The Clatterbridge Cancer Centre NHS Foundation Trust

Care & Maintenance of a Skin Tunnelled Catheter (STC1)

Patient addressograph label/patient name

REASON FOR INSERTION…

DEVICE TYPE…

DATE OF INSERTION…

These guidelines are part of the Clatterbridge Care and Maintenance of CVADs in hospital and at home for adults

The Clinical Interventions Team at The Clatterbridge Cancer Centre 0151 556-5737 bleep 4095. Mon –Fri 9-5 or alternatively the CCC Hotline on 0800 169 5555 which is available 24 hours a day 7 days a week.

These general guidelines have been provided to assist all health care professionals or other users when handling skin tunnelled lines in any setting.

When relatives have been trained and supervised please confirm they are ready to continue ongoing care:

Date:…… Trained by:……..

The Clinical Interventions Team at The Clatterbridge Cancer Centre 0151 556-5737 bleep 4095. Mon –Fri 9-5 or alternatively the CCC Hotline on 0800 169 5555 which is available 24 hours a day 7 days a week.

TROUBLE-SHOOTING GUIDE

Type of device	Risks	Actions	Variations / Comments	SIGN
Skin tunnelled catheter (Hickman line)	Infection due to loss of skin integrity Contact dermatitis Line infection potentially resulting in systemic bacteraemia	• Site clean and protect with sterile dressing as per CCC guidelines. • Minimum of 8 hourly inspection of exit site for signs of inflammation or infection. Do not remove dressing unless • Take swab for culture and sensitivity if indicated • Check weekly or at each visit if in community setting • Use Biopatch if necessary at exit site • For contact dermatitis see dressing sequencing guide *Visual Infusion Phlebitis scored (VIIAD) See chart* • Observe patient for signs of line infection (pyrexia/raised WCC) • If clinically unstable and patient has had rigors, first take blood cultures peripherally and then from line (each lumen). Administer antibiotic therapy as prescribed using the line in an attempt to conserve. Assess medical condition prior to removal of line for continued need for reliable venous access • Send line tip for culture and sensitivity following removal if line cannot be salvaged • Ensure administration lines are used according to local policy. • Label infusion lines with date for renewal. • Change add-on devices at same time as administration sets or as soon as integrity is compromised. Use needle free systems avoiding 3 way taps		

	Air embolus	• Use Needle-free systems • Ensure air dispelled from medication/ flushes/infusates prior to administration. • Close the clamp when accessing the line or removing or change infusion bags		
	Thrombus	• For suspected or confirmed thrombus commence treatment dose LMWH as soon as possible • Arrange a Doppler to confirm or exclude thrombus • Line should be used as required to conserve line and to provide reliable access particularly for those patients with restricted access • When a line is no longer required or has failed when a thrombus is diagnosed, treatment dose LMWH should be administered for between 3-5 days before removing the line to limit the risks of embolisation		
	Occlusion of lumen.	• Maintain patency via 0.9% Sodium Chloride for injection flushes using positive pressure as per CCC guidelines, Pre & post drug/ infusion administration. Only use heparinised saline for open ended catheter when indicated by Clinical Interventions Team for sluggish flow rates • Check compatibility of drugs/infusates to eliminate precipitation. • Try to flush line using a to-fro method to re-establish patency • Attach a half filled 10ml syringe to the line then pull back on syringe and let go several times (Pop technique) to help re-establish patency		
	Bleeding from site / line itself.	• Observe for signs of new bleeding from site. • Apply pressure above dressing • Ensure add-on devices/taps securely fastened. • Ensure clotting studies are in acceptable range prior to removal of line.		
	Line migration / displacement	• Check notes to ensure insertion staff have documented line is in correct place and safe to use		

		• Check each time line accessed for signs of line migration • Anchor line during dressing changes to avoid accidental displacement until the sutures have been removed from around the line allowing it to become established. • If in doubt do not use line until instructed to do so by CIT staff and ensure patient is aware of problem.		
	Line in situ when no longer required.	Arrange for the removal when line no longer required.		

Visual Infusion Phlebitis (VIP) Scoring Tool for Intravenous Access Device (VIIAD)

Exit site appears healthy	0	**No sign of phlebitis** Observe PICC exit site
One of the following is evident: Slight pain near exit site Slight redness near exit site	1	**Possible first signs of phlebitis** Continue to observe IV catheter
Two of the following are evident: Pain at exit site Swelling Erythema	2	**IMPORTANT** **Seek advice VIP score 3-5** Mon-Fri between 9am and 5pm ring the Clinical Interventions Team on 0151 556-5737 or bleep 4095 CCC Hotline on 0800 169 5555 Complete contact record with name and details of problem.
All of the following are evident: Pain along the IV catheter Erythema Swelling	3	
All of the following are evident and extensive: Pain along the path of the IV catheter Erythema Swelling Palpable venous cord	4	
All of the following are evident and extensive: Pain along the path of the IV catheter Erythema Swelling Palpable venous cord Pyrexia	5	

The Principles of Asepsis

Asepsis is defined as the absence of pathogenic (harmful) organisms.
The principles of asepsis/aseptic technique are:

- Reducing activity in the immediate vicinity of the area in which the procedure is to be performed
- Keeping the exposure of a susceptible site to a minimum
- Checking all sterile packs to be used for evidence of damage or moisture penetration
- Ensuring all fluids and materials to be used are in date
- Not re-using single use items
- Ensuring contaminated/non-sterile items are not placed in the sterile field
- Ensuring appropriate hand decontamination prior to the procedure
- Protecting uniform/clothing with a disposable apron
- Using sterile gloves.

Steps to performing an aseptic dressing change

- Staff should be “bare below the elbow”
- Maintain a sterile field throughout the procedure
- Decontaminate hands by washing with liquid soap and warm water or by applying alcohol handrub, using the recommended technique.
- Put on disposable apron
- Decontaminate the trolley (or working surface to be used if trolley not available, e.g., in the patients home) with detergent and warm water or detergent wipes and dry.
- Assemble sterile procedure packs, e.g., dressing packs and equipment, check all items are in date and packaging is intact.
- Explain and discuss the procedure with the patient.
- Ensure patient is positioned both comfortably and so the area to be exposed is accessible without undue exposure.
- Open sterile procedure pack outer packaging, sliding the contents onto the top shelf of the trolley (or working surface).
- Open the sterile field by using the corners of the paper.
- Add any extra items without compromising the sterile field.
- Lift the plastic waste disposal bag from the sterile field carefully by its open end and holding one edge of the opening end, place the other hand into bag, hence covering the hand with a sterile 'glove'. Using the sterile 'glove', arrange sterile items on the sterile field.

- Attach the bag to the trolley, below the top shelf or on a nearby surface if in a patients home. Decontaminate hands with alcohol handrub,
- Don non sterile gloves, remove old dressing and dispose of in disposal plastic bag. Decontaminate hands with alcohol handrub
- Put on sterile gloves ensuring hands do not contaminate outer surface of the glove.
- Perform the procedure as directed, using the correct dressings to suit the patients individual needs
- Ensure equipment is discarded if it becomes contaminated.
- Dispose of all used items, including soiled dressings, into the plastic waste disposal bag and seal.
- Discard disposal waste bag into clinical waste bag.
- Remove gloves and apron and dispose of in clinical waste
- Decontaminate hands with alcohol handrub; then document all actions taken within the patients hand held records or electronically as required.

Care and Maintenance of a Skin Tunnelled Catheter

EXIT DRESSING CHANGE (Weekly) - Dressings are optional once the Dacron cuff has become embedded.

Action	Rationale
Equipment required **Dressing Pack containing sterile towel and Gloves** **Surgical tape** **2% Chlorhexidine in 70% Isopropyl alcohol impregnated applicator (Chloroprep)** **Chlorhexidine 2% wipe (sani cloth) x2** **Grip Lok if required** **Semi- Permeable transparent IV dressing** **Alcohol hand rub or gel** **Plastic apron**	
Care of Exit site Dressing changes should be performed on a weekly basis or when dressing is dirty or loose. • Maintain aseptic technique at all times. • Explain the procedure to the patient. Ensure that valid consent is gained.	To prevent/reduce patient anxiety. To prevent infection.
▪ Ensure working area is clean. ▪ Ensure all equipment is gathered before commencing the procedure and all packaging is intact and in date. ▪ Take equipment/trolley to patients' bedside.	Maintain safety. To prevent infection and catheter contamination.

▪ Inspect the catheter exit site for signs of skin discolouration or signs of infection e.g. exudate from exit site. Check observation and VIAD chart for any indications of infection or complications. Ensure the intravenous access device has been comfortable and pain free. Observe for any swelling of the arm/neck. If you suspect any problems please contact the hospital team who placed the catheter for advice. Refer to trouble-shooting guide	Exit site dressings are important in preventing trauma and the extrinsic contamination of the site of entry (Jones 2004).
▪ Decontaminate hands • Open sterile pack and use a non-touch technique to place inner pack onto clean working area. • Open out sterile pack to create an aseptic field. Open remaining equipment using a non touch technique, ensuring no contamination of aseptic field. ▪ Loosen exit site dressing. To loosen dressing lift lower-end and gently ease the dressing off, from the skin.	To avoid contamination of aseptic field. To allow for an aseptic environment for accessing intravenous catheter, and to reduce incidence of infection. Chlorhexidine-based solutions are recommended (in alcohol) as per policy (DOH 2001). To prevent accidental removal of the catheter and friction or trauma to skin surface.
▪ Aseptically remove the dressing and stat lock if present. ▪ Decontaminate hands ▪ Put on sterile gloves ▪ Place sterile towel as near as possible to the catheter. ▪ Clean around the catheter and exit site with Chlorhexidine 2% impregnated applicator for 15 seconds. ▪ The solution should be applied with friction but should not be too vigorous or the skin's natural defence may be destroyed. ▪ Using a chlorhexidine 2% wipe, carefully clean the catheter from the exit site to the part of the catheter that will be covered by the sterile dressing. ▪ Allow to dry. ▪ Apply new securing device i.e. Skin closure strips or skin fixation device (if required) ▪ Apply new dressing to exit site without touching the adhesive site to suit the patient. ▪ Remove the dressing towel	Alcohol Chlorhexidine combines the benefits of rapid action and excellent residual activity (DOH 2001) Semi-permeable transparent IV dressings are well tolerated by patients (Campbell et al 1999, Treston-Aurand et al 1997, Wille 1993) and are easy to

▪ Remove gloves. ▪ Clear away equipment disposing of waste as per organisational policy. Wipe down the trolley that has been used during the procedure with multi-surface detergent wipes. ▪ Wash hands. ▪ Document care on patient's records.	apply and remove (Wille 1997).

Skin Tunnelled Catheters – 0.9% Sodium Chloride for weekly maintenance Flush..

Action	Rationale
<u>Equipment Required</u> **Dressing Pack containing sterile towel and gloves** **Gauze swabs x 1** **Chlorhexidine Gluconate 2% in 70% Isopropyl alcohol impregnated wipe (sani cloth) x 3** **10ml syringe x 1** **10ml 0.9% Sodium Chloride (Saline) prefilled syringe** **Disinfecting port protector if required** **Sharps container** **Alcohol hand rub/gel** **Plastic apron** **Needle free I/V access connector change weekly**	10ml syringes should always be used; smaller syringe sizes may damage the catheter (Hadaway 1998).
• Explain the procedure to the patient. Ensure that valid consent is gained. • Check the patient identity, prescription and flush required in accordance with trust policy for the administration of medications. ▪ Before the procedure begins make sure that your hands are washed and dried thoroughly and that they continue to be decontaminated during the procedure. A plastic apron should be worn. ▪ Maintain aseptic technique at all times. • Ensure working area is clean. ▪ Ensure all equipment is gathered before commencing the procedure and all packaging is intact and in date.	Reduce anxiety Patient compliance Maintain asepsis and safety. Reduce risk of infection. To avoid contamination. To ensure that the procedure can be carried out safely.

▪ Take equipment/trolley to patients' bedside. ▪ Inspect the catheter exit site for signs of skin discolouration or signs of infection e.g. exudate from exit site. Check observation and VIIAD chart for any indications of infection or complications. Ensure the intravenous access device has been comfortable and pain free. Observe for any swelling of the arm/neck. If you suspect any problems please contact the hospital team who placed the catheter for advice. Refer to trouble-shooting guide • Open sterile pack and use a non-touch technique to place inner pack onto clean working area. • Decontaminate hands. • Open out sterile pack to create an aseptic field. Open remaining equipment using a non touch technique, ensuring no contamination of aseptic field. • Ensure easy access to the needle free system. • Decontaminate hands. • Put on sterile gloves. • Scrub the hub of the needle free system with 2% Chlorhexidine impregnated wipe, rubbing from the top of the needle free connector to the sides. Do this several times using different parts of the wipe over a period of 15 seconds. Allow to dry. • Attach pre filled saline syringe aspirate enough blood to blush the saline and inject the flush using a push/pause action, clamping as the last ml of solution is instilled into the catheter. • Remove the syringe and discard. • NEVER FORCE THE SOLUTION INTO THE CATHETER, this can damage the catheter. The solution should flow easily. If resistance felt refer to trouble shooting guide or contact the Clinical Interventions Team. • Clean the needle free connector again with a sani cloth; attach a disinfecting port protector if necessary. Secure this to the patients' chest to suit patients' requirements. Ensure that the catheter is comfortable. • Remove dressing towel and discard. Remove gloves. Wash hands. • Clear away equipment disposing of waste as per organisational policy. Wipe down the trolley that has been used during the procedure with multi-surface detergent wipes • Decontaminate hands	To maintain a sterile field. Chlorhexidine-based solutions are recommended (in alcohol) as per policy (DOH 2001). 10ml syringes should always be used; smaller syringe sizes may damage the catheter (Hadaway 1998). There is no requirement to routinely withdraw blood and discard it prior to flushing (except prior to blood sampling although the first sample can be used for

• Document care in patient's records.	blood cultures (RCN 2005). There is an increased risk of infection and occlusion when withdrawing blood via a central venous catheter (RCN 2005), therefore for routine flushing of a line withdrawal of blood is not required. The pulsated flush creates turbulence within the catheter lumen, removing debris from the internal catheter wall (Goodwin & Carlson 1993, Todd 1998). Positive pressure within the lumen of the catheter should be maintained to prevent reflux of blood (INS 2000).

Skin Tunnelled Catheters – Blood Sampling

Action	Rationale
Equipment Required **Dressing Pack containing sterile towel and gloves** **Gauze swabs x 1** **Chlorhexidine Gluconate 2% in 70% Isopropyl alcohol impregnated wipe (Sani Cloth) x 3** **10ml syringes x 4** **10ml 0.9% Sodium Chloride for injection prefilled syringe** **Sharps container** **Surgical tape** **Alcohol hand rub/gel** **Plastic apron** **Needle free I/V access connector change weekly**	
• Explain the procedure to the patient. • Ensure that valid consent is gained. ▪ Before the procedure begins make sure that your hands are washed and dried thoroughly and that they continue to be decontaminated during the procedure. A plastic apron should be worn. • Maintain aseptic technique at all times. • Ensure working area is as clean as possible. • Ensure all equipment is gathered before commencing the procedure and all packaging is intact and in date. • Take equipment /trolley to patients' bedside ▪ Inspect the catheter exit site for signs of skin discolouration or signs of infection e.g. exudate from exit site. Check observation and VIIAD chart for any indications of infection or complications. Ensure the intravenous access device has been comfortable and pain free. Observe for any swelling of the arm/neck. If you suspect any problems please contact the hospital team who placed the catheter for advice. Refer to trouble-shooting guide	Reduce anxiety Patient compliance To ensure that the procedure can be carried out safely. Reduce risk of infection To avoid contamination To maintain a sterile field.

• Open sterile pack and use a non-touch technique to place inner pack onto clean working area. • Decontaminate hands. • Ensure easy access to the needle free system. • Decontaminate hands. • Put on sterile gloves. • Place sterile towel as near as possible to the catheter. • Scrub the hub of the needle free system with 2% Chlorhexidine impregnated wipe, rubbing from the top of the needle free connector to the sides. Do this several times using different parts of the wipe, over a period of 15 seconds. Allow to dry. • Attach empty 10ml syringe into needle free system and aspirate at least 8-10mls of blood from the catheter. Discard aspirated blood. Note if taking blood samples from a parenteral nutrition line, from a line that has just been used, following TPN or for INR sample at least 20mls of blood should be taken before taking the sample. • Attach an empty 10ml syringe and withdraw amount of blood required for analysis and transfer into the relevant blood tubes while maintaining a sterile technique by holding the blood tubes with sterile gauze, once filled place outside the sterile field. • Attach syringe with 0.9% Sodium Chloride for injection flush and flush using a push/pause action, clamping as the last ml of solution is instilled into the catheter. • Remove the syringe and discard. • NEVER FORCE THE SOLUTION INTO THE CATHETER, this can damage the catheter. The solution should flow easily. If resistance is felt refer to the trouble shooting guide or contact The Clinical Interventions team. • Clean the needle free connector again with a sani cloth, attach a disinfecting port protector). Tape this to the patients' chest as needed. • Ensure that the catheter is secure and comfortable. • Remove dressing towel and discard. Remove gloves and apron. Wash hands. • Clear away equipment disposing of waste as per organisational policy. Wipe down the trolley that has been used during the procedure with multi-surface detergent wipes. • Wash hands • Document care in patient's records.	Chlorhexidine-based solutions are recommended (in alcohol) as per policy (DOH 2001). Check catheter patency. Remove any residual solution from catheter The pulsated flush creates turbulence within the catheter lumen, removing debris from the internal catheter wall

	(Goodwin & Carlson 1993, Todd 1998). Positive pressure within the lumen of the catheter should be maintained to prevent reflux of blood (INS 2000).

ALL CENTRAL LINE TIP POSITIONS NEEDTO BE CONFIRMED EITHER BY X-RAY OR BY TIP LOCATION TECHNOLOGY AND RECORDED IN THE PATIENTS MEDICAL RECORDS PRIOR TO THE LINE BEING USED FOR CHEMOTHERAPY

Skin Tunnelled Catheters – Administration of antibiotics/infusion/additives
Administer drugs or IV therapy as prescribed using correct diluent and rate of infusion. Always use 10ml syringe, never use force to flush the catheter.

Action	Rationale
Equipment Required **Dressing pack containing sterile towel and gloves** **Gauze swabs x 1,** **Chlorhexidine Gluconate 2% in 70% Isopropyl alcohol impregnated applicator and wipes** **10ml syringes x 4** **2 x 10ml 0.9% Sodium Chloride for injection prefilled syringes** **Sharps container** **Surgical tape** **Alcohol hand rub/gel** **Antibiotics/Infusion/additives as prescribed** **Plastic apron**	
• Explain the procedure to the patient. • Ensure that valid consent is gained. • Check the patient identity, prescription and flush required in accordance with trust policy for the administration of medications. • Medication reconstitution should be performed in a clean clinical environment. This may be performed in an area designated for drug preparation or at the patient's bedside as part of this procedure. ▪ Before the procedure begins make sure that your hands are washed and dried thoroughly and that they continue to be decontaminated during the procedure. A plastic apron should be worn. • Maintain aseptic technique at all times. • Ensure working area is as clean as possible. • Ensure all equipment is gathered before commencing the procedure and all packaging	Ensures patient compliance and reduce anxiety Reduce the risk of infection and contamination Maintain asepsis.

is intact and in date. • Take equipment trolley to patients' bedside. ▪ Inspect the catheter exit site for signs of skin discolouration or signs of infection e.g. exudate from exit site. Check observation and VIIAD chart for any indications of infection or complications. Ensure the intravenous access device has been comfortable and pain free. Observe for any swelling of the arm/neck. If you suspect any problems please contact the hospital team who placed the catheter for advice. Refer to trouble-shooting guide • Open sterile pack and use a non-touch technique to place inner pack onto clean working area. • Decontaminate hands. • Ensure easy access to the needle free system. • Decontaminate hands • Put on sterile gloves. • Place sterile towel as near as possible to the catheter. • Scrub the hub of the needle free system with 2% Chlorhexidine impregnated wipe, rubbing from the top of the needle free connector to the sides. Do this several times using different parts of the wipe, over a period of 15 seconds. Allow to dry. • Attach syringe with 0.9% sodium chloride for injection, aspirate enough blush to colour the 0.9% Sodium Chloride solution then flush using a push pause action clamping as the last ml of the solution is instilled into the catheter. Remove the syringe and discard. • If unable to aspirate blood from the line continue to administer prescribed medication unless this is a **vesicant drug/infusion, in this case refer to algorithm on persistent withdrawal occlusion.** • NEVER FORCE THE SOLUTION INTO THE CATHETER, this can easily damage the catheter. The solution should flow easily. If resistance felt refer to trouble shooting guide or contact The Clinical Interventions team. • Administer IV antibiotics/infusion/additives as prescribed following trust policy. • Flush catheter again with 10ml 0.9% Normal Saline using a push/pause action. • Remove the syringe and discard. • Clean the needle free connector again with a sani cloth attach a disinfecting port protector	To check catheter patency and to remove residual solution from catheter. The RCN Standards for infusion Therapy state, "the nurse should aspirate the catheter and check for blood return to confirm patency prior to the administration of medications and/or solutions (INS 2000). On no account should a vesicant drug or vesicant infusion be administered through a vascular access device where difficulty is

• Ensure that the catheter is secure and comfortable. • Remove dressing towel and discard. Remove gloves and apron. Wash hands. • Clear away equipment disposing of waste as per organisational policy. Wipe down the trolley that has been used during the procedure with multi-surface detergent wipes. • Wash hands • Document care in patient's records.	experienced in withdrawing blood (Masoorli 2003). Creates turbulence in catheter, preventing clotting in the catheter. Maintains positive pressure and prevents backflow of blood into the catheter.

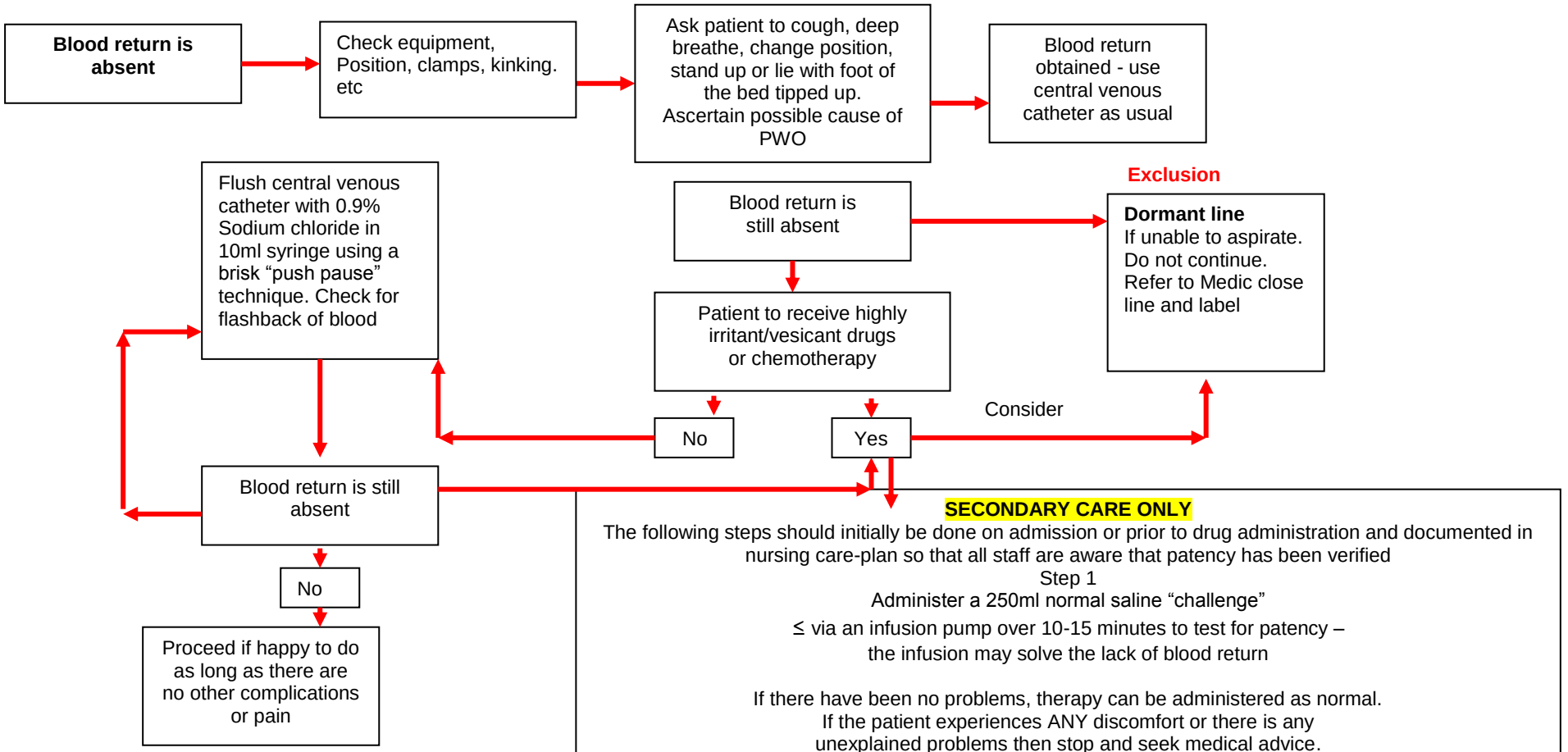
Disconnection of Ambulatory Chemotherapy (Infusor/ Infuser) from Central Venous Access Device (DST1)

Action	Rationale
Equipment Required **Dressing Pack containing sterile towel and gloves** **Gauze swabs x 1** **10ml syringes x 1** **Chlorhexidine Gluconate 2% in 70% Isopropyl alcohol impregnated wipe (Sani Cloth)** **10ml 0.9% Sodium Chloride for injection prefilled syringe** **Sharps container** **Surgical tape,** **Alcohol hand rub,** **Needle-free system** **Plastic apron** **Plastic bag for empty cytotoxic chemotherapy infusor** **Luer lock stopper for Infusor**	
• Explain the procedure to the patient. Ensure that valid consent is gained. ▪ Before the procedure begins make sure that your hands are washed and dried thoroughly and that they continue to be decontaminated during the procedure. A plastic apron should be worn. • Maintain aseptic technique at all times • Ensure working area is as clean as possible. • Inspect the catheter exit site for signs of skin discolouration or signs of infection e.g. exudate from exit site. Check observation and VIIAD chart for any indications of infection or complications. Ensure the intravenous access device has been comfortable and pain free. Observe for any swelling of the arm/neck. If you suspect any problems please contact the hospital team who placed the catheter for advice. Refer to trouble-shooting guide. • Open sterile pack and use a non-touch technique to place inner pack onto clean working area.	Ensures patient compliance and reduces anxiety Reduce the risk of infection, to avoid contamination To maintain asepsis Luer lock stopper will prevent leakage of chemotherapy from infusor this is now a sealed unit

• Decontaminate hands. • Open out sterile pack to create an aseptic field. Open remaining equipment using a non touch technique, ensuring no contamination of aseptic field. • Ensure easy access to the needle free system. • Decontaminate hands • Put on sterile gloves. • Place sterile towel as near as possible to the catheter. • Close catheter clamp. Using a Chlorhexidine 2% wipe lift the end of the catheter carefully and clean, including the pump connection, allow to dry. • Hold the catheter with sterile gauze; disconnect Infusor from the access device. Apply leur lock stopper to the end of the Infusor tubing this will need to be placed inside the plastic bag clearly labelled cytotoxic waste after the sterile procedure has been completed. • Scrub the hub of the needle free system with 2% Chlorhexidine impregnated wipe, rubbing from the top of the needle free connector to the sides. Do this several times using different parts of the wipe, over a period of 15 seconds. Allow to dry. • Attach syringe with 0.9% sodium chloride for injection, and flush the catheter using a push pause action clamping as the last ml of the solution is instilled into the catheter. Remove the syringe and discard. • NEVER FORCE THE SOLUTION INTO THE CATHETER, this can easily damage the catheter. The solution should flow easily. If resistance felt refer to trouble shooting guide or contact Clinical Interventions team. • Clean the needle free connector again with a sani cloth, attach a disinfecting port protector. • Ensure that the catheter is secure and comfortable. • Remove dressing towel and discard. Remove gloves and apron. Wash hands. • Clear away equipment disposing of waste as per organisational policy. Wipe down the trolley that has been used during the procedure with multi-surface detergent wipes. • Decontaminate hands. • Document care in patient's records.	

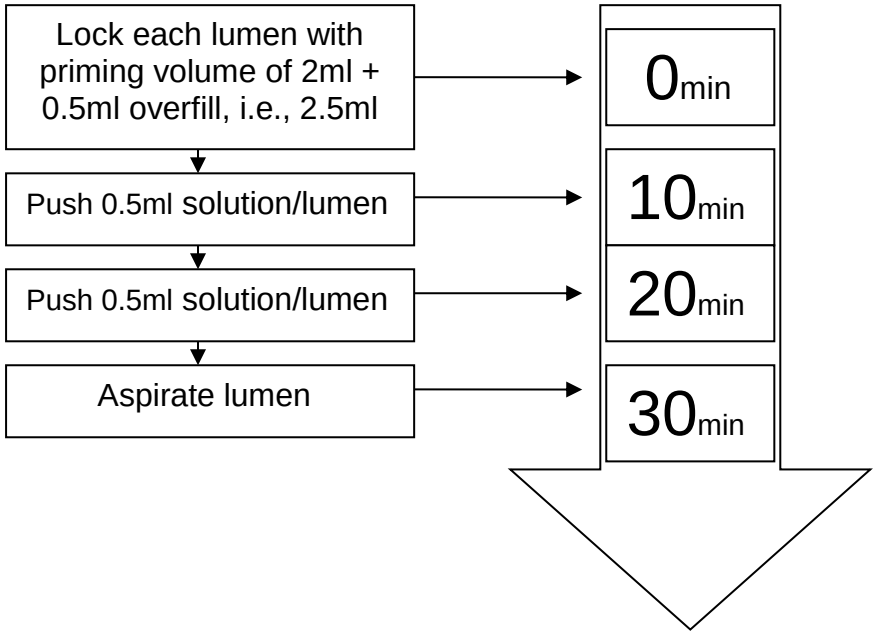
Algorithm persistent withdrawal occlusion

i.e. fluids can be infused freely by gravity but blood cannot be withdrawn from

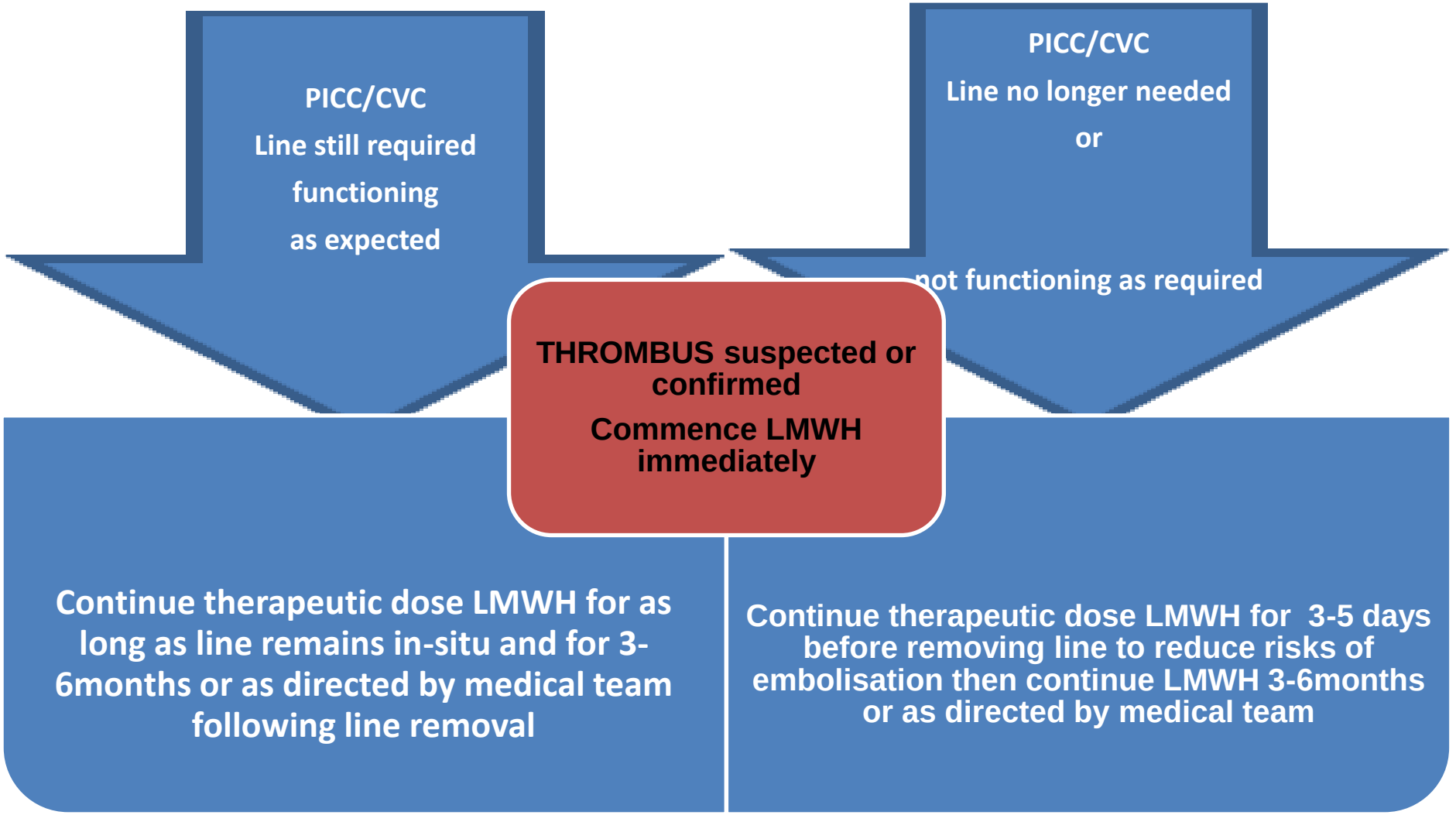


Adapted from Standards for Infusion Therapy RCN (2016)

The Push–Lock Method: Reconstitute a 10,000IU vial of Urokinase using 3.5ml of 0.9% sodium chloride for each lumen.



Algorithm for the management of Upper Extremity Deep Vein Thrombosis (UEDVT)



References

1. **Department of Health (DOH) (2001)** Guidelines for preventing infection associated with the insertion and maintenance of central venous catheters, Journal of Hospital Infection, 47 Supplement S47 – S67

2. **Department of Health (DOH 2003).** Winning Ways: Working together to reduce health care associated infection in England

3. **Department of Health (DOH 2005).** Saving Lives: A delivery programme to reduce health care associated infection including MRSA

4. **Goodwin M, Carlson I (1993)** The peripherally inserted catheter: a retrospective look at 3 years of insertions, Journal of Intravenous Nursing, 16 (2) 92-103

5. **Hadaway L (1998)** Catheter connection, Journal of Vascular access devices 3 (3), 40.

6. **INS (2000)** Infusion Nursing Standards of Practice, Journal of Intravenous Nursing 23 (6S) supplement

7. **Treston-Aurand J et al (1997)** Impact of dressing materials on central venous catheter infection rates. Journal of Intravenous Nursing 20(4):201-206.

8. **Wille JC (1993)** A comparison of two transparent film-type dressings in central venous therapy. Journal of Hospital Infection 23(2):113-121.

9. **Pratt RJ et al (2006)** National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England (epic 2). Thames Valley University, London.

10. **INS (2000)** Standards for infusion therapy. Cambridge, MA: INS and Becton Dickinson (III). In RCN Standards for Infusion (2005)

11. **Masoorli S (2003)** Extravasation injuries associated with the use of central venous access devices. Journal of vascular access devices. 21-23 Spring

12. **Wall, C. et al. (2016**) Catheter –related thrombosis: A practical approach