

Cross Site Vascular Access and IV Therapy Clinical Guidelines

Part 1 – Introduction and Fundamental Principles of Practice

Key Points

This document covers the fundamental principles of clinical practice in vascular access and IV therapy. This is Part 1 of 12 related documents which provide guidelines and clinical protocols for the insertion, care and maintenance of vascular access devices and the principles of IV therapy administration.

This set of documents also includes guidelines to recognise and treat complications associated with IV therapy and vascular access.

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Printed copies must be destroyed after use.

Abbreviations

ACF	Antecubital Fossa
ANTT	Aseptic Non-Touch Technique
COPD	Chronic Obstructive Pulmonary Disease
CRBSI	Catheter Related Blood Stream Infection
CVC	Central Venous Catheter
ECG	Electrocardiogram
GI	Gastrointestinal
IV	Intravenous
IVAS	Intravenous and Vascular Access Services
LocSSIP	Local Safety Standards
MC&S	Microscopic Culture and Sensitivity
NICE	National Institute for Health and Care Excellence
NIVAS	National Infusion and Vascular Access Society
NST	Nutritional Support Team
OPAT	Outpatient Parenteral Antibiotic Therapy
PICC	Peripherally Inserted Central Catheter
PN	Parenteral Nutrition
PSA	Procedural Sedation and Analgesia
PVC	Peripheral Venous Catheter
RIVC	Renal IV Catheter
SPN	Supplemental Nutrition
STA-CVC	Short Term Acute Central Venous Catheter
TCCVC	Tunnelled Cuffed Central Venous Catheter
TIIP	Totally implanted Intravenous Port
TPN	Total Parenteral Nutrition
VA	Vascular Access
VAD	Vascular Access Device
VasCath	Vascular Catheter
VIP	Visual Infusion Phlebitis

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1. INTRODUCTION

Intravenous therapy is a vital component of patient care. The majority of patients admitted to hospital receive some form of intravenous therapy via either a central or peripheral intravenous catheter.

Intravascular catheter related infections continue to be a major source of mortality, particularly in hospitalised patients (Zingg & Marschall 2018).

Intravenous therapy has become an essential part of clinical practice and is used within the hospital setting in numerous ways:

- Administer IV solutions, medications, blood products or Total Parental Nutrition.
- Monitor critically ill patients.
- Obtain blood specimens.

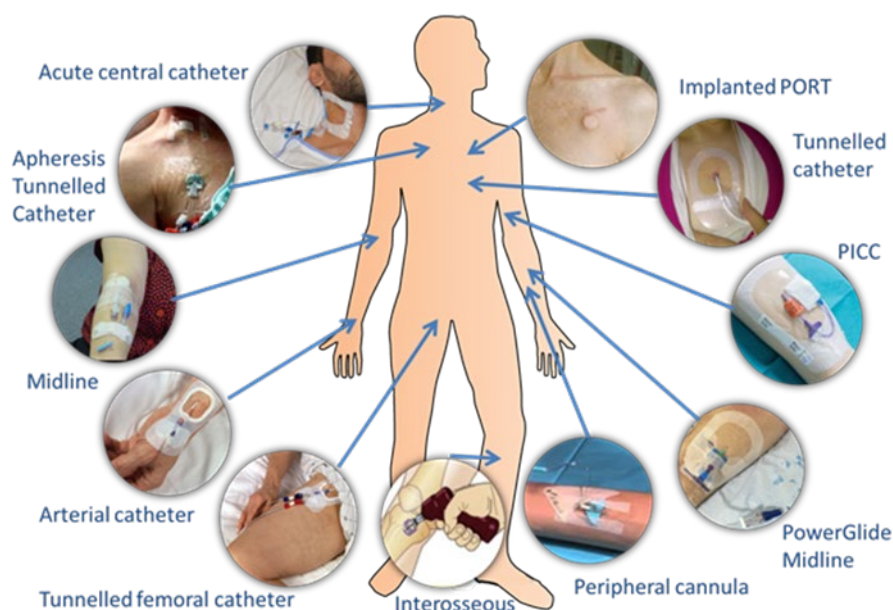
This guideline outlines the approved clinical practice pertaining to the insertion, use, care and maintenance of all vascular access devices in the Trust.

This guideline should be used in conjunction with the injectable medicines policy and the infection prevention and control manual.

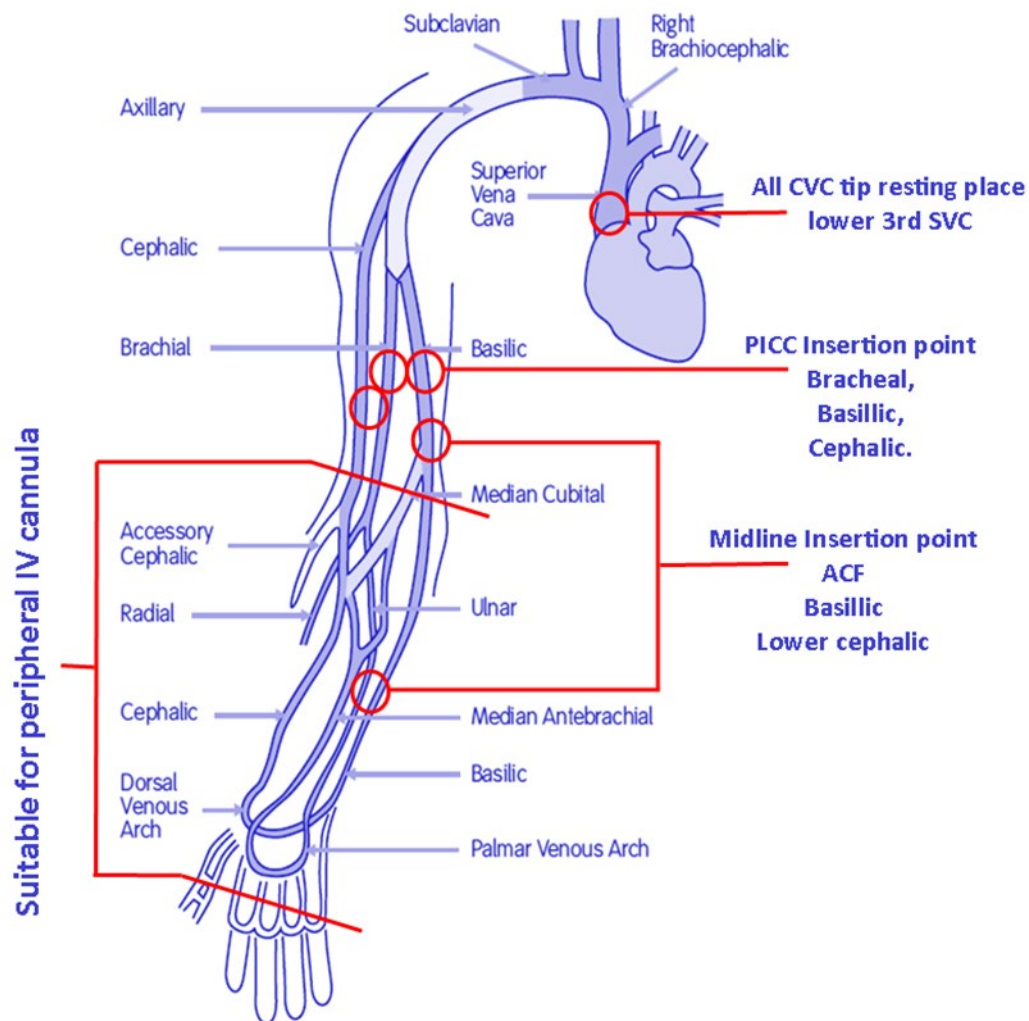
2. VASCULAR ACCESS DEVICES (VADS)

For venous access, the device and the site used should include assessment of:

- The patient's condition
- Age and diagnosis
- Vascular condition
- Infusion device history
- The type and duration of the therapy
- The potential problems associated with VADs



3. VEIN SELECTION

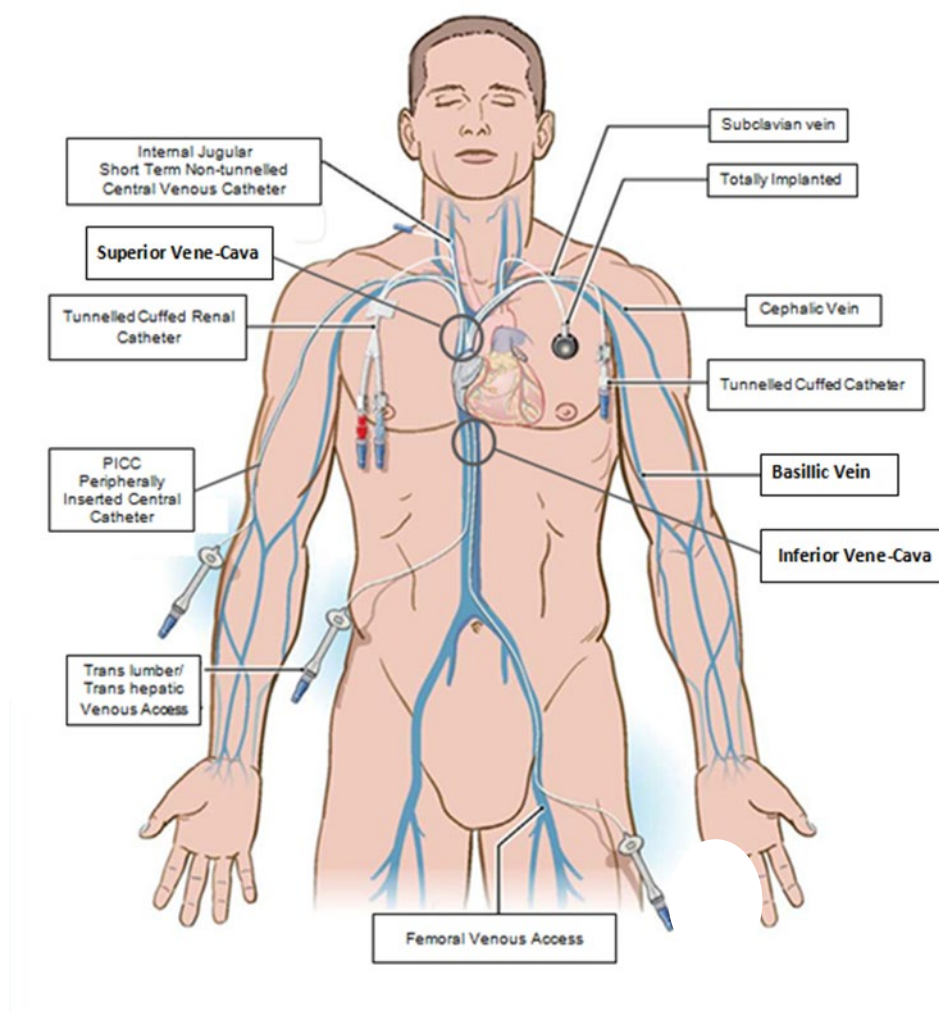


4. PERIPHERAL VENOUS CATHETER (PVC)

1. Peripheral Cannula – Intended for short term use and can remain in place for 96 hours with Visual Infusion Phlebitis (VIP) Score of 0. (See section 21 for detailed discussion of VIP.) Peripheral cannulas should be removed if no longer required or if there are signs of phlebitis. Drugs with an Osmolality below 600 and a pH of 5-9 can be safely administered through a peripheral cannula (NIVAS 2024).
2. Midline IV Catheter – Intended for medium term use. Can remain in situ for up to 6 weeks with a VIP of 0. Drugs with an Osmolality below 600 and a pH of 5-9 can be safely administered through a midline (NIVAS 2024). Preferably for bolus administration but could be used for short IV infusions.
3. Short Midline Catheter – intended for acute IV access where vessel depth is an issue but can be used for home IV therapy. Drugs with an Osmolality below 600 and a pH of 5-9 can be safely administered and these catheters are suitable for CT contrast up to 5mls per second. The indwell time is 29 days with a VIP score of 0.

5. CENTRAL VENOUS CATHETERS (CVC)

Central Venous Catheters (CVCs) are indicated for the administration of all IV therapy especially vesicants, irritants, and those drugs with high osmolality. CVCs are used for both acutely unwell patients to obtain multiple venous accesses in clinical areas such as critical care and theatres; and for long term IV treatment in areas such as oncology and nutrition.



CVCs are, by definition, venous catheters whose distal tips terminate in the central veins, usually the lower 3rd of the SVC (Bodenham et al 2016). They may be tunnelled or non-tunnelled and peripherally or centrally inserted.

1. Non-Tunnelled Short Term Acute Centrally Venous Catheters (STA-CVCs) – may be inserted into the internal jugular, subclavian or femoral vein using ultrasound. As the risk of infection is greatest from the femoral site, and subclavian sites increase the risk of pneumothorax, the internal jugular veins of the neck are preferred; however, STA-CVCs are considered to pose the highest risk of infection in the central catheter classification and their indwell time should be as limited as possible, preferable no longer than 10 days unless clinically indicated (Loveday et al 2016, Zing & Marschall 2018). STA-CVCs are allowed to be cared for and used on any clinical unit at Frimley

Health. All staff receive training on this in the IV study day. For support in using a STA–CVC or removing one, the vascular access team can be called to help.

2. Peripherally inserted central catheters (PICC) are inserted into the upper arm using Ultrasound guidance and can remain in situ for 18 months or more if still required with a VIP score of 0 (Chopra et al 2015). PICCs are available as single, double, or triple lumens. PICC's come in sizes 3fr, 4fr, 5fr, single lumen and 5fr double and triple lumen. PICCs are only inserted by the vascular access team or interventional radiology and the size of the device will be selected in relation to vessel size ensuring no more than 35% of the vessel is accommodated by the catheter to reduce the risk of complications (Chopra et al 2015, Spencer & Mahoney 2017). All PICCs are inserted with ultrasound and the tip location confirmed with ECG technology or fluoroscopy. Blind insertion is not best practice and not permitted (Royse et al 2012).
3. Tunnelled/cuffed CVCs (TCCVC) – These enter the vascular system via the axillary, subclavian or jugular vein and are tunnelled for a distance under the skin with the exit site on the chest above the nipple line. They are held in place by a Dacron cuff situated part way along the tunnelled portion of the line. Tunnelled catheters can stay in situ for as long as they are required but may need to be change after 12 months due to catheter fatigue. Tunnelled catheters should only be inserted by the vascular access team, vascular surgeons, or Interventional Radiology. Removal of tunnelled catheters should only be undertaken by a trained person as they will require blunt dissection; tunnelled catheters should NEVER be pulled out with force, removal by traction is NOT permitted at Frimley Health, a cut down technique is the safer agreed procedure (Naik et al 2019).
4. Totally Implanted Intravenous Ports (TIIVP) – is a device which involves a catheter entering the vascular system via the subclavian or, more commonly, at the neck in the jugular vein. The remaining catheter is tunnelled under the skin terminating at the implanted port which is sited below the clavicle around the second intercostal space (Anderson 2019). This is then accessed via a non-coring needle through the skin into the well of the port. Ports are inserted by the vascular access team, vascular surgeons, or interventional radiology. Port removal should be undertaken by the vascular access team, vascular surgeons, or interventional radiology under surgical/sterile conditions.
5. Renal Catheters Venus Catheter (RCVC) – can be tunnelled or non-tunnelled and inserted at the internal jugular or into the femoral vein. The Renal unit consultants and the vascular access team will have joint responsibility to insert these catheters and will follow the same standardised approach as set out in the VA-LocSSIP.
6. Sedation can be offered to patients undergoing tunnelled catheter or PORT insertion by the vascular access team, see the appendices for sedation guidance.

6. ARTERIAL CATHETERS

1. Arterial catheters are used in level one clinical areas to monitor central blood pressure and take blood samples.
2. The insertion of arterial catheters is limited to those with special competency.
3. The wrist radial artery is the safest place for this type of catheter, brachial artery insertions can lead to greater complications of emboli and thrombosis (Pacha et al 2018).
4. Ultrasound should be considered when undertaking arterial cannulation (Miller & Bardin 2016).

7. INTEROSSEOUS

1. Interosseous relates to the practice of drilling a 14- or 16-gauge steel needle into the core of the bone to administer IV medication and fluids.
2. Interosseous access is used during peri/cardiac arrest (Petitpas et al 2016).
3. Humeral head or the top of the tibia are recognised sites for this type of IV access (Petitpas et al 2016).
4. This is a competency based clinical skill.
5. Removal of interosseous should be undertaken within 24hrs of placement.

8. CHOOSING THE MOST APPROPRIATE VASCULAR ACCESS DEVICE

1. Any healthcare professional using a vascular access device should have undertaken the approved Trust IV training or be confirmed as an IV giver from another Trust.
2. It is the responsibility of the person administering the IV therapy to know that the device that is being used is suitable for the IV therapy being administered.
3. For peripheral vascular access the pH of the drug should be between 5-9 and the osmolality should be no higher than 600mOsm/L (NIVAS 2024, MEDUSA 2019).
4. A device with 2 lumens, ideally a PICC, should always be inserted for the administration of total parenteral nutrition and one lumen of this device must always be dedicated to the TPN and never used for other treatments (Comisso & Lucchini 2018). If the dedicated lumen is contaminated by other IV treatment it must be replaced before TPN can be re-commenced.
5. For detailed information about safe peripheral drug administration see the Trust guidelines on extravasation and the injectable medicines guide.

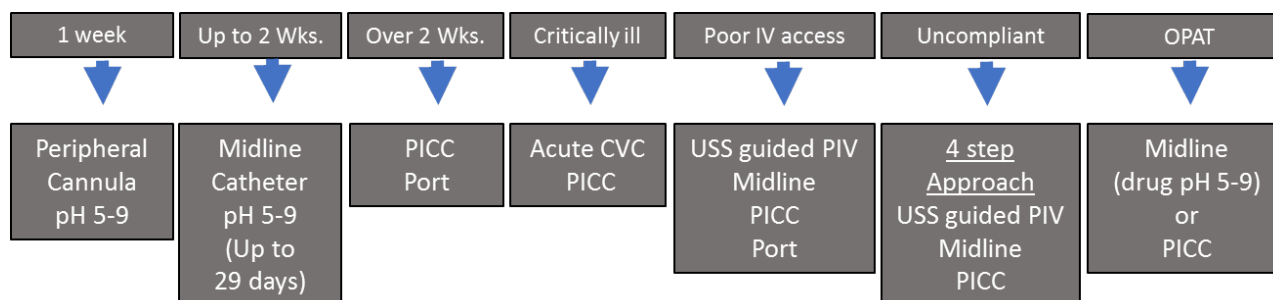
pH ranges

Stomach Acid	1.5 – 2.0	Glucagon pH: 2.5-3
Cola	2.5	Vancomycin pH 2.4 – 4.5
Vinegar	2.9	Gentamycin pH 3 – 5.5
Orange Juice	3.5	Glyceryl trinitrate pH: 3.5-6.5
Coffee	5.0	Metoclopramide pH: 3-5
Healthy Skin	5.0	Amiodarone pH: 3.5-4.5
Urine	6.0	Glucose 5% pH: 4-4.2
Pure Water	7.0	Chlorpheniramine pH: 4-5.2
Human Saliva	6.5 – 7.5	Potassium pH: 4
Blood	7.3-7.5	0.9% Saline solution pH: 7
Sea Water	7.7-8.5	Tazocin pH: 5-7
Baking Soda	8.4	Aminophylline pH: 8.8-10
Hand Soap	9.0-10.0	Frusemide pH: 8.7-9.3
Bleach	12.5	Acyclovir pH: 10-11
		Phenytoin pH: 12

It is safer to administer vesicant drugs into a central vein.

Non-vesicant drugs and solutions can be administered via a peripheral vascular access device sited in a peripheral vein.

9. CHOOSING THE CORRECT VASCULAR ACCESS DEVICE:



Vascular Access Referral Decision Making Tool

Vascular Access Device Decision (VADD) Tool							
Indwell time	96 hours plus	Up to 10 days	Up to 29 days	Up to 6 weeks	Over 18 months	Permanent	Difficult Vein Access
Vascular Access Device	Peripheral Intravenous cannula	Short Term Acute CVC (neck or groin)	Short Midline (6cm to 8cm)	Midline (15cm to 25cm)	PICC	Long-term Tunnelled CVC	Implanted PORT
Suitable Treatment Option	Peripheral	Central	Peripheral	Peripheral	Central	Central	Central
	Ph 5-9 ONLY	Vesicants Multi-lumen	Ph 5-9 ONLY	Ph 5-9 ONLY	Vesicants Multi-lumen	Vesicants Multi-lumen	Vesicants
	IV Infusion	Blood draw	Blood draw	OPAT	Blood draw	Blood draw	Blood draw
	IV Bolus	IV Bolus	IV Bolus	IV Infusion	IV Infusion	IV Infusion	IV Infusion
	Emergency	IV Infusion	IV Infusion	IV Bolus	IV Bolus	IV Bolus	IV Bolus
	High flow rates achievable	Emergency	Emergency	Blood products	High flow rates achievable	High flow rates achievable	Blood products
	Blood products	High flow rates achievable	High flow rates achievable	Osmolarity Under 600	Blood products	Blood products	Chemotherapy
	CT Contrast power injectable** (restrictions apply)	Blood products	Blood products		Chemotherapy	Chemotherapy	CT Contrast power injectable** (restrictions apply)
	Chemotherapy* (restrictions apply)	Chemotherapy	CT Contrast power injectable** (restrictions apply)		CT Contrast power injectable** (restrictions apply)	Osmolarity ≥ 600	Osmolarity ≥ 600
	Osmolarity Under 600	Osmolarity ≥ 600	OPAT Osmolarity Under 600		Osmolarity ≥ 600		
							More than 2 attempts by 2 competent staff: USE VEIN LOCATION TECHNOLOGY Ultrasound Veins below 3mm Infrared Veins up to 7mm Vein stimulation: Apply heat to vasodilate vein. Consider local/topical anaesthetic

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* For chemotherapy administration the peripheral cannula should be a 24g or 22g cannula sited in the biggest vein in the forearm or back of the hand with points of flexion avoided. (follow local guidelines)

** ENSURE CATHETER IS POWER INJECTABLE: For power injection specifications follow each individual manufacturers specifications and recommendations for device. (follow local guidelines)

10. PARENTERAL NUTRITION

The Trust [Parenteral Nutrition \(Adult\)](#) guidelines MUST be followed; the information below has been taken from those guidelines as an addition to this document.

Patients requiring intravenous parenteral nutrition should have this administered via a dedicated port of a central venous device, preferable a PICC or tunnelled cuffed catheter such as a Hickman line, the dedicated port should be highlighted with a TPN needle free connector. If a TPN IV giving set is disconnected from the needle free connector before the infusion has finished it is forbidden to reconnect the same giving set back to the needle free connector and continue the infusion due to the high risk of catheter related blood stream infection. In this case the infusion should be discarded, and a new one set up.

If the dedicated vascular access device lumen is used for anything other than TPN or is used without ANTT, the whole device must be replaced before subsequent usage for TPN, this is to reduce the risk of catheter related blood stream infection.

Blood samples should be taken from the non-dedicated lumen of the vascular access device if TPN is being given. The TPN should be stopped for 10min before the blood draw and 2mls of the first blood draw should be discarded. Where possible blood sampling should be taken when the TPN has finished before the next bag is administered.

A protective antimicrobial locking solution that also prevents biofilm and thrombosis intraluminally should be considered to lock all TPN catheter lumens when not in use for a minimum of 6-12hours. EDTA 4%.

Parenteral nutrition should only be administered on authorised clinical wards and areas, these are detailed in the Trust Parenteral Nutrition guidelines.

Definitions of Parenteral Nutrition (PN)

TOTAL PARENTERAL NUTRITION (TPN): the patient's complete nutritional needs are provided by the PN (all macro and micronutrients) and nutrition is not given by any other route than intravenously.

SUPPLEMENTAL PARENTERAL NUTRITION (SPN): nutrition is provided in addition to PN by any other route other than intravenously. For example, this situation may arise when the oral or enteral tube routes cannot independently achieve the nutritional care plan target.

HOME PARENTERAL NUTRITION (HPN): PN used outside of the hospital. Patients admitted to Frimley Park Hospital who require HPN are referred to a tertiary centre (e.g., Royal Berkshire Hospital).

11. VASCULAR ACCESS TEAM REFERRAL CONTACTS

For up to date contact information, visit the team's page on ourplace [IVAS - intravenous and vascular access services](#)

12. REFERRAL PATHWAYS

The vascular access team is based within the IVAS unit on both acute sites, the team operates 7 days a week 8am until 8pm.

Patients who require vascular access above and beyond a peripheral cannula can be referred to the vascular access team for assessment and device insertion.

A patient can be referred to the vascular access team by the following means:

Telephone referral [IVAS - intravenous and vascular access services](#)

Bleep referral [IVAS - intravenous and vascular access services](#)

EPIC referral by completing an inpatient consultation to vascular access, for outpatient EPIC referral complete a day05 procedural request for every device you require including implanted PORTS and PICCs. If a day05 request is made an inbasket message is also required to alert the team – this is sent to - P FPH vascular access team / P WPH Vascular access team.

IV drug users will only be considered for limited central vascular access, i.e., a neck CVC line or peripheral cannulation with ultrasound. IV drug users will not be considered for a PICC because of the risk of catheter misuse. This policy is in line with the patient safety and RISK office. The final decision to insert a PICC or CVC into an active IV drug user will be made on the balance of risk and via the patient safety manager and/or Director of Nursing.

The vascular access team will consider inserting IV devices into all other categories of patient, including paediatrics.

13. SEEKING ADVICE

You can refer to the vascular access team to manage any complications.

- To request a short term acute non-tunnelled central venous catheter, if competent members of the vascular access team are not available, the referring clinical team will need to liaise with the on-call anaesthetist and refer the patient to the emergency case theatre list for that day.
- Interventional Radiology can be approached for PICC, Tunnelled and PORT insertion if the vascular access team are unavailable.
- For PORT insertion with a GA the vascular surgeons should be consulted, and a referral made by the clinical team to them.
- For removal of long-term vascular access devices such as PORTS and cuffed tunnelled catheters a referral to the vascular access team should be made. For urgent removals where the vascular access team is not available, the referring clinical team will need to liaise with the on-call anaesthetist and refer the patient to the emergency case theatre list for that day.

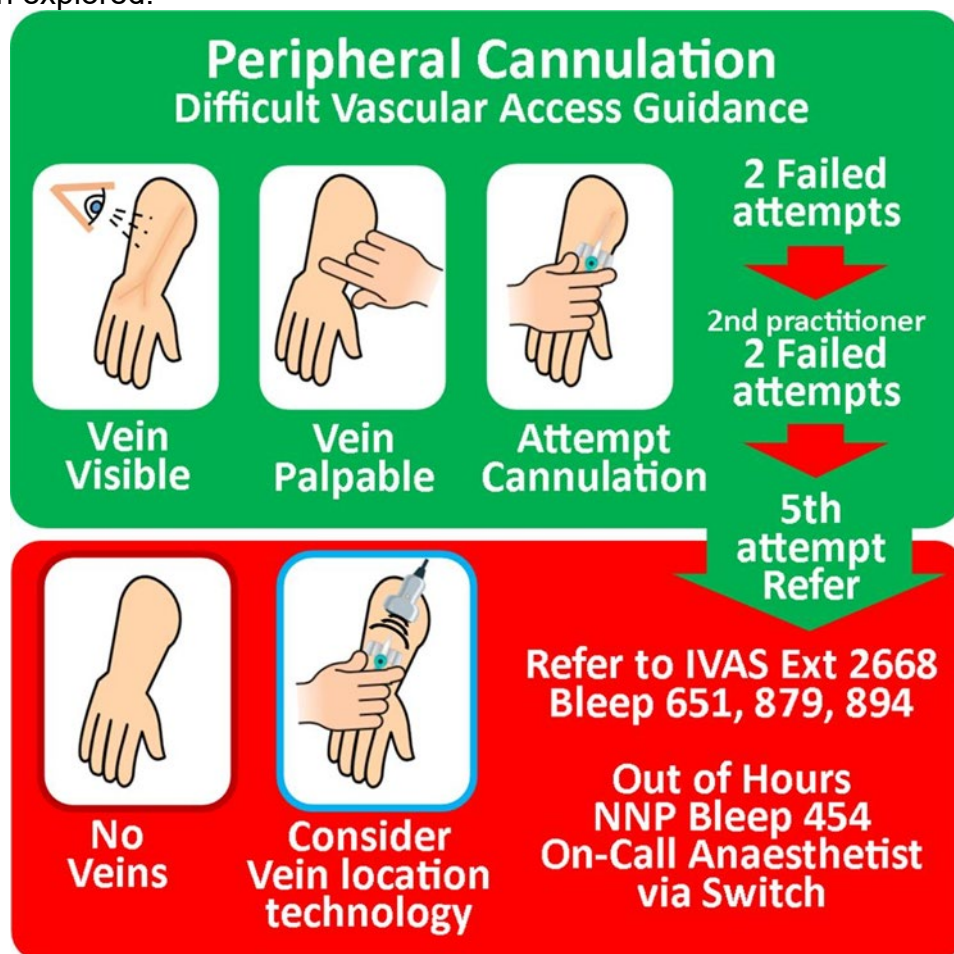
14. FAILED ATTEMPTS AT CANNULATION

Multiple failed attempts at gaining vascular access can be painful to the patient and damage veins. To minimise this, guidance is available which states that the first practitioner should have no more than 2 attempts at a venous stab. If they fail, a second practitioner, who is either more experienced in vascular access or a specialist, can have a further 2 attempts. If this then fails, the patient should be referred to the vascular access team for technology guided access. If out of hours, the on-call anaesthetists should be contacted to make further attempts.

More than 4 attempts to gain peripheral access in one episode is a red flag that the patient needs specialist vascular access involvement.

In these situations, a referral should be made for difficult IV access patients as early as possible to the vascular access team, who will recommend and insert the most appropriate device for the patient and their treatment.

- Using technology to place vascular access devices is gold standard, including topical aesthetic creams and Cryogestic spray.
- Ensure that IV access is required and all other routes of drug administration have been explored.



15. THE UNCOMPLIANT PATIENT

Patients may be unwilling to agree to vascular access for a number of reasons. In every situation the patient **MUST** give consent to undergo vascular access insertion, verbal, implied or written. The following patient groups may need special care when attempting vascular access insertion in the form of a four-stage approach (Barton 2017).

- Paediatrics
- Learning Disabilities
- Dementia and Delirium
- IV drug users
- Needle phobia

The four-stage approach is designed to meet the physical and emotional needs of the patient. The four stages are outlined below:



Topical local anaesthesia

- AMETOP 4% - Tetracaine 4%
- EMLA 5% - Lidocaine 2.5% w/w, Prilocaine 2.5% w/w

Check the patient is not allergic to the products. For these topical creams to be effective, the cream should be liberally applied to the skin over the vessel and a film dressing used to cover the area. This should be left for a minimum of 45 mins for the local anaesthetic to take effect (Pich 2018). It is not unusual for the skin to look red after the cream has been wiped off prior to cannulation (Pich 2018)

Ethyl Chloride spray

Also known as cold spray or Cryogesic spray, it is a topical anaesthetic sprayed over the desired area for cannulation about 20cm away from the skin. Apply a continuous spray for approximately 5 seconds until a frost film appears on the skin. Children tolerate cryogesic spray better if a gauze swab or sterile sponge is saturated with the ethyl chloride spray for 10 seconds and this is applied to the skin for at least 10 seconds. Cannulation should be undertaken within 10 seconds of the spray being applied for the patient to gain maximum benefit from the anaesthetic effect. It is not unusual for the skin to become red after using this product (Shah et al 2018).

Lidocaine 1% injection

Lidocaine 1% subcutaneous injection in nursing practice is only used in vascular access by the vascular access team and is not standard practice for peripheral cannulation.

Patient Distraction

Using distraction techniques enables the patient to become preoccupied with other activities while the cannulation process is being undertaken. Examples of this could be using a tablet to play games or watch a film, listening to music, receiving complementary therapy or practicing breathing techniques. When placing devices in children, a play therapist can be used with good success in distraction techniques (Barton 2017).

Positioning for comfort

To be as successful as possible when inserting vascular access devices, it's very important that the patient and operator are comfortable. Having the patient sitting or lying, depending on their preference, with their arm resting on a soft surface like a pillow will put them at ease. The person inserting the device should be seated at the chair or bed side or, if standing, the bed should be raised to waist height. If the patient and operator are in comfortable positions the procedure is more likely to be successful (Barton 2017).

Stooping over a seated patient while performing peripheral cannulation increases the risk of back injury and failure to place the device first time.

16. VEIN LOCATION TECHNOLOGY

Vein location technology is an essential asset to the vascular access team, its use should be considered with all non-visible, difficult to palpate vessels (Van Loon, et al 2018). Technology should always be used to place central vascular access devices and for difficult peripheral IV access.

Ultrasound

- This is the standard for all central vein and PICC vascular access device insertions.
- Ultrasound should also be used for difficult peripheral cannulation and venepuncture.
- To visualise vessels with ultrasound, there needs to be a minimum of 2 mm of tissue between the probe and the vessel.
- In or out of plane technique can be used.
- The probe must be covered with a sterile shield when using ultrasound in vascular access.

Infrared

Infrared technology is used to locate peripheral veins. The technology uses infrared lights to penetrate the skin around the vessel. The haemoglobin absorbs the infrared light, and the image of the vessels is projected back onto the skin. This limits infrared for use on superficial areas of the body such as hands and wrists. Infrared cannot be used to visualise vessels under tattoos or through excessively hair areas of skin.

VeinViewer is the device used at Frimley Health. It projects a green image of the vessels onto the skin using infrared and is used in ED (Frimley site).

17. USING TECHNOLOGY IN CLINICAL PRACTICE

1. Using vein location technology is a proactive way to improve vessel health and patient satisfaction (Van Loon 2018). The operator does not usually need to be competency assessed because there is no additional risk of using them for cannulation or venepuncture. Following initial training and practice on phantoms, the practitioner can use these devices in clinical practice as long as they are competent to undertake venepuncture or cannulation.
2. These devices can be used for arterial puncture, which requires an additional competency; and for central device insertion, which is limited to the IVAS team and certain clinicians.
3. When using these devices, infection control measures must be taken to ensure ANTT is maintained. Devices **MUST** be decontaminated as per manufacturing guidelines after each patient contact.
4. The skin should be decontaminated with 2%chlorhexadine and 70% alcohol (Chloraprep) prior to the use of ultrasound, and a sterile probe cover and sterile ultrasound gel used even for the vessel assessment prior to cannulation to prevent infection.

18. INFECTION PREVENTION AND CONTROL

Prevention of Catheter related blood stream infections

1. Peripheral cannula must not indwell beyond 96 hours after insertion with phlebitis score of 0.
2. Visual phlebitis of 1 or more should initiate the removal of the device without delay.
3. Short-term Acute CVC should not indwell for more than 14 days and be removed as early as possible or if signs of infection present.
4. The IPC team should be informed if a patient has a short-term acute CVC inserted; if the patient is not in critical care they should be referred to the vascular access team to replace the catheter with a lower risk device.
5. All vascular access devices in situ should have the least number of lumens required for the patient's treatment. The fewer lumens present the lower the risk of complications.
6. The cannulation site should be cleaned for 30 seconds with a 1.5ml Chloraprep (Chlorhexidine 2% in 70% alcohol) and allow drying. If patient has history of sensitivity to

Chlorhexidine, alcoholic single-use povidone-iodine applicators should be used. (Nickel et al 2024)

7. The insertion site will be regularly inspected for signs of infection/phlebitis (e.g., redness, swelling, exudate, palpable cord) and cannula removed immediately if infection is suspected, or the phlebitis score is 1.
8. Observation and documentation of the insertion site must be undertaken 6 hourly or 3 times per day, usually during the patient's drug round and prior to administration of any fluid or medication. This should be documented on the peripheral cannula avatar on EPIC with the cannula pathway completed in full (adult or child). There should be no pain redness or swelling during use; redness pain and swelling would indicate an adverse complication and the cannula should be removed and this should be documented and escalated to the clinical team.
9. A sterile, transparent, dedicated, semi permeable occlusive dressing should be used to secure the device. Dressings must be changed immediately if they are loose, dirty or have fluid collecting under them (Nickel et al 2024).
10. The vascular access device should be removed as soon as it is no longer required or if signs of phlebitis are present. (Nickel et al 2024)
11. Injection sites, bungs and needle free connections should be thoroughly disinfected with 2% Chlorhexidine in 70% alcohol (e.g. Clinell wipe) and allowed to dry before use, manipulation, or disconnection (Nickel et al 2024).
12. A closed system from infusion bag to cannula tip should always be maintained, to prevent micro-organisms from entering the system.
13. There should be as few connections, as possible. The dead space in these pieces of equipment has been shown to be a reservoir for micro-organisms which can be released into the blood stream (Hadaway et al 2016).
14. An aseptic non-touch technique should be employed when changing infusion bags or bottles and these changes should be completed as quickly as possible (Rowley & Clare 2019). (Nickel et al 2024)
15. Medicines for IV administration must not be made up ahead of time in clinical areas (NMC 2018).
16. Documentation of care of cannula sites is a nursing responsibility (NMC 2018).
IV equipment marked  (single patient use) must be disposed of immediately after use and not reused (Nickel et al 2024).
17. If a bag of IV fluid has sterile outer wrapper opened It should be used without delay – or discarded if not used.
18. Peripheral Cannulation sites should be contained to the hands and lower arms below the ACF; feet are not acceptable cannulation sites and must be avoided.
19. Blood samples can be taken from a newly inserted peripheral cannula directly after insertion only; blood sampling from established peripheral cannula is not permitted.
20. Blood cultures must be obtained by a fresh venous stab and not through a peripheral cannula.
21. Following removal of peripheral and central vascular access devices, pressure should be applied over the puncture site for at least 2 mins and a sterile waterproof dressing should be applied to keep the puncture site free from infection.

19. ASEPTIC NON-TOUCH TECHNIQUE (ANTT®)

The Aseptic Non-Touch Technique (ANTT®) is the standard intravenous technique used for the accessing of all venous access devices (VADs) regardless of whether they are peripherally or centrally inserted (Rowley & Clare 2019), Loveday et al 2014) and is the de facto standard aseptic technique in the UK (Rowley and Clare 2019).

Poor standards of aseptic technique are a fundamental cause of healthcare acquired infections. The focus of ANTT® is to minimize the introduction of micro-organisms, which may occur during preparation, administration, and delivery of IV therapy. To further reduce the potential for contamination, the technique follows some fundamental rules pertaining to infection control and staff/patient protection such as effective hand washing, the wearing of non-sterile gloves, the principles of key parts/sites and the use of alcohol-based solutions for decontamination with adequate cleaning and natural evaporation of the alcohol.

- During the training and competency stage of peripheral cannulation, it is usual that the candidate will need to re-palpate the vessel prior to inserting the needle but after the skin has been cleaned with Chloraprep. In this situation sterile gloves must be worn to avoid contamination of the puncture site. Over time, total ANTT must be achieved and re-palpation of the vessel after skin cleaning must be avoided, and clean gloves worn.



20. VASCULAR ACCESS DEVICE INSERTION SKIN PREPARATION

CANNULATION & CULTURES

Chloraprep 1.5ml applicator
Cannulation and blood culture skin preparation

BUNGS AND HUBS

Clinell Wipe for Cleaning Bungs and Hubs Only.

Wipes for the disinfection of access ports, hubs and connectors associated with venous and arterial catheters, peripheral cannulas, and blood culture bottle caps.

VENEPUNCTURE



PDI Alcohol 70% wipe for Venepuncture skin preparation

CVC & LINE CARE

Chloraprep 3ml applicator
for CVC insertion and after care.

	PDI Wipe alcohol based
VJT120	Clinell Wipe alcohol based 190 x 105mm 70% alcohol and 2% chlorhexidine wipe
MRB303	Chloraprep 1.5ml Skin antiseptic (LICENSED MEDICINES) 2% chlorhexidine gluconate in 70% ipa
MRB306	Chloraprep 3ml Skin antiseptic (LICENSED MEDICINES) 2% chlorhexidine gluconate in 70% ipa

21. SUSPECTED INFECTION IN PERIPHERAL CANNULA

Peripheral cannulas can be left in situ for up to 96 hours with a VIP score of 0. If a VIP score of 1 is noticed the cannula **MUST** be removed immediately. VIP means visual infusion phlebitis and the signs and symptoms include the following (Sengupta 2019):

1. Pain on flushing
2. Pain around cannula site
3. Tracking of the vein
4. Redness around insertion site
5. Discharge from cannulation site
6. Redness (Erythema/Phlebitis) around cannula site
7. Swelling around cannula site or limb

If a cannula site infection is suspected the following action should be taken:

8. Remove the cannula immediately
9. Swab site and send to laboratory for culture (M, C & S). Please indicate on the microbiology request form the body site the cannula was *in situ*.
10. Send the catheter tip for laboratory culture. Use sterile scissors to cut approx. 2.5cm of the tip and place in a sterile universal container. Please indicate the body site where the cannula was *in situ*.
11. Blood cultures may be taken if the patient is febrile, these should be taken from the opposite arm to the cannula site infection (see [IPC09 – Guidelines for taking blood cultures](#) in the Infection prevention and control guidelines).
12. Document your actions.
13. Systemic antibiotics and pain relief medication may be indicated.

22. CENTRAL VENOUS ACCESS INFECTIONS

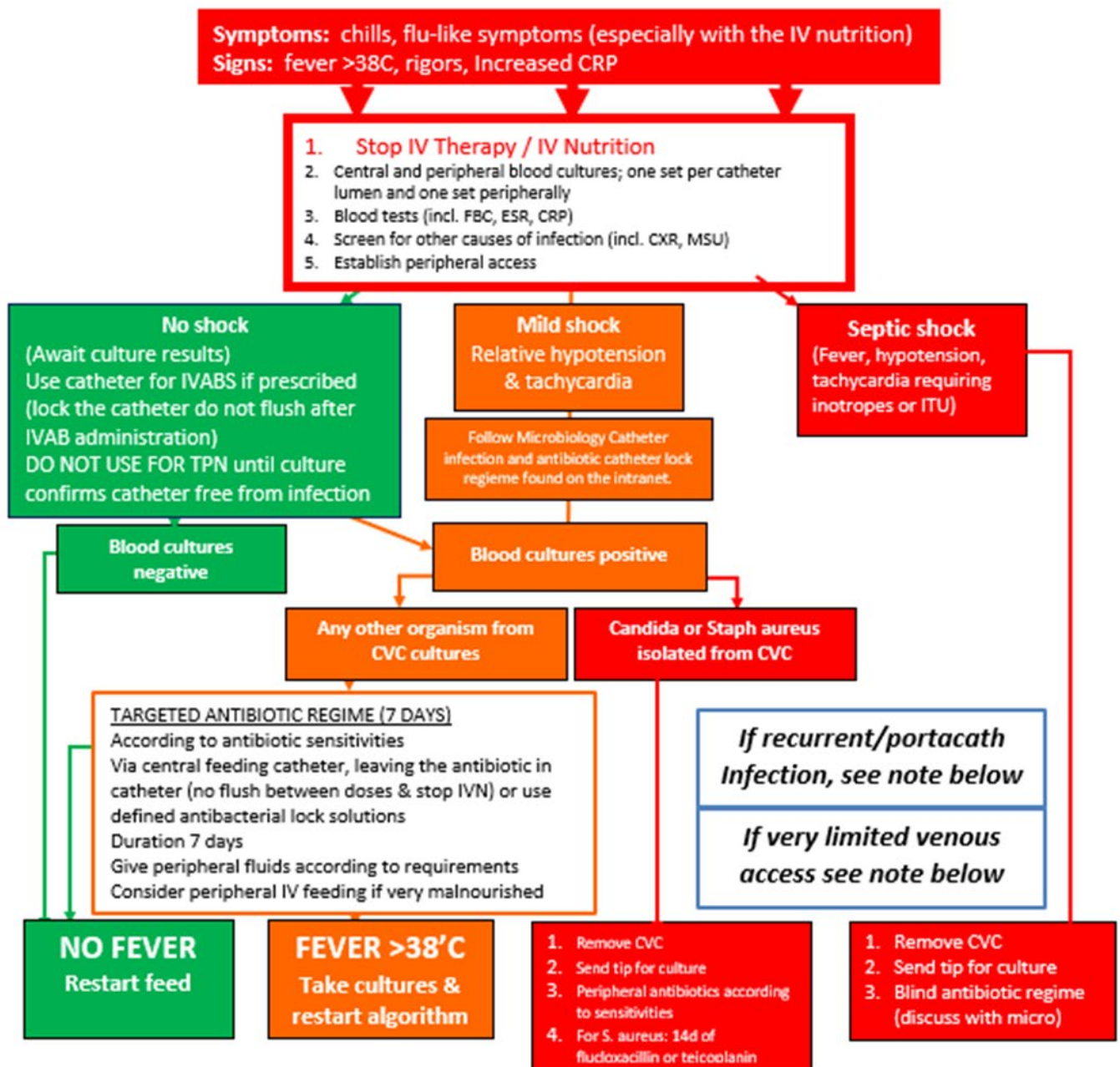
Central catheter related blood stream infection is caused by:

1. Micro-organisms from skin adjacent to catheter site that contaminate the catheter during insertion or care.
2. Micro-organisms from the hands of health care workers that contaminate the hub during care.
3. Haematogenous seeding.

If a CVC site infection is suspected the following action should be taken.

4. Discuss with Microbiology.
5. For short term acute CVCs, remove the device without delay. For PICC or tunnelled catheters a silver impregnated dressing can be used to cover the exit site, this may treat the exit site infection alongside oral antibiotics if appropriate. Review in 3 days' time and follow the algorithm for exit site infection (Part 12 of these guidelines).
6. Swab site and send to laboratory for culture (M, C & S) and, if removing the device, send the catheter tip for laboratory culture. Use sterile scissors to cut approx. 2.5cm of the tip and place in a sterile universal container. Please indicate the body site where the CVC was *in situ*.
7. Blood cultures may be taken if patient is febrile, these should be taken from each lumen of the CVC and a separate peripheral set taken and document actions.
8. Systemic antibiotics and pain relief medication may be indicated.

23. CATHETER RELATED SEPSIS ALGORITHM



PLEASE SEEK ADVICE FROM THE VASCULAR ACCESS TEAM AND MICROBIOLOGY. IF THE DEVICE IS REMOVED BECAUSE OF A SUSPECTED CATHETER INFECTION, A NEW CENTRAL ACCESS DEVICE CANNOT BE REPLACED FOR 5 DAYS WHEN ALL CULTURES ARE CLEAR.

- Patients with very limited venous access; patients with a CVC in their only remaining central vein, direct IVC Salvage treatment for a CVC infection may be considered for line salvage.
- Please discuss with microbiology and the vascular access and nutrition team.
- PortAcath infections: the treatment protocol is the same although consider treatment with antibiotics for 10-14 days.

24. CENTRAL VENOUS ACCESS INSERTION, CARE AND MAINTENANCE

1. Vascular Access LocSSIP must be adhered to when inserting all mid to central CVCs.
2. All CVCs should be inserted in designated clean areas, such as the operating theatre, IVAS, Interventional Radiology, etc., unless clinical situations dictate otherwise. PICC's can be inserted at the patient's bedside if compliant to LocSSIP.
3. Strict adherence to hand hygiene with optimal aseptic non-touch technique using sterile gowns, gloves and large sterile drapes is the minimal acceptable practice.
4. If not already visibly clean, the skin site should be cleaned with soap and water.
5. Decontaminate the insertion site with Chlorhexidine 2% in 70% alcohol (Chloraprep®) 3mls applicator as a minimum and allow drying. If patient has a history of sensitivity to Chlorhexidine, alcoholic single-use povidone-iodine applicators should be used. Do not use antimicrobial ointment on site prior to insertion.
6. Effective skin preparation will remove bacteria from both hair and skin, avoiding the need for shaving, which can result in microscopic damage and thus microbial colonisation. If hair removal is considered necessary, clipping with sterile surgical clippers is the preferred option.
7. Multiple lumens should be avoided unless they are essential for management of the patient as multiple lumen catheters are associated with a higher risk of related infection (Andersen 2019).
8. If TPN is administered, use 1 lumen exclusively for that purpose (Hadaway et al 2016, Local PN guidelines).
9. Peripherally inserted catheters must be considered if the treatment regime is suitable; however, PICCs should not be considered in hyper acute patients who require large volumes of fluids and drugs and high flow rates.
10. It is not recommended to routinely administer systemic antimicrobials before insertion or during the use of CVCs to prevent bloodstream infection (Hoey et al 2018, Choksi et al 2019, Nezami et al 2019). (Nickel et al 2024)
11. Short-term acute CVC should be firmly anchored to prevent movement, and covered with a semipermeable, film dressing in order to prevent micro-organisms from the skin migrating into the exit site of the catheter (Nickel et al 2024).
12. Where possible, avoid suturing the CVC line in situ and use a sterile adhesive fixation device. Care should be taken to assess the patient's sensitivity to adhesive dressings in general; if the patient is allergic to adhesive dressings, a fixation device may not be indicated, and suturing may be required (Spencer & DipAppSc B 2018, (Nickel et al 2024).
13. To facilitate patient care and audit, the procedure must be documented in the nursing and medical records, stating the name of the person inserting the CVC, the date of the insertion, site, catheter size, and reason for insertion space - this information will be requested on the audit form.

25. PROCEDURAL SEDATION & ANALGESIA

(Referenced from the Trust guidance for [Procedural sedation and analgesia](#))

The use of "**procedural sedation and analgesia**" (**PSA**) has limited uses in the nurse led vascular access service and only available to adult patients who are undergoing the placement of Tunnelled, Cuffed Central Venous Catheters (TCCVCs) and Totally Implanted Intravenous Ports (TIIPs).

- Patients should be nil by mouth 6hrs before the sedation and procedure.
- Only Minimal to Moderate sedation will be used by the Vascular Access team up to a total dose of 5mg midazolam IV.
- **Minimal Sedation** – The patient responds normally to verbal commands. Cognitive function and coordination may be impaired, but ventilatory and cardiovascular functions are unaffected.
- **Moderate Sedation and Analgesia** – The patient responds purposefully to verbal commands alone or when accompanied by light touch. Protective airway reflexes and adequate ventilation are maintained without intervention. Cardiovascular function remains stable.
- Sedation exists on a continuum, and it is difficult to divide it into discrete clinical stages, the definitions above notwithstanding. Moreover, many sedatives can cause rapid changes in the depth of sedation. Dissociative sedation stands apart from the continuum of sedation due to its unique characteristics.
- The use of PSA should only be offered for a vascular access patient where the patient is undergoing the procedure in interventional radiology.
- Up to 5mg Midazolam IV will be offered for sedation for vascular access. Any further sedation must be arranged with the aesthetic department and administered by an anaesthetist.
- As a rule, single drugs are less likely to result in inadvertent over-sedation. The combination of an opioid and benzodiazepine results in pronounced synergism and, with it, an increased risk of over-sedation.
- The vascular access team will be responsible for the administration, care and monitoring of the patient with the support of interventional radiology.
- When PSA is used for a vascular access procedure the follow member of the team must be present.
 - **Operator:** Practitioner responsible to carrying out the procedure who is usually the advanced practitioner/IVAS lead nurse.
 - **Sedationist:** Responsible for the administration of the sedation and monitoring of the patient until recovery – this will be the clinical nurse specialist for vascular access/IVAS/OPAT who is trained in administering sedation in line with the interventional radiology LocSSIP and competent in intermediate life support.
- Loss of verbal contact with a patient requires the same level of care as that needed for general anaesthesia. In the UK, this means that the patient should be cared for by an anaesthetist or physician's assistant (anaesthesia). In the event of a vascular access patient being inadvertently over-sedated, an emergency call must be used to summon anaesthetic help at once. This can be achieved by dialling 2222 and asking for a NEWS call to the patient location.

- Midazolam over-sedation or unplanned airway intervention should be reported and investigated, to ensure that processes are introduced to prevent recurrence.
- Contraindications - Recognised contraindications are:
 - Patient refusal
 - Patient inability to comprehend technique (e.g., cognitive impairment, language barrier)
 - Extremes of age – the dosage and lockout time may require adjustment in the elderly.

Special considerations - Use with caution in patients who have:

- Respiratory problems (severe COPD)
 - Confused or patients with mental health problems
 - Drug sensitivities
 - Severe cardiac problems
 - Renal failure, renal and biliary colic
-
- All patients undergoing sedation should be pre-assessed by an appropriately trained healthcare professional, prior to their procedure. Ideally, this should be in pre-admission clinic, so that medical problems can be identified and, if possible, resolved before admission for the procedure.
 - Following sedation, patients must be recovered in a 'post-anaesthesia care unit' staffed by healthcare professionals specially trained and competent in recovery procedures.
 - Patients meeting discharge criteria following sedation who are to be discharged home should be discharged into the care of a responsible third party. Verbal and written instructions for post-procedural care should be given if a procedure has been performed.
 - Facilities for monitoring, ventilation of patients' lungs and resuscitation, including defibrillation, must be available at all sites where patients are sedated.
 - Regular communication with the patient allows monitoring of the level of sedation. Additionally, facilities for monitoring must be available at all sites where patients receive sedation. For patients receiving conscious sedation, this must include pulse oximetry. Clinical and instrumental monitoring to a degree relevant to the patient's medical status and the sedation method must be used.
 - Monitoring of electrocardiography (ECG) may not be necessary in young healthy patients but is essential in older patients.
 - Oxygen should be given to sedated patients. Low-flow oxygen via nasal cannulae is less likely to mask significant under-ventilation.
 - A contemporary record of drugs administered during sedation, with times and doses, together with vital signs, must be recorded and stored in the patient notes whenever patients receive sedation.
 - Procedure rooms must be large enough to accommodate equipment and personnel, with enough space to move about safely and to always enable easy access to the patient.
 - The procedure room should be easily accessible to the resuscitation team and large enough to accommodate them and appropriate equipment if required. It should also be possible to arrange transfer of a patient from the procedure room to other areas within the institution if necessary.

- All clinical incidents where sedation is a factor should be reported.
- Midazolam over-sedation and failure to monitor oxygen saturation during sedation are both defined as 'never events' by the Department of Health. Reporting these incidents to the National Reporting and Learning System is mandatory.

26. GENERAL CARE AND MAINTENANCE OF ALL VASCULAR ACCESS DEVICES

1. The relevant care bundle should be completed every 6 hours, usually during the drug round.
2. Apart from peripheral cannula, all device dressings, fixation devices and needle free connectors should be replaced every 7 days, or earlier if visibly soiled or malfunctioning.
3. ANTT must be used when handling and access all vascular access devices (Rowley & Clare 2019).
4. It is vital to maintain a closed system at all times (Ghosh & Valia 2018).
5. Prior to accessing, disinfect external surfaces of catheter hub and connection ports with 2% Chlorhexidine in alcohol (e.g., Clinell wipe) unless contraindicated by manufacturer's instructions (Breimer et al 2018, Hallam 2019).
6. Insertion, manipulation and removal of lines will be undertaken by competent practitioner, using a strict aseptic technique.
7. All other lumens should be valved or clamped to avoid the risk of air embolism and other complications.

27. NEEDLE FREE CONNECTORS

1. Needle free connectors should be installed on each lumen of the device and used when accessing the lumen.
2. A passive or positive pressure needle free connector should be applied to each lumen.
3. The needle free connector should be compatible with emergency drug devices including the prefilled glass type of emergency drugs.
4. Red needle free connectors are used to identify arterial catheters and should not be used on venous catheters.

28. FILM DRESSING

1. The vascular access device should be covered by a single, sterile, transparent, dedicated, semi permeable occlusive dressing – Tegaderm advanced or a large IV 300 dressing.
2. Dressing should be changed every 7 days or earlier if soiled or failing to adhere.
3. Soiled, damp or loose dressings should be replaced immediately using a sterile replacement using ANTT (Rowley 2018) to replace it.
4. If gauze is used to cover catheter exit site (e.g., due to bleeding) this must be replaced within 24hrs when dressing becomes soiled, damp, loose or when inspection of insertion site is necessary.
5. Chlorhexidine impregnated gel CVC dressings are used by the vascular access team for specific clinical reasons.

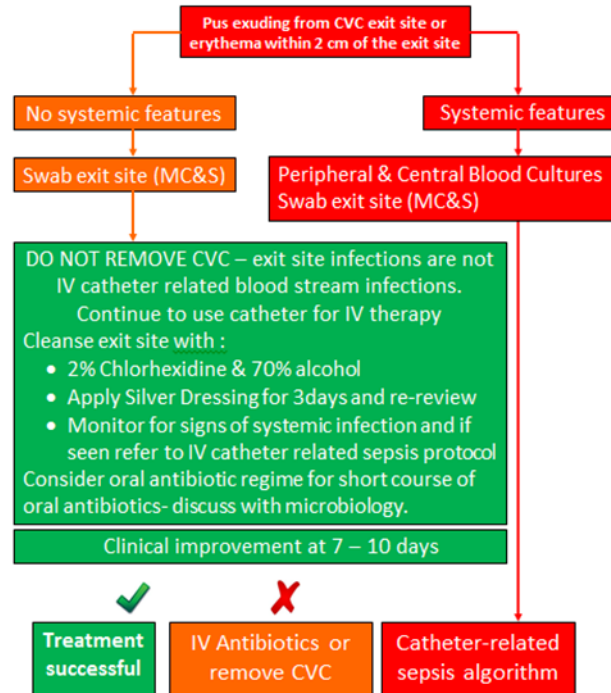
6. For exit site bleeding following insertion a haemostatic dressing or tissue adhesive can be used and left in place for 7 days.
7. The technique of using two transparent film dressings to make a 'sandwich dressing' is **not** permitted in the organisation as this technique of dressing is associated with a high instance of exit site infection.
8. Occasionally a skin reaction can occur to the adhesive of the dressing or fixation device, this is usually aggravated by applying the dressing over skin which has been cleaned with Chlorhexidine which has not been allowed to dry. Ensure the skin is completely dry after clearing with the Chlorhexidine.
9. If a dressing reaction occurs (MARSI); redness, blistering and excoriated skin may be noticed under the dressing field. The patient may also react to the adhesive of the fixation device. If a reaction occurs remove the dressing and clean skin with sterile saline. Allow to dry and cover with a low adhesive film dressing such as C-View. If the fixation device has caused the issue, then place a small C-View film dressing under the fixation device onto the skin.
10. Document the reaction and inform the clinical team.
11. A sterile single use liquid film barrier dressing can be applied to the skin, a single use applicator must be used. Do not apply barrier cream as the dressing will not adhere to the skin.
12. If the reaction continues the device can be covered with a simple silicone occlusive dressing such as a Mepilex border.
13. If a silicone occlusive dressing is used to cover an inpatients CVCs, it must be replaced daily to observe the insertion site of the CVCs.
14. Outpatients who have an occlusive dressing covering their CVCs can have this changed weekly as they won't be having daily care and maintenance.

29. CVC REPLACEMENT

1. If catheter-related infection is suspected, discuss with the vascular access team and Microbiology.
2. If the catheter is a short-term acute CVC, it can be removed immediately.
3. If the catheter is a long-term CVC it may need to be salvaged, and a line lock may be appropriate. This should be discussed with the vascular access team.
4. If the catheter is removed, send the catheter tip for laboratory culture.
5. A new CVC of any form must NOT be reinserted until all cultures are returned negative. If CVC access is essential this must be discussed with the microbiology team and the IVAS lead, who can advise the best course of action.
6. Usually, a new CVC will not be inserted for at least 5 days. Short-term Acute CVC used in critical care may replace sooner depending on the clinical condition and need of the patient.
7. A PICC will not be inserted directly after a CVC is removed if there is suspicion or confirmation of a catheter related blood stream infection.
8. If new tests reveal catheter related infection after the catheter has been inserted, the newly inserted catheter must be removed.

30. LONG TERM CVC CATHETER EXIT SITE INFECTION

(Short term acute CVC should be removed if exit site infection suspected).



31. MANAGEMENT OF UPPER LIMB DEEP VEIN THROMBOSIS



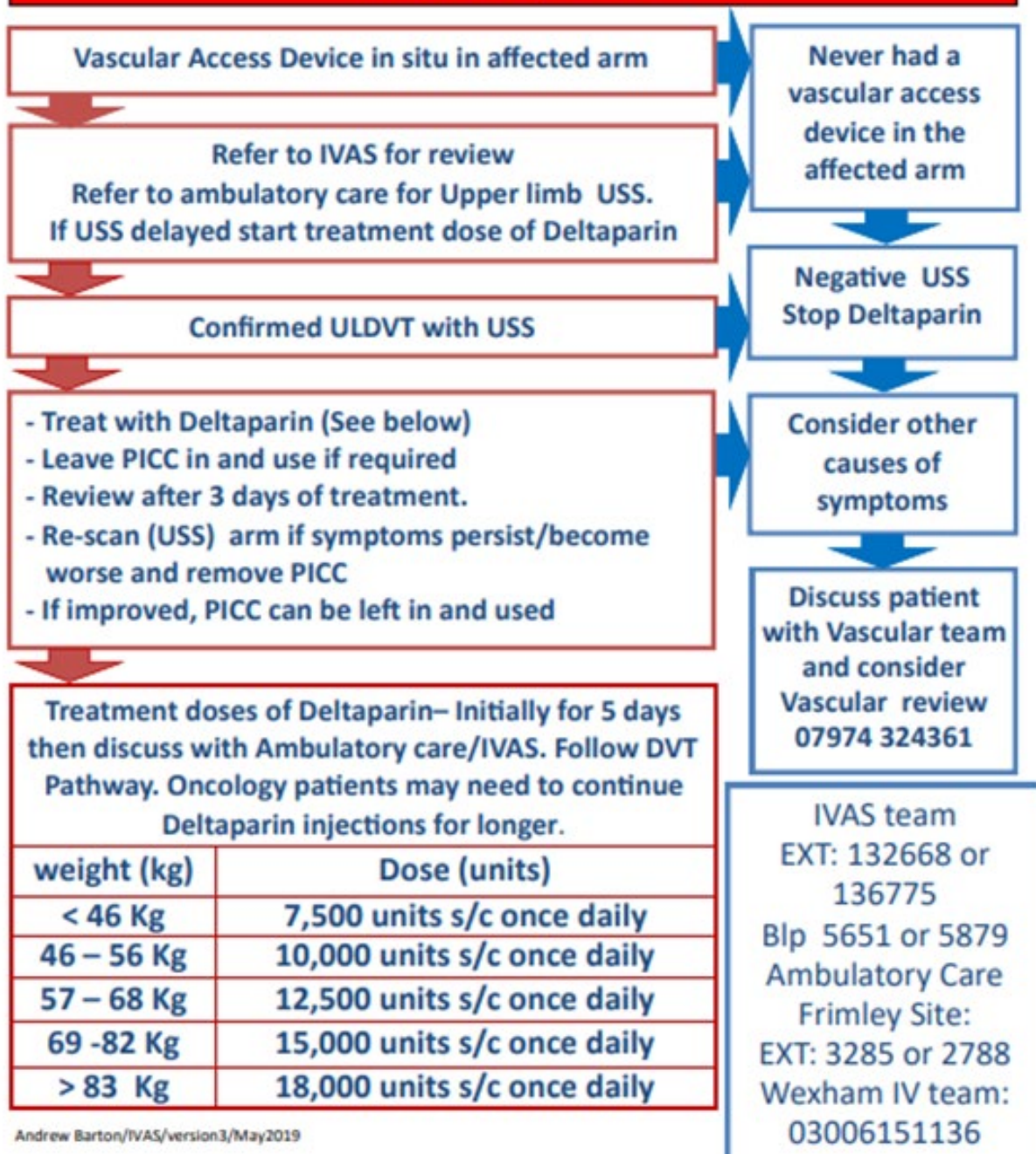
Frimley Health
NHS Foundation Trust

Management for Upper Limb Deep Vein Thrombosis (ULDVT)

Clinical signs of ULDVT

- Pain in chest, shoulder or interscapula area
- Swelling of arm or neck/face on the vascular access side
- Skin discoloration, redness, pain in the vascular access arm

If SVC Occlusion is suspected please follow the Management of thrombosis protocol



Andrew Barton/IVAS/version3/May2019

32. PATIENT GROUP DIRECTION FOR THE ADMINISTRATION OF LIDOCAINE INJECTION BY SPECIALIST NURSES INSERTING VASCULAR ACCESS DEVICES

The latest version of PGD TW X020 (Lidocaine for use in vascular access) is available in the PGD collection, in the General nursing folder

<https://ourplace.xfph-tr.nhs.uk/patient-care/clinical-department-information-and-advice/pharmacy/patient-group-directions-pgds/>

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This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt, contact a senior colleague or expert. Caution is advised when using guidelines after the review date.

This guideline is for use in Frimley Health Trust hospitals only. Any use outside this location will not be supported by the Trust and will be at the risk of the individual using it.

Version History

Version	Date	Guideline Lead(s)	Status	Comment
1	03/04/17	Advanced Nurse Practitioner Vascular Access	Final	
2	05.11.2019	Advanced Nurse Practitioner Vascular Access	Final	Ratified at NMB
2.1	April 2024		Draft	Scheduled review
3	Dec 2024	Advanced Nurse Practitioner Vascular Access	Final	

Related Documents

Document Type	Document Name
Guideline	Part 2 Vascular access LocSSIP
Guideline	Part 3 Peripheral Cannulation Guidelines
Guideline	Part 4 Venepuncture Guidelines
Guideline	Part 5 Midline Guidelines
Guideline	Part 6 PICC Guidelines
Guideline	Part 7 Short Term Acute CVC Guidelines
Guideline	Part 8 Implanted Port and Tunnelled Catheter Guidelines
Guideline	Part 9 Arterial Catheter Guidelines
Guideline	Part 10 Injectable Medicines Policy
Guideline	Part 11 Extravasation Guidelines
Guideline	Part 12 Long-term CVC Complication Guidelines
	Parts 1-12 available at http://guidelines.fhft.nhs.uk/
Guideline	Procedural Sedation and Analgesia
Guideline	FHFT IPC Manual http://guidelines.fhft.nhs.uk/
Guideline	RCN Infusion Standards
Guideline	INS Infusion Standards
Guideline	EPIC 3: <i>revised recommendation for intravenous catheter and catheter site care.</i>
Guideline	Parenteral Nutrition (Adult)