Peripheral IV Cannulation Training Programme

Quick Reference Guide

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OUR VISION

We
PROTECT
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HEALTH
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around the world.

Contents

Welcome to the B. Braun Peripheral IV Cannulation Quick Reference Guide.

The purpose of this booklet is to support the knowledge and training you received at the B. Braun peripheral IV cannulation training session.

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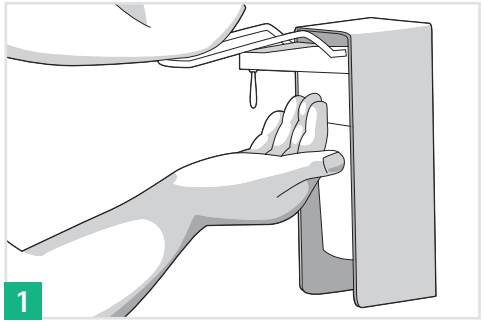
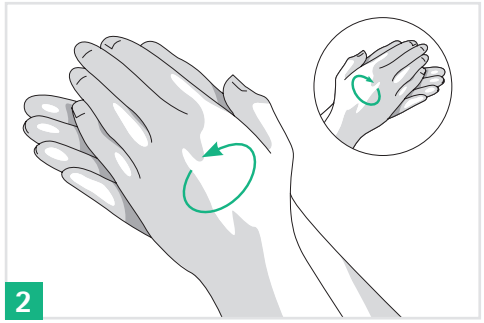
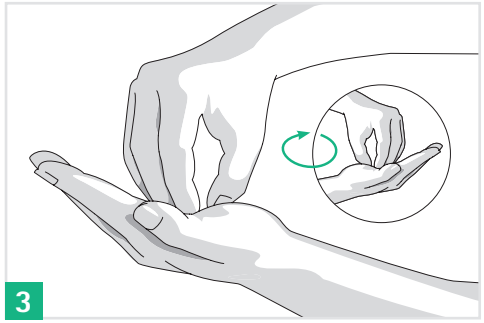
Hand Hygiene



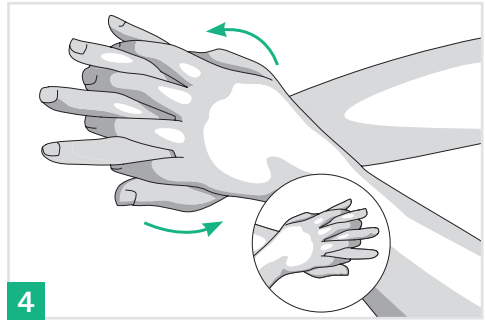
Apply the product into a cupped hand, enough to completely cover your hands.



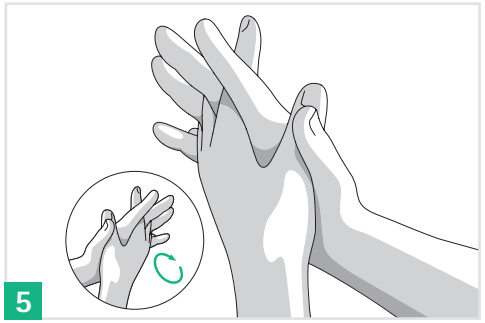
Rub hands palm to palm.



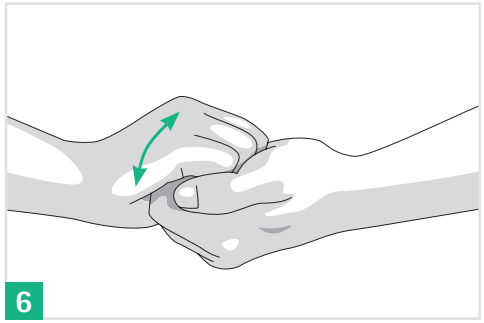
Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.



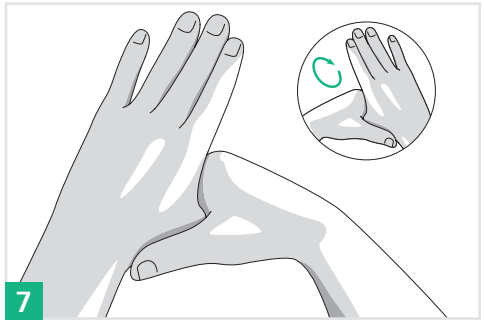
Left palm over back of right hand with interlaced fingers and vice versa.



Palm to palm with fingers interlaced.



Backs of fingers to opposing palms with fingers interlocked.



Rotational rubbing of left thumb clasped in right palm and vice versa.

Use an alcohol-based hand rub to disinfect your hands

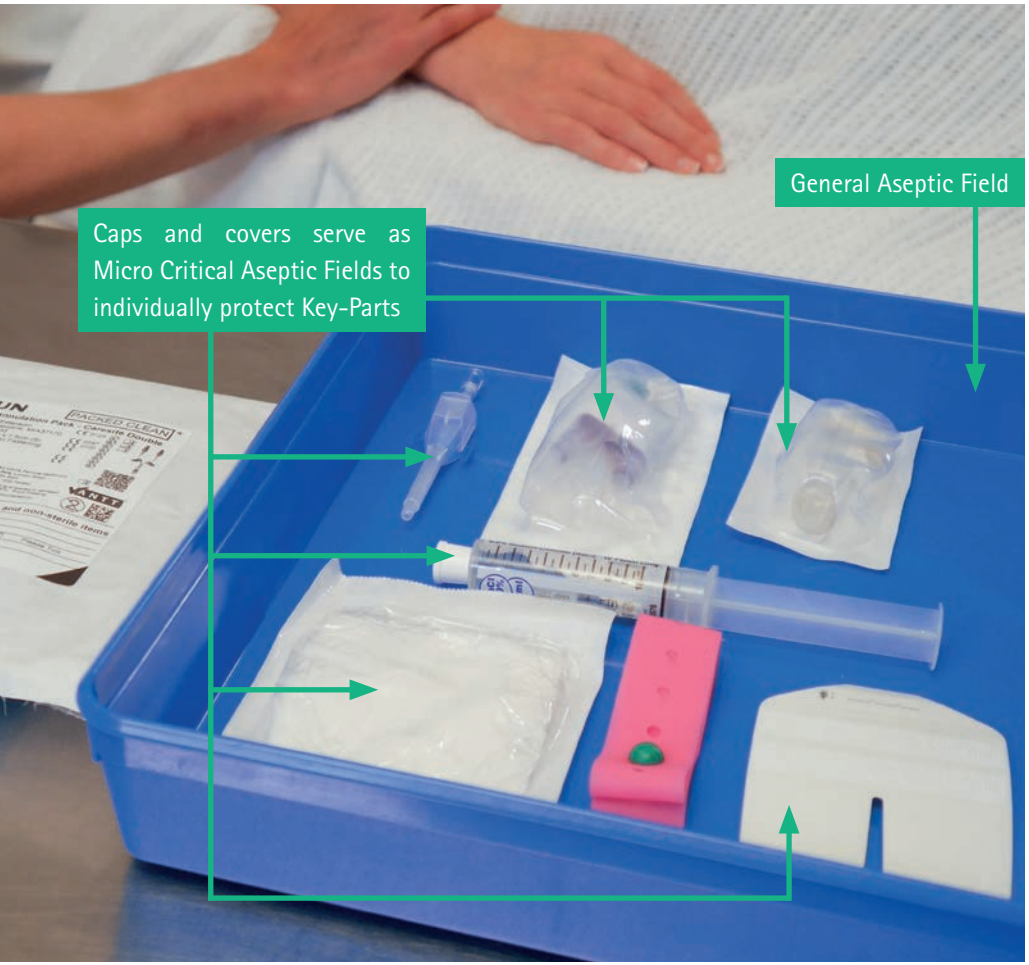
Wash hands instead when visibly soiled

Adapted from WHO Guidelines Hand Hygiene in Healthcare 2009

Principles of Standard-ANTT[1]

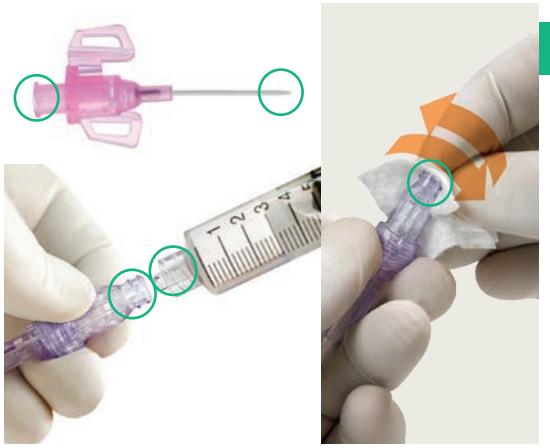
As cannulation is a relatively simple procedure, with minimal Key-Parts and only one Key-Site, it is generally performed in accordance with the principles of Standard-ANTT.

Standard-ANTT typically involves a combination of standard precautions, a General Aseptic Field and Key-Parts protected by Micro Critical Aseptic Fields and Non-Touch Technique.



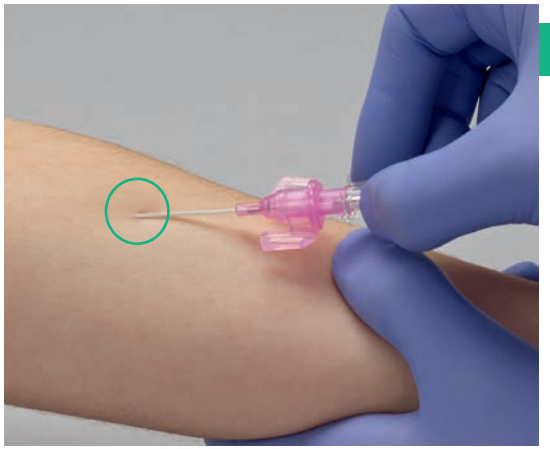
Key-Part and Key-Site Protection

Key-Parts must only touch other aseptic Key-Parts and Key-Sites.



Key-Parts

The critical parts of the equipment which, if contaminated, will transfer microorganisms to the patient e.g. the hub of a peripheral IV cannula.



Key-Sites

Any portal of entry into the patient e.g. cannula insertion site.

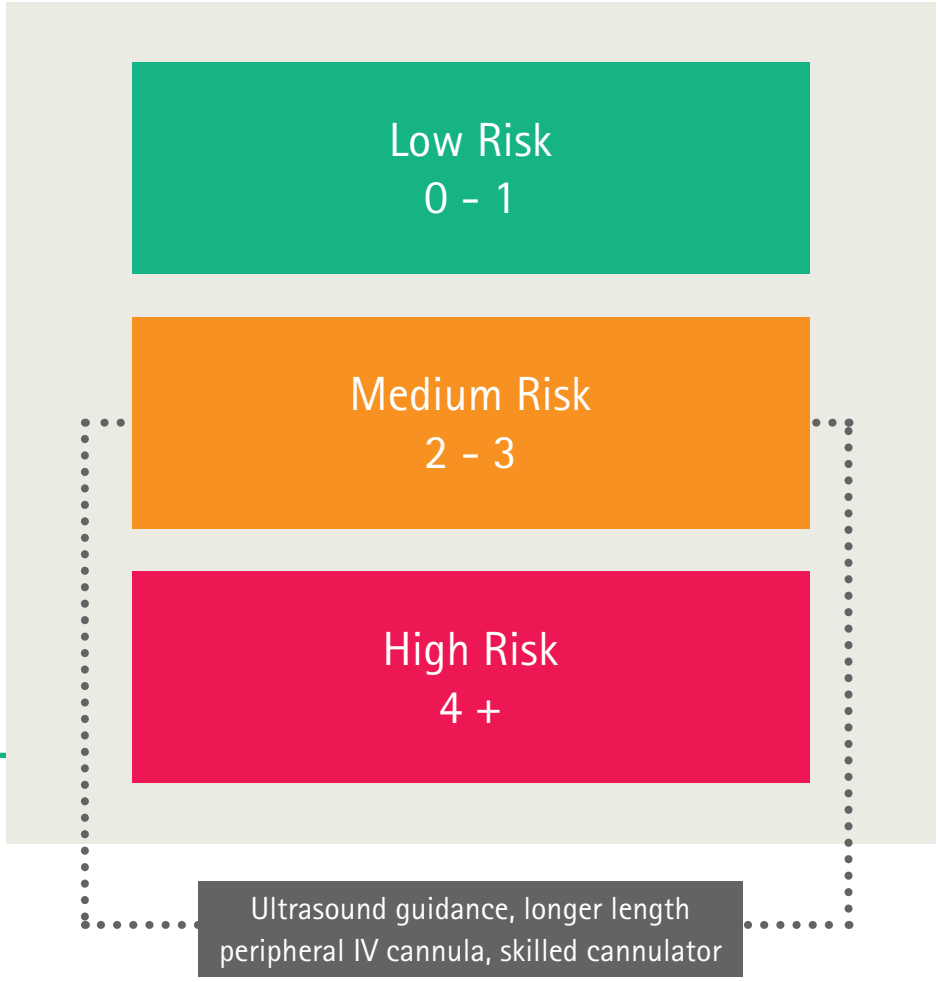
Patient Assessment

Best practice is to assess the patient for ease or difficulty of access. Difficult intravenous access can be evaluated using the following parameters and attributing **1 point** where the answer is **yes**[2]:

- Is there a known history of a difficult intravenous access? (1) ☐
- Does the clinician expect a failed attempt based on their perception/experience? (1) ☐
- No visible veins (1) ☐
- No palpable veins (1) ☐
- Has the largest vein a diameter of <3 mm after applying tourniquet? (1) ☐

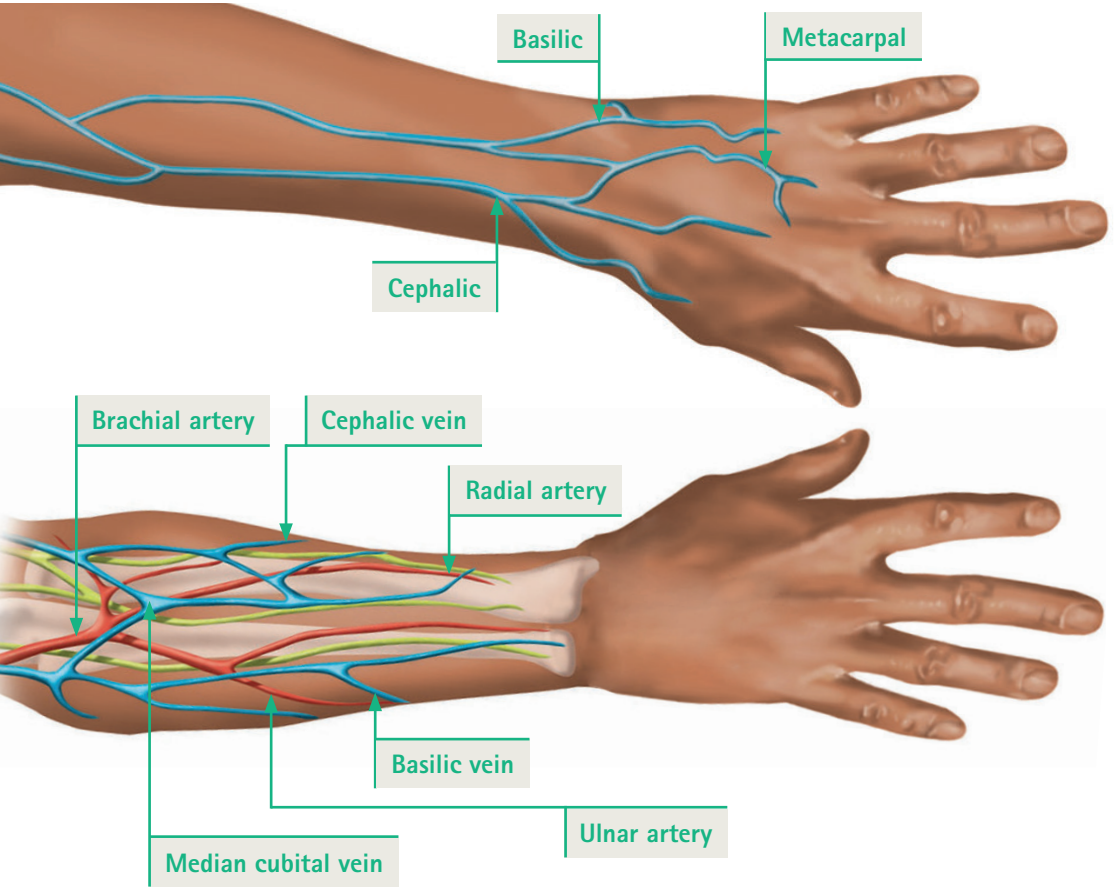
Total Score ☐

Risk of Difficult Intravenous Access



Adapted from Van Loon et al 2016

Vein Selection[3]



Short peripheral IV catheters (less than 6 cm)

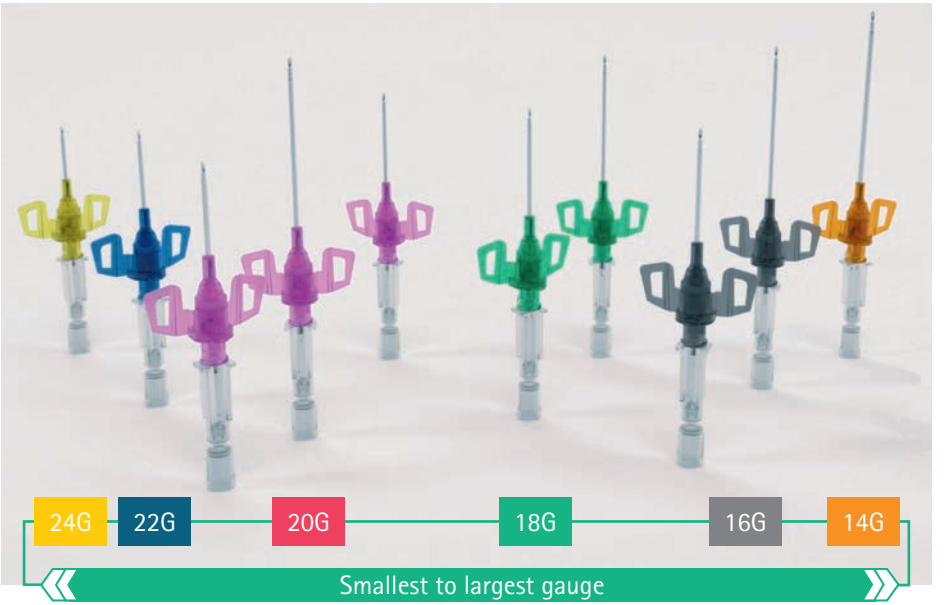
< 24 hours consider hand veins

>24 hours consider forearm vessels to prolong dwell time, decrease pain and help prevent accidental removal and occlusion.

Long peripheral IV catheters (6 cm – 15 cm)

Consider veins found on the dorsal and ventral surfaces of the upper extremities including the cephalic, basilic and median veins.

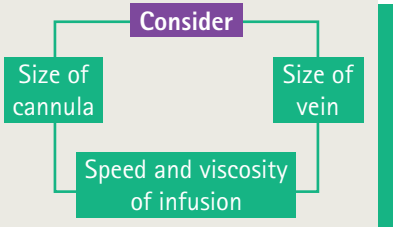
IV Cannula – Gauge Sizes[4]



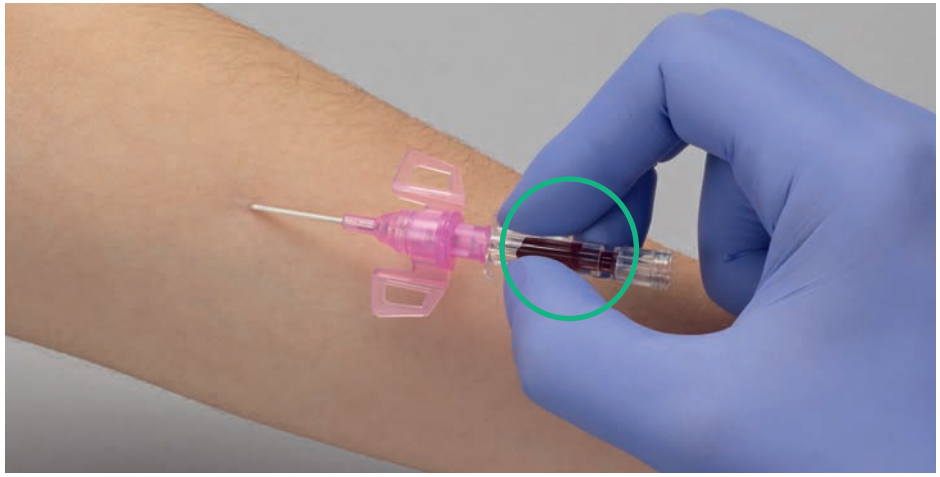
Gauge	24G	22G	20G	20G	20G	18G	18G	16G	16G	14G
Length (mm)	19	25	25	32	50	32	45	32	50	50
Gravity Flow Rate (ml/min)	22	35	65	60	55	105	100	195	185	310

Choose a catheter appropriate to the patients' vasculature and therapy requirements.

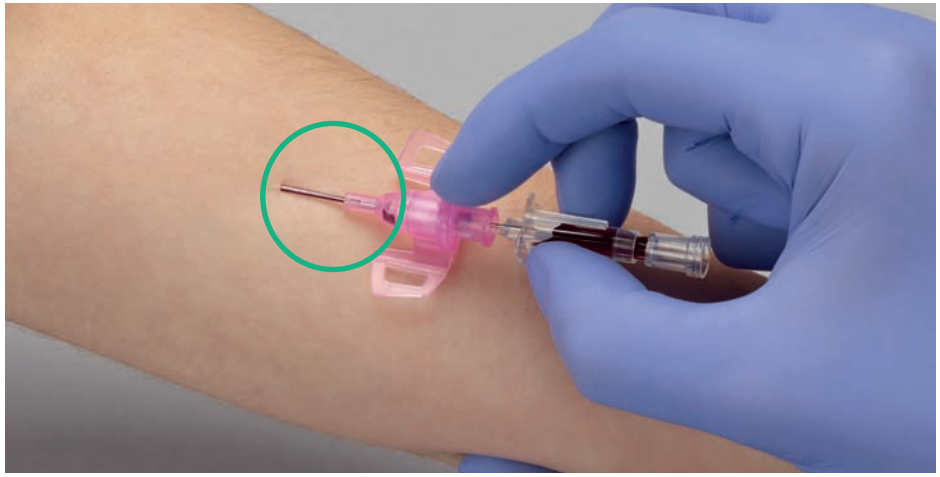
The most appropriate vein and insertion site is selected to best accommodate the vascular access device required for the prescribed infusion therapy.



Flashback Visualisation

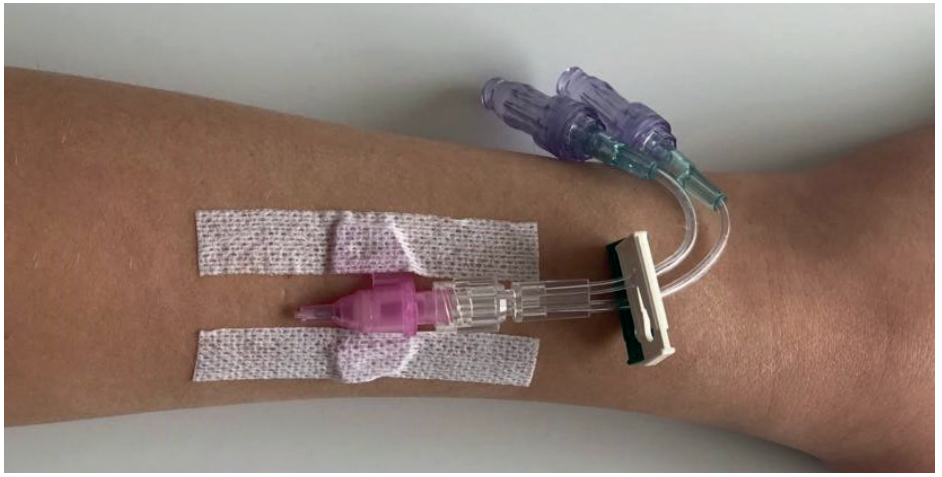


First flashback confirming the **needle tip** is in the vein.



Second flashback, catheter flashback, occurs between the catheter and the needle, confirming that the **catheter** is successfully in the vein.

Dressing Application



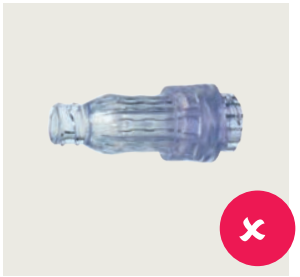
Place strips over wings.

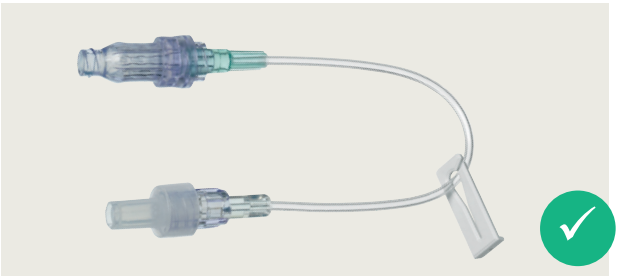
Transparent film section to be placed over insertion site.
Ensure to add the date label.

Needlefree Access

It is considered best practice to attach a needlefree extension to a peripheral IV cannula rather than a needlefree valve.

Accessing the patients peripheral IV access device via a needlefree extension, moves manipulation away from the insertion site, minimising the risk of mechanical phlebitis[5].



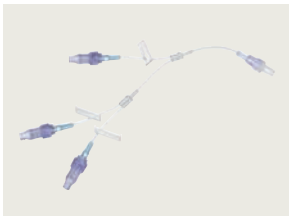


Minimum Number of Lumens

You should also use a needlefree extension with the minimum number of lumens essential for the management of the patient[6]:

Single lumen

Double lumen



Triple lumen

Minimum Lumens

Displacement

Needlefree devices can be grouped into two categories; those that permit blood reflux upon detachment of a luer connector, and those that don't.

The non blood reflux needlefree connectors, instead clear the catheter of blood.

Blood Reflux

Negative

Neutral

No Blood Reflux

Positive

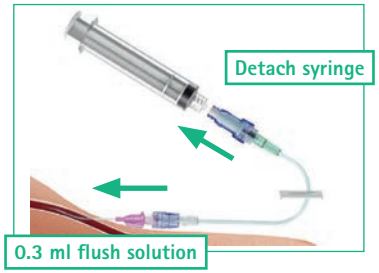
Negative Displacement

Negative displacement needlefree devices pull blood into the catheter lumen upon detachment of a luer syringe post flush.

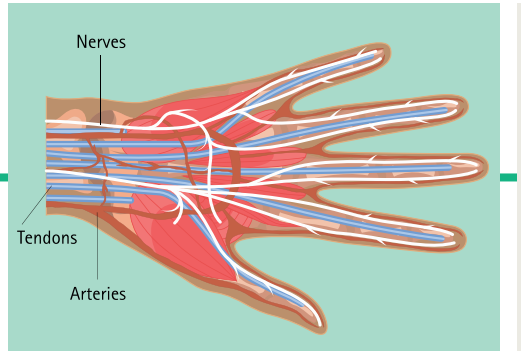
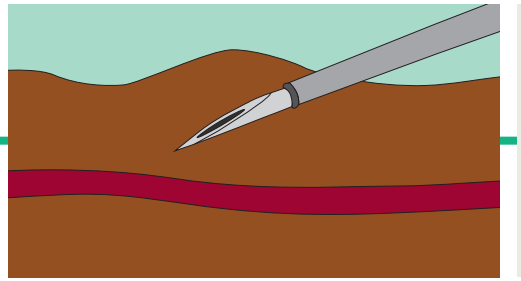
This backflow of blood could lead to an occlusion or a line infection, subsequently delaying treatment and creating a requirement for replacement line insertion.

Positive Displacement

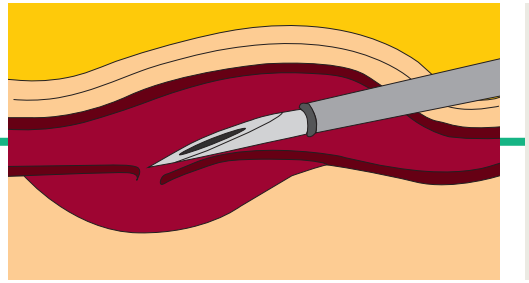
With a positive displacement needlefree device, a bolus of flush solution is delivered automatically upon disconnection of a flush syringe, preventing blood reflux and promoting catheter patency.



Potential Problems and Complications

		Cause	Prevention	Management
Vasovagal Reaction/Syncope[7]		■ Patient may have a fear of needles or blood ■ Feeling unwell ■ Very hot room	■ Discuss any anxiety/fears prior to procedure ■ Calm and confident behaviour ■ Lie patient flat for the procedure ■ Allow the patient to be accompanied by friend or family	■ Call for assistance ■ Patient conscious and feeling faint - encourage to put their head between their knees ■ Lie the patient down ■ Document
Puncturing an Artery[7]		■ Failure to palpate vein correctly ■ Patient may have difficult venous access ■ Deep or blind probing	■ Ensure veins are visible with no pulsation when palpated ■ Ensure limited movement by patient whilst device is inserted	■ Release tourniquet ■ Remove device immediately ■ Apply digital pressure - until bleeding stops and elevate ■ Do not reapply tourniquet to the limb ■ Give patient explanation ■ Document
Hitting a Nerve[7,8]		■ Poor site selection ■ Patient may have difficult venous access ■ Insertion of needle too deeply into tissue ■ Blind probing with needle	■ Ensure veins are visible, sound knowledge of vein anatomy and location of superficial nerves ■ Insert at angle of no more than 30 degrees ■ Ensure good lighting ■ Patient and practitioner are comfortable ■ Good preparation and concentration	■ If appropriate, withdraw needle slightly and realign ■ If patient complains of an electric shock down their arm, stop immediately ■ Only two attempts with patient's consent ■ Seek help from more experienced colleague ■ Document
Missed Vein[5,9]		■ Poor vein choice ■ Poor positioning	■ Ensure good lighting ■ Patient and practitioner comfortable ■ Good technique ■ Accurate vein selection	■ If appropriate, withdraw needle slightly and realign ■ Only two attempts with patient's consent ■ Seek help from more experienced colleague ■ Document

Potential Problems and Complications

		Cause	Prevention	Management
Transfixation[10]		■ On insertion - needle punctures the vein then passes through the posterior wall of the vein ■ Damage to the posterior vein wall results in a slow leak of fluids or medication into the surrounding tissues	■ Maintain competency ■ Ensure both 1st and 2nd flashbacks are observed	■ Stop cannulation immediately ■ Release tourniquet ■ Remove cannula ■ Reassure patient ■ Document
Haematoma[7,11]	 Reproduced with permission from Andrew Jackson, The Rotherham NHS Foundation Trust	■ Poor vein selection ■ Transfixation through poor device manipulation ■ Failure to remove tourniquet before removing the device - causing high intravascular pressure ■ Multiple attempts	■ Good vein/device selection ■ Use good vein anchorage with non dominant hand ■ Be aware of patient's treatment ■ Release tourniquet before removing needle/stylet ■ Apply adequate pressure on removal of cannula ■ Do not apply tourniquet to limb at site of recent venepuncture ■ Do not leave tourniquet on for longer than necessary	■ Apply pressure until bleeding stops ■ Give the patient an explanation ■ Elevate the limb if appropriate ■ Apply ice pack if appropriate ■ Do not reapply a tourniquet to affected limb ■ Document
Phlebitis[8]		■ Mechanical ■ Chemical ■ Infective	■ Hand hygiene ■ Well fitting gloves ■ Non-touch technique used when manipulating the cannula ■ Sterile occlusive dressing ■ Correct handling and preparation of infusate ■ Regular monitoring of insertion site ■ Appropriate insertion site ■ Thorough cleaning/air drying of access points before and after each use (2% chlorhexidine/70% alcohol)	■ Remove cannula ■ Follow local policy e.g. swab of insertion site or tip culture ■ Evaluate infusion therapy ■ Consult medical staff ■ Document

Potential Problems and Complications

Infiltration[5,7,8]

Reproduced with permission from Andrew Jackson, The Rotherham NHS Foundation Trust

Extravasation[5,7,8]

Reproduced with permission from Andrew Jackson, The Rotherham NHS Foundation Trust

Cause

- Transfixation of vein
- Administration/leakage of fluid into surrounding tissue as a result of a malfunctioning cannula
- Poor venous access or fragile veins intolerant to solutions or drugs
- Poor positioning of cannula near joints or on the back of hands
- Multiple attempts to the same vein and poor monitoring of patient infusions

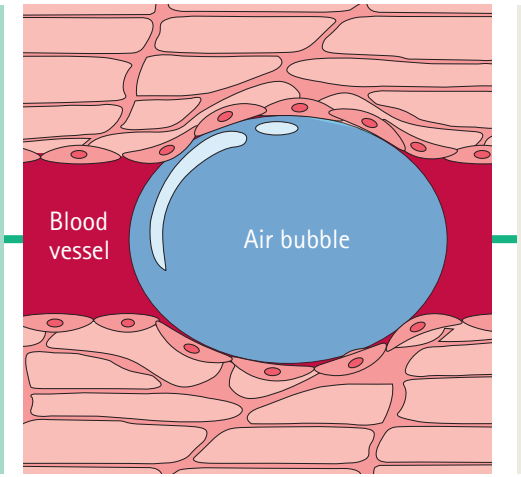
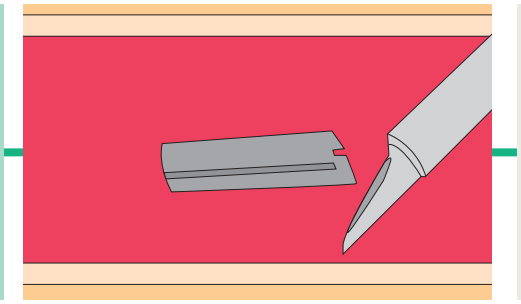
Prevention

- Correct insertion site (avoid areas of flexion) and appropriate device with adequate catheter securement
- Establish patency prior to and during infusion therapy (flushing), regular assessment before and during infusions
- Correct sequencing of drugs administered
- Recognising 'at risk' patients
- Recognition of signs and symptoms
- Increase monitoring in patients unable to communicate
- Increase monitoring in patients on medications likely to alter pain sensation e.g. narcotics

Management

1. Immediately stop the infusion and assess the area distal to the cannula site for capillary refill, sensation and motor function.
2. Aspirate for a blood return (according to local policy).
3. Do not flush the cannula, as this would inject additional medication into the tissue.
4. Disconnect the administration set from the cannula hub, and aspirate from the cannula (according to local policy) and administer antidote, steroid, antihistamine and/or analgesia if prescribed.
5. Remove the cannula as appropriate only once management plan established.
6. Apply hot/cold pack as appropriate but do not apply pressure.
7. Using a skin marker outline the area with visible signs of infiltration/extravasation to allow for assessing changes.
8. Document in patient notes, complete incident form and alert medical staff. The RCN recommend the use of a standard infiltration scale.
9. Estimate the volume of solution that has escaped into the tissue based on the original amount of solution in the container, the amount remaining when stopped and rate of injection or infusion. The need for surgical consultation is based on the clinical signs and symptoms and their progression.
10. Elevate the extremity to encourage lymphatic reabsorption of the solution/medication.
11. Use a different extremity for subsequent cannulations.

Potential Problems and Complications

		Cause	Prevention	Management
Embolism – Thromboembolism[8,12,13]		■ Trauma to the intima of the vein resulting in collection of platelets around the catheter thereby developing a thrombi	■ Regular assessment and recognise catheter dysfunction. Catheter damage causes bleeding and catheter lumen occlusion ■ Secure and protect, avoiding friction or movement ■ Timely intervention after assessment	■ 100% oxygen by face mask ■ Anticoagulant ■ Medical emergency ■ Seek medical assistance ■ Document
Air Embolism[8,12,13,14]		■ When air enters the venous system and eventually causes an obstruction in the pulmonary circulation ■ Catheter damage increases the risk of catheter fracture which can result in air emboli ■ Infusion lines not being primed with infusate ■ Vented infusions being allowed to run dry	■ Recognise early signs and symptoms of catheter damage including difficulty aspirating or resistance to flushing ■ Monitor frequent infusion pump alarms ■ Suspect catheter damage if visible catheter or fractured hub and leaking at the site	■ Prevent further air entry by closing entry holes, clamping lines or applying pressure to the site ■ Place patient on left side with head below heart level unless contraindicated ■ 100% oxygen by face mask ■ CPR if cardiac arrest occurs ■ Inform medical staff ■ Document
Cannula Embolism[8,12,13]		■ Realignment or reinsertion of needle on insertion causing catheter damage	■ Avoid flushing against resistance ■ Recognise catheter dysfunction ■ Protect and secure cannula adequately	■ Application of tourniquet (care on placement) ■ X-ray and/or chest radiography ■ Locate ■ Salvage ■ Document

Further Resources

The B. Braun team of Clinical Therapy Specialists offer a range of educational resources from E-learning, clinical demonstration videos, study days, practical hands-on workshops to educational webinars.

Scan the QR code to visit our IV Education Resources webpage and scroll to the Clinical Demonstration Videos section to view peripheral IV catheter insertion videos. (https://tinyurl.com/yc84c35u).

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