1. **Aim/Purpose of this Guideline**

1.1. Neonates commonly require central intravenous access for the administration of total parenteral nutrition, hyperosmolar fluids, or drugs. The procedure carries risks of tissue injury, line misplacement injury and potential introduction of infection. This guidance applies to all staff undertaking the procedure of neonatal percutaneous longline insertion and aims to detail how to perform the procedure successfully and to minimise risks for the baby.

1.2. Peripheral long lines need to be placed in a large bore vessel in order to be used safely. Guidance to ascertain acceptable positioning of the longline and documentation required is included in Section 2.3.

1.3. Any staff member performing the procedure independently needs to have experience and competence. This guidance should be read in conjunction with RCH documents indicated in the References Section. Implicit consent is considered acceptable for many routine procedures performed in neonatology but whenever possible, parents should be informed of the assessed need for this procedure and potential risks (BAPM Consent for Common Neonatal Investigations, Interventions and Treatments 2004).

1.4. This version supersedes any previous versions of this document.

1.5. **Data Protection Act 2018 (General Data Protection Regulation – GDPR) Legislation**

The Trust has a duty under the DPA18 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed and documented. We can’t rely on Opt out, it must be Opt in.

DPA18 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the DPA18 please see the ‘information use framework policy’, or contact the Information Governance Team [rch-tr.infogov@nhs.net](mailto:rch-tr.infogov@nhs.net)

2. **The Guidance**

The baby needs to be able to be kept warm and in a comfortable position for the procedure. A second person may be needed to support the baby.

2.1. **EQUIPMENT**

- Sucrose analgesia/ ensure appropriate analgesia in progress
- Sterile gown and gloves
- Tape measure
• Premicath or Nutriline longline, single or double lumen (Premicath usually for <1kg weight baby)
• +/- separate splitting insertion needle if using Nutriline
• Vygon microsite 2FR MST Kit.
• Steristrips, small piece of sterile gauze and clear sterile dressing
• Sterile dressing pack with gallipot, gauze, sterile drape, gloves
• Sterile scissors and fine non-toothed forceps
• 10mL luer lock syringe and needle, 10mL 0.9% saline, 0.05% Chlorhexidine solution

2.2. PROCEDURE

2.2.1. Initial Preparation

• Prepare a trolley surface, cleaning with 70% alcohol wipe and allow to dry
• Gather equipment required, double checking the 0.9% saline ampoule to be used with a second practitioner
• Wash hands
• Identify the patient in accordance with RCHT policy
• Administer sucrose analgesia/ ensure baby has adequate pain relief and position baby to promote comfort of baby and practitioner for procedure

2.2.2. Examination and calculating insertion length

• In good light/ using vein illumination device, inspect limbs for suitable longline insertion sites.
• Long saphenous veins or antecubital fossa (ACF) sites are preferable. The lesser saphenous or popliteal veins can also be used. Scalp veins can be suitable but are less preferable and should only be used by experienced staff
• The basilic veins at the ACF are often more successful insertions due to less angulation at the shoulder
• Once site identified, measure and note insertion distance with tape measure
• ACF site insertion measure to suprasternal notch
• Long saphenous site measure to xiphisternum
• Scalp veins measure to suprasternal notch

2.2.3. Procedure without using microsite kit

• Wash hands again thoroughly before putting on sterile gown and gloves
• Prepare equipment listed onto sterile surface and prime the extension set
• Clean the skin of the limb to be used, including between fingers or toes near to insertion site planned, using 0.05% Chlorhexidine soaked gauze and position the limb on/through a sterile towel and allow skin to dry
• Place sterile drapes across field to prevent contamination of equipment
• Apply gauze tourniquet approximately 2-3cm above insertion site
• Occlude the vessel, using fingers supporting the baby’s limb above planned insertion site and apply slight traction proximal to site
• Insert the splitting cannula, bevel uppermost, at an angle of 20° to the skin until securely within the vein
• When blood flow is seen in the cannula chamber stabilise the needle and begin to insert the primed longline, using forceps to feed in the line until the desired length is inserted, periodically flushing gently with saline
• If resistance or swelling occurs, remove the needle and apply pressure to site to reduce any haematoma formation
• If the cannula flushes satisfactorily, withdraw the needle with gauze held firmly over the insertion site to avoid accidental withdrawal of the line
• Split the cannula and lift out the line carefully from it, to avoid perforation
• Apply steristrips to secure the cannula, place a small piece of gauze beneath the wings within the line to avoid pressure damage and place the transparent dressing over the site, allowing for ongoing site inspection.
• Ensure the dressing does not circumference the limb
• Avoid wrapping the heel (as prevents later capillary sampling from that limb)
• Dispose of waste according to RCH waste and sharps policy and wash hands
• Document the procedure in the baby’s notes (utilising the sticker proforma when available) indicating the gauge and lot of longline used, insertion length and site and any sterile supplies equipment pack used
• If unsuccessful after 1 attempt, a new needle should be used. Another suitably trained/ more experienced practitioner should be consulted after 2 unsuccessful attempts. Separate needles now available on unit.
• Unsuccessful attempts should also be documented in the notes
• After successful insertion, patency should be maintained with 1ml/hr 0.9% saline until tip site confirmed by X-Ray (0.3ml contrast will be needed for Premicath lines, flushed with saline immediately after X-Ray taken)
• Longline position on X-Ray should be immediately reviewed by a senior medical staff member. Clear documentation in the medical notes of the line tip position and any adjustments should be made. The X-Ray report should be chased and result documented in medical notes. Daily review is advised to ensure staff awareness of the baby’s line position. If the consultant on service has not seen the X-Ray they should review the film.

2.2.4. Procedure when using the microsite kit

• Wash hands again thoroughly before putting on sterile gown and gloves
• Prepare equipment listed onto sterile surface and prime the extension set
• Clean the skin of the limb to be used, including between fingers or toes near to insertion site planned, using 0.05% Chlorhexidine soaked gauze and position the limb on/through a sterile towel and allow skin to dry
• Place sterile drapes across field to prevent contamination of
equipment
• Apply gauze tourniquet approximately 2-3cm above insertion site
• Occlude the vessel, using fingers supporting the baby’s limb above planned insertion site and apply slight traction proximal to site
• Insert introducing needle or preferred cannula, bevel uppermost, at an angle of 20° to the skin until securely within the vein.
• Insert the microwire into the needle/cannula using the blue adaptor.
• Advance the microwire up to the black mark. Don’t advance the microwire too far.
• Remove the microwire ensuring that you apply gentle pressure over the microwire, at the end of the needle/cannula, to ensure that the microwire does not come out with the needle.
• Feed the splitting needle and white dilator over the microwire until fully inserted into the vein.
• Carefully remove the microwire.
• Insert the primed longline, using forceps to feed in the line until the desired length is inserted, periodically flushing gently with saline.
• If resistance or swelling occurs, remove the needle and apply pressure to site to reduce any haematoma formation.
• If the cannula flushes satisfactorily, withdraw the needle with gauze held firmly over the insertion site to avoid accidental withdrawal of the line.
• Split the cannula and lift out the line carefully from it, to avoid perforation.
• Apply steristrips to secure the cannula, place a small piece of gauze beneath the wings within the line to avoid pressure damage and place the transparent dressing over the site, allowing for ongoing site inspection.
• Ensure the dressing does not circumference the limb.
• Avoid wrapping the heel (as prevents later capillary sampling from that limb).
• Dispose of waste according to RCH waste and sharps policy and wash hands.
• Document the procedure in the baby’s notes (utilizing the sticker proforma when available) indicating the gauge and lot of longline used, insertion length and site and any sterile supplies equipment pack used.
• If unsuccessful after 1 attempt, a new needle should be used. Another suitably trained/ more experienced practitioner should be consulted after 2 unsuccessful attempts. Separate needles now available on unit.
• Unsuccessful attempts should also be documented in the notes.
• After successful insertion, patency should be maintained with 1ml/hr 0.9% Saline until tip site confirmed by X-Ray (0.3ml contrast will be needed for Premicath lines, flushed with saline immediately after X-Ray taken).
• Longline position on X-Ray should be immediately reviewed by a senior medical staff member. Clear documentation in the medical notes of the line tip position and any adjustments should be made. The X-Ray report should be chased and result documented in medical notes. Daily review is advised to ensure staff awareness of the baby’s
line position. If the consultant on service has not seen the X-Ray they should review the film.

2.3. **CONFIRMING LINE POSITION ON XRAY**

2.3.1. Peripheral long lines need to be placed in a large bore vessel in order to be used safely for parenteral nutrition. A line tip in a superficial or fine vessel risks vein perforation and subsequent extravasation. The fine nature of the catheter increases the risk of perforation and puncture of the myocardium with possible subsequent cardiac tamponade if an intra-cardiac position occurs. If the catheter tip crosses the foramen ovale to the left atrium the position is also unsatisfactory.

2.3.2. The best position for the line is in the superior or inferior vena cava. The superior vena cava has no branches and is completely safe. The inferior vena cava has the renal veins draining into it at L1 and a catheter tip may inadvertently enter the renal vein and cause renal vein thrombosis. The tip therefore needs to be above L1 but below the right atrium or alternatively well below L3.

2.3.3. The brachiocephalic veins and iliac vessels are also large bore and if the tip is placed in these it is likely this is a safe position. Be aware though that if the tube is positioned in the cephalic system that the tip is not necessarily in a large bore vein at the clavicular level. The cephalic vein drains into the axillary vein having crossed the clavipectoral fascia. A cephalic insertion is inferred by the catheter passing lateral to the humerus and not medial. The tip can get obstructed as it passes the fascia. Long lines can take a wrong course and become coiled in vessels or can end up in the neck or contralateral limb.

2.3.4. Lines coursing in to the neck should not be used and should be immediately withdrawn. Ascending lumbar vein (ALV) malposition is a relatively common complication of lower-limb placed PICCs but may often go unrecognised.

2.3.5. Practitioners inserting CVCs should be familiar with the specific features of ALV malposition.

Consider pericardial effusion/cardiac tamponade/supraventricular tachycardia in any neonate who collapses with a long line/central venous catheter in situ.
Peripheral long lines need to be placed in a large bore vessel in order to be used safely for parenteral nutrition (TPN). A line tip in a superficial or fine vessel risks vein perforation and subsequent extravasation. The fine nature of the catheter increases the risk of perforation and puncture of the myocardium with possible subsequent cardiac tamponade if an intracardiac position occurs. If the catheter tip crosses the foramen ovale to the left atrium the position is also unsatisfactory. Lines towards neck/head vessels should also be withdrawn. The best position for an upper body longline is in the superior or inferior vena cava. The superior vena cava has no branches and is completely safe. The tip therefore needs to be above L1 but below the right atrium or alternatively well below L3. Lower body longlines appearing to ‘spiral’ in the lumbar region should be removed as they may have entered the ascending lumbar veins (ALV) pathway.
**Example longline positions** (RCH radiology images)

<table>
<thead>
<tr>
<th>SVC Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well sited long line</td>
</tr>
</tbody>
</table>

**Left Atrial Insertion – urgent withdrawal**
**Insertion in Cephalic System**

The line may or may not be in a large vessel in this position, observe for signs of swelling.

**Line in Ascending Lumbar Vein**

Line inadvertently entering ALV – remove.
2.4. **ONGOING CARE OF THE LINE**

2.4.1. The longline site should be monitored and documented daily on the care plan with site checked hourly

2.4.2. Any access to the line should use strict approved ANTT technique

2.4.3. A minimum of 4 hourly core observations should be taken whilst line in situ with prompt investigation and assessment of any nursing concerns

2.4.4. The line should be removed at the earliest opportunity

*Consider pericardial effusion/cardiac tamponade in any neonate who collapses with a long line/central venous catheter in situ*

3. **Monitoring compliance and effectiveness**

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Incidents relating to presence of longlines, catheter related sepsis, extravasation injury</th>
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<tbody>
<tr>
<td>Lead</td>
<td>Guidelines Lead</td>
</tr>
<tr>
<td>Tool</td>
<td>Audit&lt;br&gt;To be included in the Neonatal Audit and Clinical Audit Programme&lt;br&gt;Findings reported to the Audit and Clinical Guidelines meetings.</td>
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<tr>
<td>Frequency</td>
<td>As dictated by audit findings</td>
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<tr>
<td>Reporting arrangements</td>
<td>Neonatal Clinical Guidelines meeting</td>
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<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>Guidelines Lead</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Required changes to practice will be identified and actioned within 3 months of audit&lt;br&gt;A Lead member of the team will be identified to take change forward where appropriate&lt;br&gt;Lessons will be shared with all relevant stakeholders</td>
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4. **Equality and Diversity**

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the ‘Equality, Inclusion & Human Rights Policy’ or the Equality and Diversity website.

4.2. **Equality Impact Assessment**

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
## Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Neonatal Longline Insertion - Clinical Guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>20 November 2019</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>December 2019</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>December 2022</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Lel George, Advanced Neonatal Nurse Practitioner</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252667</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>Procedure for neonatal central venous access using a percutaneous longline, equipment required, technique to be used, documentation and monitoring required</td>
</tr>
<tr>
<td>Suggested Keywords:</td>
<td>Neonate, neonatal, central line, longline, percutaneous, TPN</td>
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<tr>
<td>Target Audience</td>
<td>RCHT CFT KCCG</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>November 2019</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Neonatal Longline Insertion – Clinical Guideline V2.0</td>
</tr>
<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>Neonatal Guidelines group. Child Health Audit. Consultant approved</td>
</tr>
<tr>
<td>Care Group General Manager confirming approval processes</td>
<td>Debra Shields</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not required</td>
</tr>
<tr>
<td>Name and Signature of Care Group/Directorate Governance Lead confirming approval by specialty and care group management meetings</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Name: Caroline Amukusana</td>
<td></td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet ✅ Intranet Only</td>
</tr>
</tbody>
</table>
Related Documents:

1. RCHT documents; record keeping standards, Patient identification policy, Infection prevention and control policy, waste management policy, medications policy Document Library RCHT
2. Consent for common neonatal investigations, interventions and treatments. BAPM Publications 2004
5. BAPM 2015. Use of Central Venous catheters in Neonates, a Framework for practice

Training Need Identified? No

Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<tr>
<td>6.4.2014</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>Judith Clegg, ANNP, NNU</td>
</tr>
<tr>
<td>30.7.2016</td>
<td>V2.0</td>
<td>Amendments for correct line position post insertion in Consultation with Dr Thorogood, Radiologist, text and references updated as per BAPM guidance</td>
<td>Judith Clegg ANNP</td>
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<tr>
<td>18 August 2016</td>
<td>V2.0</td>
<td>Version reviewed and approved at Consultant led Neonatal Guidelines Group meeting</td>
<td>No changes required</td>
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</table>
Addition of procedure using Vygon microwire kit
Appendix demonstrating the procedure using the Vygon microwire kit.
Removal of photographs.

Lel George ANNP
Appendix 2. Initial Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed:</th>
<th>Neonatal Longline Insertion – Clinical Guideline V3.0</th>
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<tbody>
<tr>
<td>Directorate and service area:</td>
<td>New or existing document:</td>
</tr>
<tr>
<td>Child Health. Neonatal</td>
<td>Existing</td>
</tr>
<tr>
<td>Name of individual completing assessment:</td>
<td>Telephone:</td>
</tr>
<tr>
<td></td>
<td>(01872) 252667</td>
</tr>
</tbody>
</table>

1. **Policy Aim***
   - Who is the strategy / policy / proposal / service function aimed at?
   - The guideline is aimed at all neonatal medical staff who may be required to insert a longline in a neonatal patient and nursing staff caring for babies with a longline in situ

2. **Policy Objectives***
   - As above

3. **Policy – intended Outcomes***
   - Audit

4. **How will you measure the outcome?**
   - Audit

5. **Who is intended to benefit from the policy?**
   - Medical staff required to insert a neonatal long line. Nursing staff required to assist in the procedure and subsequent care of the longline. Neonatal patients requiring a long line for intravenous fluids or drug therapy.

6a. **Who did you consult with**
   - Workforce
   - Patients
   - Local groups
   - External organisations
   - Other
   - x

   - Consultant led, neonatal guidelines group approval

7. **The Impact**
   Please complete the following table. If you are unsure/don’t know if there is a negative impact you need to repeat the consultation step.

Are there concerns that the policy could have differential impact on:

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
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Neonatal Longline Insertion – Clinical Guideline V3.0
Page 14 of 18
<table>
<thead>
<tr>
<th>Age</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Sex (male, female, trans-gender / gender reassignment)</td>
<td>x</td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td>x</td>
</tr>
<tr>
<td>Any information provided should be in an accessible format for the parent/carer’s needs – i.e. available in different languages if required/access to an interpreter if required</td>
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<tr>
<td>Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.</td>
<td>x</td>
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<tr>
<td>Those parent/carers with any identified additional needs will be referred for additional support as appropriate - i.e to the Liaison team or for specialised equipment. Written information will be provided in a format to meet the family's needs e.g. easy read, audio etc</td>
<td></td>
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<tr>
<td>Religion / other beliefs</td>
<td>x</td>
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<tr>
<td>All staff should be aware of any beliefs that may impact on treatment decisions.</td>
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<tr>
<td>Marriage and Civil partnership</td>
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<tr>
<td>Pregnancy and maternity</td>
<td>x</td>
</tr>
<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>x</td>
</tr>
</tbody>
</table>

**You will need to continue to a full Equality Impact Assessment if the following have been highlighted:**
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation - this excludes any policies which have been identified as not requiring consultation. or
- Major this relates to service redesign or development

8. Please indicate if a full equality analysis is recommended. Yes, No, x

9. If you are **not** recommending a Full Impact assessment please explain why.

No area indicated

<table>
<thead>
<tr>
<th>Date of completion and submission</th>
<th>20 November 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members approving screening assessment</td>
<td>Policy Review Group (PRG)</td>
</tr>
<tr>
<td></td>
<td>APPROVED</td>
</tr>
</tbody>
</table>

**This EIA will not be uploaded to the Trust website without the approval of the Policy Review Group.**

A summary of the results will be published on the Trust’s web site.

**Appendix 3 Procedure for using Vygon microwire 2FR MST kit:**

*Neonatal Longline Insertion – Clinical Guideline V3.0*  
*Page 15 of 18*
N.B both sizes of longline fit through this splitting needle therefore use the nutriline for baby’s over 1Kg.

Vygon microsite 2FR MST kit contains introducing needle (which can be replaced with a cannula), microwire with blue adaptor, yellow splitting needle with white dilator.

Using strict Aseptic technique, and following preparation as described in the guideline, insert the introducing needle (or cannula) into vein.

Insert the microwire through the blue adaptor up to the black mark. Don’t advance the microwire past the black mark.
When into the black mark, remove the microwire ensuring that gentle pressure is applied over the microwire to ensure that it does not come out with the needle.

Applying pressure at the tip of the needle to prevent the wire from moving.

Feed the splitting needle with the white dilator over the microwire until fully inserted into the vein.
Remove the white dilator.

Insert the long line through the splitting needle to the desired length. Remove the splitting needle whilst applying gentle pressure on the longline to ensure that it does not move. Split the needle and remove, secure the line as described in the guideline. Document insertion in the notes, request Xray. Review position with senior paediatrician.