

Mid-Line Policy

**(Insertion, Care of and Removal of Peripherally Inserted
Midline Catheters in Adults Policy and Procedures)
Used by Cystic Fibrosis, Bronchiectasis and Heart
Failure teams**

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REVIEW DATES AND DETAILS OF CHANGES MADE DURING THE REVIEW

June 2018 – review of V4 Added in Heart failure service and Assistant Practitioner role in scope, updated into latest Trust format

January 2023 – review of V5 Added in further usage for Heart Failure Team

KEY WORDS

Mid line, cannula, home intravenous antibiotics, cystic fibrosis, bronchiectasis, heart failure

1 INTRODUCTION AND OVERVIEW

- 1.1** This document sets out the University Hospitals of Leicester (UHL) NHS Trusts Policy and Procedures for the insertion, care of and removal of Peripherally Inserted Mid-Line (PIML) catheters in adult patients, hereafter known as 'Mid Lines'
- 1.2** A Peripherally Inserted Mid-Line (PIML) is an intravenous access device designed for short to medium term access. They are often used when standard peripheral access is difficult or limited. A mid-line catheter for adults is defined as one that is between three and eight inches (8cm – 20cm)
- 1.3** The use of a PIML can help protect the integrity of veins and are appropriate for the administration of fluids and medications.
- 1.4** Mid-lines are often used to administer intravenous antibiotics for patients receiving ten days or more treatment either as an inpatient or at home.
- 1.5** Midlines will also be used for IV furosemide by the heart failure team as better practice for longer term treatment

2 POLICY SCOPE

- 2.1** This policy applies to:
 - a) Adult patients within the Respiratory Service at Glenfield Hospital
 - b) Adult patients registered with the Heart Failure Service being cared for at Glenfield Hospital
- 2.2** This Policy does not apply to the use of Mid-Lines in Children under 16 years, please refer to Childrens Guideline: Insertion and Maintenance of Central Lines C112/2016
- 2.3** This Policy applies to Doctors, Registered Nurses and Assistant Practitioners who have been trained and assessed as competent in the insertion, care of and removal of Mid-Lines (see section 6 for more details)
- 2.4** UHL is a teaching hospital and provides placement or work based learning for Pre-registration students such as Medicine, Nursing, Midwifery, Paramedic, Radiography, Physiotherapy, Occupational Therapy and Pharmacy and Trainees in the workplace such as Assistant Practitioners and Nursing Associates. This policy applies to these learners in the following circumstances:
 - a) If Mid Line insertion, care of and/or removal is a specific competency requirement of their placement or programme then the pre-registration student / trainee is able to perform the skill under direct supervision of their mentor / supervisor once they have received the relevant underpinning theory and passed a simulated practice
 - b) If the pre-registration student / trainee have passed an LCAT competency assessment in practice they may be able to perform the skill with indirect supervision at the discretion of their mentor / supervisor and the Registered Professional delegating the task.
 - c) If Mid Line insertion, care of and/or removal are not a specific competency requirement of their placement or programme then the pre-registration student / trainee must only participate in the process as an observer.
 - d) Please also see section 6 for education and training requirements
- 2.5** This policy is to be used in conjunction with the Vascular Access Policy (Trust Reference B13/2010) and uses the LocSIPP from that policy

3 DEFINITIONS AND ABBREVIATIONS

CF – Cystic Fibrosis

HF – Heart Failure

HIVAT – Home Intravenous Antibiotic Therapy

Mid line Catheters – peripherally inserted lines used for short to medium term access

4 ROLES

4.1 The Lead for this Policy is the Renal, Respiratory, Cardiac and Vascular (RRCV) Head of Nursing

4.2 The RRCV Clinical Management Group (CMG) Clinical Director and Head of Nursing are responsible for:

- a) Supporting line managers to ensure they have sufficient staff trained as competent in the insertion, care of and removal of mid-lines appropriate to their patient group
- b) Act on any concerns where service may be compromised due to lack of competent staff.

4.3 Ward Sister / Charge Nurse within RRCV, Specialist Nurses and Advanced Nurse Practitioners are responsible for:

- a) Ensuring that they have sufficient staff trained as competent in the insertion, care of and removal of mid-lines appropriate to their patient group
- b) Acting on concerns raised by staff regarding a loss of competence by arranging additional training and assessments as needed

4.4 The Doctor, Specialist Nurse or Assistant Practitioner inserting mid-lines are responsible for:

- a) Ensuring that they are trained and assessed as competent to perform the task
- b) Following the appropriate procedure to obtain patient consent
- c) Following the procedures set out in this policy for the insertion of the line
- d) Liaising with the nursing team caring for the patient to make sure they are able to care for the mid-line in their clinical area.
- e) Informing their line manager if they have any concerns regarding their competency.

4.5 The Doctor, Registered Nurse or Assistant Practitioner caring for and / or removing mid-lines are responsible for:

- a) Ensuring that they are trained and assessed as competent to perform the task
- b) Following the appropriate procedure to obtain patient consent
- c) Following the procedures set out in this policy for the care of and / or removal of the line
- d) Informing their line manager if they have any concerns regarding their competency.

5. POLICY IMPLEMENTATION AND ASSOCIATED DOCUMENTS

This policy is supported by procedures for the Insertion, Administration of Medicines, Care of and removal of Mid-lines attached as appendices One, Two and Three

5.1 Indications for using a Mid-Line:

- a) Mid to long term IV therapy (e.g. antibiotics) greater than 7 days
- b) Mid-Lines may also be used for patients who need continuous infusions but whose cannula need to be changed daily

5.2 Contraindications for using a Mid-Line:

- a) Veins compromised due to oedema
- b) Inadequate practical knowledge of mid-lines in the area where the patient is being nursed.

5.3 Advantages of using a Mid-Line

- a) Complications of central line placement are avoided
- b) Chest x-ray not required for 8cm mid-lines
- c) Provides dedicated access for IV medications such as antibiotics
- d) Preserves the peripheral vascular system of the upper extremities
- e) Reduces the need for repeated venepuncture, preserving venous access
- f) Suitable for all IV fluid and drug types normally administered through a short peripheral cannula
- g) Reported infection rates are lower than for central lines

5.4 Disadvantages of using a Mid-Line

- a) Extensive training and education required
- b) Maintenance of skill level
- c) Mechanical or chemical phlebitis can be a complication
- d) Not suitable for long term use (e.g. longer than 4-6 weeks) If the line is used for longer than this time it must be clearly documented in the patients case notes and the justification provided.

5.5 Dwell Time

Factors affecting the dwell time of the catheter include:

- a) Clinical status of the patient
- b) Environment in which care is provided
- c) Skill level of health professionals caring for the patient
- d) Type and duration of intravenous therapy
- e) Characteristic of catheter

5.6 Choice of Insertion Site

Please see Appendix One for the procedure for Inserting a Mid Line

<p style="text-align: center;">Superficial veins of the right upper limb</p>	<p>Median Basilic Vein</p> <p>Usually the first choice of vein. It is large and follows a smooth path that will facilitate passage. However it does not sit as superficial as the cephalic vein and may require entry by palpation. The basilic vein is in close proximity to the brachial artery and some branches of the internal cutaneous nerve, care must therefore be taken to prevent injury to either of these structures during venepuncture.</p> <p>Median Cephalic Vein</p> <p>This is usually superficial and easy to enter at the antecubital fossa. However because of the abrupt angle with which the cephalic joins the axillary vein difficulties can be encountered while attempting to thread the line through the vein. Positioning the patient's arm at a right angle to the trunk of their body may facilitate catheter passage. If the cephalic vein is connected to the subclavian vein by a branch, catheter passage may be impossible beyond this point.</p>
<p>Because of the shorter length of these lines, they can be placed on the lower arms. Avoid joints e.g. at the wrist, as insertion can be more painful and there is also a higher chance of line fracture or blockage.</p>	

5.7 Potential Problems with Mid Lines

Problem	Possible Solution / Action
Insertion Failure	Early identification and referral of suitable patients prior to repeated episodes of peripheral access is recommended.
Arterial puncture	Be aware of the position of arteries, keep the needle superficial, and observe the nature of blood at flashback. Only insert lines into veins, which can be palpated.
Nerve Injury	Accurate vessel recognition, palpation of the vessel and superficial needle insertion will reduce the risk of nerve damage.
Failure to advance line	Ensure the patient is comfortable and correct positioning of arm. Median Cephalic vein insertion- vessel may be small and convoluted. Median Basilic vein insertion - medial intramuscular septum (mid upper arm) may interfere with catheter placement
Insertion site leakage	Observe, dressing may need to be changed after 24 hours
Catheter related infection	Aseptic non touch technique (ANTT) must be followed

Problem	Possible Solution / Action
Mechanical phlebitis	Usually occurs within the first 48 hours (may occur up to 7 days) treatment involves application of heat (see also troubleshooting guide Appendix Four)
Catheter occlusion	Never force flushing (see also troubleshooting guide Appendix Four)
Stuck' catheter	Stuck catheters should NEVER be stretched follow removal procedure. (see also troubleshooting guide Appendix Four)

5.8 Documentation:

The following must be documented:

- a) Patient verbal consent
- b) Risks and benefits explanation to patient
- c) Catheter size, make and batch number
- d) Position of placement
- e) Solutions used to clean area prior to insertion
- f) Dressing used
- g) Flushing procedure used following insertion
- h) Name of professional inserting line
- i) Reason for insertion of line/who requested insertion
- j) If available please also use the label off the mid line pack

5.9 Patient Consent and Additional Patient Information

Information that should be given to patients to enable informed consent, a patient leaflet is available from the Specialist Nurses

a) An explanation of any risks to include:

- Infection of line
- Phlebitis (Mechanical, Infective and Chemical)
- Thrombosis
- Air embolism
- Infiltration of drug
- Catheter tip migration
- 'Stuck' Line on removal

b) An explanation of benefits to include:

- Improved patient comfort
- Ease of use, enables patient to be confident and competent with drug delivery
- Lower infection rate
- Provides dedicated IV access
- No anaesthetic required for insertion (topical may be used if required)

- Preservation of poor venous access
- Inserted on ward
- Facilitates safe delivery of potentially irritant drugs

c) **Washing and Swimming Guidelines Post Mid-Line Insertion**

There is little literature to support any guidelines. The following principles may be taken into account when advising patients.

Because the mid line enters the vein at the point where the catheter exits from the body (that is, there is no tunnelling as in a Hickman Line), the exit site should not be allowed to come into contact with unsterile water. Therefore an IV dedicated transparent dressing, if properly applied, will allow showering, but immersing the site while bathing should be discouraged. Patients should not swim

5.10 **Dressings and Needle free injectable bung:**

- A Stat Lock and a suitable semi permeable dressing should be applied immediately after insertion.
- Ideally the exit wound should be left undisturbed; routine taking down of the dressing for inspection exposes the patient to increased risk of infection. Replace dressing every 7 days
- Any dressing should be inspected regularly and renewed immediately should it become soiled, wet or detached
- All lines must be accessed using a needle free injectable bung, These can be accessed safely for 7 days or a 100 punctures

5.11 **Associated Documents –None.**

6 EDUCATION AND TRAINING REQUIREMENTS

- All Healthcare Professionals identified in Section 2 must undertake the necessary education and training and assessment of competence to be able to insert, care for and remove Mid lines.
- Training on the insertion and removal of midlines is available from the CF and Bronchiectasis Specialist Nurses and will be provided based on service need. Staff attending training must have already received training and successfully been assessed as competent in peripheral cannulation and phlebotomy
- Training will cover the following subjects and include supervised practice and assessment of competence in the clinical area using a tool such as LCAT
 - Correct identification of patient and gaining informed consent
 - Identification of suitable vein for line insertion
 - Choose the most appropriate line for the patient and it's intended use
 - Demonstrate strict ANTT throughout procedure
 - Insert catheter following the procedures laid down in this policy
 - Comply with Documentation requirements
- Staff who have been trained outside the Trust must complete a one off practical assessment to verify competence

7 PROCESS FOR MONITORING COMPLIANCE

Element to be monitored	Lead	Tool	Frequency	Reporting arrangements Who or what committee will the completed report go to.
Audit of mid line catheters within RRCV	CF, Bronchiectasis and Heart Failure Specialist Nurses	Audit with CASE	Every 2 years	CMG Senior Clinical Leads Infection Prevention team

8 EQUALITY IMPACT ASSESSMENT

- 8.1 The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
- 8.2 As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

9 SUPPORTING REFERENCES, EVIDENCE BASE AND RELATED POLICIES

Loveday et al (2014) *epic3: National Evidence Based Guidelines for Preventing Healthcare Associated Infections in NHS Hospitals in England*; Journal Hospital Infection S1-S70

NHS Improvement (2017) *High Impact Interventions - Care processes to prevent infection, 4th edition of Saving Lives*, Infection Prevention Society

Owen K (2014) The use of 8cm Mid Lines in Community IV Therapy. *British Journal of Nursing*, Vol. 23 No. Sup19 | pp S18–S20

Policy for Documenting in Patients' Health Records* (in all media), Trust Reference B30/2006

Vascular Access in Adults and Children, Policy and Procedures, Trust reference B13/2010

10 PROCESS FOR VERSION CONTROL, DOCUMENT ARCHIVING AND REVIEW

- 10.1 This policy will be reviewed in 18 months or sooner in response to identified clinical risks.
- 10.2 This Policy is available through INsite Documents in the PAGL Library and the Trust's externally-accessible Freedom of Information publication scheme. It will be archived through the Trusts PAGL system

1. Introduction and who Procedure applies to

This procedure applies Doctors, Specialist Nurses and Assistant Practitioners who have been trained and assessed as competent in the insertion of Mid-Lines

2. Equipment needed for insertion of Mid-line Catheter:

- a) Mid-line catheter
- b) Dressing pack
- c) Stat lock
- d) Sterile gloves
- e) Plastic apron
- f) Sterile paper towels x2
- g) Chlorhexadine gluconate (Chlorprep) 2%
- h) Sodium Chloride 0.9%
- i) Heparin 200 units in 2mls (Used with specific patient groups only)
- j) 10ml syringes (no smaller size line should be used)
- k) Green Needle
- l) Blue or filter Needle
- m) Needle free injectable bung
- n) Semi permeable dressing

3. Procedure for Insertion of Mid-Line Catheter

No	PROCEDURE	RATIONALE
1	Discuss the option of a mid line with the patient (and family if appropriate) giving full details of options, risks and benefits, explain procedure and give option for questions. Gain consent for the procedure.	To reduce anxiety. Ensure patient has informed choice and is fully aware of the procedure
2	Assess potential venous access. Identify appropriate vein. Always consider non-dominant arm first.	To ascertain adequate venous access
3	Assess patients need for topical anaesthetic and apply if required.	For patient comfort and to reduce pain on canulation
4	Obtain required Mid-Line. Prepare dressing trolley with equipment required.	Ensure adequate preparation for procedure
5	Prepare patient and bed area, ensure plenty of space	Ensure procedure can be performed freely
6	Assist positioning of patient with arm extended to 45 or 90 degree angle to the trunk of the body	To allow the best possible position for the insertion of the catheter
7	Wash hands and apply alcohol hand rub	To reduce risk of cross infection

No	PROCEDURE	RATIONALE
8	Using 2 nd health professional, open required equipment and put on plastic apron and sterile gloves.	To provide a sterile environment for line placement and ensure all equipment is to hand
9	Prime the line with the normal saline 0.9% observing the length of the line	Observe for damage to the line
10	Ask assisting person to remove dressing and clean off anaesthetic cream (if used)	Reduce risk of contamination to sterile field
11	Place sterile field under arm, clean area around desired vein with chlorprep	Maintain sterile field
12	Ask assisting person to tighten tourniquet and place sterile towel over arm leaving desired area visible	Enable palpation of vein Extend sterile field
13	Cannulate the identified vein	Venepuncture is confirmed by a free flowing blood 'flashback'
14	Ask assisting person to release tourniquet	To prevent unnecessary blood loss and allow entry for line
15	Insert guide wire approx 10cm Apply slight pressure on insertion site and remove insertion needle, thread line over guide wire, ensure that the end of the guide wire is visible at the end of the line. Hold this and advance line up the guide wire until entire length is inserted.	To anchor vein To prevent dislodging of guide wire To prevent migration of guide wire Ensure correct positioning of line
16	Remove guide wire	To remove the introducer
17	Ensure the skin is clean and dry prior to securing the catheter with stat lock and an appropriate dressing	To provide a sealed dressing to prevent contamination of the insertion site of the catheter
18	Connect needle free injectable bung	Provide a sealed unit and prevent air embolism Provide a needle less system
19	Flush with the rest of the normal saline 0.9%	To ensure patency
20	Some patient groups also require a 'heplock' with Heparin 200units in 2mls. (<i>In the absence of convincing evidence local experience is used</i>)	To maintain a positive lock and prevent clotting within the line while not in use
21	Remove gloves and apron and dispose of used equipment safely	Maintain health and safety of staff and patients
22	Record procedure in patients notes	To maintain medical records and promote communication
23	Ensure patient is left comfortable	Reduce anxiety

1. Introduction and who Procedure applies to

This procedure applies Doctors, Specialist Nurses, Registered Nurses and Assistant Practitioners who have been trained and assessed as competent in the care of Mid-Lines

2. Care Standards

The Registered Nurse in charge of the patient's care must undertake the following on each shift:

- a) Monitor the condition of the mid-line
- b) Immediately report any issues concerning the mid-line to the professional who inserted the line or a suitably qualified practitioner in their absence
- c) Educate patient/carer how to care for the mid-line as appropriate
- d) Troubleshoot any problems occurring and know who to contact if unable to resolve (also see appendix four of the main policy)

3. Things to consider:

- a) Always follow a clean procedure, good hand washing principles, use of hand rub
- b) Slight oozing from the catheter entry site is normal in the first 24 hours post insertion
- c) Mechanical phlebitis may be treated with the application of heated pads three times a day - phlebitis should resolve within 48 hours.
- d) Never use less than 10ml syringe for administration of medications or flushing
- e) Cover arm with either tubigrip (ensure not too tight) or a bandage as patients preference
- f) Venous sampling: Lumen of midline may be too small for this procedure to be undertaken and can increase risk of blockage
- g) Always use needle free injectable system (Bionector) these should be changed every 100 insertions or every 7 days whichever is the sooner
- h) Dressings should be changed every 7 days or sooner if becomes soiled
- i) Always flush with pulsed/turbulent technique (push/pause)
- j) Ensure clamps are closed when not in use
- k) The line must be flushed daily when not in use with 10mls sodium chloride 0.9% followed (For certain patient groups only) by heparin 200 units in 2 mls
- l) Always clamp line under positive pressure

1. Introduction and who Procedure applies to

This procedure applies Doctors, Specialist Nurses, Registered Nurses and Assistant Practitioners who have been trained and assessed as competent in the removal of Mid-Lines

2. Procedure for the removal of a Mid Line

No	PROCEDURE	RATIONALE
1	Determine that Mid-line is no longer needed	Determine end of intravenous treatment and prevent unnecessary removal
2	Check medical notes to determine length of line inserted	Pre determine length of line expected on removal
3	Position patient comfortably	Relax patient and reduce anxiety
4	Wash hands and apply alcohol hand rub	Maintain good practice
5	Loosen dressing until free from skin contact	Prevent contamination Facilitate smooth removal
6	Apply alcohol hand rub and powder free non sterile gloves	Maintain clean procedure
7	Gently and slowly remove line in small increments	Removal too quickly can make the vein go into spasm and make removal difficult and painful
8	Once the line has been removed cross check with size inserted and ensure line is intact	Ensure all of the line is removed
9	Cover insertion site with mepor style dry dressing which should be left in place for 6 hours	To prevent infection and leakage
10	Ensure equipment is disposed of correctly	Maintain health and safety policy
11	Ensure patient comfortable	Reduce anxiety for future mid line usage
12	Document procedure in patient's medical notes	In line with Trust Policy (B30/2006)

Problem	Troubleshooting Tips
<p>Mechanical phlebitis (redness, swelling, tenderness) <i>Possible causes;</i> <i>*Use of powdered gloves</i> <i>*Catheter irritating vein</i></p>	<ul style="list-style-type: none"> Elevate affected arm Encourage movement of affected arm Apply heated pads e.g. warm towel If does not improve after 48-72 hours or worsens then remove line - Small amount (<1cm) of redness at insertion site without tenderness and oozing is common
<p>Soiled dressing</p>	<ul style="list-style-type: none"> A small amount of bleeding is common immediately following placement If saturated with blood change dressing If bleeding excessively, apply firm manual pressure, change dressing to prevent catheter migration Catheter movement may cause oozing at insertion site, change dressing and immobilise catheter
<p>Occluded Catheter <i>Possible causes;</i> <i>*Catheter kinked</i> <i>*Kink in IV tubing</i> <i>*Clot within Line</i></p>	<ul style="list-style-type: none"> Check clamps Check catheter extension for twist or kinks Attach 10ml syringe with sodium chloride 0.9%, apply positive and negative pressure (push/pull the plunger) to aspirate occlusive substance If still occluded seek advice - DO NOT use < 10ml syringe
<p>Leaking Catheter</p>	<ul style="list-style-type: none"> Tighten all leuer lock connectors Change T-connector if used If dressing is wet, clean and redress Flush with 10mls sodium chloride 0.9%, if there appears to be a hole in the catheter, it will have to be removed (follow removal guidelines)
<p>Catheter Migration</p>	<ul style="list-style-type: none"> Determine amount of catheter remaining in the arm (Total length – external length) DO NOT attempt to reinsert line Redress and coil all external catheter under dressing
<p>Resistance with removal</p>	<ul style="list-style-type: none"> Make sure the patient's arm is straight DO NOT pull on the catheter Secure catheter and apply warm, moist compress to promote vasodilation, continue with warm, moist compresses for 1-2 hours if necessary Attempt to remove every 15-30 minutes, if resistance continues, reapply warm compress and seek advice