are evident: • Pain near site • Erythema • Swelling	2	**Early stage of phlebitis** Escalate & document Swab entry site Discuss with medics Consider **SEPSIS 6** – take blood cultures from line and peripheral site

Removal Details

Date _____
VIP on Removal _____
Signature _____

Inserted by:	
Date inserted:	Site inserted:
Length of line inserted:	
Distance from entry point to hub on insertion (cm):	
Midline:	CVAD:
22g – fine bore leader flex 8cm □ (recommended dwell time 21 days)	PICC □ 4fr□ 4.5fr□ 5fr□
22g – fine bore leader flex 20cm □ (recommended dwell time 21 days)	Hickman □ Standard □ Apheresis □
4 French-lifecath □ (recommended dwell – duration of therapy)	Central Line □
Other □ please state:	
For multi-lumen devices please state number of lumens:	
Designated line/lumen for Parenteral Nutrition identified & labelled accordingly □	

Date / Time (min 8hrly)	Is the device still appropriate & required	VIP Score (see Chart)	Distance from entry point to hub (cm)	Is the dressing clean, dry and intact	Is the line secured correctly	Is the catheter split or damaged	Date of dressing change (min 1/52)	Needle free access device changed (min 1/52)	Clamp on if line not in use	Device Flushed	Device Locked	Signature

General Advice

● Remember first dressing change is post 24hrs insertion ● VIP can't be recorded during first 24hrs ● Site should be assessed post 24hrs after removal.

1

Date / Time (min 8hrly)	Is the device still appropriate & required	VIP Score (see Chart)	Distance from entry point to hub (cm)	Is the dressing clean, dry and intact	Is the line secured correctly	Is the catheter split or damaged	Date of dressing change (min 1/7)	Needle free access device changed (min 1/7)	Clamp used when not in use	Flushed	Device/Line Locked	Signature

General Advice

- Commence new chart when completed

PCC

Care of Percutaneous Central Venous Catheter (CVC)

Insertion of a Central Venous Catheter

Objectives

CVC lines are inserted by:

1. Medical staff
2. Specialist Practitioners who have undergone training and have a recognised competency in insertion of CVC lines.

- To ensure that CVC lines are inserted using an aseptic technique and maximal sterile barrier precautions to reduce the risk of infection.
- Approved routes: High approach to the internal jugular vein (preferred route)
- Low approach to the internal jugular vein
- Infraclavicular approach to the subclavian

Contraindications:

- Coagulopathy. If INR is greater than 1.5 and platelets less than 80 considerations should be given to correction of abnormal clotting. This may be overridden on occasions where the benefit of a central venous catheter outweighs the risks of insertion.
- Serious distortion of neck anatomy
- Inability of patient to lie still with head - down tilt for required length of time.

The policy applies to the percutaneous placement of centrally placed central venous catheters in adult patients throughout the organisation. It does not apply to radiological catheters, cardiac pacing and ECG wires that are inserted under image guided control. Also specifically excluded are peripherally inserted central catheters (PICC lines), surgical cut down approaches and paediatric practice

Equipment

- Outer wrap and infection control tracking slip
- Large tray
- Triple lumen 16cm antimicrobial catheter which includes: Introducer needle, Mosquito cannula, 5ml luer slip syringe, Dilator, No11 mini scalpel, Guidewire, Injection bungs, secondary fixation wing and anchor.
- 5ml luer slip syringe
- 10ml luer slip syringe
- Safety needle 21g x 1.5”
- Safety needle 25g x 5/8”
- Swabs 10 x 10cm, 8 ply white
- 1 x Gallipot 60ml
- 1 x Two step mixing cannula without filter
- 3 x Needle free access ports
- 1 x One-step 3 ml applicator of 2% Chlorhexidine gluconate and 70% Isopropyl alcohol
- 1 x Sterile semi permeable transparent dressing 8.5 x 10.5 cm
- Silk suture 2.0 with curved needle.
- 1 x Clear aperture drape 140 x 100 cm with absorbent panel
- 2 x Hand towels
- 1 x Examination gown

Good practice tips

- If the procedure is to be undertaken by an inexperienced doctor this must be under the direct supervision of a competent doctor for the duration of the procedure who will take responsibility for this.
- A bed or trolley with head tilting facility is essential for insertion.
- The central venous catheter of choice will be a quad lumen with silver impregnation to reduce the risk of line colonisation.
- If an attempt by the internal jugular or subclavian route is unsuccessful a chest x-ray should routinely be taken prior to any attempt being made on the other side. This may be overridden if the benefits of a central venous catheter outweigh the potential risk of further attempts.
- If attempts by two routes fail the situation must be discussed with the Consultant responsible. Complications of a potentially or actually life threatening nature must be reported to the responsible Consultant immediately.

Insertion of a Central Venous Catheter – Continued

- Ultrasound guidance should be used when placing internal jugular lines.
- The Seldinger technique should be used for the placement of all CVC'S
- Correct tip placement of central venous catheters is important. As a general guide:
  i. Adult right internal jugular 10 – 12 cm
  ii. Adult right subclavian 8 – 10 cm
  iii. Adult left internal jugular 14 – 16 cm
  iv. Adult left subclavian 12 – 14 cm
  These measurements are a guide and should not be taken as absolute.
- Blood should be aspirated from all ports to ensure intravascular placement.
- Following insertion, a chest x-ray should be taken as soon as is practical to identify the position of the tip prior to use.
- If the carotid artery is punctured then firm pressure needs to be applied for 5 minutes and staff made aware to observe for signs of airway obstruction.
- Central venous catheters should not routinely be replaced, as there is no evidence for this practice. If the patient has evidence of sepsis consideration should be given to remove the line and replace in a new site. The tip of line should be sent to microbiology for culture and sensitivity. Lines should not be wired and replaced.
- Following insertion / attempted insertion the following will be recorded in the patient's health record:
  - ✓ Date and time of insertion
  - ✓ Name of the doctor undertaking the procedure (including supervisor)
  - ✓ Route of insertion and whether ultrasound was used
  - ✓ Difficulties encountered and how they were managed
  - ✓ Type of catheter used, and length of line
  - ✓ Visual, verbal and documentary confirmation of guide-wire removal by 2 people
  - ✓ Chest x-ray findings (position of tip, absence of pneumothorax)
  - ✓ Signature and designation of doctor

Dressing Change for a CVC

Good practice tips

- Frequency of dressing change: If sterile gauze is applied post insertion the dressing must be changed within 24 hours of and then every 7 days using transparent, high moisture vapour permeable dressing.
- Any dressing should be changed if it has become lose, damp or soiled.
- Sutures should be used to secure the CVC in addition to the transparent, high moisture vapour permeable dressing.
- Measure catheter length to check for migration. This measurement should be from the exit site to the CVC hub and the length documented on the central venous access device observation record

Equipment

- Sterile dressing-pack including sterile gloves.
- Apron
- Non sterile gloves
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).

Procedure

1. Assess the need to carry out additional procedures e.g. change of needle free access device.
2. Using the principles of ANTT prepare the equipment and assemble on a clean dressing trolley or tray.
3. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
4. Put on non-sterile gloves and loosen the dressing, removing it without touching the catheter and exit site.
5. Measure catheter length to check for migration.
6. Use effective hand hygiene and put on sterile gloves.
7. Clean catheter site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin), start from the exit site, extending out to the area that will be covered by the dressing.
8. Allow to air dry for minimum of 30 seconds.
9. Apply a transparent high moisture vapour permeable transparent dressing over the top.
10. Leave extension set / injection port exposed.
11. Dispose of all waste as per guidelines and use effective hand hygiene.
12. Document using the central venous access device observation record:
    - ✓ Date/time of dressing change
    - ✓ Insertion site score
    - ✓ Evidence of catheter migration
    - ✓ Any nursing intervention as per individual area practices

Changing Needle Free Access Device for a CVC

Good practice tips

- The needle free access device is a self-sealing bung that must not be pierced by a needle.
- It does not have to be removed to attach a syringe or giving set tube to the CVC.
- The device can be used for up to 140 times, but must always be changed at least weekly.
- The device must also be changed if it becomes contaminated, or if it is suspected that blood may have collected inside.
- The device will usually be changed at the same time as the dressing change.

Equipment

- Sterile dressing pack including sterile gloves
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Needle free access device

Procedure

1. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Ensuring line is clamped, holding a sterile piece of gauze, one in each hand, hold the line and with the other hand remove the existing needle free access device and discard.
4. Clean catheter hub end with 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
5. Using ANTT attach the new needle free access device to the catheter hub.
6. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
7. Record procedure and any variances in the patient's clinical record.

Administration of Intermittent Intravenous Medication for a CVC

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- 10 ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- Needle free access device (if required)
- Sterile gloves and dressing towel (if breaking CVAD line)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an existing needle free device, use principles of ANTT clean the needle free access device with recommended cleansing wipe, 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe (not in neonates). As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter (usually in aphaeresis / haemodialysis lines).

If blood cannot be withdrawn refer to *Management of complications.*

6. **Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.**
7. Do not force if resistance is met as forcing may result in emboli or catheter rupture.
8. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
9. Administer medication
10. Follow procedure and administration as per Drug Treatment Chart (QMR2), and manufacturer's instructions.
11. Attach new needle free access device (if required).Needle free devices must be changed within 7 days or 140 uses.
12. Flush the sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
13. If the line is not going to be accessed within 8 hours. Instil Heparin sodium solution 50 I.U/mls/ manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
14. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
15. Record procedure and any variances in the patient's clinical record.

Administration of Continuous Infusions for a CVC

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution.
- 10ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Administration set
- Fluid/Drug for administration
- Volumetric infusion pump (if required)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an existing needle free device, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe (not in neonates). As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter (usually in aphaeresis / haemodialysis lines).

If blood cannot be withdrawn refer to *Management of complications*.

6. **Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.**
7. Do not force if resistance is met as forcing may result in emboli or catheter rupture.
8. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
9. Administer medication
10. Follow procedure and administration as per Drug Treatment Chart (QMR2), and manufacturer's instructions.
11. Using ANTT attach the primed line by connecting to the cleaned needle free access device.
12. Place newly primed set in pump (if pump required). Commence infusion at prescribed rate.
13. Use of pumps should be considered in accordance with parenteral therapy guidelines.
14. Ensure that all lines are labelled as per hospital guidelines.
15. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual
16. Record procedure and any variance in the patient's clinical record.

Disconnecting an Intravenous Infusion for a CVC

Equipment

- 10ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- Needle free access device (if required)
- Sterile gloves and dressing towel (if breaking CVAD line)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. **Use ANTT throughout the procedure.**
4. Clamp both the catheter and the infusion line.
5. Disconnect the infusion.
6. Unclamp the catheter and flush the sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
7. If the line is not going to be accessed within 8 hours. Instil Heparin sodium flushing solution 50 I.U./mls/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
8. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
9. Record procedure and any variances in the patient's clinical record.

Blood Sampling for a CVC

Good practice tips

- **Blood sampling must only be undertaken from an acute CVC when access via an alternative peripheral route is impossible.**
- It is vitally important that the CVC is properly flushed using a pulsatile flush after the blood has been taken.
- The needle free access device must be changed after blood sampling if it is suspected that blood may have collected inside.
- When withdrawing blood from a CVC line do not use a vacutainer or syringes below 10mls as they yield high negative pressure causing potential catheter collapse.
- The lumen of the CVC must be greater than 22G. Withdrawing blood through a lumen smaller than this may damage the platelets and result in altered laboratory results.
- Do not take clotting screens from lines that have contained Heparin Sodium flushing solution 50 I.U. /5mls.
- If the line has multiple lumens use larger size lumen for taking blood where possible and clearly document which line was accessed.
- Turn off infusions to other lumens prior to taking blood samples as the infusate may contaminate the sample.
- Blood cultures must only be undertaken from a CVC when access via an alternative peripheral route is impossible or where a line related infection is suspected.

Equipment

- ANTT tray (Sterile dressing towel if patient is immunocompromised or exposing the catheter hub)
- Non sterile gloves (Sterile gloves if patient is immunocompromised or exposing the catheter hub)
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Blunt fill needle (for drawing up)
- 10ml syringes as required
- 2x 10mls Pre-filled syringe of Sodium chloride 0.9% (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- Needle free access device (if required)
- Blood sampling bottles

Procedure

1. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. If using an **existing needle free device**, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Insert syringe, unclamp line and withdraw 3-5mls of blood, clamp line and discard syringe.
5. Insert new syringe, unclamp line and collect required amount of blood by slowly withdrawing syringe. Clamp line, attach sterile blood transfer device onto syringe and place syringe onto ANTT tray/sterile field and decant into blood sampling bottles once line flushed.
6. Unclamp line and flush the 20mls sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
7. If the line is not going to be accessed within 8 hours. Instil Heparin sodium flushing solution 50 I.U/mls
8. /manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
9. Consider change of needle free device.
10. Decant blood into blood sampling bottles and label sample bottle(s) at the patient's side.
11. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
12. Record procedure and any variances in the patient's clinical record.

Routine Flushing and Hep-locking for a CVC

Good practice tips

- This procedure is for routine flushing and hep-locking of a CVC only; if flushing is related to another procedure please refer to that procedure.
- Flushing of the line will depend on the frequency of access, if the line is to be accessed within 8 hours flushing of the catheter should be with sodium chloride 0.9%, if the line is NOT to be accessed within 8 hours it will need to be locked with a locking solution of heparin sodium 50i.u/5mls. The heparin sodium 50i.u/5mls lock will last for 7 days.
- Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.
- Do not force if resistance is met as forcing may result in emboli or catheter rupture

Equipment

- ANTT tray
- Dressing pack
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Blunt fill needle (for drawing up)
- 10ml syringes as required
- 10mls Pre-filled syringe of Sodium chloride 0.9%
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution

Procedure

1. Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Using the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe, thoroughly clean the needle free device and allow to air dry. Ensure CVC line does not come into contact with anything else or place CVC onto a sterile towel.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Unclamp line and check for flash back of blood by gently withdrawing syringe As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. *It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter (usually in aphaeresis / haemodialysis lines).*

If blood cannot be withdrawn refer to *Management of complications*.

6. If the line is not going to be accessed within 8 hours. Unclamp line and instil Heparin sodium flushing solution 50 I.U./mls/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
7. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
8. Record procedure and any variances in the patient's clinical record.

Central Venous Pressure (CVP) Monitoring using a Fluid Filled Water Manometer

Good practice tips

- Central venous pressure is a recording of the pressure in the right atrium or the superior vena cava.
- It can give an indication of the patient's blood volume and the functioning ability of the right heart although it is a poor indicator of left heart function.
- Central venous pressure which is measured by means of a rigid fluid manometer aligned with the right atrium is depicted in cm's H_2O, whereas that measured by means of a pressure transducer is depicted in mmHg and represents the pressure directly transmitted from the catheter tip in the superior vena cava or right atrium to the fluid in the manometer.
- Normal values CVP = 0 – 9 cm's H_2O OR 0 – 6mmHg
- To convert reading from cm's H_2O to mmHg, divide cm's H_2O by 1.36.
- To convert reading from mmHg to cm's H_2O, multiply mmHg by 1.36
- Used principally in the management of hypovolaemic patients, central venous pressure is influenced by: blood volume, right sided heart function, intra-thoracic pressure, venous tone or systemic vascular resistance. A low central venous pressure may indicate hypovolaemia, peripheral / systemic vasodilatation, a leak within OR malpositioning of the pressure monitoring device, whilst an elevated central venous pressure may be clinically indicative of fluid overload, right sided heart high pulmonary or systemic vascular resistance or positive pressure ventilation.

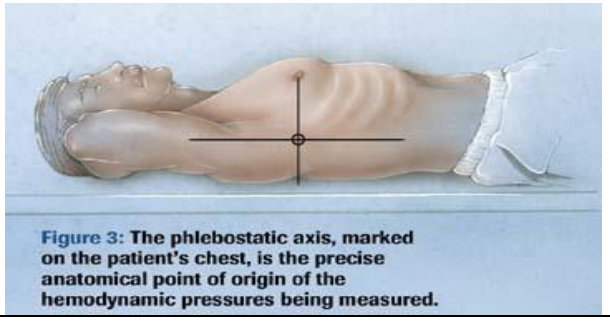
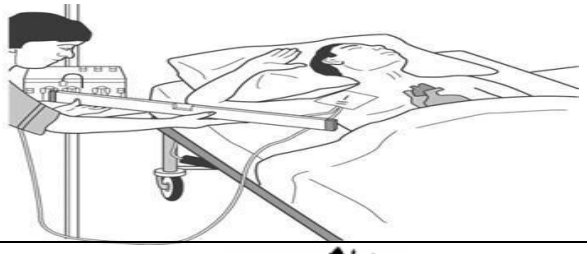
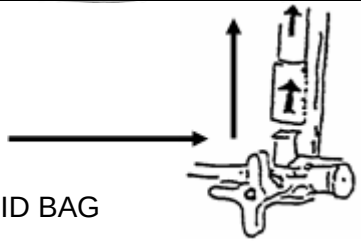
Equipment

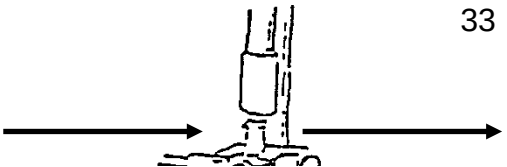
- Central venous pressure manometer line / manometer scale / spirit level
- 500ml bag of sterile 0.9% sodium chloride prescribed on fluid balance / drug chart
- Sterile intravenous giving set
- ANTT tray
- X 2 pairs non sterile gloves
- Sterile cap / needle
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing wipes OR 10% aqueous Povodine Iodine if Chlorhexidine sensitivity suspected

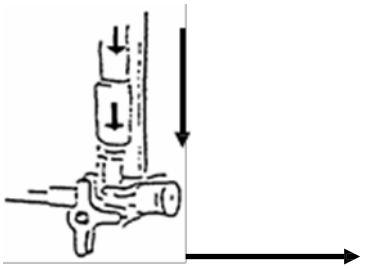
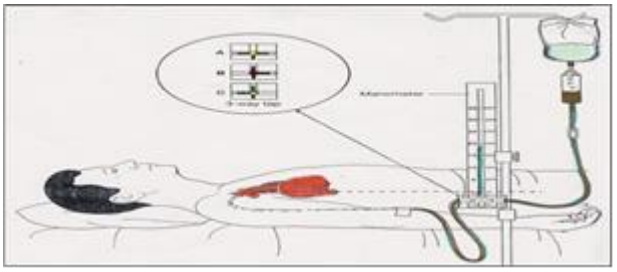
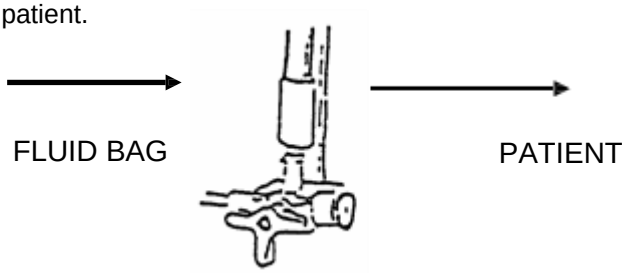
Procedure

1. Perform effective hand hygiene
2. Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.
3. Perform effective hand hygiene and put on non-sterile gloves
4. Using ANTT connect and prime intravenous giving set and complete monitoring circuit with prescribed 0.9% sodium chloride. Attach sterile cap / needle to end of circuit and store in ANTT tray prior to attachment to the patient.
5. Identify central venous catheter lumen for attachment of central venous monitoring device. NB. If a multi- lumen central line is in situ the lumen corresponding to the distal catheter port should be chosen.
6. Remove gloves, perform effective hand hygiene.
7. Put on non-sterile gloves, clamp the line and clean the chosen central venous access lumen with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing wipes and allow drying for 30 seconds.
8. Remove sterile cap / needle from open end of manometer device and firmly attach manometer directly onto the catheter lumen ensuring all key parts are protected at all times. (Do not attempt to monitor CVP via a needle free access port) Inspect the tubing and catheter for kinks.
9. Remove and dispose of equipment correctly.
10. Remove gloves and perform effective hand washing.

Central Venous Pressure (CVP) Measurement using a Fluid Filled Water Manometer Continued

Procedure	Rationale
Prepare and explain the procedure to the patient.	To ease anxiety. gain informed consent and maximise patient co-operation / compliance.
The patient must be lying supine with one pillow. The bed is horizontal. If the patient is not able to lie this way, the chosen patient position must be documented in the clinical records to allow recordings to be taken in the same position each time.	This is the most consistent patient position. Some patients find it very uncomfortable to lie flat for more than a short period of time; a different position can be used e.g. lying at a 30 degree angle, as long as there is consistency of position when recordings are taken.
Make a mark or locate the mark, on the patient's chest (X) at the mid-axillary line and level with the fourth intercostal space Mark made with felt pen on the initial reading.	Establishes the position of the right atrium (zero position). i.e. phlebostatic axis  **Figure 3: The phlebostatic axis, marked on the patient's chest, is the precise anatomical point of origin of the hemodynamic pressures being measured.**
In order to ascertain a central venous pressure reading, clamp all lines that are running via the central venous catheter with the exception of the pressure manometer line which must be in the unclamped position.	
Open the manometer line fully and run fluid through (at least 10mL) to ensure patency of the line. **Note:** Not all manometer lines run right to left as outlined in this procedure, please check before adjusting stopcock.	To flush line and ensure patency. FLUID BAG PATIENT
Take the manometer from the IV stand OR using spirit level, place vertically against the side of the patient's chest with 0 cm lined directly with the (X) of the "zero point" (Magder 2006)	To gain starting point. 
Turn the 3-way stopcock to fill the manometer - do not overfill - eliminate all air bubbles,(fill at least to 20 cm or 4 cm above the last recorded central venous pressure	 FLUID BAG PATIENT



Central Venous Pressure (CVP) Measurement using a Fluid Filled Water Manometer Continued	
Turn the 3-way stopcock to allow the fluid in the manometer to run to the patient.	 FLUID BAG PATIENT
Read the CVP by allowing the fluid level to fall until it settles to where it oscillates with breathing. Read the bottom of the fluid meniscus at expiration. Written as ± cm H_2O.	
Replace at least 10cm of fluid into the manometer and clamp the line. Return the stopcock to the bag / patient position and return manometer to IV stand.	Minimises air bubbles from accumulating and ensures air cannot move from the manometer to patient.  FLUID BAG PATIENT
Reset fluids as prescribed or if not in use clamp line and record pressure reading in the clinical record.	
Notify medical staff if pressure reading is outside prescribed parameters for the patient.	

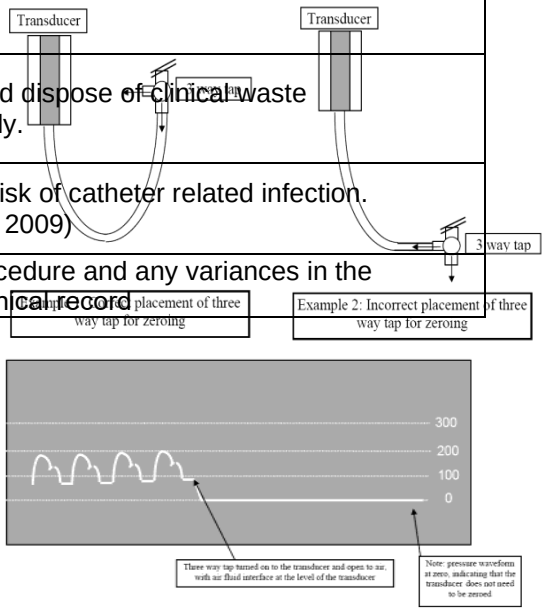
Measuring Central Venous Pressure using a Pressure Transducer

Equipment

- Central venous pressure transducer line
- Pressure transducer attached to appropriate invasive pressure module
- 500ml bag of sterile 0.9% sodium chloride, prescribed on fluid balance / drug chart.
- Pressure infuser bag
- ANTT tray
- X 2 pairs non sterile gloves
- Sterile cap / safety needle
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing wipes OR 10% aqueous Povodine Iodine if Chlorhexidine sensitivity suspected.

Procedure	Rationale
Perform effective hand hygiene Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray	To minimise risk of central venous catheter related infection. (Pratt et al 2007)
Perform effective hand hygiene and put on non-sterile gloves Using ANTT attach 500ml bag of 0.9% sodium chloride solution to pressure transducer set and tighten all connections then close the roller clamp. **DO NOT USE ANY OTHER INTRAVENOUS SOLUTION OTHER THAN SODIUM CHLORIDE, UNLESS ABSOLUTELY CONTRAINDICATED. DO NOT USE DEXTROSE OR HEPARINISED SALINE.**	To reduce risk of central catheter related infection. To reduce risk of false reporting of results consistent with hyperglycaemia.
Prime the transducer set by first placing the sodium chloride on a drip stand and partially filling the drip chamber. Open the roller clamp whilst using gravity and the set flush mechanism; prime the set, including the side ports. Ensure there are no air bubbles remaining in the system. Taking care to protect all key parts, cover open end of transducer set with sterile cap / safety needle. Replace any vented caps with non-vented. Place the sodium chloride in an infuser pressure bag and pressurise to 300mmHg which will result in the delivery of a 3ml fluid flush / hr. Place in ANTT tray.	To ensure complete priming of the transducer set and removal of any air. To reduce risk of air embolism. To reduce risk of central venous catheter occlusion.
Identify central venous catheter lumen for attachment of central venous monitoring device. NB. If a multi- lumen central line is in situ the lumen corresponding to the distal catheter port should be identified. Remove gloves and perform effective hand hygiene.	To ensure most appropriate central venous catheter lumen is chosen for pressure monitoring, to ascertain accurate CVP reading.
Mount transducer set onto the transducer mounting, connect transducer cable to appropriate pressure module within the patient monitor. Establish transducer height and alignment with the patient's phlebostatic axis.	To ensure central venous pressure readings are taken from landmark consistent with right atrial alignment in order to maintain consistency and accuracy. (Woodrow 2009)  Figure 3: The phlebostatic axis, marked on the patient's chest, is the precise anatomical point of origin of the hemodynamic pressures being measured.

Measuring Central Venous Pressure using a Pressure Transducer Continued	
Perform effective hand hygiene and put on non-sterile gloves. Clean identified catheter lumen with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing wipe or if sensitivity suspected 10% aqueous Povodine iodine. Allow to dry for 30 seconds. Clamp the identified lumen and remove any needle free access port for disposal.	To minimise risk of central venous catheter related infection. (Pratt et al 2007)
Ensuring all key parts are protected, remove sterile cap / safety needle from open end of transducer circuit and attach directly onto the identified catheter lumen *Do not attempt to monitor CVP via a needle free access port* Ensure connection is secure and open clamp. Flush to ensure patency using integral manometer flush device.	To ensure central venous pressure monitoring is securely attached to catheter lumen, to ensure safe and effective monitoring and reduce risk of catheter related infection, inaccurate CVP reading and development of air embolism.
Taking care to protect all key parts, calibrate the pressure transducer by opening the three way tap to room air and simultaneously pressing the corresponding 'zeroing' button on the patient monitor and waiting for successful calibration. (Magder 2006) Once calibrated, the three way tap must be closed and its port protected by a non-vented cap. Re-calibration of the transducer should be undertaken at least once per shift or as necessity dictates.	
Carefully flush the transducer set and observe that the integral flushing device flushes easily. Observe pressure waveform to establish accuracy of reading. Report any discrepancy in central venous pressure waveform with medical staff.	
Remove and dispose of equipment correctly. Remove gloves and perform effective hand washing.	Remove and dispose of clinical waste appropriately.
Time and date transducer set and change at least every 72hrs unless clinically indicated earlier.	To reduce risk of catheter related infection. (Thompson 2009)
Document accordingly in appropriate documentation.	Record procedure and any variances in the patient's clinical record



Removal of a CVC Line

Equipment

- Dressing pack including sterile gloves
- Non sterile gloves
- Apron
- Stitch cutter
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).

Procedure

1. Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Position patient in the trendelenberg or supine position which will increase CVP pressure preventing air being aspirated into the venous system.
4. Put on non-sterile gloves and loosen the dressing, removing it without touching the catheter and exit site.
5. Use effective hand hygiene and put on sterile gloves.
6. Clean catheter site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin), start from the exit site, extending out to the area that will be covered by the dressing. Do not return to the catheter exit site with the same swab.
7. Allow to air dry for minimum of 30 seconds.
8. Cut and remove sutures ensuring that the external part of the suture is not taken under the skin.
9. Note: During removal of CVAD instruct patient to perform the Valsalva movement (trying to breathe out with glottis closed). If this is not possible, respirations should be momentarily ceased or removal performed on expiration. Keep the catheter / extension set below the level of the heart which maintains positive pressure and lessen the risk of drawing air into the vein. Catheter fracture and remobilisation can occur if the CVAD is removed against resistance. Remove the catheter by; placing sterile gauze over the catheter site and withdrawing catheter in a slow constant motion (no resistance should be felt). This maintains a positive pressure into the vein.
10. Stop if you meet resistance. Rest patient. If there is difficulty removing the line, it may be helpful to warm the arm and neck as this will reduce the potential for venous spasm.
11. Using sterile gauze apply pressure over the exit site until bleeding stops approx. 5 minutes. Cover with high moisture vapour permeable transparent dressing which prevents bleeding and air aspiration. Observe for signs of swelling for the next 30 minutes.
12. Ensure that the length of the line removed corresponds with the patients insertion details.
13. Inspect catheter ensuring it is complete with no ragged edges. If it is not intact, the tip may migrate to the heart and pulmonary system, urgent medical assistance will be required.
14. If infection of catheter is suspected using sterile scissors, cut off 5cm at tip of line and place in specimen container and send for culture and sensitivity.
15. Remove and dispose of equipment correctly.
16. Remove gloves and perform effective hand washing.
17. Record procedure and any variances in the patient's clinical record.
18. Remove the dressing after 72 hours and assess the site every 24 hours until the site has epithelised

Peripherally Inserted Central Catheters (PICC)

Ultrasound Guided Insertion of a PICC

Objectives:

- PICC lines are inserted by:
  - Medical staff
  - Specialist Practitioners who have undergone training and are recorded on the approved databases as having recognised competency in insertion of Midline lines.
- To ensure that PICC lines are inserted using an aseptic technique and maximal sterile barrier precautions to reduce the risk of infection.

Equipment

- PICC line placement pack 2x pair's sterile gloves
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous povodine iodine cleansing solution
- Lidocaine 1% 0.5mls-2mls for s/c injection
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- SecurAcath or Sterile steri-strips

PICC line and Micro-Seldinger equipment

- PICC line, needle free access device
- Micro-access tearaway introducer kit
- Disposable scalpel

PICC Placement Pack contains:

- Sterile ultrasound probe cover & gel
- 2 x large sterile drapes
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing)
- 0.9% sodium chloride pre filled syringe x 20ml
- Safety needles and syringes
- Examination gown
- 2 x sterile hand towels
- Large ANTT tray
- 20 sterile gauze swabs
- Yellow disposal bag
- 1x pair sterile scissors

Procedure

1. Obtain referral from appropriate practitioner and assess patient's medical history to ensure the patient has no underlying medical problems which would contra-indicate the insertion of a line.
2. Explain and discuss the procedure with the patient. Obtaining consent outline the risks and benefits. Apply tourniquet and assess venous access. Assess both arms and locate veins by use of an ultrasound. Remove tourniquet.
3. Ensure patients privacy, lie patient supine and extend arm 90° to the body.
4. Using a measuring tape, measure from the selected venepuncture site to desired tip position. Apply tourniquet to patient's arm. Do not tighten tourniquet until ready to perform the procedure. Open PICC placement pack at patient's bedside onto a prepared trolley.
5. Dispense all required sterile equipment onto sterile field.
6. Use effective hand hygiene, drying hands with sterile hand towels. Put on sterile gown and sterile gloves then arrange equipment.
7. Prepare the two pre-filled 10ml syringes with 0.9% sodium chloride, 2mls of lidocaine 1% and one 10ml syringe with 5mls of Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
8. Remove the cap from the side flushing port of the PICC and prime the line with 0.9% sodium chloride.
9. Trim the line to the required measured length by withdrawing the guide wire 1cm from the desired tip length. Using the graduated markings on the catheter and using sterile scissors, trim the catheter then advance the guide wire to the end of the catheter. Never allow the guide wire to protrude beyond the catheter tip.
10. Place one sterile drape under patients arm.
11. Clean skin at the selected site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution with friction for 2 minutes. Prepare an area of 10 – 15cm either side of the proposed insertion site.

Ultrasound Guided Insertion of a PICC continued

12. Allow the solution to dry thoroughly.
13. Drape the patient with the sterile fenestrated drape.
14. Insert enough sterile gel into the probe cover to coat the end of the probe and apply cover over the ultrasound probe. Secure with the sterile elastic band and adhesive tape.
15. Tighten the tourniquet underneath the sterile field, being careful not to contaminate the sterile field.
16. Discard first pair of gloves and replace with second pair of sterile gloves.
17. Locate vein on ultrasound ensuring the vein is pictured in the centre markers of the screen. Inject local anaesthetic into subcutaneous tissue at planned insertion site.
18. Using the blade make a small incision (approx. 0.5cm) into the planned insertion site.
19. Using the ultrasound to guide, insert the needle into the small incision taking care to advance the needle into the centre of the vein. Blood will begin to advance up the needle.
20. Insert the guide-wire down through the needle, leaving approximately 3cm exposed at the end. Carefully withdraw the needle leaving the guide-wire in place.
21. Release tourniquet being careful not to contaminate the sterile field.
22. Advance the tearaway introducer over the top of the guide-wire, whilst holding the guide-wire push the tearaway introducer down through the skin and into the vein. Withdraw and remove the guide-wire leaving the tearaway introducer in place.
23. Unlock and twist the inner sheath and remove from the tearaway introducer.
24. Thread the catheter to approximately 15-20 cms through the introducer, instruct the patient to turn their head toward the insertion site and touch their chin to their shoulder. This helps inhibit malposition of the catheter into the jugular vein.
25. Once the catheter has been advanced, ask the patient to relax their head and carefully withdraw the introducer and peel away, taking care not to dislodge the catheter.
26. Secure catheter at exit site with gentle pressure and slowly withdraw the guide wire from the line and immediately attach the needle free access device to the end of the line.
27. Using a 10ml syringe of 0.9% sodium chloride aspirate blood to obtain flashback, when flashback is obtained using a pulsatile flush technique flush the catheter; continue with the second 10ml syringe of 0.9% sodium chloride and using a positive pressure flush finish with 5mls of Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution.
28. Secure the catheter with either a SecurAcath device (appendix 10) or sterile steri-strips ensuring the hub and device are firmly adhered to the patient's arm.
29. Apply a small gauze dressing over the exit site and secure with a high moisture vapour permeable transparent dressing.
30. Dispose of equipment appropriately.
31. Use effective hand hygiene.
32. Document the procedure in the patient's medical records, noting:
    - ✓ Technique used
    - ✓ Type of anaesthetic
    - ✓ Type, length and gauge of catheter
    - ✓ Visual, verbal and documentary confirmation of guide-wire removal by 2 people
    - ✓ Insertion site and vein accessed
    - ✓ Securing method and dressing
    - ✓ Any problems encountered during insertion
    - ✓ Name and contact number of person who inserted the line

Catheter tip position must be confirmed radiographically prior to use.

Dressing Change for a PICC

Good practice tips

- Frequency of dressing change: within 24 hours of insertion and then every 7 days using transparent, high moisture vapour permeable dressing.
- Any dressing should be changed if it has become lose, damp or soiled.
- SecurAcath or Sterile steri-strips should be used to secure the PICC in addition to the transparent, high moisture vapour permeable dressing.
- Measure catheter length to check for migration. This measurement should be from the exit site to the PICC hub and the length documented on the central venous access device observation record.
- Mechanical phlebitis is more likely to occur within the first 7 days following insertion of the PICC. It can usually be resolved within 48 hours by the application of heat to the upper arm for 10-20 minutes, 3 times a day.

Equipment

- Sterile dressing-pack including sterile gloves.
- Apron
- Non sterile gloves
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Sterile steri-strips if no securAcath is in place.
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).

Procedure

1. Assess the need to carry out additional procedures e.g. change of needle free access device. Using the principles of ANTT prepare the equipment and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Put on non-sterile gloves and loosen the dressing, removing it without touching the catheter and exit site.
4. Measure catheter length to check for migration.
5. Use effective hand hygiene and put on sterile gloves.
6. Clean catheter site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin), start from the exit site, extending out to the area that will be covered by the dressing. If a securAcath is in place ensure that the line is not raised more than 90% angle or rotated (appendix 11). Allow to air dry for minimum of 30 seconds.
7. If a securAcath is not in place then secure line with steristrips placing them in an “H” style and apply a transparent high moisture vapour permeable transparent dressing over the top.

8. Lines can be looped under the dressing for extra security; however **DO NOT** loop line over the top of itself. Leave extension set / injection port exposed.
9. Dispose of all waste as per guidelines and use effective hand hygiene.
10. Document using the central venous access device observation record:
    - ✓ Date/time of dressing change
    - ✓ Insertion site score
    - ✓ Evidence of catheter migration
    - ✓ Any nursing intervention as per individual area practices

Changing the Needle Free Access Device for a PICC

Good practice tips

- The needle free access device is a self-sealing bung that must not be pierced by a needle.
- It does not have to be removed to attach a syringe or giving set tube to the PICC.
- The device can be used for up to 140 times, but must always be changed at least weekly.
- The device must also be changed if it becomes contaminated, or if it is suspected that blood may have collected inside.
- The device will usually be changed at the same time as the dressing change.

Equipment

- Sterile dressing pack including sterile gloves
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Needle free access device

Procedure

1. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Ensuring line is clamped, holding a sterile piece of gauze, one in each hand, hold the line and with the other hand remove the existing needle free access device and discard.
4. Clean catheter hub end with 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
5. Using ANTT attach the new needle free access device to the catheter hub.
6. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
7. Record procedure and any variances in the patient's clinical record.

Administration of Intermittent Intravenous Medication for a PICC

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- 10 ml syringes as required
- **Blunt fill needle** (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- Needle free access device (if required)
- Sterile gloves and dressing towel (if breaking the line)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an **existing needle free device**, use principles of ANTT clean the needle free access device with recommended cleansing wipe, 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe **(*not in neonates*)**. As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter.

Within Paeds locking solution is removed and discarded as higher strength heparin is used

6. If blood cannot be withdrawn refer to *Management of complications*.
7. Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.
8. Do not force if resistance is met as forcing may result in emboli or catheter rupture.
9. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
10. Administer medication
11. Follow procedure and administration as per Drug Treatment Chart (QMR2), and manufacturer's instructions.
12. Attach new needle free access device (if required). Needle free devices must be changed within 7 days or 140 uses.
13. Flush the sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
14. If the line is not going to be accessed within 24 hours. Instil Heparin sodium solution 50 I.U./mls/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
15. Record procedure and any variances in the patient's clinical record.

Administration of Continuous Infusions for a PICC

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution.
- 10ml syringes as required
- Blunt fill syringe (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Administration set
- Fluid/Drug for administration
- Volumetric infusion pump (if required)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an existing needle free device, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe (*not in neonates*). As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter

If blood cannot be withdrawn refer to *Management of complications*.

6. ***Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.***
7. Do not force if resistance is met as forcing may result in emboli or catheter rupture.
8. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
9. Administer medication
10. Follow procedure and administration as per Drug Treatment Chart (QMR2), and manufacturer's instructions.
11. Using ANTT attach the primed line by connecting to the cleaned needle free access device.
12. *If using TPN in neonates use a filter*
13. Place newly primed set in pump (if pump required). Commence infusion at prescribed rate.
14. Ensure that all lines are labelled as per hospital guidelines.
15. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
16. Record procedure and any variance in the patient's clinical record.

Disconnecting an Intravenous Infusion for a PICC

Equipment

- 10ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- Needle free access device (if required)
- Sterile gloves and dressing towel (if breaking the line)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. **Use ANTT throughout the procedure.**
4. Clamp both the catheter and the infusion line.
5. Disconnect the infusion.
6. Unclamp the catheter and flush the sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
7. If the line is not going to be accessed within 24 hours. Instil Heparin sodium flushing solution 50 I.U./mls/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
8. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
9. Record procedure and any variances in the patient's clinical record.

Blood Sampling for a PICC

Good practice tips

- A vacuum sampling system is the preferred method for obtaining blood samples as it minimises the risk of needle-stick injuries.
- It is vitally important that the PICC is properly flushed using a pulsatile flush after the blood has been taken.
- The needle free access device must be changed after blood sampling if it is suspected that blood may have collected inside.
- When withdrawing blood from a PICC line do not use a syringe below 10mls as they yield high negative pressure causing potential catheter collapse.
- The lumen of the PICC must be greater than 22G. Withdrawing blood through a lumen smaller than this may damage the platelets and result in altered laboratory results.
- Do not take clotting screens from lines that have contained Heparin Sodium flushing solution 50 I.U. /5mls.
- If the line has multiple lumens use larger size lumen for taking blood where possible and clearly document which line was accessed.
- Turn off infusions to other lumen prior to taking blood samples as the infusate may contaminate the sample.

Equipment

- ANTT tray (Sterile dressing towel if patient is immunocompromised or exposing the catheter hub)
- Non sterile gloves (Sterile gloves if patient is immunocompromised or exposing the catheter hub)
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Blunt fill needle (for drawing up)
- 10ml syringes as required
- Vacuum blood sampling system
- 2x 10mls Pre-filled syringe of Sodium chloride 0.9% (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- Needle free access device (if required)
- Blood sampling bottles

Procedure

1. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. If using an **existing needle free device**, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. *Vacuum sampling:*
   - Assemble vacuum sampling system and insert luer lock adapter into the hub
   - To avoid contaminate from blood sample insert a 5mls bio-chemistry tube, fill tube with blood and discard
   - Obtain blood samples required

   Syringe sampling:
   - Insert syringe, unclamp line and withdraw 3-5mls of blood, clamp line and discard syringe.
   - Insert new syringe, unclamp line and collect required amount of blood by slowly withdrawing syringe. Clamp line, attach blood transfer device onto the syringe and place syringe onto ANTT tray/sterile field and decant into blood sampling bottles once line flushed.
5. Unclamp line and flush the 20mls sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
6. If the line is not going to be accessed within 24 hours instil Heparin sodium flushing solution 50 I.U./mls / manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure
7. Consider change of needle free device.
8. Syringe sampling only:
   - Decant blood into blood sampling bottles and label sample bottle(s) at the patients' side.
9. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
10. Record procedure and any variances in the patient's clinical record.

Routine Flushing and Hep-locking for a PICC

Good practice tips

- This procedure is for routine flushing and hep-locking of a PICC only; if flushing is related to another procedure please refer to that procedure.
- Flushing of the line will depend on the frequency of access, if the line is to be accessed within 24 hours flushing of the catheter should be with sodium chloride 0.9%, if the line is NOT to be accessed within 24 hours it will need to be locked with a locking solution of heparin sodium 50i.u/5mls. The heparin sodium 50i.u/5mls lock will last for 7 days.
- Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.
- Do not force if resistance is met as forcing may result in emboli or catheter rupture.

Equipment

- ANTT tray
- Dressing pack
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Blunt fill needle (for drawing up)
- 10ml syringes as required
- 10mls Pre-filled syringe of Sodium chloride 0.9% (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution

Procedure

1. Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Using the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe thoroughly clean the needle free device and allow to air dry. Ensure PICC line does not come into contact with anything else or place PICC onto a sterile towel.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Unclamp line and check for flash back of blood by gently withdrawing syringe **(*not in neonates*)**. As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. *It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter*
6. If blood cannot be withdrawn refer to *Management of complications*.
7. If the line is not going to be accessed within 24 hours. Unclamp line and instil Heparin sodium flushing solution 50 I.U./mls/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
8. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
9. Record procedure and any variances in the patient's clinical record

Removal of a PICC Line

Equipment

- Dressing pack including sterile gloves
- Non sterile gloves
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Sterile scissors - disposable
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).

Procedure

1. Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Position patient in the supine position which will increase CVP pressure preventing air being aspirated into the venous system.
4. Put on non-sterile gloves and loosen the dressing, removing it without touching the catheter and exit site. If a securAcath is in place grip the HOLD tab with thumb and finger. Pry upwards the edge of the LIFT tab to release the cover from the base.
5. Use effective hand hygiene and put on sterile gloves.
6. Clean catheter site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin), start from the exit site, extending out to the area that will be covered by the dressing. Allow to air dry for minimum of 30 seconds.
7. Note: During removal of CVAD instruct patient to perform the Valsalva movement (trying to breathe out with glottis closed). If this is not possible, respirations should be momentarily ceased or removal performed on expiration. Keep the catheter / extension set below the level of the heart which maintains positive pressure and lessen the risk of drawing air into the vein. Catheter fracture and remobilisation can occur if the CVAD is removed against resistance. Remove the catheter by; placing sterile gauze over the catheter site and withdrawing catheter in a slow constant motion (no resistance should be felt). This maintains a positive pressure into the vein.
8. Stop if you meet resistance. Rest patient. If there is difficulty removing the line, it may be helpful to warm the arm as this will reduce the potential for venous spasm.
9. Using sterile gauze apply pressure over the exit site until bleeding stops approx. 5 minutes. If a securAcath is in place please remove as manufacturer's guidelines (appendix 10) before covering with high moisture vapour permeable transparent dressing which prevents bleeding and air aspiration.
10. Ensure that the length of the line removed corresponds with the patients insertion details.
11. Inspect catheter ensuring it is complete with no ragged edges. If it is not intact, the tip may migrate to the heart and pulmonary system, urgent medical assistance will be required.
12. If infection of catheter is suspected using sterile scissors, cut off 5cm at tip of line and place in specimen container and send for culture and sensitivity and follow blood culture policy.
13. Remove and dispose of equipment correctly.
14. Remove gloves and perform effective hand washing.
15. Record procedure and any variances in the patient's clinical record.
16. Remove the dressing after 72 hours and assess the site every 24 hours until the site has epithelised.

Midline

Ultrasound Guided Insertion of a Mid-Line

Objectives:

- Mid lines are inserted by:
  - Medical staff
  - Specialist Practitioners who have undergone training and are recorded on the approved databases as having recognised competency in insertion of Midline lines.
- To ensure that Mid-lines are inserted using an aseptic technique and maximal sterile barrier precautions to reduce the risk of infection.

Equipment

- PICC line placement pack
- 2x pairs sterile gloves
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous povodine iodine cleansing solution
- Lidocaine 1% 0.5mls-2mls for s/c injection
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- SecurAcath or Sterile steri-strips

PICC line and Micro-Seldinger equipment

- PICC line, needle free access device
- Micro-access tearaway introducer kit
- Disposable scalpel

PICC Placement Pack contains:

- Sterile ultrasound probe cover and gel
- 2 x large sterile drapes
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing)
- 0.9% sodium chloride pre filled syringe x 20ml
- Safety needles and syringes
- Examination gown
- 2 x sterile hand towels
- Large ANTT tray
- 20 sterile gauze swabs
- Yellow disposal bag
- 1x pair sterile scissors

Procedure

1. Obtain referral from appropriate practitioner and assess patient's medical history to ensure the patient has no underlying medical problems which would contra-indicate the insertion of a line.
2. Explain and discuss the procedure with the patient. Obtaining consent outline the risks and benefits.
3. Apply tourniquet and assess venous access. Assess both arms and locate veins by use of an ultrasound. Remove tourniquet.
4. Ensure patients privacy, lie patient supine and extend arm 90° to the body.
5. Using a measuring tape, measure from the selected venepuncture site to desired tip position.
6. Apply tourniquet to patient's arm. Do not tighten tourniquet until ready to perform the procedure.
7. Open PICC placement pack at patient's bedside onto a prepared trolley.
8. Dispense all required sterile equipment onto sterile field.
9. Use effective hand hygiene, drying hands with sterile hand towels.
10. Put on sterile gown and sterile gloves then arrange equipment.
11. Prepare the two pre-filled 10ml syringes with 0.9% sodium chloride, 2mls of lidocaine 1% and one 10ml syringe with 5mls of Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution.
12. Remove the cap from the side flushing port of the PICC and prime the line with 0.9% sodium chloride.
13. Trim the line to the required measured length by withdrawing the guide wire 1cm from the desired tip length. Using the graduated markings on the catheter and using sterile scissors, trim the catheter then advance the guide wire to the end of the catheter. Never allow the guide wire to protrude beyond the catheter tip.
14. Place one sterile drape under patients arm.

Ultrasound Guided Insertion of a Mid-Line Continued

15. Clean skin at the selected site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution with friction for 2 minutes. Prepare an area of 10 – 15cm either side of the proposed insertion site.
16. Allow the solution to dry thoroughly.
17. Drape the patient with the sterile fenestrated drape.
18. Insert enough sterile gel into the probe cover to coat the end of the probe and apply cover over the ultrasound probe. Secure with the sterile elastic band and adhesive tape.
19. Tighten the tourniquet underneath the sterile field, being careful not to contaminate the sterile field.
20. Discard first pair of gloves and replace with second pair of sterile gloves
21. Locate vein on ultrasound ensuring the vein is pictured in the centre markers of the screen. Inject local anaesthetic into subcutaneous tissue at planned insertion site.
22. Using the blade make a small incision (approx 0.5cm) into the planned insertion site.
23. Using the ultrasound to guide, insert the needle into the small incision taking care to advance the needle into the centre of the vein. Blood will begin to advance up the needle.
24. Insert the guide-wire down through the needle, leaving approximately 3cm exposed at the end. Carefully withdraw the needle leaving the guide-wire in place.
25. Release tourniquet being careful not to contaminate the sterile field.
26. Advance the tearaway introducer over the top of the guide-wire, whilst holding the guide-wire push the tearaway introducer down through the skin and into the vein. Withdraw and remove the guide-wire leaving the tearaway introducer in place.
27. Unlock and twist the inner sheath and remove from the tearaway introducer.
28. Thread the catheter to approximately 15-20 cms through the introducer, instruct the patient to turn their head toward the insertion site and touch their chin to their shoulder. This helps inhibit malposition of the catheter into the jugular vein.
29. Once the catheter has been advanced, ask the patient to relax their head and carefully withdraw the introducer and peel away, taking care not to dislodge the catheter.
30. Secure catheter at exit site with gentle pressure and slowly withdraw the guide wire from the line and immediately attach the needle free access device to the end of the line.
31. Using a 10ml syringe of 0.9% sodium chloride aspirate blood to obtain flashback, when flashback is obtained using a pulsatile flush technique flush the catheter; continue with the second 10ml syringe of 0.9% sodium chloride and using a positive pressure flush finish with 5mls of Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution.
32. Secure the catheter with either a securAcath (appendix 10) or sterile steri-strips ensuring the hub and device are firmly adhered to the patient's arm.
33. Apply a small gauze dressing over the exit site and secure with a high moisture vapour permeable transparent dressing.
34. Dispose of equipment appropriately.
35. Use effective hand hygiene.
36. Document the procedure in the patient's medical records, noting:
    - ✓ Technique used
    - ✓ Type of anaesthetic
    - ✓ Type, length and gauge of catheter
    - ✓ Visual, verbal and documentary confirmation of guide-wire removal by 2 people
    - ✓ Insertion site and vein accessed
    - ✓ Securing method and dressing
    - ✓ Any problems encountered during insertion
    - ✓ Name and contact number of person who inserted the line

Dressing Change for a Midline

Good practice tips

- Frequency of dressing change: within 24 hours of insertion and then every 7 days using transparent, high moisture vapour permeable dressing.
- Any dressing should be changed if it has become lose, damp or soiled.
- SecurAcath or Sterile steri-strips should be used to secure the Midline **in addition** to the transparent, high moisture vapour permeable dressing.
- Measure catheter length to check for migration. This measurement should be from the exit site to the Midline hub and the length documented on the central venous access device observation record.
- Mechanical phlebitis is more likely to occur within the first 7 days following insertion of the Midline. It can usually be resolved within 48 hours by the application of heat to the upper arm for 10-20 minutes, 3 times a day.

Equipment

- Sterile dressing-pack including sterile gloves.
- Apron
- Non sterile gloves
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Sterile steri-strips if no securAcath is in place.
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).

Procedure

1. Assess the need to carry out additional procedures e.g. change of needle free access device.
2. Using the principles of ANTT prepare the equipment and assemble on a clean dressing trolley or tray.
3. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
4. Put on non-sterile gloves and loosen the dressing, removing it without touching the catheter and exit site.
5. Measure catheter length to check for migration.
6. Use effective hand hygiene and put on sterile gloves.
7. Clean catheter site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin), start from the exit site, extending out to the area that will be covered by the dressing. If a securAcath is in place ensure that the line is not raised more than 90% angle or rotated (appendix 10).
8. Allow to air dry for minimum of 30 seconds.
9. If a securAcath is not in place then secure line with steri-strips placing them in an “H” style and apply transparent high moisture vapour permeable transparent dressing over the top

10. Lines can be looped under the dressing for extra security; however **DO NOT** loop line over the top of itself. Leave extension set / injection port exposed.
11. Dispose of all waste as per guidelines and use effective hand hygiene.
12. Document using the central venous access device observation record:
    - ✓ Date/time of dressing change
    - ✓ Insertion site score
    - ✓ Evidence of catheter migration
    - ✓ Any nursing intervention as per individual area practices

Changing the Needle Free Access Device for a Midline

Good Practice Tips

- The needle free access device is a self-sealing bung that must not be pierced by a needle.
- It does not have to be removed to attach a syringe or giving set tube to the Midline.
- The device can be used for up to 140 times, but must always be changed at least weekly.
- The device must also be changed if it becomes contaminated, or if it is suspected that blood may have collected inside.
- The device will usually be changed at the same time as the dressing change

Equipment

- Sterile dressing pack including sterile gloves
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Needle free access device

Procedure

1. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Ensuring line is clamped, holding a sterile piece of gauze, one in each hand, hold the line and with the other hand remove the existing needle free access device and discard.
4. Clean catheter hub end with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
5. Using ANTT attach the new needle free access device to the catheter hub.
6. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
7. Record procedure and any variances in the patient's clinical record.

Administration of Intermittent Intravenous Medication for a Midline

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol
- 10 ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- Needle free access device (if required)
- Sterile gloves and dressing towel (if breaking the line)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an **existing needle free device**, use principles of ANTT clean the needle free access device with recommended cleansing wipe, 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe **(*not in neonates*)**. As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter If blood cannot be withdrawn refer to *Management of complications*.
6. ***Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.***
7. Do not force if resistance is met as forcing may result in emboli or catheter rupture.
8. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
9. Administer medication
10. Follow procedure and administration as per Drug Treatment Chart (QMR2), and manufacturer's instructions.
11. Attach new needle free access device (if required). Needle free devices must be changed within 7 days or 140 uses.
12. Flush the sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
13. If the line is not going to be accessed within 24 hours. Instil Heparin sodium solution 50 I.U./mls/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
14. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
15. Record procedure and any variances in the patient's clinical record.

Administration of Continuous Infusions for a Midline

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol
- 10ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Administration set
- Fluid/Drug for administration
- Volumetric infusion pump (if required)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an existing needle free device, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe (*not in neonates*). As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter
6. If blood cannot be withdrawn refer to *Management of complications*.
7. *Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.*
8. Do not force if resistance is met as forcing may result in emboli or catheter rupture.
9. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
10. Administer medication
11. Follow procedure and administration as per Drug Treatment Chart (QMR2), and manufacturer's instructions.
12. Using ANTT attach the primed line by connecting to the cleaned needle free access device.
13. *If using TPN in neonates use a filter*
14. Place newly primed set in pump (if pump required). Commence infusion at prescribed rate.
15. Ensure that all lines are labelled as per hospital guidelines.
16. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
17. Record procedure and any variance in the patient's clinical record.

Disconnecting an Intravenous Infusion for a Midline

Equipment

- 10ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- Needle free access device (if required)
- Sterile gloves and dressing towel (if breaking line)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. **Use ANTT throughout the procedure.**
4. Clamp both the catheter and the infusion line.
5. Disconnect the infusion.
6. Unclamp the catheter and flush the sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
7. If the line is not going to be accessed within 24 hours. Instil Heparin sodium flushing solution 50 I.U./mls/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
8. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
9. Record procedure and any variances in the patient's clinical record.

Blood Sampling for a Midline

Good practice tips

- Some Midlines **DO NOT** bleed back, this is due to the tip of the line lying in the axillary vein and not lying centrally in the superior vena cava.
- A vacuum sampling system is the preferred method for obtaining blood samples as it minimises the risk of needle-stick injuries.
- It is vitally important that the Midline is properly flushed using a pulsatile flush after the blood has been taken.
- The needle free access device must be changed after blood sampling if it is suspected that blood may have collected inside.
- Do not take clotting screens from lines that have contained Heparin Sodium flushing solution 50 I.U. /5mls.
- When withdrawing blood from a Midline line do not use a syringe below 10mls as they yield high negative pressure causing potential catheter collapse.
- The lumen of the Midline must be greater than 22G. Withdrawing blood through a lumen smaller than this may damage the platelets and result in altered laboratory results.

Equipment

- ANTT tray (Sterile dressing towel if patient is immunocompromised or exposing the catheter hub)
- Non sterile gloves (Sterile gloves if patient is immunocompromised or exposing the catheter hub)
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Blunt fill needle (for drawing up)
- 10ml syringes as required
- Vacuum blood sampling system
- 2x 10mls Pre-filled syringe of Sodium chloride 0.9% (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution
- Needle free access device (if required)
- Blood sampling bottles

Procedure

1 Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.

2 Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.

3 If using an **existing needle free device**, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.

4 *Vacuum sampling:*

- Assemble vacuum sampling system and insert luer lock adapter into the hub
- To avoid contaminate from blood sample insert a 5mls bio-chemistry tube, fill tube with blood and discard
- Obtain blood samples required

5 *Syringe sampling:*

- Insert syringe, unclamp line and withdraw 3-5mls of blood, clamp line and discard syringe.
- Insert new syringe, unclamp line and collect required amount of blood by slowly withdrawing syringe. Clamp line, attach sterile blood transfer device onto syringe and place syringe onto ANTT tray/sterile field and decant into blood sampling bottles once line flushed.

6 Unclamp line and flush the 20mls sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.

7 If the line is not going to be accessed within 24 hours. Instil Heparin sodium flushing solution 50 I.U./mls /manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure

8 Consider change of needle free device.

9 *Syringe sampling only:*

- Decant blood into blood sampling bottles and label sample bottle(s) at the patients' side.

10 Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.

11 Record procedure and any variances in the patient's clinical record

Routine Flushing and Hep-locking for a Midline

Good practice tips

- This procedure is for routine flushing and hep-locking of a Midline only; if flushing is related to another procedure please refer to that procedure.
- Flushing of the line will depend on the frequency of access, if the line is to be accessed within 24 hours flushing of the catheter should be with sodium chloride 0.9%, if the line is NOT to be accessed within 24 hours it will need to be locked with a locking solution of heparin sodium 50i.u/5mls. The heparin sodium 50i.u/5mls lock will last for 7 days.
- Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.
- Do not force if resistance is met as forcing may result in emboli or catheter rupture.
- Some Midlines **DO NOT** bleed back, this is due to the tip of the line lying in the axillary vein and not lying centrally in the superior vena cava.

Equipment

- ANTT tray
- Dressing pack
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Blunt fill needle (for drawing up)
- 10ml syringes as required
- 10mls Pre-filled syringe of Sodium chloride 0.9% (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution

Procedure

1. Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Using the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe thoroughly clean the needle free device and allow to air dry. Ensure midline does not come into contact with anything else or place midline onto a sterile towel.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Unclamp line and check for flash back of blood by gently withdrawing syringe (*not in neonates*). As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. *It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter*
6. If blood cannot be withdrawn refer to *Management of complications*.
7. If the line is not going to be accessed within 24 hours. Unclamp line and instil Heparin sodium flushing solution 50 I.U./mls/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
8. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
9. Record procedure and any variances in the patient's clinical record.

Removal of a Midline Line

Equipment

- Dressing pack including sterile gloves
- Non sterile gloves
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Sterile scissors - disposable
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).

Procedure

1. Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Position patient in the supine position which will increase CVP pressure preventing air being aspirated into the venous system.
4. Put on non-sterile gloves and loosen the dressing, removing it without touching the catheter and exit site. If a securAcath is in place grip the HOLD tab with thumb and finger. Pry upwards the edge of the LIFT tab to release the cover from the base.
5. Use effective hand hygiene and put on sterile gloves.
6. Clean catheter site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin), start from the exit site, extending out to the area that will be covered by the dressing.
7. Allow to air dry for minimum of 30 seconds.
8. Note: During removal of CVAD instruct patient to perform the Valsalva movement (trying to breathe out with glottis closed). If this is not possible, respirations should be momentarily ceased or removal performed on expiration. Keep the catheter / extension set below the level of the heart which maintains positive pressure and lessen the risk of drawing air into the vein. Catheter fracture and remobilisation can occur if the CVAD is removed against resistance. Remove the catheter by; placing sterile gauze over the catheter site and withdrawing catheter in a slow constant motion (no resistance should be felt). This maintains a positive pressure into the vein.
9. Stop if you meet resistance. Rest patient. If there is difficulty removing the line, it may be helpful to warm the arm as this will reduce the potential for venous spasm.
10. Using sterile gauze apply pressure over the exit site until bleeding stops approx. 5 minutes. If a securAcath is in place please remove as manufacturer's guidelines (appendix 10) before covering with a high moisture vapour permeable transparent dressing which prevents bleeding and air aspiration.
11. Ensure that the length of the line removed corresponds with the patients insertion details.
12. Inspect catheter ensuring it is complete with no ragged edges. If it is not intact, the tip may migrate to the heart and pulmonary system, urgent medical assistance will be required.
13. If infection of catheter is suspected using sterile scissors, cut off 5cm at tip of line and place in specimen container and send for culture and sensitivity.
14. Remove and dispose of equipment correctly.
15. Remove gloves and perform effective hand washing.
16. Record procedure and any variances in the patient's clinical record.
17. Remove the dressing after 72 hours and assess the site every 24 hours until the site has epithelised.

Care of a Tunnelled Cuffed Catheter (Hickman Line)

Insertion of a Hickman Line

Hickman lines are inserted by Medical staff who are competent in this procedure, in paediatrics this is in a tertiary centre.

Skin tunnelled catheters are routinely inserted in a Radiology Department. Using an aseptic technique and fluoroscopic control the patient is monitored with pulse oximetry and ECG to detect any arrhythmias. The procedure is usually performed under sedation and with local anaesthesia.

The percutaneous insertion involves the internal jugular (on occasion the subclavian vein) being accessed using an ultra sound guided percutaneous puncture and Seldinger technique. After the catheter has been tunnelled subcutaneously, a vein dilator is passed over the guide wire and the catheter is cut to length and introduced using a 'peel-away' sheath. The line is inserted under radiological conditions and then aspiration of blood from each lumen to confirm position.

Using a pulsatile technique the lumen is then flushed with 20mls 0.9% sodium chloride and 5mls of Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution

Document the procedure in the patient's medical records, noting:

- ✓ Technique used
- ✓ Type of anaesthetic
- ✓ Type, length and gauge of catheter
- ✓ Visual, verbal and documentary confirmation of guide-wire removal by 2 people
- ✓ Insertion site and vein accessed
- ✓ Securing method and dressing
- ✓ Any problems encountered during insertion
- ✓ Name and contact number of person who inserted the line

Dressing Change for a Hickman Line

Good practice tips

- Frequency of dressing change: within 24 hours of insertion and then every 7 days using transparent, high moisture vapour permeable dressing.
- Any dressing should be changed if it has become lose, damp or soiled.
- Sutures should be used to secure the Hickman line in addition to the transparent, high moisture vapour permeable dressing.
- A dressing is not required on a Hickman line once the sutures are removed and the site is healed. (See removal of sutures for guidance)
- Measure catheter length to check for migration. This measurement should be from the exit site to the hub and the length documented on the central venous access device observation record.

Equipment

- Sterile dressing-pack including sterile gloves.
- Apron
- Non sterile gloves
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).

Procedure

1. Assess the need to carry out additional procedures e.g. change of needle free access device.
2. Using the principles of ANTT prepare the equipment and assemble on a clean dressing trolley or tray.
3. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
4. Put on non-sterile gloves and loosen the dressing, removing it without touching the catheter and exit site.
5. Measure catheter length to check for migration.
6. Use effective hand hygiene and put on sterile gloves.
7. Clean catheter site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin), start from the exit site, extending out to the area that will be covered by the dressing. Allow to air dry for minimum of 30 seconds.
8. Lines can be looped under the dressing for extra security, however **DO NOT** loop line over the top of itself. Leave extension set / injection port exposed.
9. Dispose of all waste as per guidelines and use effective hand hygiene.
10. Document using the central venous access device observation record:
    - ✓ Date/time of dressing change
    - ✓ Insertion site score
    - ✓ Evidence of catheter migration
    - ✓ Any nursing intervention as per individual area practices

Changing the Needle Free Access Device for a Hickman Line

Good practice tips

- The needle free access device is a self-sealing bung that must not be pierced by a needle.
- It does not have to be removed to attach a syringe or giving set tube to the Hickman line.
- The device can be used for up to 140 times, but must always be changed at least weekly.
- The device must also be changed if it becomes contaminated, or if it is suspected that blood may have collected inside.
- The device will usually be changed at the same time as the dressing change.

Equipment

- Sterile dressing pack including sterile gloves
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Needle free access device

Procedure

1. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Ensuring line is clamped, holding a sterile piece of gauze, one in each hand, hold the line and with the other hand remove the existing needle free access device and discard.
4. Clean catheter hub end with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
5. Using ANTT attach the new needle free access device to the catheter hub.
6. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
7. Record procedure and any variances in the patient's clinical record.

Suture Removal from a Hickman Line

Good practice tips

- Extreme care must be taken when removing sutures as ***puncturing the line can lead to air embolism which may be fatal.***
- If line is punctured clamp the line immediately between the skin and puncture site. Seek medical advice.
- When removing sutures ensure that the external part of the suture is not taken under the skin.
- A dressing is not required on Hickman lines once all the sutures are removed and the site is healed.
- **Remove sutures from entry site at 7 days.**
- **Remove sutures from exit site at 21 days.**

Equipment

- Sterile dressing pack including sterile gloves
- Stitch cutter
- Apron
- Non sterile gloves
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).

Procedure

1. Assess the need to carry out additional procedures e.g. change of needle free access device.
2. Using the principles of ANTT prepare the equipment and assemble on a clean dressing trolley or tray.
3. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
4. Put on non-sterile gloves and loosen the dressing, removing it without touching the catheter and exit site.
5. Measure catheter length to check for migration.
6. Use effective hand hygiene and put on sterile gloves.
7. Clean catheter site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin), start from the exit site, extending out to the area that will be covered by the dressing. Allow to air dry for minimum of 30 seconds.
8. Taking extreme care not to puncture the catheter remove the sutures using the stitch cutter.
9. Lines can be looped under the dressing for extra security; however **DO NOT** loop line over the top of itself. Leave extension set / injection port exposed.
10. Dispose of all waste as per guidelines and use effective hand hygiene.
11. Document using the central venous access device observation record:
12. Date/time of dressing change
13. Insertion site score
14. Evidence of catheter migration
15. Any nursing intervention as per individual area practices

Administration of Intermittent Intravenous Medication for a Hickman Line

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- 10 ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution of heparin 25,000 I.U./5mls or Gentamycin (usually in aphaeresis / haemodialysis lines).
- Needle free access device (if required)
- Sterile gloves and dressing towel (if breaking CVAD line)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an **existing needle free device**, use principles of ANTT clean the needle free access device with recommended cleansing wipe, 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe **(*not in neonates*)**. As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter (usually in aphaeresis / haemodialysis lines).
6. If blood cannot be withdrawn refer to *Management of complications*.
7. ***Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.***
8. Do not force if resistance is met as forcing may result in emboli or catheter rupture.
9. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
10. Administer medication
11. Follow procedure and administration as per Drug Treatment Chart (QMR2), and manufacturer's instructions.
12. Attach new needle free access device (if required).Needle free devices must be changed within 7 days or 140 uses.
13. Flush the sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
14. If the line is not going to be accessed within 8 hours. Instil Heparin sodium solution 50 I.U./mls/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
15. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
16. Record procedure and any variances in the patient's clinical record.

Administration of Continuous Infusions for a Hickman Line

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution.
- 10ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Administration set
- Fluid/Drug for administration
- Volumetric infusion pump (if required)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an **existing needle free device**, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of catheter by attaching a syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe **(*not in neonates*)**. As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter (usually in aphaeresis / haemodialysis lines).
6. If blood cannot be withdrawn refer to *Management of complications*.
7. ***Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.***
8. Do not force if resistance is met as forcing may result in emboli or catheter rupture.
9. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
10. Administer medication
11. Follow procedure and administration as per Drug Treatment Chart (QMR2), and manufacturer's instructions.
12. Using ANTT attach the primed line by connecting to the cleaned needle free access device.
13. *If using TPN in neonates use a filter*
14. Place newly primed set in pump (if pump required). Commence infusion at prescribed rate.
15. Ensure that all lines are labelled as per hospital guidelines.
16. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
17. Record procedure and any variance in the patient's clinical record.

Disconnecting an Intravenous Infusion for a Hickman Line

Equipment

- 10ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution of heparin 25,000 I.U./5mls or Gentamycin (usually in aphaeresis / haemodialysis lines).
- Needle free access device (if required)
- Sterile gloves and dressing towel (if breaking CVAD line)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. **Use ANTT throughout the procedure.**
4. Clamp both the catheter and the infusion line.
5. Disconnect the infusion.
6. Unclamp the catheter and flush the sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
7. If the line is not going to be accessed within 8 hours. Instil Heparin sodium flushing solution 50 I.U./5mls or manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
8. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual
9. Record procedure and any variances in the patient's clinical record.

Blood sampling for a Hickman Line

Good practice tips

- A vacuum sampling system is the preferred method for obtaining blood samples as it minimises the risk of needle-stick injuries.
- It is vitally important that the Hickman line is properly flushed using a pulsatile flush after the blood has been taken.
- The needle free access device must be changed after blood sampling if it is suspected that blood may have collected inside.
- When withdrawing blood from a Hickman line do not use a syringe below 10mls as they yield high negative pressure causing potential catheter collapse.
- The lumen of the Hickman line must be greater than 22G. Withdrawing blood through a lumen smaller than this may damage the platelets and result in altered laboratory results.
- Do not take clotting screens from lines that have contained Heparin Sodium flushing solution 50 I.U. /5mls.
- If the line has multiple lumens use larger size lumen for taking blood where possible and clearly document which line was accessed.
- Turn off infusions to other lumen prior to taking blood samples as the infusate may contaminate the sample

Equipment

- ANTT tray (Sterile dressing towel if patient is immunocompromised or exposing the catheter hub)
- Non sterile gloves (Sterile gloves if patient is immunocompromised or exposing the catheter hub)
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Blunt fill needle (for drawing up)
- 10ml syringes as required
- Vacuum blood sampling system
- 2x 10mls Pre-filled syringe of Sodium chloride 0.9% (for flushing)
- Heparin Sodium flushing solution 50 I.U. /5mls or manufacturers locking solution of heparin 25,000 I.U./5mls or Gentamycin (usually in aphaeresis / haemodialysis lines).
- Needle free access device (if required)
- Blood sampling bottles

Procedure

1. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. If using an existing needle free device, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. *Vacuum sampling:*
   - Assemble vacuum sampling system and insert luer lock adapter into the hub
   - To avoid contaminate from blood sample insert a 5mls bio-chemistry tube, fill tube with blood and discard
5. Obtain blood samples required
6. *Syringe sampling:*
   - Insert syringe, unclamp line and withdraw 3-5mls of blood, clamp line and discard syringe.
   - Insert new syringe, unclamp line and collect required amount of blood by slowly withdrawing syringe. Clamp line, attach sterile needle onto syringe and place syringe onto ANTT tray/sterile field and decant into blood sampling bottles once line flushed.
7. Unclamp line and flush the 20mls sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
8. If the line is not going to accessed within 8 hours. Instil Heparin sodium flushing solution 50 I.U./mls/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure.
9. Consider change of needle free device.
10. *Syringe sampling only:*
    - Decant blood into blood sampling bottles and label sample bottle(s) at the patients' side.
11. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
12. Record procedure and any variances in the patient's clinical record.

Removal of a Hickman Line

- Removal should only be carried out by:
  - Medical staff
  - Specialist Practitioners who have undergone training and have a recognised competency in removal of Hickman lines.
- ANTT should be used throughout the procedure.
- Positioning of the patient in the supine position will increase CVP pressure preventing air being aspirated into the venous system.
- Consent and recent INR/FBC are required prior to removal.

Surgical Excision

- Once the cuff has been found, local anaesthetic is inserted to enable a surgical excision. A scalpel may cause tissue damage therefore a blunt dissection is used.
- A small incision is made over the site of the cuff and blunt dissection is performed with the use of forceps.
- The cuff and the catheter are freed from the surrounding fibrous tissue.
- Gentle traction is then used to remove all of the line.
- Once the catheter has been removed, the wound is sutured using interrupted sutures, which can be removed after 7 days.
- Following removal, pressure should be applied to the site until the bleeding stops, and a sterile semi permeable occlusive dressing may be required for up to 72 hours.
- The patient should be encouraged to rest flat for 30-60 minutes to allow the tissue tract time to seal (Perucca 2001).
- If the tip is required for microbiological examination, care should be taken to clean the exit site with chlorhexidine in 70% alcohol, prior to removal, to prevent a false positive tip culture. The tip should be placed into a sterile container immediately upon removal and sent to the laboratory (Perucca2001).

Permacath/CVC for Extracorporeal Therapies

General Care of a Permacath/CVC for Extracorporeal Therapies

Good practice

- Central venous catheters used for extracorporeal therapies includes:
  - Single or dual lumen temporary CVC's, which may have extra lumens for CVP monitoring or dual lumen Permacaths, which are long term dialysis catheters.
  - Both types of lines have wide bore lumens to allow high blood flow rates required for dialysis treatments.
  - CVCs used for extracorporeal therapies must have dedicated lumens for this therapy and should only be used for CVP monitoring and drug administration if the CVC has either a triple or quad lumen line.
  - Permacaths should never be used for anything other than extracorporeal therapies.
  - This procedure can be applied for CVCs used for dialysis therapies, plasma exchanges and MARS treatments.
  - To prevent excessive pressure being exerted within the catheter, syringes no smaller than 10mls should be used on either a permacath or temporary CVC.

During connection and disconnection to extracorporeal therapies, the following principles must be followed:-

  - Sterile gloves must always be worn when accessing the CVC.
  - The use of two sterile fields must be used during the procedure, one for equipment and one for the lumens of the catheter.
  - The open end of each lumen should be exposed for the minimum amount of time whilst ensuring that key part protection is maintained.
  - Equipment must never be shared between lumens.
  - To prevent the entry of air embolus, always ensure the lumen is clamped prior to disconnection of equipment.
  - To prevent an air embolus entering the patient's circulation, no air should be present in any syringe or line prior to connection.
  - During the procedure, when the nurse is lifting or moving the line, unclamping or clamping the lumen, sterile betadine soaked gauze must be used to touch the line.
  - Equipment must never be shared between lumens.
  - These guidelines must be used in conjunction with the relevant Renal Dialysis Unit policies for machine use.
  - Locking solutions are prescribed individually to each patient.
  - During the procedure, when the nurse is lifting or moving the line, unclamping or clamping the lumen, sterile betadine soaked gauze must be used to touch the line.
  - To prevent an air embolus entering the patient's circulation, no air should be present in any syringe or line prior to connection.
- ANTT must be adhered to throughout the procedure.
- If extracorporeal therapies are required on the same day as insertion of the CVC, the following principles should be adhered to:-
  - Unless instructed otherwise by a renal consultant or registrar, reduced heparinisation must be performed during the treatment.
  - The exit site of the CVC must be monitored throughout the treatment for bleeding.
  - Leave insertion dressing undisturbed for 24hours.
- Temporary CVCs should be removed using the procedure outlined in Appendix 4.
- Permacaths are to be removed by a renal consultant or registrar.
- Permacaths that are not used for regular extracorporeal treatments, either due to intermittent therapy or development of AV fistula cannulation, should have maintenance and dressing of the line performed 3 times a week.

Connection to Extracorporeal Circuit for Permacath/CVC

This procedure is to be undertaken once the machine is lined and the priming process has been completed. The patient should be prepared for the extra corporeal therapy and ready for connection.
This is a 2 person procedures, with the nurse dealing solely with the CVC, with an assistant to manage the machine.

Equipment

- Renal pack with gallipot
- Sterile gloves
- Betadine Antiseptic Solution
- 4 x 10 ml luer lock syringes
- Blunt fill safety needle
- 20 mls of sterile Sodium Chloride 0.9% for injection solution.

Procedure

1. Prepare the equipment as per ANTT and assemble on clean table or dressing trolley Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
2. Undertake effective hand hygiene in accordance with the Infection Control Manual.
3. Put on a clean apron.
4. Maintaining ANTT, open sterile renal pack and open equipment onto sterile field without touching the equipment or sterile field. Ensure to open packaging as designed. Dispense Betadine Antiseptic solution into gallipot.
5. Open sodium chloride 0.9% ampoules for flushing the catheter, and place beside sterile field.
6. Undertake effective hand hygiene with Hibiscrub, drying hands on sterile hand towel from within the renal pack. Stelisept soap can be used to wash hands if an allergy to Hibiscrub occurs.
7. Put on sterile gloves pulling them up and over wrist area.
8. Maintaining ANTT, prepare 2 x 10 ml sodium chloride 0.9% flushes.
9. Open out sterile sheet; make a tear approximately half way along the folded sheet. Creating a sterile field around the line place the lumens through the tear of the sterile sheet.
10. Prepare four pieces of gauze by soaking them in the Betadine antiseptic solution.
11. Clean each lumen with ***separate*** pieces of Betadine antiseptic soaked gauze and discard.
12. Wrap each lumen with the remaining pieces of Betadine antiseptic soaked gauze. The line is now ready to be accessed.
13. Using the Betadine antiseptic soaked gauze hold the line, ensure that the clamp is on, and using a fresh piece of gauze remove the cap from the lumen, discard. Attach an empty 10ml syringe immediately onto the end of the lumen. Repeat this process for each lumen.
14. To remove the locking solution from the previous treatment, unclamp the line and withdraw approximately 2-3mls of blood from each lumen and waste. Clamp line. If the lock cannot be withdrawn, this can be flushed into the patient.
15. To assess the CVCs ability to be used with the high blood flow rates required for extracorporeal therapies, using a separate syringe containing 10mls sodium chloride 0.9% for each lumen repeatedly withdraw an adequate amount of blood into the syringe, whilst using a pulsatile technique to flush this back into the line, re-clamp.
    - *If the CVC function does not appear adequate for extracorporeal therapies, then CVC occlusion procedures (appendix 11) should be followed or the renal team informed.*
16. The arterial and venous lines of the extracorporeal circuit will be handed to the person performing this procedure. The lines should be received with a sterile piece of gauze and attached directly to the lumens of the CVC. No air should be present in these lines, to prevent air embolism.
    - If a dual lumen line is in use, the **arterial line** should be connected to the **red lumen** and the **venous line** to the **blue lumen**. However, if the CVC function does not provide adequate flows for extracorporeal therapies these lines can then be reversed, the CVC occlusion procedures should be followed and the renal team informed.
17. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual
18. Record procedure and any variances in the patient's clinical record

Disconnection from Extracorporeal Circuit for Permacath/CVC

This procedure is to be undertaken once the patient and machine are ready.
The patient should have completed the extra corporeal therapy and be ready for disconnection.
This is a 2 person procedure, with the nurse dealing solely with the CVC, with an assistant to manage the machine

Equipment

- Renal pack with gallipot
- Sterile gloves
- Betadine Antiseptic Solution
- 4 x 10 ml luer lock syringes
- White caps
- Blunt fill safety needle
- 20 mls of sodium chloride 0.9% for injection solution
- Locking solution

Procedure

1. Prepare the equipment as per ANTT and assemble on clean table or dressing trolley
2. Check volume of each lumen for corresponding amount of lock required. This is normally written on the lumens of the CVC.
3. Undertake effective hand hygiene in accordance with the Infection Control Manual.
4. Put on a clean apron.
5. Maintaining ANTT, open sterile renal pack and open equipment onto sterile field without touching the equipment or sterile field. Ensure to open packaging as designed. Dispense Betadine Antiseptic solution into gallipot.
6. Prepare sodium chloride 0.9% ampoules for flushing the catheter, and place beside sterile field.
7. Undertake effective hand hygiene with Hibiscrub, drying hands on sterile hand towel from within the renal pack. Stelisept soap can be used to wash hands if an allergy to Hibiscrub occurs.
8. Put on sterile gloves pulling them up and over wrist area.
9. Maintaining ANTT, prepare 2 x 10 ml sodium chloride 0.9% flushes.
10. Using ANTT, mix prescribed locking solution remembering to reduce the volume in each syringe to correspond with the locking volume of each lumen.
11. Open out sterile sheet; make a tear approximately half way along the folded sheet. Creating a sterile field around the line place the lumens through the tear of the sterile sheet.
12. Prepare four pieces of gauze by soaking them in the Betadine antiseptic solution.
13. Clean each lumen with ***separate*** pieces of Betadine antiseptic soaked gauze and discard.
14. Wrap each lumen with the remaining pieces of Betadine antiseptic soaked gauze. Clamp line.
15. ***The disconnection procedure should follow the policy specific to the machine used***.
16. On completion, using sterile gauze, disconnect the arterial and venous lines of the extracorporeal circuit, hand to an assistant. Immediately attach a syringe containing 10mls sodium chloride 0.9% to each lumen. Flush the sodium chloride 0.9% into the line using a pulsatile flush technique.
17. Instil locking solution using positive pressure flush and clamp line which will prevent backflow of blood into the catheter and promote a positive pressure.
18. For each lumen, exchange the locking syringe for a white cap; ensure the cap is firmly in place.
19. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
20. Record procedure and any variances in the patient's clinical record.
21. Document using the central venous access device observation record:
    - ✓ Date/time of dressing change
    - ✓ Insertion site score
    - ✓ Evidence of catheter migration
    - ✓ Any nursing intervention as per individual area practices

Locking Solutions for Permacath/CVC

Good Practice tips

- Locking solutions are individual to each patient and should be prescribed.
- ANTT should be followed when preparing locks taking care to protect key parts.
- The locking solution should be prepared in conjunction with the disconnection procedure.
- **For maintenance only**: **(when CVC not regularly used for extracorporeal therapies)**: prior to instilling each locking solution blood should be withdrawn and discarded to prevent introducing locking solutions systemically.

Mixing Gentamicin Locks

The standard dose of these locks is Gentamicin 5mg & Heparin 5000iu per lumen. a smaller dose may be administered due to the smaller volume required to lock the lumen.

Drugs required

- Gentamicin solution 20mg/2mls (paediatric)
- Monoparin Heparin solution 5000iu/ml X 2ml ampoule
- Sodium Chloride 0.9% 1ml for injection solution

Procedure

Using ANTT reconstitute lock

- Withdraw 1ml of gentamicin (equivalent of 10mg dose).
- Into the same syringe withdraw 2mls of 5000iu/ml of heparin (equivalent of 10,000iu dose)
- The locking solution should initially go cloudy and then clear, if the solution does not clear adding extra heparin may be required.

If the locking solution does not clear the solution must be discarded and the procedure recommenced.

- Withdraw 1ml of Sodium Chloride 0.9% into the same syringe.
- *Decant* 2mls of this locking solution into another syringe.
- Reduce the volume in each syringe to coincide with the locking volume of the line.

Mixing Urokinase Locks

The standard dose of these locks is Urokinase 12,500 IU per lumen. However, if the lumen is shorter than 2mls a smaller dose may be administered due to the smaller volume required to lock the lumen. The lock needs to be of the correct concentration, rather than a particular dose.

Drugs required

- Urokinase 25,000iu 1 x ampoule
- Sodium Chloride 0.9% 4mls for injection solution

Procedure

Using ANTT reconstitute for each lumen

- Mix Sodium Chloride 0.9% 4mls with Urokinase 25,000 IU in the Urokinase ampoule.
- The solution will dissolve rapidly.
- Withdraw **2mls** of the Urokinase solution from the ampoule back into the syringe for **each lumen.**
- Reduce the volume in each syringe to coincide with the locking volume of the line.

Dressing Change for a Permacath

Good practice tips

- The dressing change needs to be a separate procedure from all other procedures, and **should not** be combined with **connection** or **disconnection** of extracorporeal therapies.
- Frequency of dressing change: within 24 hours of insertion, due to presence of sterile gauze and then every 7 days **CHG 2% tegaderm dressing or 3 times per week** using **transparent**, high moisture vapour permeable dressing.
- Gauze dressings can be used on tunnelled catheters if infected/oozing but **must be** changed every **24 hours.**
- Any dressing should be changed if it has become lose, damp or soiled

Equipment

- Sterile renal pack
- Sterile gloves
- Apron
- Non sterile gloves
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- CHG 2% Tegaderm or Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).

Procedure

1. Using the principles of ANTT prepare the equipment and assemble on a clean dressing trolley or table
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Undertake effective hand hygiene in accordance with the Infection Control Manual (January 2010).
4. Put on a clean apron.
5. Maintaining ANTT, open sterile renal pack and open equipment onto sterile field without touching the equipment or sterile field. Ensure to open packaging as designed.
6. Put on non-sterile gloves and loosen the dressing, removing it without touching the catheter and exit site.
7. Use effective hand hygiene, with Hibiscrub, drying hands on sterile hand towel from within the renal pack and put on sterile gloves. Stelisept soap can be used to wash hands if an allergy to Hibiscrub occurs.
8. Clean catheter site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin), start from the exit site, extending out to the area that will be covered by the dressing.
9. Allow to air dry for minimum of 30 seconds.
10. Apply CHG 2% tegaderm dressing with the exit site in the centre of the gel pad. If an alternative dressing is required, ensure the exit site is in the centre of the dressing.
11. Measure catheter length to check for migration.
12. Dispose of all waste as per guidelines and use effective hand hygiene.
13. Document using the central venous access device observation record:
    - ✓ Date/time of dressing change
    - ✓ Insertion site score
    - ✓ Evidence of catheter migration
    - ✓ Any nursing intervention as per individual area practices

Suture Removal for a Permacath

Good practice tips

- Extreme care must be taken when removing sutures as ***puncturing the line can lead to air embolism which may be fatal.***
- If line is punctured clamp the line immediately between the skin and puncture site. Seek medical advice.
- Suture removal should be performed as part of a dressing change procedure once the old dressing has been removed.
- When removing sutures ensure that the external part of the suture is not taken under the skin.
- **Remove sutures from entry (neck) site at 7 days.**
- **Remove sutures from exit (wing) site at 14 days.**

Equipment

- Equipment as for dressing change procedure.
- Stitch cutter

Procedure

1. Assess the need to carry out additional procedures e.g. change of needle free access device.
2. Using the principles of ANTT prepare the equipment and assemble on a clean dressing trolley or table
3. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
4. Undertake effective hand hygiene in accordance with the Infection Control Manual (January 2010).
5. Put on a clean apron.
6. Maintaining ANTT, open sterile renal pack and open equipment onto sterile field without touching the equipment or sterile field. Ensure to open packaging as designed.
7. Put on non-sterile gloves and loosen the dressing, removing it without touching the catheter and exit site.
8. Use effective hand hygiene with Hibiscrub, drying hands on sterile hand towel from within the renal pack and put on sterile gloves. Stelisept soap can be used to wash hands if an allergy to Hibiscrub occurs.
9. Clean catheter site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin), start from the exit site, extending out to the area that will be covered by the dressing. Allow to air dry for minimum of 30 seconds.
10. Taking extreme care not to puncture the catheter remove the sutures using the stitch cutter.
11. Measure catheter length to check for migration.
12. Dispose of all waste as per guidelines and use effective hand hygiene.
13. Document using the central venous access device observation record:
    - ✓ Date/time of dressing change
    - ✓ Insertion site score
    - ✓ Evidence of catheter migration
    - ✓ Any nursing intervention as per individual area practices

Blood sampling for a Permacath

Good practice tips

- Permacaths should **never** be accessed **solely** for the purpose of obtaining blood samples, blood samples should **only** be obtained from Permacaths **as part** of the **connection** or **disconnection** procedures for extracorporeal therapies.
- Low fill blood bottles should always be used to minimise the effects of anaemia from frequent blood sampling and renal failure.
- Blood samples obtained during the disconnection to extra corporeal therapies using a dual lumen CVC, can be aspirated from the arterial lumen, after the disconnection of the arterial line.
- It is vitally important that the Permacath is properly flushed using a pulsatile flush after the blood has been taken.

Equipment

- Low fill blood sampling bottles
- 30mls syringe
- Sterile vacutainer
- Equipment required for connection or disconnection to extracorporeal therapies

Procedure

1. If the blood sample is to be taken as part of the **connection** procedure, this should be taken **after** the **lock** has been **aspirated** from the Permacath and **prior** to **flushing** the lumen.
2. If the blood sample is to be taken from a single lumen CVC **after** extracorporeal therapies, then this should be taken **after** the **arterial** and **venous** line have been **disconnected**, but **prior** to flushing the line.
3. With a dual lumen CVC, either lumen, where blood can be aspirated, can be used for blood sampling.
4. To prevent dilution or contamination of the blood sample, insert a 30ml syringe into the lumen and withdraw 30mls of blood. Place onto the sterile field.
5. Attach the sterile vacutainer onto the end of the lumen and insert the low fill vacutainer blood bottles taking care not to touch the blood bottles. The bottles can be handled with a sterile piece of gauze or by an assistant who ensures they do not touch the sterile vacutainer device or the sterile field.
6. Return the 30mls of blood via the same lumen.
7. Continue with connection/disconnection procedure

Routine Flushing and Locking for a Permacath

Good practice tips

- This procedure is only to be used for Permacaths that are not being used for regular extracorporeal treatments, either due to intermittent therapy or development of AV fistula cannulation.

Equipment

- Sterile renal pack
- Sterile gloves
- Apron
- 20 mls of Sodium Chloride 0.9% for injection solution
- Prescribed Locking solution
- Betadine Antiseptic Solution
- Blunt fill needle (for drawing up)
- 6 x 10ml syringes
- 10mls Pre filled Sodium chloride 0.9% (for flushing)
- 2 white caps

Procedure

1 Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.

2 Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.

3 Undertake effective hand hygiene in accordance with the Infection Control Manual.

4 Put on a clean apron

5 Maintaining ANTT, open sterile renal pack and open equipment onto sterile field without touching the equipment or sterile field. Ensure to open packaging as designed. Dispense Betadine Antiseptic solution into gallipot.

6 Open sodium chloride 0.9% ampoules for flushing the catheter and locking solutions, and place beside sterile field.

7 Undertake effective hand hygiene with Hibiscrib drying hands on sterile hand towel from within the renal pack. Stelisept soap can be used to wash hands if an allergy to Hibiscrub occurs.

8 Put on sterile gloves pulling them up and over wrist area.

9 Maintaining ANTT, prepare 2 x 10 ml sodium chloride 0.9% flushes and locks.

10 Open out sterile sheet; make a tear approximately half way along the folded sheet. Creating a sterile field around the line place the lumens through the tear of the sterile sheet.

11 Prepare four pieces of gauze by soaking them in the Betadine antiseptic solution.

12 Clean each lumen with ***separate*** pieces of Betadine antiseptic soaked gauze and discard.

13 Wrap each lumen with the remaining pieces of Betadine antiseptic soaked gauze. The line is now ready to be accessed.

14 Using the Betadine antiseptic soaked gauze hold the line, ensure that the clamp is on, and using a fresh piece of gauze remove the cap from the lumen, discard. Attach an empty 10ml syringe immediately onto the end of the lumen. Repeat this process for each lumen.

15 To remove the locking solution from the previous treatment, unclamp the line and withdraw approximately 2-3mls of blood from each lumen and waste. Clamp line. If the lock cannot be withdrawn, this can be flushed into the patient.

16 Attach a syringe containing 10mls sodium chloride 0.9% to each lumen. Flush the sodium chloride 0.9% into the line using a pulsatile flush technique.

17 Instil locking solution using positive pressure flush and clamp line which will prevent backflow of blood into the catheter and promote a positive pressure.

18 For each lumen, exchange the locking syringe for a white cap; ensure the cap is firmly in place.

19 Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.

20 Document using the central venous access device observation record:

- ✓ Date/time of dressing change
- ✓ Insertion site score
- ✓ Evidence of catheter migration
- ✓ Any nursing intervention as per individual area practices.

Implanted Ports

Insertion of a Gripper Needle

Equipment

- Sterile dressing pack – including sterile gloves
- Recommended cleansing 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Heparin Sodium flushing solution for line lock: 100u/ml/4mls (child), 50 I.U. /5mls (adults) or manufacturers locking solution
- 10ml syringes x 1
- Blunt fill needle (for drawing up)
- Needle free access device
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing). Gripper needle (appropriate length for individual child)
- 10mls Pre-filled syringe of Sodium Chloride 0.9%

Procedure

1. Using the principles of ANTT prepare the equipment and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine port site for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. If applicable apply local anaesthetic, refer to manufacturers recommendations.
4. Use effective hand hygiene and put on sterile gloves.
5. Prepare pre-filled sodium chloride 0.9% and locking solutions.
6. Attach the needle free access device to end of gripper, prime gripper and needle free access device with pre-filled sodium chloride 0.9% and apply clamp.
7. If applicable remove local anaesthetic with sterile gauze.
8. Clean skin at port site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin). Allow to air dry for minimum of 30 seconds.
9. Position patient in a comfortable position.
10. Place sterile towel under area needing to be accessed.
11. Locate the edges of the port and hold firmly to prevent from moving. Identify the centre of the port and push the gripper needle through the skin and portal septum until it touches the back of the chamber.
12. Check patency of port by attaching a syringe containing pre-filled 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe (***not in neonates***). As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
13. If the line is not going to be accessed within 8 hours. Instil Heparin sodium solution /manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the port and promotes positive pressure
14. Remove wings and cover with sterile Opsite IV 3000 / tegaderm.
15. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
16. Record procedure and any variances in the patient's clinical record.
17. **Change the needle free device weekly and record in nursing notes.**

Changing the Needle Free Access Device for an Implanted Port

Good practice tips

- The needle free access device is a self-sealing bung that must not be pierced by a needle.
- It does not have to be removed to attach a syringe or giving set tube to the port.
- The device can be used for up to 140 times, but must always be changed at least weekly.
- The device must also be changed if it becomes contaminated, or if it is suspected that blood may have collected inside.
- The device will usually be changed at the same time as the dressing change.

Equipment

- Sterile dressing pack including sterile gloves
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution Needle free access device

Procedure

1. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
2. Prepare the patient and observe for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Ensuring gripper line is clamped, holding a sterile piece of gauze, one in each hand, hold the line and with the other hand remove the existing needle free access device and discard.
4. Clean catheter hub end with 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
5. Using ANTT attach the new needle free access device to the catheter hub.
6. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
7. Record procedure and any variances in the patient's clinical record.

Administration of Intermittent Intravenous Medication for an Implanted Port

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- 10 ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Heparin Sodium flushing solution for the line lock: 100u/ml/4mls (child), 50 I.U. /5mls (adults) or manufacturers locking solution
- Needle free access device (if required)
- Sterile gloves and dressing towel (if breaking line)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an **existing needle free device**, use principles of ANTT clean the needle free access device with recommended cleansing wipe, 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of port by attaching a pre-filled syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe (***not in neonates***). As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. It is not necessary to routinely withdraw and discard blood from the port before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter.
6. If blood cannot be withdrawn refer to *Management of complications*.
7. ***Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.***
8. Do not force if resistance is met as forcing may result in emboli or catheter rupture.
9. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
10. Administer medication
11. Follow procedure and administration as per Drug Treatment Chart (QMR2), and manufacturer's instructions.
12. Prime and attach new needle free access device (if required).Needle free devices must be changed within 7 days or 140 uses.
13. Flush the sodium chloride 0.9% into the gripper line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
14. If the line is not going to be accessed within 8 hours. Instil Heparin sodium solution /manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the port and promotes positive pressure.
15. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
16. Record procedure and any variances in the patient's clinical record.

Administration of Continuous Infusions for an Implanted Port

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution.
- 10ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Administration set
- Fluid/Drug for administration
- Volumetric infusion pump (if required)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an existing needle free device, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of port by attaching a pre-filled syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe (*not in neonates*). As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter
6. If blood cannot be withdrawn refer to *Management of complications*.
7. ***Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.***
8. Do not force if resistance is met as forcing may result in emboli or catheter rupture.
9. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
10. Administer medication
11. Follow procedure and administration as per Drug Treatment Chart (QMR2), and manufacturer's instructions.
12. Using ANTT attach the primed line by connecting to the cleaned needle free access device.
13. *If using TPN in neonates use a filter*
14. Place newly primed set in pump (if pump required). Commence infusion at prescribed rate.
15. Ensure that all lines are labelled as per hospital guidelines.
16. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
17. Record procedure and any variance in the patient's clinical record.

Disconnecting an Intravenous Infusion for an Implanted Port

Equipment

- 10ml syringes as required
- Blunt fill needle (for drawing up)
- 10mls Pre-filled syringe of Sodium chloride 0.9% as required (for flushing)
- Heparin Sodium flushing solution for line lock: 100u/ml/4mls (child)
  50 I.U. /5mls (adults) or manufacturers locking solution
- Needle free access device (if required)
- Sterile gloves and dressing towel (if breaking CVAD line)

Procedure

1. Explain the procedure to the patient.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. **Use ANTT throughout the procedure.**
4. Clamp both the gripper line and the infusion line.
5. Disconnect the infusion.
6. Flush the pre-filled sodium chloride 0.9% into the gripper line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
7. If the line is not going to be accessed within 8 hours. Instil Heparin sodium flushing solution manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the port and promotes positive pressure.
8. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
9. Record procedure and any variances in the patient's clinical record.

Blood Sampling for an Implanted Port

Good practice tips

- It is vitally important that the Port is properly flushed using a pulsatile flush after the blood has been taken.
- The needle free access device must be changed after blood sampling if it is suspected that blood may have collected inside.
- When withdrawing blood from a Port do not use syringes below 10mls as they yield high negative pressure causing potential catheter collapse.
- The lumen of the extension set must be greater than 22G. Withdrawing blood through a lumen smaller than this may damage the platelets and result in altered laboratory results.
- Do not take clotting screens from lines that have contained Heparin Sodium flushing solution
- Turn off infusions to other lumen prior to taking blood samples as the infusate may contaminate the sample.

Equipment

- ANTT tray (Sterile dressing towel if patient is immunocompromised or exposing the catheter hub)
- Non sterile gloves (Sterile gloves if patient is immunocompromised or exposing the catheter hub)
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Blunt fill needle (for drawing up)
- 10ml syringes as required
- 2x 10mls Pre-filled syringe of Sodium chloride 0.9% (for flushing)
- Heparin Sodium flushing solution for line lock: 100u/ml/4mls (child)
  50 I.U. /5mls (adults) or manufacturers locking solution
- Needle free access device (if required)
- Blood sampling bottles

Procedure

1. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
2. Prepare the patient and extension set for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. If using an **existing needle free device**, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Obtain blood samples required
   Vacuum sampling:
   - Assemble vacuum sampling system and insert luer lock adapter into the hub
   - To avoid contaminate from blood sample insert a 5mls bio-chemistry tube, fill tube with blood and discard

   Syringe sampling:
   - Insert syringe, unclamp line and withdraw 3-5mls of blood, clamp line and discard syringe.
   - Insert new syringe, unclamp line and collect required amount of blood by slowly withdrawing syringe. Clamp line, attach sterile blood transfer device onto syringe and place syringe onto ANTT tray/sterile field and decant into blood sampling bottles once line flushed.
5. Unclamp line and flush the 20mls pre-filled sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation.
6. If the line is not going to be accessed within 8 hours. Instil Heparin sodium flushing solution /manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the port and promotes positive pressure.
7. Consider change of needle free device.
8. Decant blood into blood sampling bottles and label sample bottle(s) at the patient's side.
9. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
10. Record procedure and any variances in the patient's clinical record.

Routine Flushing and Hep-locking for an Implanted Port

This procedure includes insertion/removal of a gripper needle

Good practice tips

- This procedure is for routine flushing and hep-lock of a Port only; if flushing is related to another please refer to that procedure
- This procedure is for patients with a gripper needle in situ.
- Flushing of the line will depend on the frequency of access, if the line is to be accessed within 8 hours flushing of the Port should be with sodium chloride 0.9%, if the line is NOT to be accessed within 8 hours it will need to be locked with a locking solution of heparin sodium. The heparin sodium will last for 4 weeks.
- Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.
- Do not force if resistance is met as forcing may result in emboli or catheter rupture

Equipment

- ANTT tray
- Dressing pack
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Blunt fill needle (for drawing up)
- 10ml syringes as required
- 10mls Pre-filled syringe of Sodium chloride 0.9% (for flushing)
- Heparin Sodium flushing solution for line lock: 100u/ml/4mls (child)
  50 I.U. /5mls (adults) or manufacturers locking solution
- Gripper Needle
- Needle-free access device

Procedure

1. Using the principles of ANTT prepare the equipment and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine port site for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. If applicable apply local anaesthetic, refer to manufacturers recommendations.
4. Use effective hand hygiene and put on sterile gloves.
5. Prepare pre filled sodium chloride 0.9% and locking solutions.
6. Attach the needle free access device to end of gripper, prime gripper and needle free access device with sodium chloride 0.9% and apply clamp.
7. If applicable remove local anaesthetic with sterile gauze.
8. Clean skin at port site with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution. Using a scrubbing technique for 30 seconds (this will allow the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol to penetrate the top 5 layers of skin). Allow to air dry for minimum of 30 seconds.
9. Position patient in a comfortable position.
10. Place sterile towel under area needing to be accessed.
11. Locate the edges of the port and hold firmly to prevent from moving. Identify the centre of the port and push the gripper needle through the skin and portal septum until it touches the back of the chamber.
12. Check patency of port by attaching a pre-filled syringe containing 10mls sodium chloride 0.9% to the needle free access device. Check for flash back of blood by gently withdrawing syringe (***not in neonates***). As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
13. *It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter.*

Within Paeds locking solution is removed and discarded as higher strength heparin is used

14. If blood cannot be withdrawn refer to *Management of complications*.
15. Unclamp line and instil Heparin sodium flushing solution/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure. The heparin sodium will last for 4 weeks.
16. Hold port firmly with one hand whilst removing gripper from port.
17. **If applicable**, apply gentle pressure with sterile gauze if site is bleeding, remove gauze and cover with a high moisture vapour permeable transparent dressing.
18. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
19. Record procedure and any variances in the patient's clinical record

Removal of a Gripper Needle for an Implanted Port

Equipment

- ANTT tray
- Dressing pack
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- Blunt fill needle(for drawing up)
- 10ml syringes as required
- 10mls Pre-filled syringe of Sodium chloride 0.9% (for flushing)
- Heparin Sodium flushing solution for line lock: 100u/ml/4mls (child)
  50 I.U. /5mls (adults) or manufacturers locking solution
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).

Procedure

1. Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Using the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe thoroughly clean the needle free device and allow to air dry. Ensure gripper line does not come into contact with anything else or place gripper line onto a sterile towel.
4. Check patency of catheter by attaching a pre-filled syringe containing 10mls sodium chloride 0.9% to the needle free access device. Unclamp line and check for flash back of blood by gently withdrawing syringe **(*not in neonates*)**. As soon as a trace of blood is seen in the catheter or syringe, flush the sodium chloride into the line using a pulsatile flush technique.
5. *It is not necessary to routinely withdraw and discard blood from the catheter before flushing unless a concentrated solution of heparin 25,000 I.U./5mls or Gentamycin is used to lock the catheter*

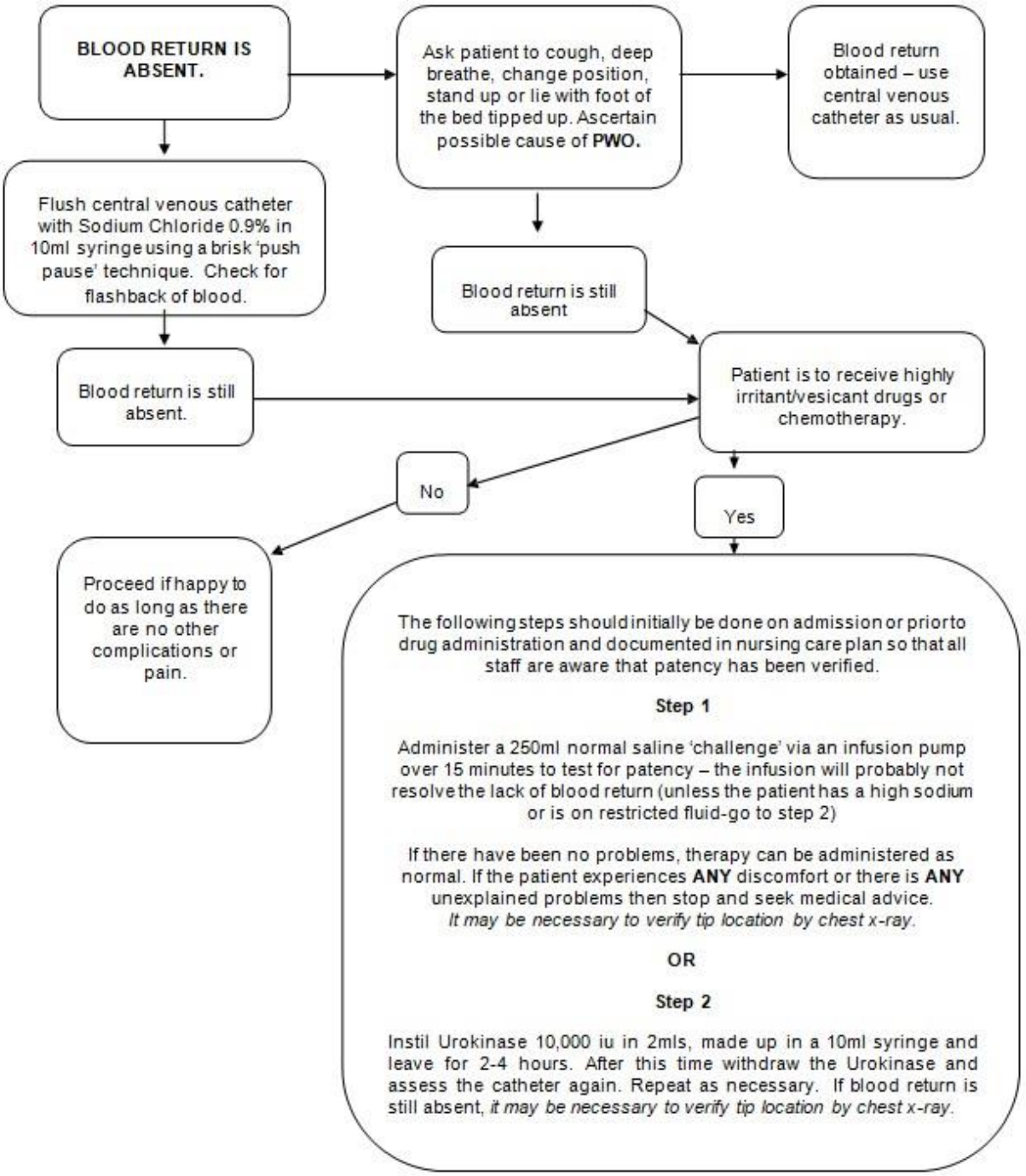
Within Paeds locking solution is removed and discarded as higher strength heparin is used

6. If blood cannot be withdrawn refer to *Management of complications*.
7. Unclamp line and instil Heparin sodium flushing solution/manufacturers locking solution using positive pressure flush and clamp line which prevents backflow of blood into the catheter and promotes positive pressure. The heparin sodium will last for 4 weeks.
8. Hold port firmly with one hand whilst removing gripper from port.
9. **If applicable**, apply gentle pressure with sterile gauze if site is bleeding, remove gauze and cover with a high moisture vapour permeable transparent dressing.
10. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
11. Record procedure and any variances in the patient's clinical record.

Management of Complications

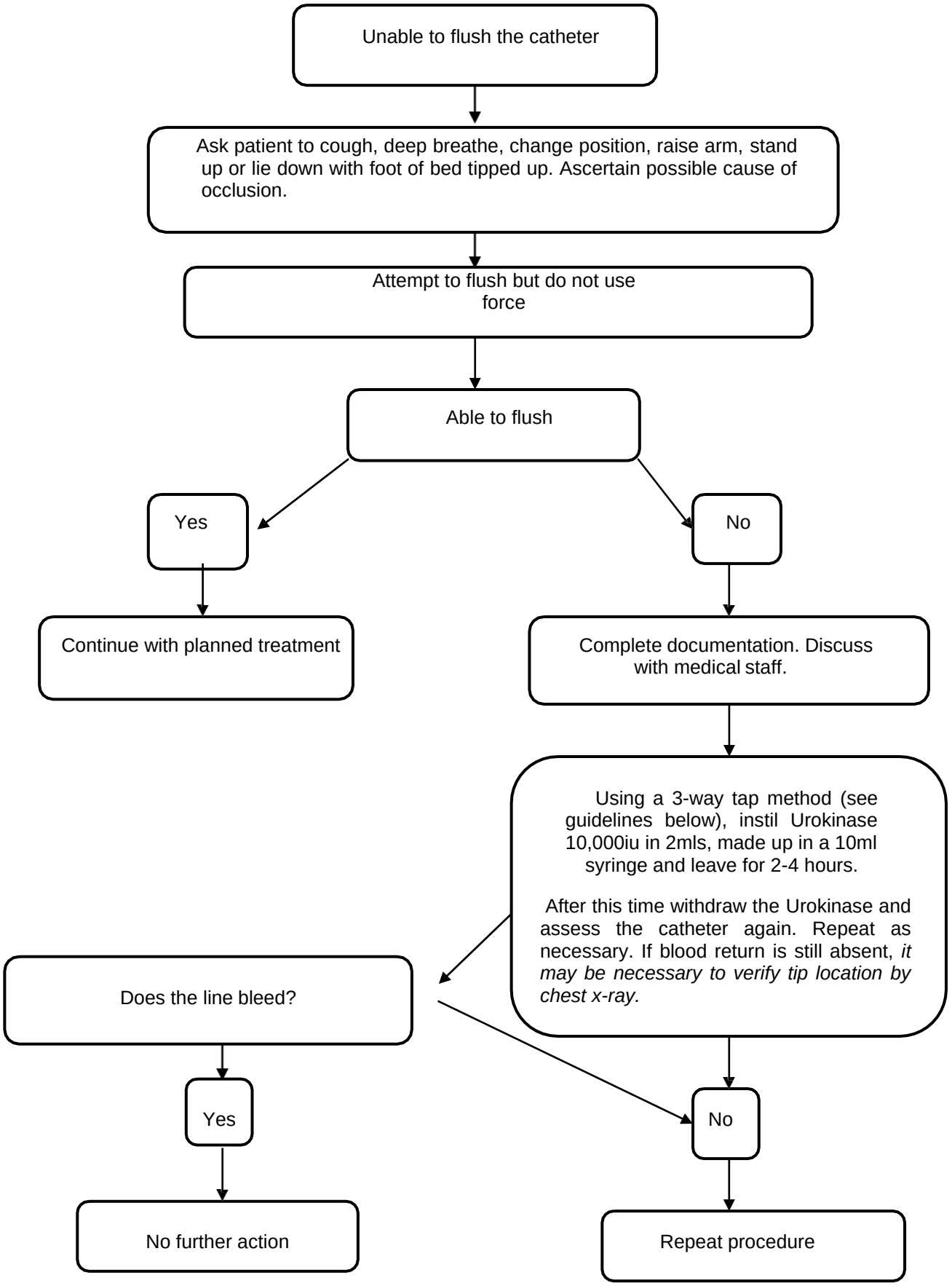
Management of Persistent Withdrawal Occlusion (PWO)

This is when fluids can be infused freely but blood cannot be withdrawn from the catheter (London Standing Committee 2000) (Adapted from RCN 2010).

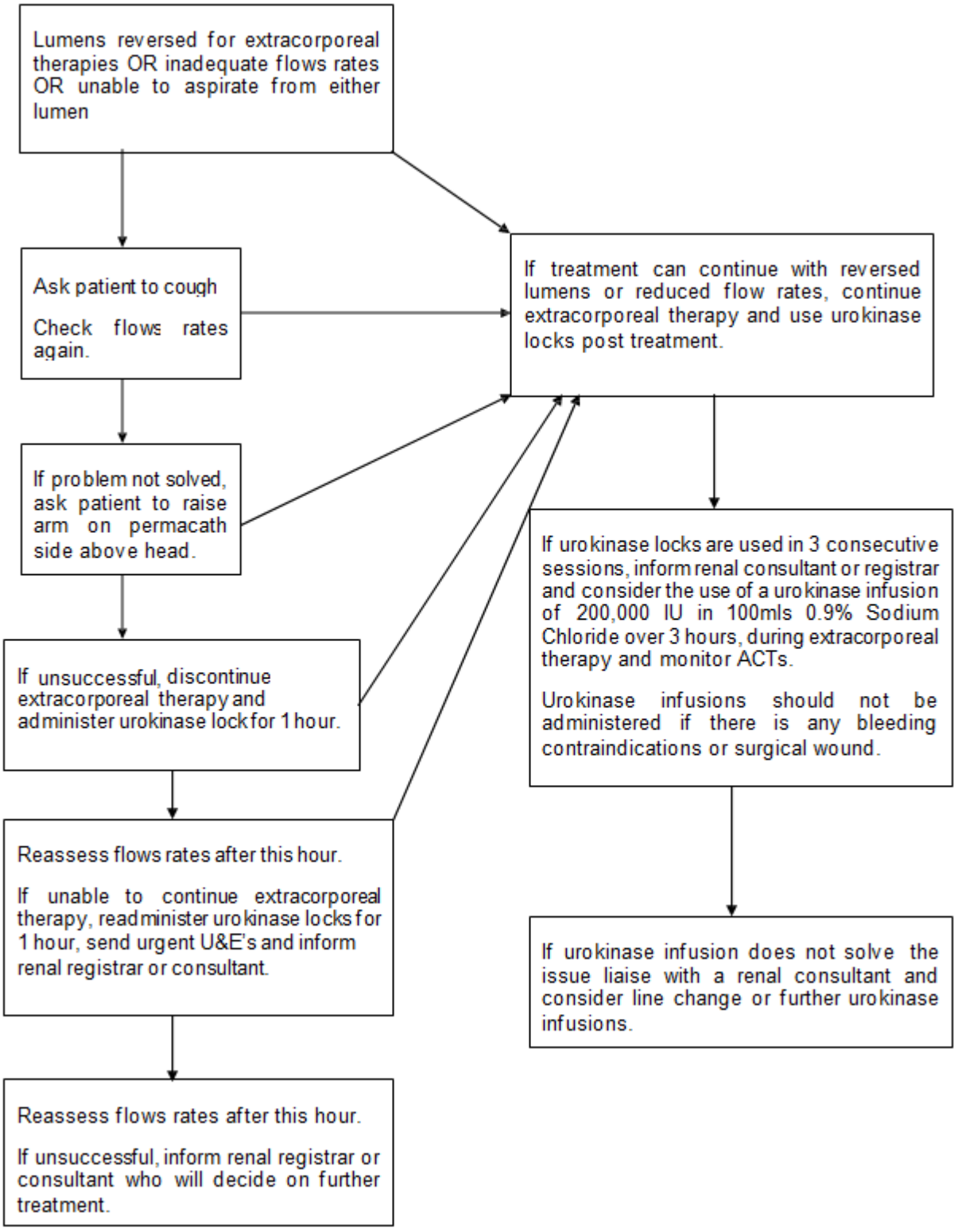


Management of Complete Occlusion

This is when neither fluid can be infused freely and blood cannot be withdrawn from the catheter



Dealing with Inadequate flows for Permacaths



Administration of Bolus Urokinase into a line with a Complete Occlusion

Equipment

- ANTT tray
- Sterile dressing pack- including sterile gloves
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution
- 10,000iu Urokinase in 2mls of water made up in a 10ml syringe (made in pharmacy)
- 2x 10mls Pre-filled syringe of sodium chloride 0.9% (for flushing)
- 1x 10ml syringes
- Blunt fill needle (for drawing up)
- 3 way tap

Procedure

1. Using the principles of ANTT prepare the equipment and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Use effective hand hygiene and put on sterile gloves.
4. Reconstitute the Urokinase vial of 10,000 units with 2mls water for injection and prime the 3-way tap with the Urokinase solution. (Pharmacy)
5. Ensure that the line is clamped and using the 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected 10% aqueous Povodine iodine cleansing solution chlorhexidine, thoroughly clean the needle free access device, allow to air dry.
6. Attach the 3-way tap to the needle free access device and unclamp the line. Close the 3-way tap to the patient.
7. Attach the syringe containing the Urokinase to one access point of the 3-way tap and one empty syringe to the other access point i.e. Urokinase syringe at 3 o'clock and the empty syringe at 6 o'clock.
8. Turn off tap of Urokinase (3 o'clock), pull gently back on empty syringe (6 o'clock) to create a vacuum in the catheter to approximately 8-9mls and hold the plunger at 9mls whilst turning the closed position onto the empty syringe. A small amount of Urokinase will then be drawn into vacuum. Remove empty syringe and expel air from empty syringe.
9. Repeat every 5 minutes until all Urokinase solution is inserted into line. This can take up to 20 minutes to complete.
10. Leave the Urokinase insitu for 2-4 hours, then withdraw and discard the Urokinase lock.
11. Attempt to withdraw blood. If blood withdrawal is possible, using a pulsatile technique flush with 20mls sodium chloride 0.9%.
12. *If blood return is not possible repeat this process*.

Infection

Each year approximately 6,000 patients in the UK acquire a catheter related bloodstream infection (Dept. of Health 2001) which can result in a life threatening bacteraemia with estimated mortality rates ranging from 1 – 35% (Oncu & Sakarya 2003).

Infection can occur during insertion or as a result of contamination by a healthcare professional either as an intra- luminal colonisation or around the central catheter exit site and any signs suggestive of patient infection for example erythema, discomfort, discharge or pyrexia **MUST** be promptly reported and appropriate action taken. (Bishop et al 2006, Simcock 2006, Doyle 2008, Thompson 2009)

The micro-organisms that colonise the skin adjacent to the insertion site may enter the patient's blood stream during insertion of the central line therefore thorough skin cleansing and a sterile technique will prevent introduction of skin flora into the blood stream (Dept of Health 2001). 2% Chlorhexidine gluconate in 70% Isopropyl alcohol has been shown to be the most effective agent for disinfection of the skin prior to insertion of the catheter (Maki et al, 1991: Pratt et al, 2007) and for routine catheter exit site cleansing as it has the advantage of being highly effective against the resident microbial flora of the skin, and its action persists for several hours after the initial application.

Action

If a patient with a CVAD has clinical signs of an infection, is systematically unwell or has a temperature, the CVAD should be **considered** as a likely source of infection.

- Blood cultures should be taken peripherally and from all lumens of the CVAD.
- Swabs from the exit point of the CVAD.
- Microbiology advice should be considered.

Thrombosis

Thrombosis is the formation of a blood clot within the blood vessel or around the catheter and can occur days after central venous catheter insertion. It is a natural response to vascular injury which may result from damage to the vessel wall during insertion, or mechanical or chemical irritation in an incorrectly placed catheter where the tip is in too small a vein or rubbing against the vessel wall, instead of floating parallel to it. (National Kidney Foundation 2000)

Unless the clot is at the internal tip of the catheter it will not usually affect catheter patency. A large proportion of patients who develop a thrombosis are never detected, however, pain in the shoulder, arm or axilla, swelling of the face, neck, one limb or the fingers, hand or arm, distension of the local venous system and / or any skin discolouration / temperature change **MUST** be reported immediately to the medical practitioner responsible for the patients care, the catheter reviewed and appropriate action taken immediately.

Action

- An urgent Doppler, ultrasound or venogram may be required to confirm diagnosis, prior to the administration of appropriately prescribed anticoagulation therapy. (Bishop et al 2006, Simcock 2006, Doyle 2008, Thompson 2009)
- The line may continue to be used whilst the patient undergoes anti coagulation therapy.

Air Embolism

The central venous access device is a wide bore catheter, thus air may enter the blood stream if a closed system is not maintained at all times. Air embolism is a potentially fatal complication; it can be clinically silent and can occur at any time.

Any signs of patient distress, respiratory insufficiency, dyspnoea, cyanosis and / or pain **MUST** be reported and responded to immediately.

This may happen

- During insertion/removal as the procedure involves opening the venous system to air. If possible the patient should be positioned head down to minimise the risks.
- There is a break in the closed system of a CVAD.
- When changing a needle free access device.
- The line is damaged during removal of sutures.
- There is air in a giving set.
-

Action

If it is suspected that air has entered the central venous access device,

- Clamp the line below the site of air entry, or cover with sterile high moisture vapour permeable transparent dressing.
- Lay the patient on their left hand side; head down as this position is more likely to keep the embolism contained within the apex of the right ventricle, **call for immediate medical assistance.**
- Attach a 20 ml syringe to the end of the catheter or extension tube, release the clamp & aspirate until blood is withdrawn. Re-clamp the line. (Simcock 2006, Doyle 2008, Thompson 2009)

Catheter Migration

On occasions it is possible for the central venous access device to migrate within the venous system for no apparent reason or become dislodged from its original position.

Changes in intrathoracic pressure, coughing, sneezing, Valsalva manoeuvre, vigorous exercise, forceful flushing or congestive cardiac failure may lead to migration. (Hadaway 1998)

It is essential for the central catheter to be observed a minimum of 8 hourly with documentation of the catheter length.

The catheter will be secured in position with either sutures/ securAcath/steri-strips and then effectively and carefully anchored by the sterile high moisture vapour permeable transparent dressing. It is extremely important that the infusion lines also be supported to prevent pulling.

Catheter migration should be suspected if:

- There are repeated and unresolved patency problems.
- The patient complains of pain on flushing.
- The patient develops a thrombosis.
- The external length of the catheter increases.

Action

(Simcock 2006) Catheter migration may predispose to thrombosis or patency impairment of the line therefore if migration is suspected, the medical practitioner **MUST** be informed immediately, the catheter reviewed and a chest x-ray undertaken to confirm placement. (Thompson 2009)

Haemorrhage

Bleeding may occur at any time during catheter insertion, from or around the central catheter exit site whilst in use and following removal.

Patients with reduced or inefficient clotting are at an increased risk of catheter related haemorrhage.

Action

The patient should be monitored closely for any signs of haemorrhage and if suspected, the medical practitioner responsible for the patients care informed immediately and the patient urgently reviewed. (Doyle 2008, Thompson 2009)

Cardiac Arrhythmias

Cardiac arrhythmias are most common during central catheter line insertion secondary to stimulation of the myocardial tissue (Bivins & Callahan 2000), although central venous catheter tips placed within the right atrium rarely cause a problem.

Arrhythmias resulting from myocardial irritation by the central venous catheter can usually be resolved by pulling the catheter back a few centimetres.

- The patient should be carefully observed throughout the procedure for signs of cardiac arrhythmias, awareness of palpitations, hypotension or light-headedness or dizziness. (Simcock 2006, Doyle 2008, Thompson 2009)
- **Catheter tip position must be confirmed radiographically prior to use.**

Pneumothorax

A pneumothorax is the presence of air within the pleural space and is an iatrogenic complication following central venous access device insertion resulting from accidental puncture of the pleural membrane that allows atmospheric air to enter down the needle into the pleural space.

Pneumothorax is one of the most potentially life threatening complications associated with central venous catheter insertion and if suspected **MUST** be treated as a medical emergency. It is most common if the catheter is inserted via the subclavianvein.

If the patient develops symptoms which include; dyspnoea, respiratory insufficiency / distress, tachycardia, hypotension, agitation, cough, pleuritic chest pain or shoulder tip pain

Action

- The medical practitioner responsible for the patients care **MUST** be informed immediately.
- Urgent medical review.
- A chest X-ray. (Simcock 2006, Doyle 2008, Thompson 2009)

Note: It is important to remember that an x-ray taken post insertion may not identify a slowly developing pneumothorax. A further chest x-ray will be required if the patient becomes symptomatic of a pneumothorax

Pinch Off

Pinch off syndrome occurs when the catheter is compressed between the first rib and the clavicle causing intermittent occlusion. It is more likely to occur in subclavian central venous access devices.

The potential for the catheter to fracture or develop an embolism is high, so if suspected should be confirmed with the use of either an x-ray or linogram

Phlebitis

Phlebitis is the inflammation of the tunica intima of the vein. There are three types of phlebitis: mechanical, chemical and infective (Macklin, 2003).

The symptoms of phlebitis may include pain and tenderness, erythema and swelling with a feeling of warmth at the site or along the vein, with infective phlebitis purulent exudates may also be experienced.

Monitoring the CVAD for signs of phlebitis, using the **Central Venous Access Device Observation Record** is essential as it allows early diagnosis and treatment to take place.

Mechanical Phlebitis is more common in PICC and Mid-lines and occurs within the first week of insertion. It is caused by friction of the CVAD irritating the vessel wall (Hamilton and Walker 2006).

- To reduce the risk of developing mechanical phlebitis the patient is advised to apply a warm pad to their upper arm for 10-20 minutes, three times a day for the first week.

Chemical Phlebitis is caused by irritation of the vein usually by irritant medication. It is unlikely to occur in patients with a central venous catheter in situ, although it may occur if the central venous catheter becomes damaged, in the presence of fibrin sheath formation or malpositioning of the central venous catheter.

Infective Phlebitis has the potential to develop into septicaemia. Measures should be taken to reduce the risk of infection when handling or accessing the CVAD as outlined throughout this document.

securAcath

PLACEMENT

Aquilant

Place catheter according to protocol, leaving 3cm of catheter external to the insertion site. SecurAcath requires 3cm of catheter shaft to attach to catheter.

Select appropriate size SecurAcath device to match catheter diameter. If the catheter is labeled with a half French size, use the closest smaller size SecurAcath, e.g. with 8.5F catheter, use 8F SecurAcath.

- Fold the base downward until tips of feet come together
- Lift the catheter to visualize the insertion site
- Apply light traction to the skin to help dialate the insertion site
- Use the tip of a dilator to stretch the skin opening if necessary

- Hold folded base perpendicular to the catheter track
- Slant base at an angle to skin surface with tips pointing towards insertion site
- Insert tips of feet into the insertion site following catheter track until the curved segment is no longer visible

- Align base to desired orientation
- Advance feet a few mm into subcutaneous tissue
- Release base to allow it to open until flat
- Gently retract base to be sure there is some subcutaneous tissue between the feet and the dermis

- Use sterile gauze to remove blood, ultrasound gel or other fluids from the catheter
- Be sure catheter and base are clean and dry
- Align catheter with the groove in the base and press catheter into the groove

- Place cover on the base by pressing firmly at center then edges while holding the base
- Check to be sure cover is fully attached to base. No gap should be visible between the cover and base.

- Catheter is now secured
- SecurAcath device lays flat on skin and will secure catheter for the duration of therapy
- Optional – cover may be removed and replaced to adjust catheter length
- Dress site per hospital protocol
- Apply transparent dressing somewhat loosely. Make sure catheter hub is under the dressing with only extension tubes outside

More Information available at www.securacath.com

TO ORDER WITH AQUILANT:

Call Customer Service on
01256 365 490
or email contactus@aquilantservices.com

Download the new SecurAcath® app!

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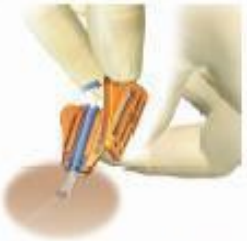
securAcath

REMOVAL

Aquilant

- Grip the HOLD tab with thumb and finger of one hand to stabilize device and securement feet beneath the skin
- Pry upward at the edge of LIFT tab with index finger tip of other hand and thumb placed at center to release cover from base



- Completely detach cover from base

- Remove the catheter - do not use excessive force
- Hold pressure at site to achieve hemostasis
- If the insertion site is "crusty" or firm, apply sterile gauze and saline at the site for a few minutes. The tissue will soften and removal will be easier

FOLD OPTION

Can be used with or without catheter in place

- Apply firm pressure at the insertion site to keep tissue still
- Fold wings downward to bring feet together under the skin

- Hold folded base horizontal to skin
- Use swift, deliberate upward motion to remove following the shape of the feet

SPLIT OPTION

Catheter must be removed prior to using this method

- Use a blunt tip scissors to cut base completely in half lengthwise along the groove

- Apply firm pressure at the insertion site with one hand
- The flexible securement feet are shaped like an "L" with the feet extending 5mm to each side of the insertion site

- Turn blue edge upward and use a swift, deliberate upward motion to remove each foot separately following the shape of the foot

Download the new SecurAcath® app!

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www.securacath.com

CE 0473

www.securacath.com/patents

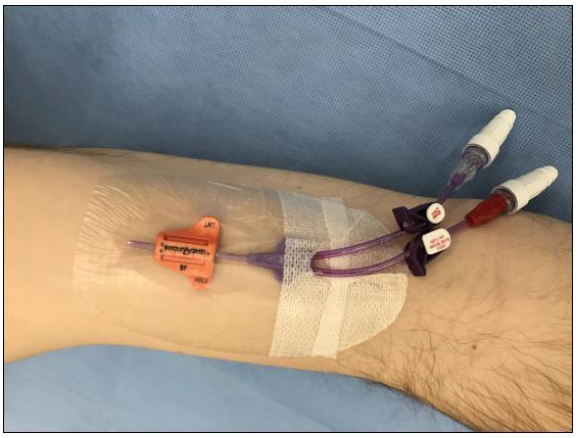
1329-013 Rev. H

Care and Maintenance

The SecurAcath is designed to make dressing changes faster and easier because the catheter always remains secured while performing site maintenance.

Important points:

- If blood is present on SecurAcath device, use sterile saline soaked gauze to dissolve and remove blood
- Gently lift the catheter and SecurAcath device to clean around the catheter insertion site using 3ml 2% chlorhexidine gluconate / 70% isopropyl alcohol
- Do not twist or rotate the SecurAcath device from its original position
- Dress as per CVAD policy placing the transparent dressing on somewhat loosely. If the dressing is applied too tightly, it can cause discomfort when patient moves
- Be sure the hub of the catheter is under the transparent dressing to prevent pulling or kinking of the catheter
- If the patient complains of pain at the insertion site, try changing the dressing. Make sure the SecurAcath is lying flat on the skin and has not shifted from its original position. Replace transparent dressing; make sure it is not too tight



Keep catheter hub under dressing

Umbilical Venous / Umbilical Arterial Catheters / Long Lines

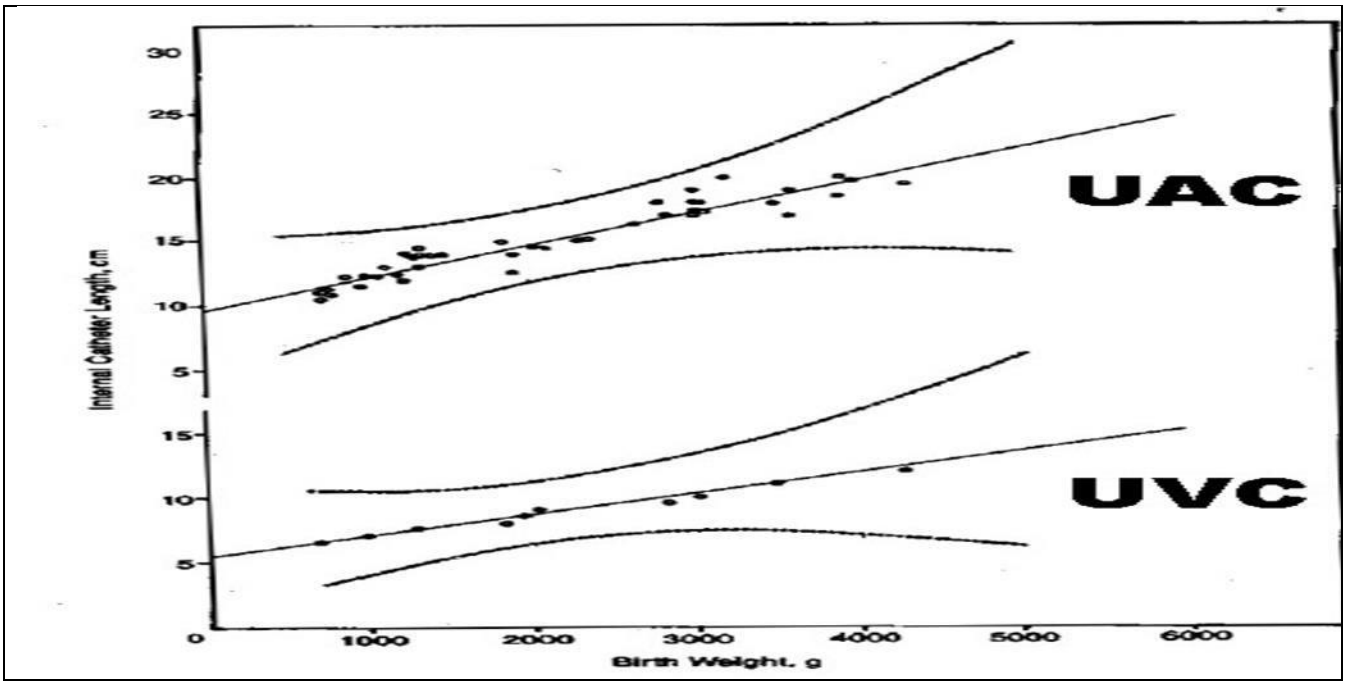
Care of a Baby with Umbilical Venous / Umbilical Arterial Catheters / Long Lines

Good practice tips:

- Clean the skin in neonates using a solution of **0.05% Chlorhexidine gluconate**
- Long Lines are for long term use (TPN, Antibiotics, and Prostin etc.) and may be left in for up to 14 days,as long as there is no evidence of line infection.
- UAC indications: Any baby who needs, or looks likely to need, 40% oxygen or more,
- Babies of less than 1501g who need supplemental oxygen, babies that may require an exchange transfusion.

Indications for use include

- Major gastrointestinal disease.
- Prolonged intolerance to enteral feeds
- Parental nutrition administration
- Compromised peripheral venous access
- Long term antibiotic therapy
- Inotrope infusions/ irritant drug use
- Simultaneous infusions of multiple infusions
- Blood sampling (UAC only



Insertion of Umbilical Arterial Catheter/ UAC

UAC Indications:

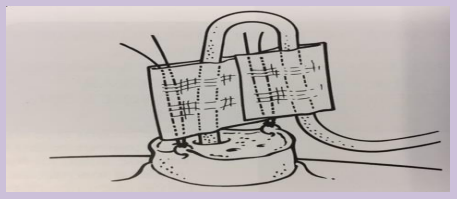
- Any baby who needs, or looks likely to need, 40% oxygen or more
- Babies of less than 1500g who need supplemental oxygen
- May also be required for exchange Transfusion

Equipment

- Exchange Packs (gown in pack).
- Gloves
- Umbilcal Catheter 5fr – L40cm 4fr – L40cm
- Chlorhexidine Gluconate 0.05%
- 5ml syringe.
- Blunt filter needle (for drawing up)
- 3 way tap + needle free device.
- 10ml syringe filled with 0.9% sodium chloride.
- Suture = Mersilk 3-0
- Scalpel blade.
- Blood Pressure transducer.
- Fluid – 0.9% saline 500ml with 500 units of heparin.
- Giving set.
- Second person identified for assisting with the procedure.

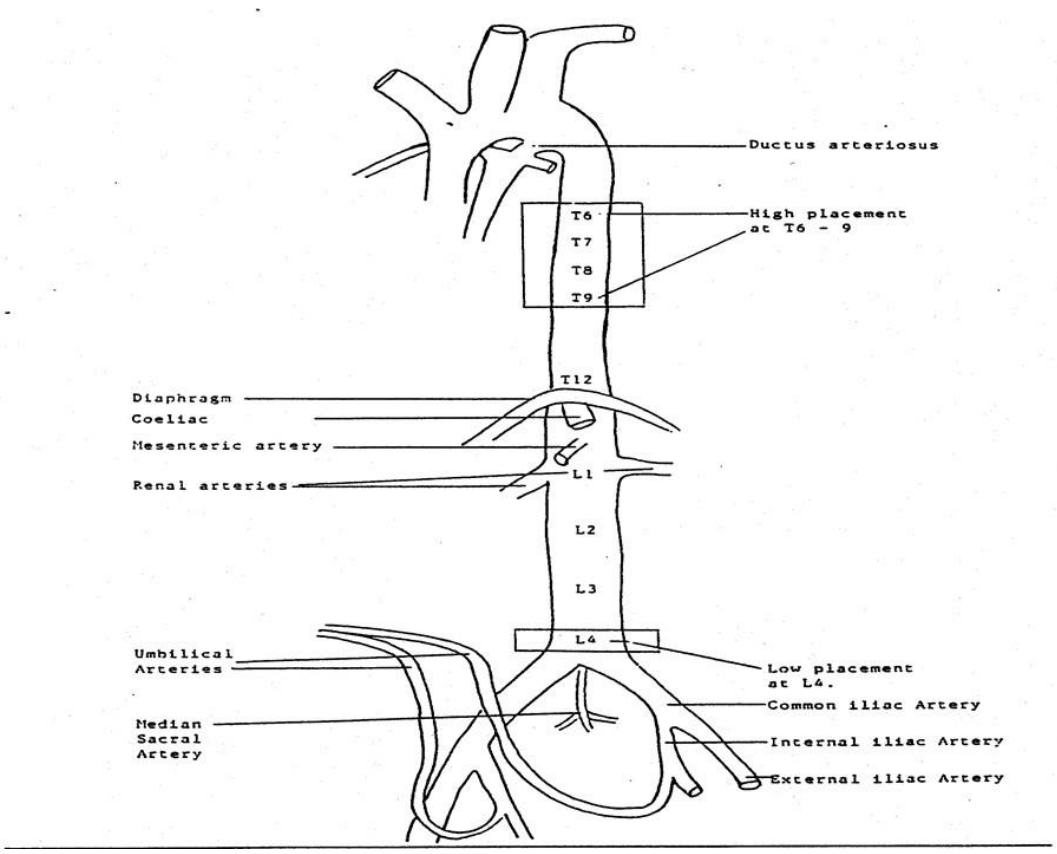
Procedure

1. Calculate length before starting using Shukla's formula (Length in cm = (2.5 x weight) + 9.7 from abdominal wall), from reference charts (laminated copy on wall in intensive care room) to calculate length of catheter required.
2. Prepare the equipment using an aseptic technique and assemble on sterile field, using dressing trolley/table or tray.
3. Perform effective hand hygiene and put on sterile gown and gloves, assisting member of staff to help gather all equipment and open all required equipment for practitioner, ensuring sterility of equipmentand sterile field.
4. Prepare sodium chloride 0.9% syringe and flush both the line and 3 way tap, attach needle free device to the top point (for future access).
5. Using the chlorhexidine gluconate 0.05% clean the umbilical cord.
6. Maintain cord sterility and place a cord tie around the base of the cord to prevent excessive bleeding during the procedure and cover the area with a sterile drape, cutting hole in the drape to pass the umbilical cord through.
7. Using a scalpel blade, in a straight line, cut the cord approximately 1inch from the base.
8. To ensure a stable base is obtained, clamp the 2 artery forceps either side of the cord.
9. Starting with the fine forceps tease open one of the arteries, then using a dilator gently open the artery further. Once opened pass the catheter to the desired length (include the cord length into total insertion). Pull back on 3 way tap and blood should easily flow back and pulsate indicating arterial flow.



10. Check neonate for ischemia. If ischemia not present then suture into the cord and secure the catheter by wrapping the suture around the cord then knotting the sutures together. Continue and place sutures along the side of the catheter and between the sleek, this will secure the catheter in place. Ensure all connections on the catheter are luer-locked.

Insertion of Umbilical Arterial Catheter/ UAC Continued



11. X-ray to confirm tip position at either T6-10 (High level), which is preferable or L3-5 (Low position). If any suspicion of ischaemia, remove the catheter.

12. The catheter can be withdrawn and re-secured under sterile conditions, but must not be advanced; it is advisable to reconfirm tip position before use.

13. If there is accidental displacement of either the umbilical arterial or umbilical venous lines and reinsertion of lines is undertaken, the position must be reconfirmed with x-ray. If the clinical situation is such that a repeat x-ray is not done then the clinical rationale for this decision should be clearly documented.

14. Ensure procedure and x-ray results/actions are clearly documented in medical notes.

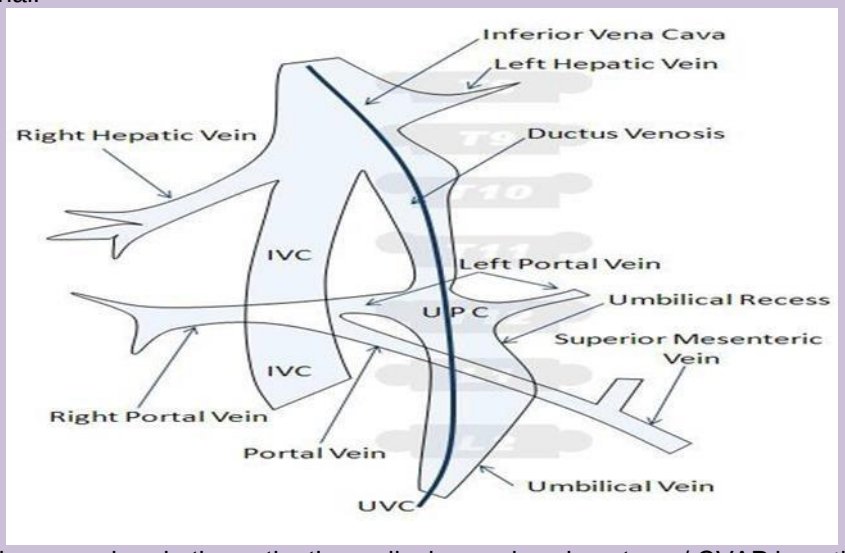
15. Set up Blood Pressure transducer to ensure constant arterial blood pressure monitoring and follow procedure for connection of intravenous infusions, where medically indicated and documented, clear fluids can be commenced pre x-ray.

16. Document the procedure in the patient's medical records using stamp/ CVAD insertion sheet noting:

- ✓ Technique used
- ✓ Type, length and gauge of catheter
- ✓ Insertion site accessed
- ✓ Securing method and dressing
- ✓ Any problems encountered during insertion
- ✓ Name and contact number of person who inserted the line and name of assisting staff member

Insertion of Umbilical Arterial Catheter/ UAC Continued

17. Ensure procedure and x-ray results/ actions are clearly documented in medical notes. Where medically indicated and documented, medication and fluids other than clear fluids can be commenced pre x-ray. Clear fluids are acceptable to be administered pre x-ray, with sound clinical rational.



18. Document the procedure in the patient's medical records using stamp/ CVAD insertion sheet noting:

- ✓ Technique used
- ✓ Type, length and gauge of catheter Insertion site
- ✓ Securing method
- ✓ Any problems encountered during insertion
- ✓ Name and contact number of person who inserted the line
- ✓ Name of assisting staff member

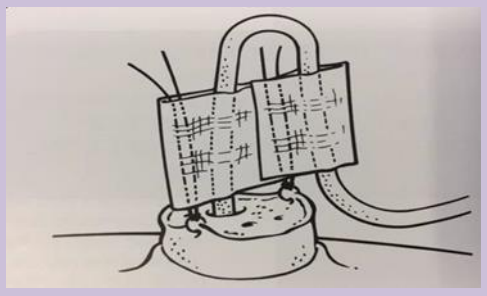
Insertion of Umbilical Venous Catheter/ UVC

Equipment

- Exchange pack (gown in pack).
- Double lumen umbilical catheter size 4fr.
- Chlorhexidine gluconate cleaning solution 0.05%.
- 5ml syringe.
- Blunt filter needle (for drawing up)
- 10ml syringe filled with 0.9% sodium chloride
- Suture mersilk -3.0.
- Scalpel blade.
- Needle free access device
- Second person identified for assisting with the procedure

Procedure

1. Using the reference chart/ UVC length in cm = [1.5 x birth weight (kg)] + 5.5 or use http://mobile.nicutools.org/#ETTubes to calculate length of catheter required.
2. Prepare the equipment using an aseptic technique and assemble on sterile field, using dressing trolley/table or tray.
3. Perform effective hand hygiene and put on sterile gown and gloves, assisting member of staff to help gather all equipment and open all required equipment for practitioner, ensuring sterility of equipment and sterile field.
4. Prepare sodium chloride 0.9% syringe and flush both the lines of the UVC catheter, attach needle free device to both lumens of the catheter.
5. Using the chlorhexidine gluconate 0.05% clean the umbilical cord.
6. Maintain cord sterility and place a cord tie around the base of the cord to prevent excessive bleeding during the procedure and cover the area with a sterile drape, cutting hole in the drape to pass the umbilical cord through.
7. Using a scalpel blade, in a straight line, cut the cord approx. 1inch from the base.
8. To ensure a stable base is obtained, clamp the 2 artery forceps either side of the cord.
9. Once umbilical vein visualised pass the catheter to the desired length and blood should easily flow back. The flow should NOT pulsate
10. Suture into the cord and secure the catheter by wrapping the suture around the cord then knotting the sutures together. Continue and place sutures along the side of the catheter and between the sleek, this will secure the catheter in place.



11. X-ray to confirm position of umbilical catheter. Tip position should be in the Inferior vena Cava (IVC) in line with the diaphragm, and not intracardiac or curved into the hepatic vein. Tip position must be identified and documented for safe use.

*To secure, initially use sleek tape pre x-ray. Once position confirmed (as instructed below) please re-secure using zinc oxide tape for babies in humidification.

Insertion of Long Line

Equipment

- Cut down set/ Long Line set/ Long Line pack.
  Asst'd Lines – Clinical indication is always determined by the inserting practitioner:
  Premicath (28G) for neonates <1Kg.
  Nutriline (24G) for Neonates >1Kg
  Nutriline Twin Flo (24G 2Fg) for all neonates requiring multiple infusions of incompatible solutions.
- Peel-away introducer (micro-flash introducer) or 24g Cannula for insertion (optional for extreme preterm babies but not recommended by manufacturer) or Vygon's 2Fr Microsite can be used to gain access to difficult neonatal veins.
- Gown
- Chlorhexidine Gluconate 0.05%.
- Sterile gloves x 2 pairs.
- Steri-strips.
- Sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing).
- Needle free device.
- 0.9% Sodium Chloride 10ml bottle.
- Blunt filter needle (for drawing up)
- 10ml Syringe.
- Tape measure.
- Second person identified for assisting with the procedure

Procedure

1. Using the Long Saphenous, Ante Cubital veins or scalp vein, measure the approximate distance from the insertion point to the heart.
2. Prepare the equipment using an aseptic technique and assemble on sterile field using dressing trolley/table or tray
3. Perform effective hand hygiene and put on sterile gown and 2 pairs of sterile gloves.
4. Using the chlorhexidine gluconate 0.05% clean the appropriate limb. Making a hole in the sterile field place the cleaned limb through. Remove outer gloves and discard.
5. Using the sodium chloride 0.9% prime the catheter. Using a piece of sterile gauze proceed to make a tourniquet above the area of insertion, tourniquet -only for limbs, not for scalp veins.
6. Advance a butterfly stylet (peelable cannula) or cannula into the chosen vein, once flashback is observed, carefully release the tourniquet, and using the forceps proceed to introduce the catheter to the required length. Follow manufactures guidelines for Vygon's 2Fr Microsite prior to introduction of catheter.
7. Once the catheter has been introduced remove the butterfly stylet (peelable cannula) or cannula, ensuring the cannula is completely removed from under the skin. Hold sterile gauze over the insertion point until bleeding has stopped.
8. Place the sterile steri-strips over the insertion point, then, curling the unused catheter round, secure well with steri-strips. Place a small piece of sterile gauze under the hub of the long line to protect the skin from pressure.
9. Making sure the dressing does not go around the whole of the limb, place sterile IV 3000 or Tegaderm (high moisture vapour permeable transparent dressing) over the area ensuring the gauze and catheter is completely covered.
10. Confirm line and tip position with x-ray. Ensure the x-ray has been performed prior to the guide wire removal; the tip of the line will be visible with the guide-wire in situ. The Nutriline twin-flo does not have a guide-wire however this line is usually wide enough to be seen on x-ray without the need for Omnapaque. (Omnapaque 0.5ml will only be required if there remains uncertainty regarding the tip position post guide wire removal).
11. For Premicath and Nutriline catheters; once tip position has been confirmed by the medical team, the guide wire can be removed remaining under aseptic conditions. Ensure needle free access device is attached to the end on the catheter.
12. For Nutriline-Twin Flo **Infuse** 0.9% sodium chloride through at 1ml/hr through one of the lumens until line position confirmed and permission given to use prescribed infusion(s), ensure both lumens have a needle free access device attached.
13. Ensure procedure and x-ray results/actions are clearly documented in medical notes

Insertion of Long Line Continued

14. Document the procedure in the patient's medical records using stamp/ CVAD insertion sheet noting;

- ✓ Technique used
- ✓ Type, length and gauge of catheter
- ✓ Visual, verbal and documentary confirmation of guide-wire removal by 2 people (if applicable)
- ✓ Insertion site and vein accessed
- ✓ Securing method and dressing
- ✓ Any problems encountered during insertion
- ✓ Name and contact number of person who inserted the line
- ✓ Name of assisting staff member.
- ✓ Post x-ray confirm or adjust the tip position maintaining sterility at all times, and document changes and who supervised (where applicable).

Changing the Needle Free Access Device
For Umbilical Venous / Umbilical Arterial Catheters / Long Lines

Good Practice Tips

- The needle free access device is a self-sealing bung that must not be pierced by a needle.
- It does not have to be removed to attach a syringe or giving set tube to the UAC, UVC or Long Line.
- The device can be used for up to 140 times, but must always be changed at least weekly for all neonates regardless of level
- The device must also be changed if it becomes contaminated, or if it is suspected that blood may have collected inside.

Equipment

- ANTT Tray
- X2 pair of non-sterile gloves
- Apron
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol cleansing solution or if chlorhexidine sensitivity is suspected consider 10% aqueous Povodine iodine cleansing solution
- Needle free access device

Procedure

1. Prepare the equipment using ANTT, don first pair of gloves and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter and patient for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Clean hands as per trust policy and change to the second pair of gloves.
4. Ensuring line is clamped, hold the line and with the other hand remove the existing needle free access device and discard.
5. Clean catheter hub end with recommended cleansing wipe, 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected, consider 10% aqueous Povodine iodine cleansing solution, and allow to air dry for a minimum of 30 seconds/ hub appears dry.
6. Using ANTT attach the new needle free access device to the catheter hub, protecting key parts at all times.
7. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Infection Control Manual.
8. Record procedure and any variances in the patient's clinical record

Administration of Intermittent Intravenous Medication For Umbilical Venous / Umbilical Arterial Catheters / Long Lines

Good Practice Tips

- Do not give intermittent intravenous medication via a UAC; Intravenous medication should only be given via the UAC route under rare circumstances under specialist instruction.
- Bolus and intermittent drug administration should be kept to a minimum as repeated manipulation of line increases the risk of blood stream infections.
- Bolus and intermittent drug administration also increases the risk of line rupture.

Equipment

- Recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected consider 10% aqueous Povodine iodine cleansing solution
- 10ml syringes as required
- ANTT Tray, apron, non-sterile gloves
- Blunt filter needle (for drawing up medications)
- 10mls syringe or BD 5ml Posi-flush as (as psi the same) of Sodium chloride 0.9% required for flushing
- Needle free access device (if required)

Procedure

1. Explain the procedure to the parents.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. If using an existing needle free device, use principles of ANTT clean the needle free access device with recommended cleansing wipe, 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected consider 10% aqueous Povodine iodine cleansing solution and allow to air dry for a minimum of 30 seconds / hub appears dry.
4. Check patency of catheter by attaching a 10ml syringe containing 5mls of sodium chloride 0.9%/ 5ml BD Posi-flush to the needle free access device. Do not check for flash back of blood in the catheter or syringe (venous lines only), continue to flush the sodium chloride into the line using a pulsatile flush technique.
5. Signs of catheter occlusion, whether partial or complete will require early action to restore patency of the device.
6. Do not force if resistance is met, as forcing may result in emboli or catheter rupture.
7. Prior to administration ensure that medication, dose and rate are second checked by an appropriate practitioner.
8. Administer the drug/ prescription as recommended in the hospital IV drug policy. Using a pulsatile flush technique, flush the line between drug administration and at the end of drug administration with Sodium Chloride 0.9% and clamp under positive pressure.
9. Follow procedure and administration as per Drug Treatment Chart and manufacturer's instructions.
10. Prime and attach new needle free access device (if required). Needle free devices must be changed within 7 days or 140 uses.
11. Flush the sodium chloride 0.9% into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation. Clamp the line under positive pressure.
12. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene referring to Trust Hand Hygiene Policy.
13. Record procedure and any variances in the patient's clinical record

Administration of a Continuous Infusion
For Umbilical Venous / Umbilical Arterial Catheters / Long Lines

Good Practice Tips

- Infusions within Neonatal Care should be delivered through an electronic infusion device as there is a need for accurate administration and prompt occlusion alarms. Increased resistance to flow (indicated by a change in pressure) could indicate migration of the catheter or another physiological obstruction to flow and should be immediately investigated. The pressures must be recorded hourly to facilitate this, measurable and sustained changes, sustained/ repeated occlusion alarms and indications of Baby discomfort require a re-assessment of the baby and the babies infusion site, including VIP Score assessment. Raised VIP and continued concerns signal escalation to a medical practitioner.
- The only fluid to be administered via **UAC** is Heparinised saline (Hep Sal) as prescribed.
- Blood products are only to be administered via a **UVC** or peripheral cannula.
- When using a **UVC or Long Line** it is recommended that a 0.22 micron filter is used on the Parenteral Nutrition bag and medication where indicated. **Do not use with Lipid**. The 0.22 micron filter reduces the risk of contamination, retains endotoxins, protects against particulate matter, and air embolus. The filter should be changed every 96 hours. Parenteral nutrition should be delivered through light protected lines. (NICE,)
- Administration sets to be changed as follows:
    - Parenteral Nutrition 24 OR 48hour bags as advised from pharmacy
    - lipids changed every 24 hours
    - Clear fluids 72 hours if line is unbroken

Equipment

- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected consider 10% aqueous Povodine iodine cleansing solution
- Intravenous infusion sets
- Intravenous fluids as prescribed
- ANTT Tray, apron, non-sterile gloves

If the type of fluid / medication is to change also include:

- 10ml syringe with 3-5mls Sodium Chloride 0.9% **or** 5ml Pre-filled BD Posi-flush syringe of Sodium Chloride 0.9% to flush line before new infusion is attached.

Procedure

1. Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.
2. Prepare the patient and examine catheter and patient for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician and document.
3. Undertake effective hand hygiene in accordance with the Trust Hand Hygiene Policy.
4. Prepare intravenous fluid as per prescription, keep key parts protected.
5. Make the line accessible, stop the infusion, clamp line, clamp the catheter (using correct method either ‘pinch clamp’ or 3 way tap ‘off to baby’) and remove infusion in situ if applicable, from needle free access device.
6. Using an ANTT clean the needle free device with 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected consider 10% aqueous Povodine iodine cleansing solution. Allow to air dry for a minimum of 30 seconds.
7. Attach new infusion ensuring that medications must be infused through the needle free access device.
8. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Trust Hand Hygiene Policy
9. Record procedure and any variances in the patient's clinical record.

Disconnecting an Intravenous Infusion
For Umbilical Venous / Umbilical Arterial Catheters / Long Lines

Good Practice Tips

- Never disconnect the Heparinised saline infusion from the UAC for 'UAC removal', only disconnect if you are changing the Heparinised saline due to expiry, as per 'Administration of a Continuous Infusion' guide above. See 'Removal of a UVC/ UAC/ Long Lines' guide below for correct removal technique.

Equipment

- 5ml syringes as required
- ANTT Tray, apron, non-sterile gloves
- Blunt filter needle (for drawing up)
- 5mls Pre-filled syringe (BD Posi-flush) of Sodium chloride 0.9% as required (for flushing)
- Needle free access device (if required)

Procedure

1. Explain the procedure to the parent.
2. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
3. Use ANTT throughout the procedure.
4. Clamp both the infusion line and catheter (using correct method either 'pinch clamp' or 3 way tap 'off to baby') and the ensuring needle free access device is left in situ, change to the second pair of gloves.
5. Disconnect the infusion.
6. If ending the infusion then (long line/ UVC only), flush the line with sodium chloride 0.9% using either 10ml syringe or BD Posi-flush 5ml syringe into the line using a pulsatile flush technique; this will create turbulence inside the catheter lumen aiding the removal of fibrin and drug precipitation. Re-clamp the line under positive pressure ensuring needle free access devise remains in situ.
7. If connecting a new infusion follow 'Administration of a Continuous Infusion' as above
8. Remove and dispose of waste equipment correctly. Undertake effective hand hygiene in accordance with the Trust Hand Hygiene Policy
9. Record procedure and any variances in the patient's clinical record.
10. Continue to observe the site as per policy.

Blood sampling
Umbilical Arterial Catheter (UAC)

Good practice tips

- It is vitally important that the catheter is properly flushed using a pulsatile flush after the blood has been taken.
- The needle free access device must be changed after blood sampling if it is suspected that blood may have collected inside.
- Always check the colour and warmth of toes and lower limbs whilst the catheter is in situ. During insertion observe legs and buttocks for pallor or blueness, palpate the femoral pulses. During sampling observe for any blanching, change of colour and temperature. Inform medical staff immediately of any abnormal findings and document in patient's records.

Equipment

- ANTT Tray, apron, non-sterile gloves
- 2% Chlorhexidine gluconate and 70% Isopropyl alcohol wipe or if chlorhexidine sensitivity is suspected consider 10% aqueous Povodine iodine cleansing solution
- Blunt filter needle (for drawing up)
- 5ml syringes as required
- pre-heparinised syringe for blood gas sample
- 5mls BD Posi flush Pre-filled syringe of Sodium chloride 0.9% or 10ml syringe can be used (for flushing)
- Needle free access device (if required)
- Blood sampling bottles if required.

Procedure

1. Prepare the equipment using ANTT and assemble on a clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Assess colour and warmth of toes and lower limbs prior to sampling as a baseline assessment.
4. Close 3 way tap off to infusion of heparinised saline (500units in 500mls) to patient
5. If using an existing needle free device, use principles of ANTT clean the needle free access device with recommended cleansing wipe 2% Chlorhexidine gluconate/70% Isopropyl alcohol or if chlorhexidine sensitivity is suspected consider 10% aqueous Povodine iodine cleansing solution and allow to air dry for a minimum of 30 seconds / hub appears dry.
6. Insert 5ml syringe into needle free access device and withdraw up to 2mls of blood. Protect keep parts of syringe by either holding the syringe or placing syringe back into the packet for reinfusion after sampling.
7. Insert new syringe and collect blood required by slowly withdrawing blood from the needle free access device in to the syringe. Place blood samples into ANTT tray protecting key parts at all time.
8. Re-infuse the 2mls of blood initially withdrawn back to the patient.
9. Flush up to 5mls (or the least amount possible to clear the line dependant on catheter length) of 0.9% sodium chloride into the line using a pulsatile flush technique. This will create turbulence inside the catheter lumen aiding the removal of fibrin.
10. Decant blood into sample bottle and label samples at patient's bedside.
11. Reopen 3 way tap to allow infusion of heparinised saline (500units in 500mls) to patient.
12. Remove and dispose of waste equipment correctly.
13. Undertake hand hygiene in accordance with the Trust Hand Hygiene Policy.
14. Record procedure and any variances in the patient's clinical record.
15. Document all saline flushes on the input side of the fluid observation chart

Removal of a UVC / UAC / Long Lines

Good Practice Tips

- A UVC and UAC should be removed by nursing and medical staff using an ANTT technique.
- **A Long line is to be removed by an Advanced Nurse Practitioner or Medical staff**
- The tip of the line should only be sent to microbiology for culture and sensitivity where medically indicated.

Indication

- Arterial line is no longer required for blood sampling/ Blood pressure monitoring
- Removal is necessitated due to risk of infection
- Removal is necessitated due to problems with limb perfusion

Equipment

- ANTT tray
- 0.05% Chlorhexidine gluconate or if chlorhexidine sensitivity is suspected consider 10% aqueous Povodine iodine cleansing solution.
- Non-sterile gloves
- Scissors/ scalpel for cutting sutures (UAC/UVC only)
- Sterile gauze for any oozing/bleeding from umbilicus/ insertion site
- Specimen container for line tip (if applicable/ medically indicated)

Procedure

1. Prepare the equipment as per ANTT and assemble on clean dressing trolley or tray.
2. Prepare the patient and examine catheter for signs of infection/ damage, dislodgement or phlebitis. If any concerns inform clinician.
3. Use effective hand hygiene and put on non-sterile gloves.
4. For **UAC/UVC**; Clamp both the infusion line and catheter (using correct method either 'pinch clamp' or 3 way tap 'off to baby') and leave for 60 minutes. **Do not remove/ disconnect any fluids in situ or get baby out of the incubator at this point**.
5. Clean catheter site with 0.05% Chlorhexidine gluconate or if chlorhexidine sensitivity is suspected consider 10% aqueous Povodine iodine cleansing solution. Allow to air dry for minimum of 30 seconds.
6. Undo/ cut the suture into the cord and unsecure the catheter by unwrapping the suture around the cord.
7. For a **UAC/UVC** gently pull the line until it is half way out, stop and tape to nappy**, do not leave the neonates unattended during this time**. Wait another 30 minutes **minimum** and slowly remove the remainder of the UAC/UVC catheter.
8. For **Long lines** remove all dressing and pull catheter out gently ensure the line is not damaged and the tip is accounted for (*ANNP and medical staff only*).
9. Using sterile gauze apply pressure over the umbilical stump/ insertion site until bleeding stops approximately 5 minutes (if applicable)
10. If medically indicated using sterile scissors cut off approximately 3cm at tip of line and place in specimen container and send for culture and sensitivity.
11. Ensure that the length of the line removed corresponds with the patients insertion details.
12. Inspect catheter ensuring it is complete with no ragged edges. If it is not intact, the tip may migrate to the heart and pulmonary system, urgent medical assistance will be required.
13. Nurse baby supine observing umbilicus for 4 hours. **Do not put baby prone for at least 4 hours for EITHER UVC/UAC removal.**
14. Remove and dispose of equipment correctly.
15. Remove gloves and perform effective hand washing.
16. Record procedure and any variances in the patient's clinical record.

Paediatric CVAD

For patients under 1 year/ clotting disorders, please refer to medic/pharmacist for guidance

Burton site/ BCH shared care

Type of line:

PICC Lines/ Tunnelled and non - tunnelled central lines

↓

Flush – 0.9% saline

↓

If not accessing for more than **12 hours,** lock with heparinised saline

100units/ml

2mls- 200 units per lumen

Community: Flush & lock every 7 days

Fully implanted ports

↓

Flush – 0.9% saline

↓

If not accessing for more than **12 hours**, lock with heparinised saline

100units/ml

<8yrs=2mls- 200 units

>8yrs=4mls- 400 units

Community: Flush & lock every 4 weeks

Paediatric CVAD

For patients under 1 year/ clotting disorders, please refer to medic/pharmacist for guidance

Derby site / NUH /UHL shared care

Type of line:

PICC Lines / Tunnelled and non - tunnelled central lines

↓

Flush – 0.9% saline

↓

If not accessing for **8 hours** or more lock with heparinised saline

10units/ml

2.5ml per lumen

Community: Flush & lock every 7 days

Fully implanted ports

↓

Flush – 0.9% saline

↓

If not accessing for **8 hours** or more lock with heparinised saline

100units/ml

<5yrs= 2mls- 200units

>5yrs= 4mls- 400 units

Community: Flush & lock every 4 weeks

Paediatric Education Team Feb 2023 Version2.