

Cross Site Vascular Access and IV Therapy Clinical Guidelines

Part 12: Longterm Central Venous Catheter Complications protocols

Key Points

Clinical guidelines to treat complications including:

- Long Term CVC exit site infection (PICC or Tunnelled line)
- CVC tunnel infection
- CVC (PICC or Tunnelled line) fracture
- Catheter related central vein thrombosis
- Central venous stenosis protocol
- Management of a suspected venous thrombosis
- Management of a mechanical occlusion of the central venous catheter
- Pharmaceutical interventions for a suspected non-thrombotic occlusion
- 3 way tap technique for catheter occlusion
- ALL vascular access devices should be monitored closely, and VIP scored every 6 hours using the Trust care bundle appropriate to device in situ.
- VIP score of 1 should initiate an action to avoid catheter complications.
- Please contact a member of the vascular access team for help and advice using the contact information overleaf.
- Peripheral cannulas are not covered in these protocols and should be removed immediately if complications arise

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Key words: CRBSI, complication, thrombosis, catheter fracture, catheter sepsis, MARSI, exit site infection

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Abbreviations

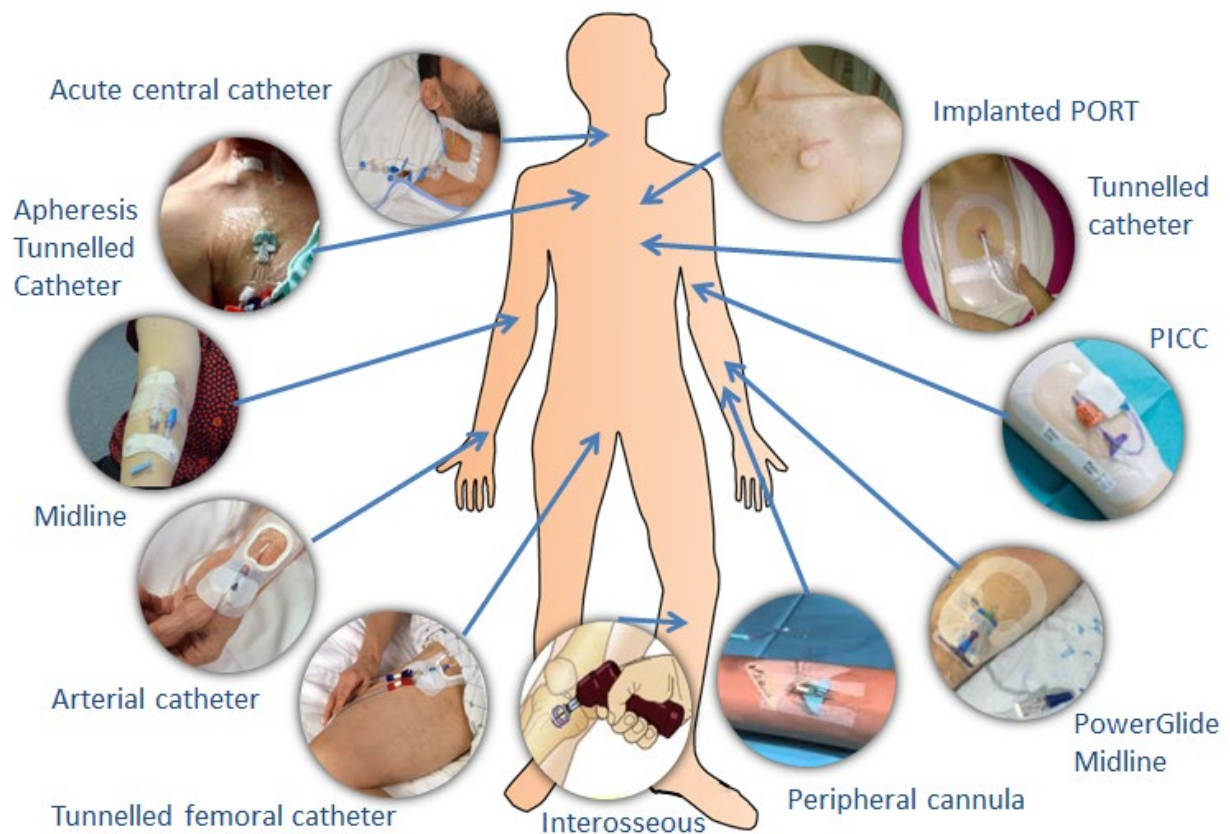
ACF	Antecubital Fossa
ANTT	Aseptic Non-Touch Technique
COPD	Chronic Obstructive Pulmonary Disease
CRBSI	Catheter Related Blood Stream Infection
CVC	Central Venous Catheter
CXR	Chest X-ray
ECG	Electrocardiogram
GI	Gastrointestinal
IV	Intravenous
IVAS	Intravenous and Vascular Access Services
IVC	Inferior vena cava
LocSSIP	Local Safety Standards
MARSI	Medical adhesive related skin injury
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

ALL vascular access devices should be monitored closely and VIP scored every 6 hours using the Trust care bundle appropriate to device in situ. VIP score of 1 should initiate an action to avoid catheter complications.

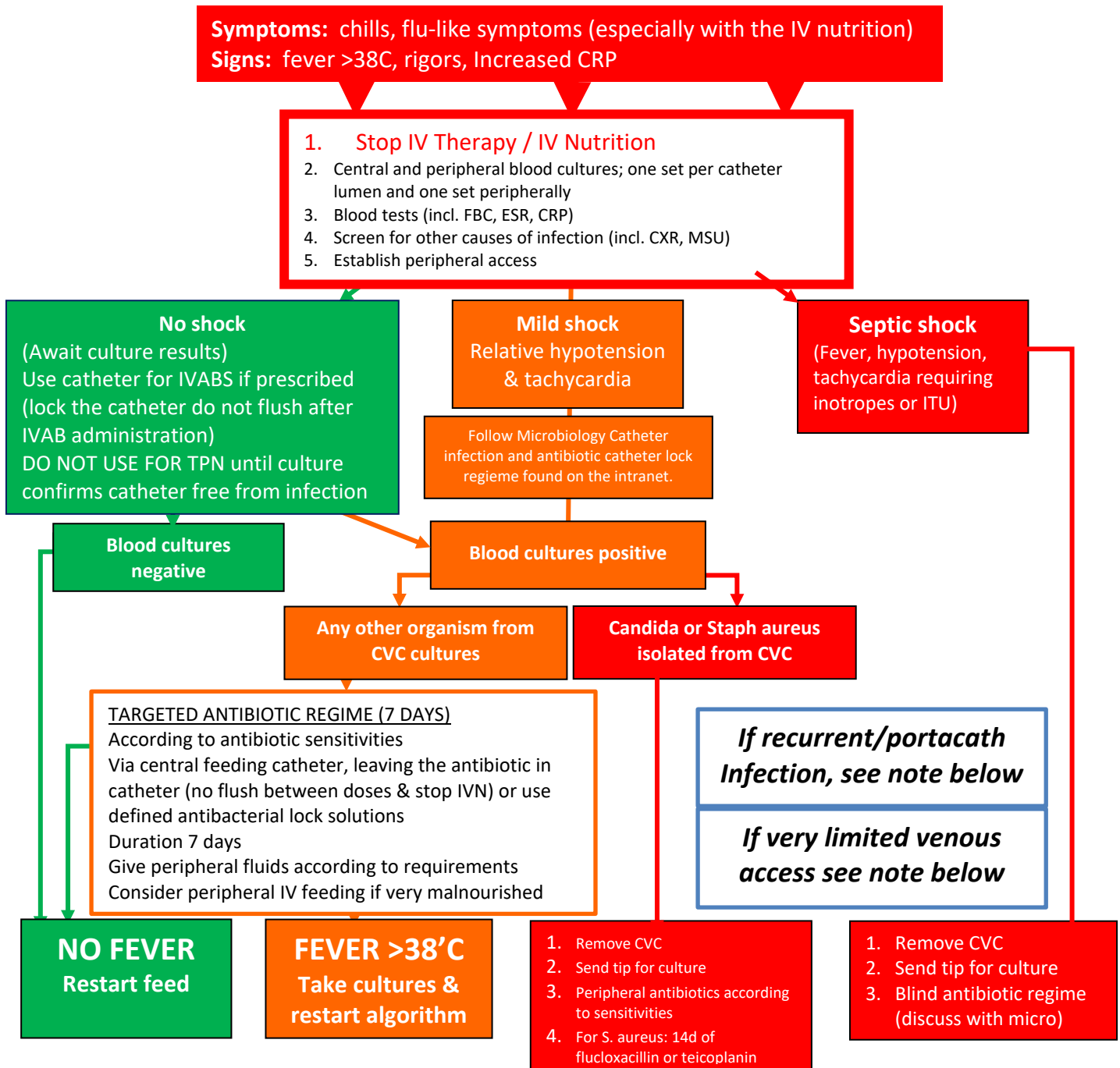
Please contact a member of the vascular access team for help and advice using the contact information at

<https://ourplace.xfph-tr.nhs.uk/patient-care/clinical-department-information-and-advice/IVAS-intravenous-and-vascular-access-services>.

Peripheral cannulae are not covered in these protocols and should be removed immediately if complications occur.



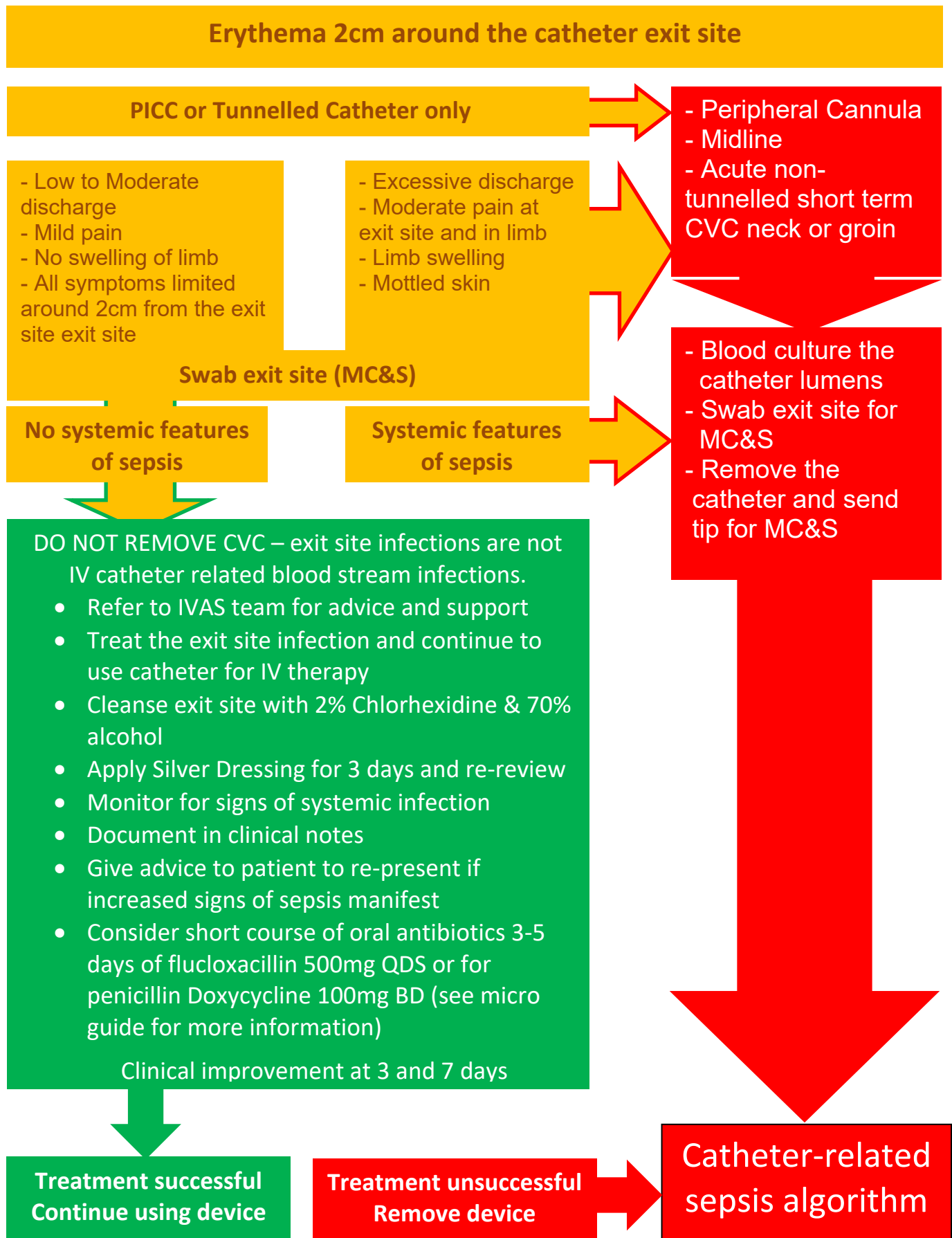
1. LONG TERM CVC (CATHETER) RELATED SEPSIS PROTOCOL



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.

2. LONG TERM CVC EXIT SITE INFECTION (PICC)



CVC TUNNEL INFECTION (HICKMAN, RENAL AND CUFFED CATHETERS)

- Erythema & tenderness over the subcutaneous tunnelled catheter from neck to exit site
- Signs of sepsis on use, rigors, temp > 38°C

Signs of Severe sepsis

Discontinue use of line while investigation occurs

Tunnel infections are usually extra luminal so can be treated as soft tissue infections; however, they can become blood stream infections if left for long enough or become serious

CLINICAL ACTIONS

Contact IVAS team for advice and assistance.

- 1 set of Blood cultures from each lumen
- 1 set of blood cultures taken peripherally and in line with Trust guidelines
- Swab exit site for MC&S
- Follow Treatment protocol for sepsis
- Discuss with Microbiology to identify antibiotic regime to treat infection.

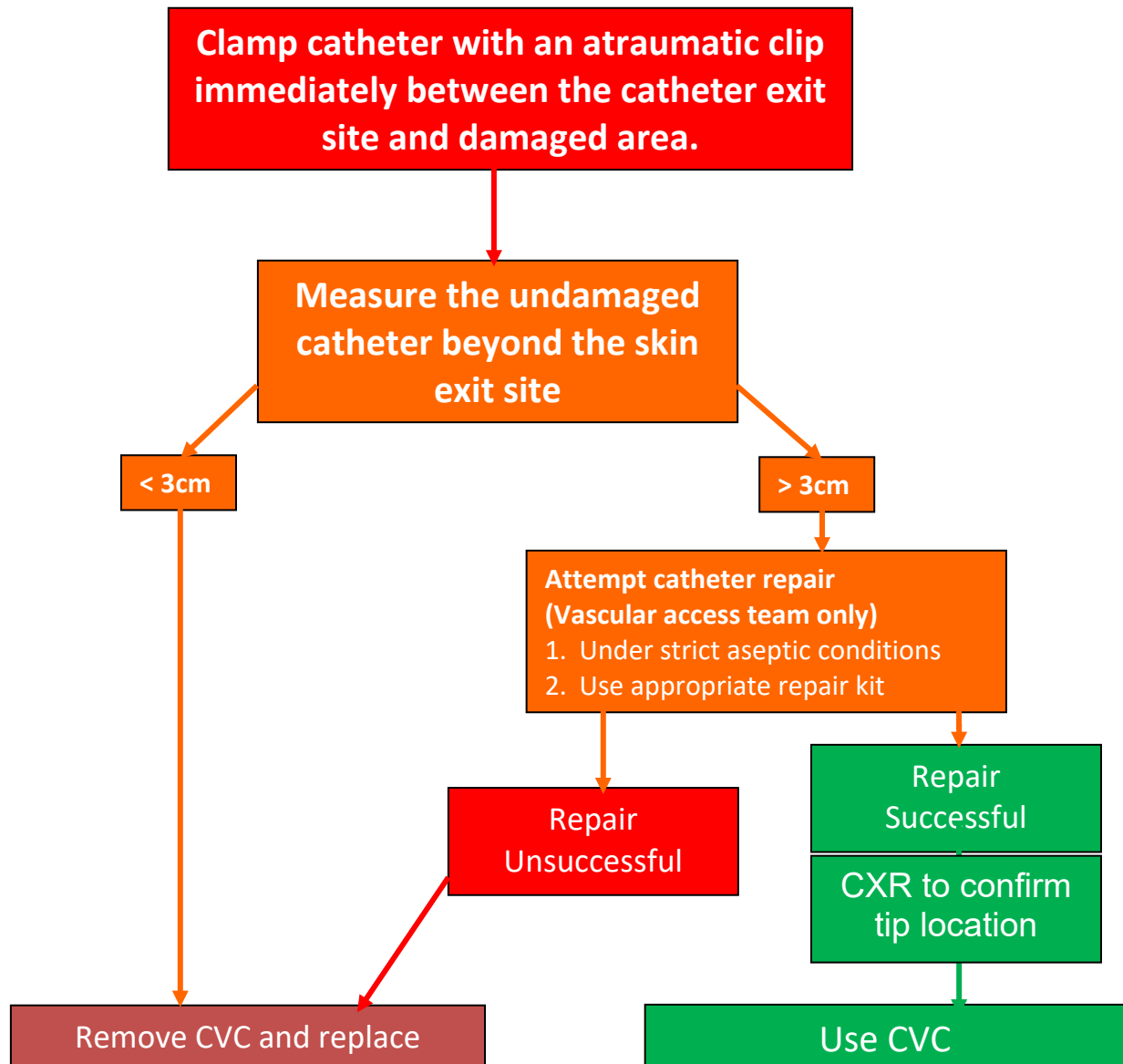
**Treatment successful
Continue using device**

**Positive blood cultures and/or continuing
signs of sepsis**

DO NOT USE THE TUNNELLED CATHETER

- CALL IVAS to surgically remove CVC and send tip for MC&S, out of hours, call on-call surgical Register to remove catheter on emergency list. Ensure it is handed over to send catheter for MC&S
- IV antibiotics as per Trust microbiology protocol
- Replacement CVC on opposite side (if possible) after 5 days
- IVAS team to provide peripheral IV access if required and vessels are difficult to access.
- Document in medical notes.

3. CVC (PICC OR TUNNELLED LINE) FRACTURE

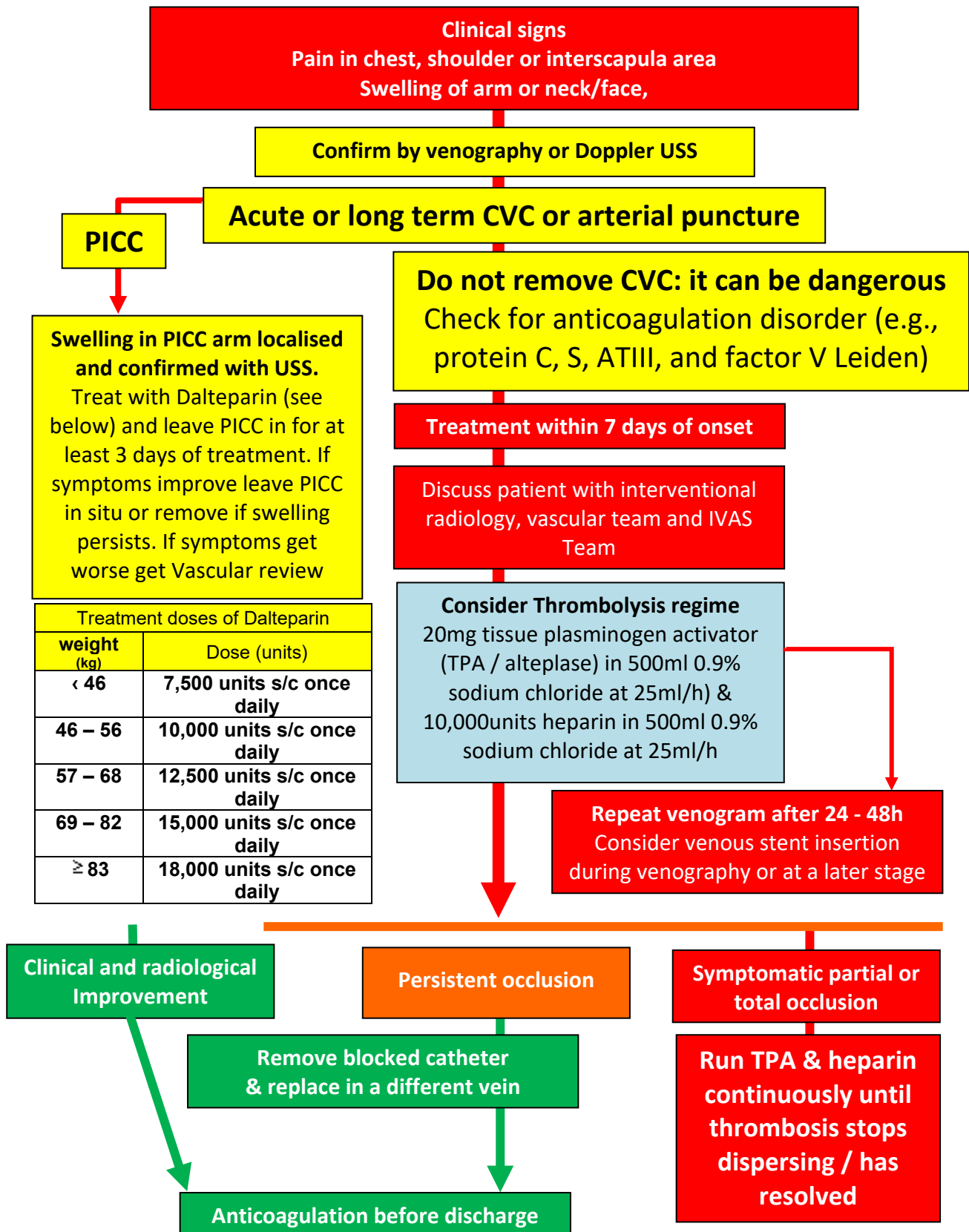


CVC cuff extrusion

Occasionally the CVC Dacron cuff may become visible at the exit site. This is an indication for replacement of the catheter and if the cuff is completely externalised then this needs to be performed as a priority, otherwise arrangements can be made for elective replacement. Patients should be advised to keep the CVC well secured using tape, dressing or Statlock securement device until it is replaced.

A CXR should be taken: if the CVC tip is in the mid SVC or above then the CVC should be removed, as the risk of thrombosis is high.

4. MANAGEMENT OF THROMBOSIS



5. MANAGEMENT OF UPPER LIMB DVT ASSOCIATED WITH PICC

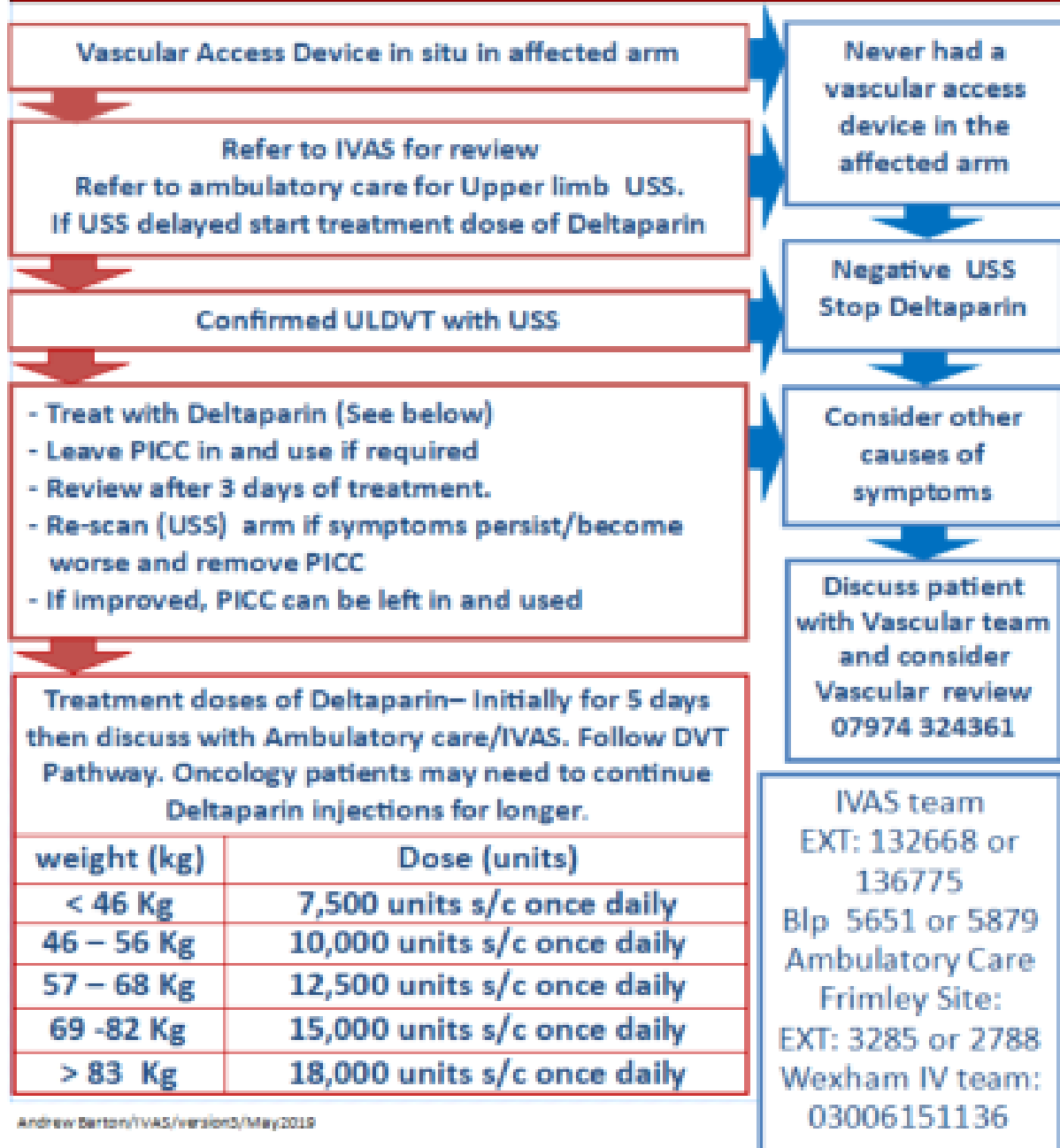


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Management for Upper Limb Deep Vein Thrombosis (ULDVT)

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

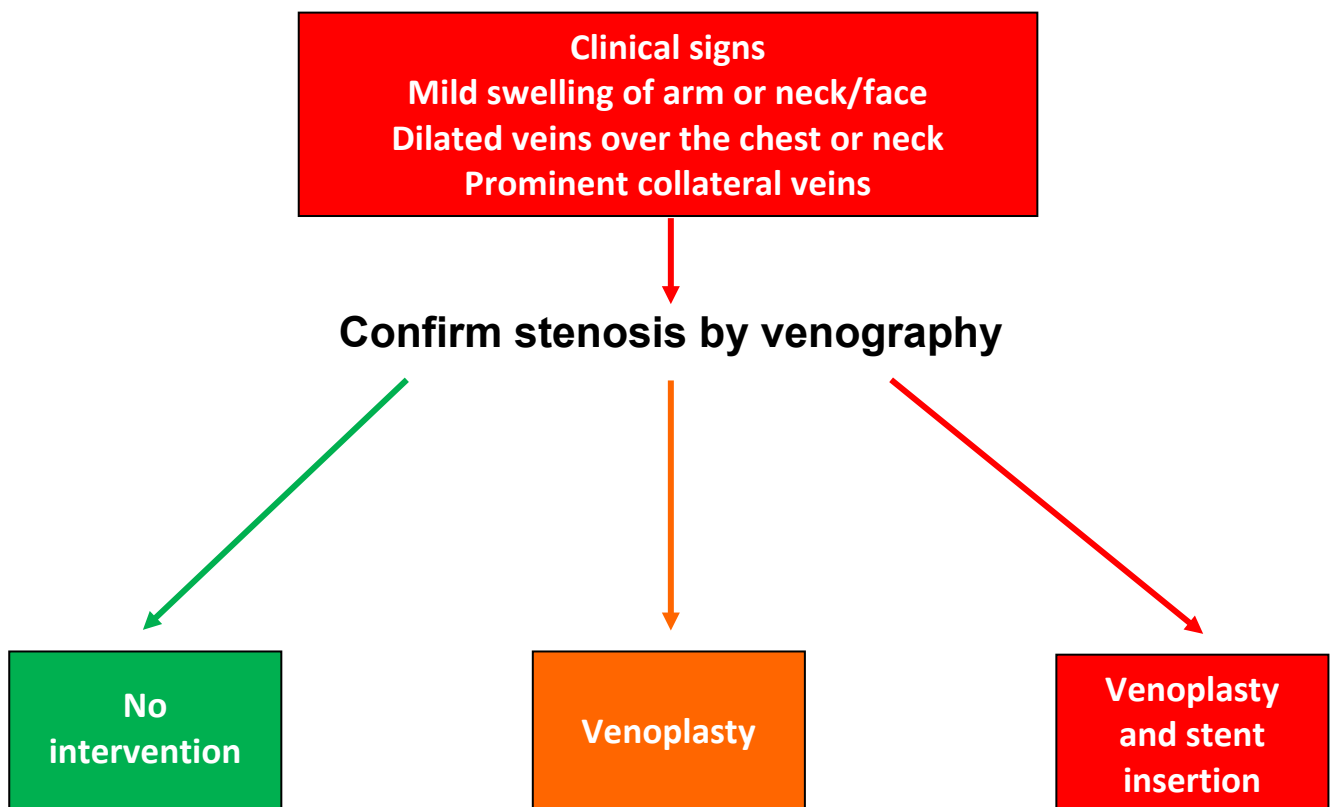


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6. CENTRAL VENOUS STENOSIS PROTOCOL

A central venous stenosis may be present in patients who have had an indwelling central venous catheter over a long period of time. The clinical signs are similar to those for a central venous thrombosis but are much less acute. Often there are subtle signs with dilated veins over the chest or neck, dilated collateral veins or mild signs of swelling when an infusion is running. In addition, central venous stenosis can often occur following thrombolysis or treatment for a central venous thrombosis. The most appropriate treatment for this requires close discussion with the interventional radiologists and, if necessary, the vascular surgeons.

The general principles of treatment are presented in the figure below:



The decision as to the best course of action for the patient is often based on the location of the stenosis, if the patient has other venous thrombosis and any other factor which would increase the risk of the procedure to the patient.

Following venoplasty or venous stent insertion the patient will need to be anticoagulated indefinitely.

7. CENTRAL VENOUS CATHETER OCCLUSION PROTOCOL

When central lines become occluded this may be from thrombin, particulate debris or lipid particles. It is logical to address each of these in the relevant context.

Sluggish flow or inability to flush catheter

Consider mechanical obstruction

Yes – remove needle free connector and try to flush lumen

Signs of venous thrombosis

Yes – follow trust thrombosis management guidelines

3-Way Tap Technique

1. Open to the empty syringe and draw back 6-7mls air from occluded device

2. The negative pressure from the blocked catheter will draw in the CathFlo

30kg and above = Actilyse CathFlo 2mg in 2mls Line lock.
Add 2mls of water to the vial and dissolve the CathFlo.
Use 3 way tap technique to lock solution in Catheter lumen for 30 mins, then check pull/push patency.
If still occluded continue to lock for a further 90 mins.

- Actilyse is a fridge item
- Actilyse needs to be prescribed
- 2mg/2ml per occluded lumen

Occlusion remains

If the catheter is still blocked after the first treatment with Actilyse Cathflo, the whole procedure may be repeated once.

Occlusion remains

Consider non thrombotic obstruction

- Lipid deposits
- Calcium phosphate precipitation
- Drug/solution incompatibility

Occlusion remains

Flow restored

Catheter replacement

Use Device

**Consider Central Venous thrombosis
See Thrombosis algorithm**

8. MANAGEMENT OF A SUSPECTED VENOUS THROMBOSIS

Possible cause	Assessment and intervention
Venous thrombosis	Signs of thrombosis: - Ipsilateral swelling of the arm and neck, head or face, distended collateral circulation over chest wall - SVC thrombosis will have bilateral signs Arrange a venogram and initiate anti-thrombotic therapy (see catheter related central vein thrombosis algorithm) For cases where CrCl, calculated using the Cockcroft and Gault formula, should be used to determine renal dose adjustments, see <i>Important: dosage adjustment advice in the BNF</i>. In addition, the MHRA advises that CrCl should be used as an estimate of renal function for direct-acting oral anticoagulants (DOACs), and drugs with a narrow therapeutic index that are mainly renally excreted. If dose adjustment based on CrCl is important and no advice is provided in the relevant BNF drug monograph, prescribers should consult product literature. Renal function and drug dosing should be reassessed in situations where eGFR and/or CrCl change rapidly, such as in patients with AKI.
Stasis of blood in catheter	Aspiration from catheter may clear obstruction. Consider alteplase, see local trust policy.

9. MANAGEMENT OF A MECHANICAL OCCLUSION OF THE CENTRAL VENOUS CATHETER

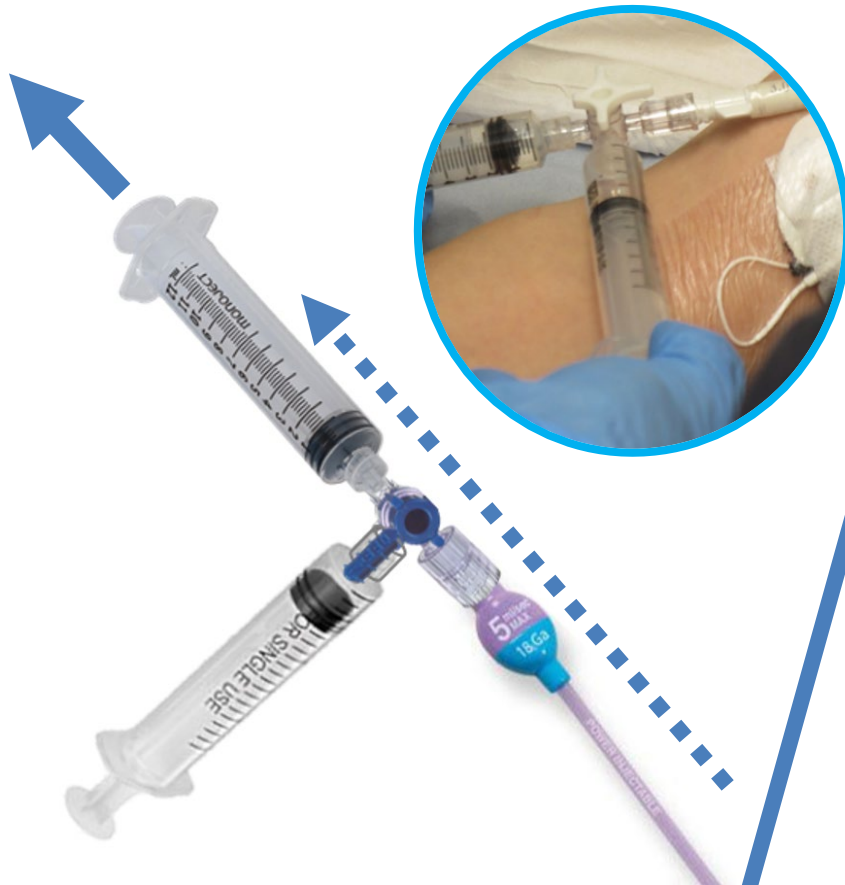
Possible cause	Assessment and intervention
Kinked/clamped catheter	Straighten catheter Ensure all clamps are open Examine reinforcement sleeve for indentations & massage catheter between thumb and index finger to remove any kinks
Faulty needle free bung/connector	Remove connector/bung and reassess patency by flushing directly via catheter hub
Obstruction with catheter hub	Direct observation of obstruction inside of catheter hub, clamp catheter if applicable, remove needle free connector and aspirate, if unable to dislodge occlusion with aspiration replace catheter.

Constriction of sutures/dressing	Remove any potentially constricting sutures/dressings (re-suture if catheter in-situ < 3 weeks)
Catheter tip against vessel wall	Change patient's position (supine/upright or vice versa) Try the Valsalva manoeuvre and reassess patency
Catheter tip migration or malposition	Check notes and/or CXR for initial tip placement Perform repeat CXR to assess current tip position
“Pinch-off” syndrome (subclavian vein catheters only)	Check patient's notes for verification of venous access route. Assess if the occlusion is intermittent or positional (relieved by rolling shoulder forward or raising arm on ipsilateral side)
Implanted ports: needle displacement	Insert new Huber needle and reassess patency

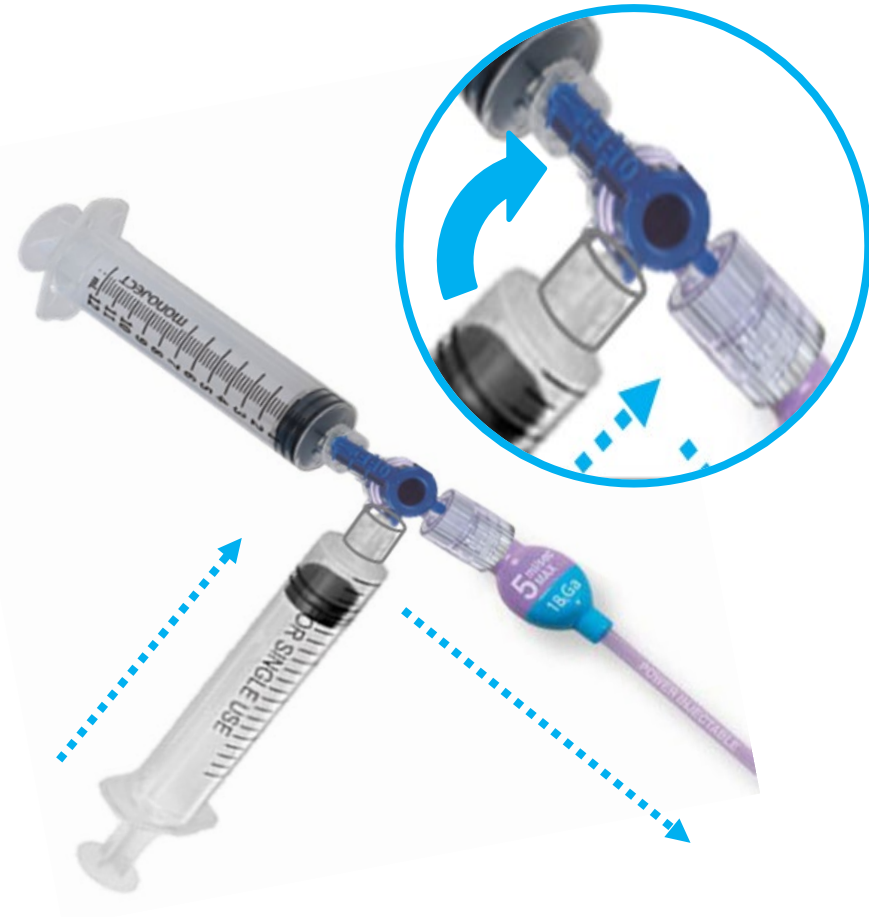
10. PHARMACEUTICAL INTERVENTIONS FOR A SUSPECTED OCCLUSION

Drug (reference)	Indication	Dose	Assessment and Intervention
Alteplase (actilyse cathflo)	Suspected fibrin deposits	2mg	1. Use 10ml luer-lock syringe and inject via hub of catheter using a push-pause motion 2. Monitor catheter closely for signs of “ballooning” or traumatic fracture 3. Initial dwell time is 30 minutes 4. Attempt aspiration, if the catheter is functional then withdraw the alteplase in line with the manufacturer's guidelines and flush catheter with 10mls 0.9% sodium chloride 5. If the catheter is not functional after a dwell time of 120 minutes assess the catheter functionality again 6. Repeat once if initial dose not successful a second equal dose of equal amount may be instilled.

3-Way Tap Technique



1. Open to the empty syringe and draw back 6-7mls air from occluded device



The negative pressure from the blocked catheter will draw in the CathFlo

Full version control record

Version:	3
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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 NHS Foundation 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 Control Sheet

Version	Date	Guideline Lead(s)	Status	Comment
1	1/1/18	Advanced Nurse Practitioner Vascular Access	Final	
2	05.11.2019	Advanced Nurse Practitioner Vascular Access	Final	Ratified at NMB
3	March 2025	IVAS Lead Nurse Consultant	Final	Scheduled review

Related Documents

Document Type	Document Name
Guideline	Part 1 Vascular Access
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 PORTS and Tunnelled Cuffed CVCs
Guideline	Part 9 Arterial Catheters and Blood Sampling
Guideline	Part 10 Injectable Medicines Policy
Guideline	Part 11 Extravasation Guidelines
Guideline	Procedural Sedation and Analgesia guideline
Guideline	FHFT IPC Manual
Guideline	RCN Infusion Standards
Guideline	INS Infusion Standards
Guidance	Epic