



Value Life

MID & LONG TERM VASCULAR ACCESS



smartmidline  
NURSES GUIDE

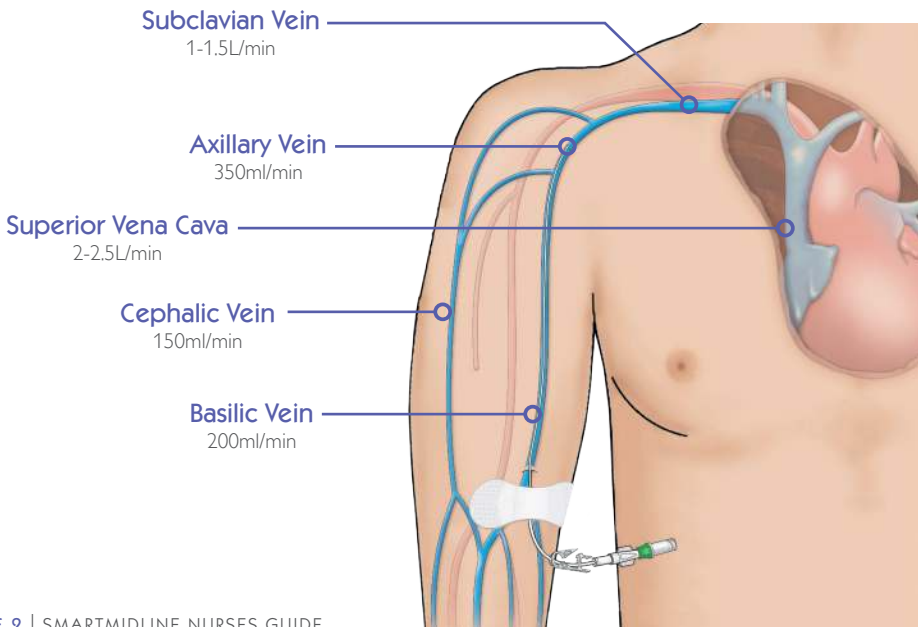
# A Nurse's Guide to smartmidline

This booklet provides guidance in the care and maintenance of smartmidline. It does not dictate medical practice, and you should always follow your local hospital or Trust policies.

smartmidline is a polyurethane peripheral catheter, which has an integral extension and a clamp. This should provide a comfortable and easy way of delivering treatment.

smartmidline is available in four different lengths, and can be used for infusions of fluids or drugs, and for single drug doses (a bolus). The shorter lengths (4, 6 or 8cm) are most commonly used for the administration of IV antibiotics and generally remain in situ for 1-2 weeks (duration of therapy). However, the catheter material and the device classification allows the catheter to remain in situ for up to four weeks, as long as the device remains patent and there are no signs of phlebitis or infection. The longer catheter (20cm) can be left in place for up to 30 days.

## Adult venous blood flow



# Midline catheters overview

## Description

- Midline catheters offer an alternative to peripheral and central venous access, providing vascular access in a larger peripheral vein without entering central venous circulation
- They are available in various sizes which are suitable for both children and adults
- They are peripherally inserted with the tip terminating in the axillary vein
- Benefits to the patient include less frequent resiting of the catheter and a subsequent reduction in associated venous trauma.

## Indications

- Patients undergoing IV therapy (e.g. antibiotics) for one or more weeks, in order to preserve the integrity of the veins and increase patient comfort by removing the need for resites
- Patient preference
- Where patients present with poor peripheral venous access in the lower arm and when the use of a CVC is contraindicated, the midline catheter provides venous access along with easy, less hazardous insertion.

## Contraindications

The following therapies are not appropriate for administration via a midline catheter:

- Total Parental Nutrition (TPN)\*
- Irritating antibiotics, unless administered with caution and according to local guidelines (INS, 2016)
- Vesicant chemotherapeutic agents
- Hyperalimentation fluids
- Mastectomy on side of insertion
- Fistula on side of insertion
- Difficulty in identifying adequate target vein in arm.

## Seldinger insertion technique

Allows access to smaller palpable/fragile vessels.



\*ESPEN Guidelines<sup>(1)</sup> recommend that peripheral PN (given through a short peripheral cannula or through a midline catheter) should be used only for a limited period of time, and only when using nutrient solutions whose osmolality does not exceed 850 mOsm/L

# CT-rated midline

Up to 325psi and 7ml/s (for 5Fr catheters)

Vygon Code	Catheter Size	Length (cm)	Guidewire Length (cm)	Max. Flowrate (Viscosity 11.8 cP)
128.1204	2Fr	4	23	1.5ml/s
128.1206		6	23	1.5ml/s
128.12062		6	40	1.5ml/s
128.1208		8	26	1ml/s
128.12082		8	40	1ml/s
128.1210		10	26	1ml/s
128.1215		15	40	0.5ml/s
128.1220		20	50	0.5ml/s
128.1412	4Fr	12	40	5ml/s
128.1415		15	50	5ml/s
128.1420		20	50	5ml/s
128.1425		25	60	5ml/s
128.1515	5Fr*	15	-	7ml/s
128.1520		20	-	7ml/s

\*5Fr catheters are delivered without accessories. Must be used with an MST kit with a 5.5Fr introducer sheath.

## Education and training

If you are looking to extend the skills of individual members of your team, Vygon can offer you a number of supporting services as part of our on-going commitment to education and training. For more information about either of these services please contact your local Vygon representative.

### Local and regional educational study days

Designed to teach and support competency in placing and caring for extended dwell IV catheters.

### Insertion Structured Learning Programme and Clinical Competency Portfolio

For the insertion care and maintenance of extended dwell IV catheters.



# Post-insertion care

## Overview

- Midline catheters can be adequately secured with catheter securement devices such as Grip-Lok™
- The insertion site can then be covered with a semi-permeable transparent dressing and changed according to the manufacturer's recommendations
- The device should be flushed with 0.9% sodium chloride solution after each use
- Midline catheters can be left in situ for extended periods of time, maximum dwell time is unknown, but Philpot and Griffiths report a Midline removed at 296 days.<sup>(2)</sup>

## Cleaning solutions

- Most transient flora can be removed from the skin by cleaning with soap and water
- Chlorhexidine 2% in 70% alcohol has been shown to be the most effective agent for skin cleaning around the site prior to insertion and between dressing changes.<sup>(2)</sup>

## Securement of device and dressings

- Midline catheters should be secured to prevent movement, which reduces the risk of phlebitis, infiltration, infection and migration
- Choice of dressing is usually based upon suitability for a particular VAD site or skin type
- An IV dressing is applied to minimise the contamination of the insertion site.

## Pulsated flush

Use a pulsated (push-pause technique) flush to create a turbulent flow when administering the flush solution. This removes debris from the internal catheter wall.



"push-pause"

## Positive flush technique

Positive flushing prevents reflux of blood into the catheter tip, reducing the risk of catheter occlusion. This is accomplished by maintaining pressure on the plunger of the syringe during disconnection from the line.

## How to remove the catheter

- Remove the dressing and securement device
- Pull the catheter to remove, maintaining gentle firm traction
- Pressure should be applied to the insertion site after removal for at least three to four minutes and the site inspected prior to applying a dressing to ensure bleeding has stopped
- The catheter integrity should be checked and its length measured to ensure that an intact device has been removed.

# Catheter complications

## Fibrin sheath formation

---

- Fibrin is a fibrous protein that works with platelets to clot blood and to form a protective mesh over a wound site. It forms a sheath around catheters placed in the bloodstream and can provide a potential focus for bacterial growth
- When the sheath covers the catheter tip it can act as a one-way valve, allowing fluids to be administered but making it difficult or impossible to aspirate
- Fibrin sheath formation often leads to persistent withdrawal occlusion (PWO). PWO can be managed using thrombolytic therapy such as Urokinase. However, PWO may lead to more serious complications such as chemotherapy extravasation.

### Treatment <sup>(3)</sup>

Attempt to flush the catheter using a 10ml syringe of 0.9% sodium chloride. If resistance is met, stop and request a resiting of the device.

### Prevention <sup>(3)</sup>

Maintain a continuous, regular fluid flow, or ensure that patency is maintained by flushing. Instruct the patient to keep their arm below the level of the heart if ambulant and attached to a gravity flow infusion.

## Phlebitis

---

Phlebitis is the inflammation of a vein, which can occur in a number of ways:

- Infusion phlebitis is diagnosed when the acute inflammation of a vein can be linked directly to the presence of any vascular access device, and causes can be mechanical, chemical or infective
- Thrombophlebitis is a further complication when phlebitis can be linked to a thrombus.

### Identification

- The symptoms of phlebitis include skin inflammation, the formation of erythema, oedema, venous cord and pain
- In 50% of patients, pain will be the first indication of phlebitis. It is therefore important that the practitioner takes any indication of pain or discomfort during line assessment seriously.

## Mechanical phlebitis

---

Mechanical phlebitis results from catheter trauma to the tunica intima (the lining of the vessel wall). This may occur during insertion, or as a result of repeated catheter movement within the vessel. The trauma exposes the subendothelial layer of the vessel to which platelets adhere, which activates the normal haemostatic clotting processes and increases the likelihood of thrombus formation.

### Treatment <sup>(3)</sup>

Stop the infusion and resite the device. Apply warm compresses to provide symptomatic relief. Encourage mild movement of the limb. Reassure the patient by explaining what has happened then document.

### Prevention <sup>(3)</sup>

Always select an appropriately-sized catheter for the patient. Ensure the device is correctly secured. Use an extension set to minimise manipulation of the device. Instruct the patient on the amount of movement permitted.

## Chemical phlebitis

---

Chemical phlebitis can usually be attributed to the nature of the fluid being administered. An inflammatory response can result if solutions or medication with a high or low pH or osmolarity damage the tunica intima, resulting in phlebitis.

### Treatment <sup>(3)</sup>

Stop the infusion and resite the device. Apply warm compresses to provide symptomatic relief. Encourage movement of the limb. Reassure the patient by explaining what has happened then document.

### Prevention <sup>(3)</sup>

Dilute drugs according to instructions. Check compatibilities carefully to reduce the risk of particulate formation. Administer drugs via infusion rather than bolus injection. Be aware of the factors involved, such as pH.

## Infective phlebitis

---

Infective phlebitis is the inflammation of a vein caused by the presence of infection. It is characterised by positive significant bacterial culture from the catheter tip, in conjunction with a positive culture from a peripheral vein. If the bacteria cultures are negative, the cause of the phlebitis is assumed to be either mechanical or chemical.

### Treatment <sup>(3)</sup>

Stop the infusion, remove the catheter and site a new device in the opposite arm if possible. Follow hospital policy about sending cannula tip for bacterial analysis. Clean the area and apply a sterile dressing. Check regularly and document.

### Prevention <sup>(3)</sup>

The use of correct aseptic technique during insertion, while handling the catheter; and proper care and dressing of the insertion site will minimise the risk of infective phlebitis.

## Thrombophlebitis

---

- Thrombophlebitis is venous inflammation in combination with venous thrombosis, which may lead to vessel occlusion. Dislodgement of a thrombus could cause a pulmonary embolus
- Clinical symptoms of peripheral thrombophlebitis include: oedema of the affected arm, shoulder and face, associated with pain, numbness or tingling; there may be a distension of the veins and the formation of a collateral blood supply; and the affected arm may be cooler or discoloured compared with the other arm.

### Treatment <sup>(3)</sup>

The patient may require ultrasound to diagnose a clot in the arm. If confirmed the patient will require anticoagulation therapy. Catheter removal will depend on the severity of the symptoms, and other device options.

### Prevention <sup>(3)</sup>

Ensure the tip is correctly positioned.

Vygon (UK) Ltd, The Pierre Simonet Building, V Park, Gateway North,  
Latham Road, Swindon, Wiltshire SN25 4DL

Tel: 01793 748800 Fax: 01793 748899 Email: [vygon@vygon.co.uk](mailto:vygon@vygon.co.uk)

[vygon.co.uk](http://vygon.co.uk) [@vygonuk](https://twitter.com/vygonuk) [in](https://www.linkedin.com/company/vygonuk) vygonuk [yt](https://www.youtube.com/channel/UCvYgONk) vygonuk [ig](https://www.instagram.com/vygonuk) vygonuk

Copyright Vygon (UK) Ltd 2018 Content correct as of: 04/2018 Code: BUIVT-028 v1



Value Life