Clinical Guideline: Neonatal Tracheostomy Care

Authors: Dr Susan Broster

For use in: EoE Neonatal Units
Guidance specific to the care of neonatal patients.

Used by:

Key Words:

Date of Ratification: Sept 2017
Review due: Sept 2020
Registration No: NEO-ODN-2017-4

Approved by:

<table>
<thead>
<tr>
<th>Neonatal Clinical Oversight Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Lead Mark Dyke</td>
</tr>
<tr>
<td>Approved</td>
</tr>
<tr>
<td>Network Director</td>
</tr>
</tbody>
</table>

Ratified by Clinical Oversight Group:

<table>
<thead>
<tr>
<th>Date of meeting</th>
<th>September 2017</th>
</tr>
</thead>
</table>
1. **Scope**  
Use within Neonatal Services.

2. **Purpose**  
To ensure maintenance of an open airway

3. **Definition of a tracheostomy**  
A tracheostomy is a surgical opening in the anterior wall of the trachea into which a tube is inserted to facilitate ventilation by by-passing the airway mechanisms which normally filter and moisten air\(^1\).

![Diagram of the trachea and tracheostomy](image)

**Fig 1.** A tracheostomy tube is inserted at the level of the 2\(^{nd}\) to 5\(^{th}\) tracheal rings\(^2\)

4. **Abbreviations**  
EENBG – East of England Neonatal Benchmarking Group  
NICU – Neonatal intensive Care Unit  
ITU Chart – Intensive Therapy Chart

5. **Indications for Tracheostomy\(^3\):**  
- When the airway cannot be secured by an oro- or naso-endotracheal tube and resulting airway obstruction becomes life threatening  
- Laryngeal or subglottis stenosis  
- Congenital abnormality:  
  - subglottic haemangioma  
  - tracheomalacia  
  - web, cyst or vascular ring  
- Anticipated need for prolonged ventilation:  
  - chronic lung disease  
  - cardiac disease  
  - pulmonary disease  
- Craniofacial syndrome  
- Neurological disease
Contact Tracheostomy CNS and / LTV CNS to meet parents/guardians to discuss the procedure and aftercare and to answer any questions they may have relating to tracheostomy care of an infant. This may be done at the tertiary receiving centre. Consider location of care for the infant with a tracheostomy; will the staff have access to necessary equipment, can the infant be visible to staff at all times and do staff have the necessary skills and knowledge to care for the infant appropriately. I agree with these points.

6. Complications of Tracheostomies

6.1 Early Complications (within 7 days):
- Airway obstruction due to secretions
- Accidental de-cannulation or displacement
- Infection
- Air leaks
  - subcutaneous emphysema
  - pneumomediastinum
  - pneumothorax
  - pneumoperitoneum
- Haemorrhage
- Tracheosophageal fistula

6.2 Late Complications (after 7 days):
- Tracheal granuloma or erosion
- Infection
- Airway obstruction
- Accidental de-cannulation
- Pneumonia
- Tracheomalacia
- Pneumothorax
- Haemorrhage

7. Tracheostomy Equipment
(This equipment should remain with the infant at all times including transfers to other departments/hospitals)
- Suction equipment (checked as working on each shift and set at the appropriate pressure)
- Appropriate sized suction catheters (see chart)
- Humidified oxygen (tracheostomy mask if required)
- Spare tracheostomy tubes (one of the same size and one smaller size)
- Spare tapes
- Sterile scissors and/or stitch cutter
- Disposable gloves
- Neopuff equipment (checked as working on each shift and set at the appropriate pressure settings for the infant)
- Heat and Moisture Exchange filter (HME) (Swedish nose) (if required)

8. Immediate Post-operative Care
Chest x-ray to check for pneumothorax and position of tube on return to ward  
  Complete cot side tracheostomy sign as per tube size and suction length and appropriate to airway pathology.

- The infant is ventilated and it is usual for paralysis +/- sedation for at least 24 hours post surgery
- Humidifier should be set at 40°C (-3) to ensure adequate humidity to reduce the risk of dry secretions blocking the tube.
- Check the external position of the tube frequently and auscultate both sides of the chest to verify the correct intra-tracheal position and patency.
- Support the tube securely at all times
- Ensure that the tapes are secure
- Suction as necessary - it is not unusual to need very frequent suctioning in the first few hours
- Record airway assessment every two hours on appropriate local airway flowchart.
- Observe for oozing and bleeding from the wound, alert ENT team if bleeding continues or increases from slight ooze.
- Dressings around the tube can be changed with care after 24 hours
- Maintain analgesia
- Check for surgical emphysema around the neck and chest

8.1 Sutures
There are three types of sutures - stay, flange and wound.

- **Stay sutures** are pulled gently laterally to aid re-insertion of the tracheostomy tube if it falls out

- Stay sutures may fall out in the first few days or are removed at the first successful tube change
- **Flange Sutures** The tracheostomy tube flange is sutured in place

  **Wound Sutures** – these sutures are used to close the surgical opening around the tracheostomy tube. They will likely be ready for removal at around day 7.

- Stitch cutter to be kept by the bed at all times in case of a need to replace the tube - to cut the stitches

8.2 Suctioning
The aim of suctioning is to maintain a patent airway, remove secretions and to prevent the formation of crusts around the inner surface of the tracheostomy tube. It is performed as clinically indicated and not as a routine intervention. Suction catheters should not occlude more than half the inner diameter of the tracheostomy tube.
Refer to the EENBG guideline—Suction Neonatal Suctioning Guideline

1. Assess the need for suction - excessive coughing, cyanosis, tachypnoea, bradycardia and apnoea or excessive secretions

2. The suction equipment should be pre-set at 50-100 mmHg (or 8-10kpa) to minimise the risk of trauma and atelectasis.

3. Measure the depth to which the suction tube needs to be passed against an identical tracheostomy tube.

4. Wash hands, dry and apply hand rub to reduce the risk of infection

5. Open the suction catheter and attach to the tubing, leaving the rest of the catheter in the packet to keep the catheter as clean as possible

6. Put on gloves to minimise the risk of infection. Where gloves are used they should be non-powdered to prevent the introduction of powder into the airway.

7. Instill saline if needed due to the presence of thick or copious secretions. Always use a plastic ampoule (glass ampoules should never be used as there is the risk that glass fragments could be introduced with the saline) - 0.25-0.5ml is sufficient to loosen secretions.

8. Insert the catheter into the tracheostomy tube. **DO NOT** pass catheter beyond end of tracheostomy tube (check the length by measuring against another tube).

9. To minimise irritation of the mucous membranes, cover the side port with your gloved thumb which will permit suction at distal tip of catheter. Remove catheter gently and maintain suction throughout. There is no benefit to intermittent suction or rotating the catheter. Any pass of the suction catheter should not take longer than 10 seconds.

10. Reassess the infant to determine whether further suctioning is necessary, ensuring infant has recovery time between each pass. Use a new sterile catheter on each occasion.

11. Observe for recovery of oxygenation, heart rate, respiration - altering FiO₂ if necessary.

12. Disconnect and dispose of the catheter. Clear the suction tubing with sterile water.

13. Record the suctioning event on the appropriate observation chart indicating the amount, colour and consistency. Secretions are likely to be blood stained in the first 24 hours.

**Suction catheter guide:**

<table>
<thead>
<tr>
<th>Tube size</th>
<th>Suction catheter</th>
<th>Bivona Neonatal Flextend-suction length</th>
<th>Bivona Neonatal Standard-</th>
</tr>
</thead>
</table>

Page 5 of 14
## Suction catheter guide:

<table>
<thead>
<tr>
<th>Tube size</th>
<th>Suction catheter</th>
<th>Bivona Paediatric Flextend-suction length</th>
<th>Bivona Paediatric Standard-suction length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>5</td>
<td>8.5</td>
<td>6.0</td>
</tr>
<tr>
<td>3.0</td>
<td>6</td>
<td>9.0</td>
<td>6.5</td>
</tr>
<tr>
<td>3.5</td>
<td>7</td>
<td>9.0</td>
<td>6.5</td>
</tr>
<tr>
<td>4.0</td>
<td>8</td>
<td>9.5</td>
<td>7.0</td>
</tr>
<tr>
<td>4.5</td>
<td>8 (no 9 available)</td>
<td>11.0</td>
<td>7.5</td>
</tr>
</tbody>
</table>

## (See attached bedhead signs and policy).

### 9. Daily Care

1. The skin around site of the tracheostomy should be cleaned twice daily, but not for the first 24 hours to prevent bleeding and tube displacement.

2. Check the skin around the stoma for erythema, exudate, odour, crusting or granulation tissue.

3. Take a swab if there is an identified problem and inform the medical team. Check any recent results of white cell count.

4. With washed hands, clean the area under the flange using sterile normal saline and gauze/cotton buds and dry with gauze. Cotton wool balls or cut gauze should not be used as fibres may enter the wound or airway. Wipe the gauze/cotton bud in one direction.

5. Apply Cavilon to the dried skin using a stick, to protect the skin above and below the flange.

6. Wash hands after the procedure.

### 10. Changing the tapes

The tapes securing the tracheostomy tube should be changed at least daily to prevent excoriation of the skin from dirty/wet or loose tapes. Two people should always be present for this procedure.

1. Wash hands
2. Placing a roll under the infant’s shoulders extends the neck and allows better access to the tracheostomy area.

3. One person needs to hold the tube in position whilst the other carefully cuts the tape with round-ended scissors.

4. Remove the old tape and clean the area using sterile saline or water.

5. Whilst the tube continues to be supported prepare the tapes for insertion.

6. Using the Marpac twill tapes, insert one loose end through the neck plate opening, ensure the foam padding is positioned at the centre of the child’s neck and secure loosely (initially) with two reef knots.

7. Repeat action on other side of neck, always securely holding the tracheostomy until completely happy with tape tension and knots secure.

8. Check neck area for any loose tape which may put tube at risk of accidental displacement. To check correct tape tension, place one small/medium finger between neck tapes and the child’s neck. Adjust accordingly and secure with at least three reef knots. Cut excess tape leaving approx. 2cm.

9. If there are any areas of evident pressure apply a piece of Duoderm to the area before securing the tapes.

10. If the infant’s head is supported forward it should be possible to slip your little finger comfortably between the tapes and the infant’s neck. If the tapes are too tight it will be uncomfortable and the skin may blister. If it is too loose the tube can fall out.

11. Ensure the infant is replaced in a comfortable supported position following the procedure.

12. Wash hands.

11. Dressings

Dressings between the flange and the skin are used to improve patient comfort and protect the skin from rubbing by the flange, which may lead to tissue breakdown. Pre-cut dressings should be used, as these will reduce the risk of dressing fibres entering the stoma (Trachi-Dress TR DRE 0001 SMALL by Kapitex). This dressing also has a non-adherent layer as this will help to absorb the moisture away from the skin. Apply the keyhole dressing starting from below the tracheostomy tube. This is secured by the tracheostomy tapes.

12. Use of heat and moisture exchanger filters
These are used to preserve humidity and minimise damage to the tracheal epithelial cells as the normal humidification systems in the nose have been by-passed. They help reduce heat loss and prevent thickened secretions. If the infant is self-ventilating but requires oxygen via tracheostomy mask - a humidifier can be attached to the tracheostomy with elephant tubing. Always ensure that the water bag of the humidifier is changed every 24 hours to reduce the risk of infection. Once the infant is self-ventilating in air a 'Swedish nose' can be applied but this is not sufficient for a newly formed tracheostomy.

13. Replacement of a blocked or dislodged tube prior to tract formation (0-7 days)

1. Call for urgent medical assistance
2. Refer to emergency algorithm as attached.
3. Primary aim is to maintain oxygenation throughout. Therefore deliver oxygen and/or hand ventilate via nose and mouth and/or tracheostoma until airway secured.
4. Position infant with neck extended.
5. Apply tension laterally to the stay sutures (if present).
6. Place the introducer into the new tracheostomy tube before inserting into the stoma.
7. Whilst holding neckplate of the tracheostomy tube and keeping the introducer in place, point tube directly down into the neck opening and then follow the 90 degree curve down towards the infant’s toes.
8. Two attempts can be made with the same tube size before attempting a smaller tube which should be at the cot side in the emergency equipment.
9. If tube cannot be re-inserted easily or there is increased subcutaneous emphysema or bleeding, consider an endotracheal intubation or use mask bagging or ‘Neopuff’ via the nose/mouth.
   *Consider whether the infant has a patent upper airway. If the infant has an obstructed upper airway, oral intubation will be impossible and therefore all efforts must be via the tracheostomy
10. If there is a patent upper airway remember to seal the tracheostomy hole before attempting to use a mask bag.

14. Changing Tracheostomy Tubes (>7 days)

Tracheostomy tubes are recommended to be changed weekly (PVC) or monthly (Silicone) to avoid secretions from the lungs coating and blocking the inside of the tracheostomy tube. If a change is planned the infant should have a feed withheld until the tube change is completed as the movement of the tube may induce coughing which...
may lead to vomiting. At least two people should always be present for the tube change.

**15.1 Equipment**
- New tube plus a smaller sized tube in case of difficulty with insertion
- A water based lubricant
- Round ended scissors
- Stitch cutter
- A neck roll
- Marpac infant twill ties
- Clean water
- Gauze
- Dressing

**15.2 Method**
1. All staff should wash their hands and dry thoroughly to prevent cross infection
2. Prepare the new tracheostomy tube and lubricate the tip/outside of the new tube.
3. Fold the tape approximately one third along and insert the folded edge into one side of the tracheostomy tube. Thread the two ends of the tape through this loop to secure. Repeat for the other side of the tube.
4. Suction if necessary
5. Ensure that the infant is positioned in a supported comfortable position with his/her neck extended, as this will provide better access to the tube.
6. One person should hold the current tracheostomy tube in position whilst the other cuts and removes the old tape.
7. Prepare the introducer if present.
8. Remove the old tube.
9. Insert the new tube gently following the curve of the tube.
10. **Confirm the correct placement in trachea, by evidence of airflow or secretions on suctioning.**
11. Hold the tube in securely and allow any coughing to settle. Suction as needed.
12. Whilst one person supports the tube, clean the area around the stoma with gauze and warm water.
13. Apply Cavilon to the dried skin using a stick, to protect the skin above and below the flange and allow to dry.
14. Tie the tapes securely and check the tension.
15. Clear away rubbish.

16. Wash hands and dry thoroughly to prevent cross infection.

17. Document the tube change on flowsheet commenting on any suctioning required and how well the infant tolerated it.

15. Resuscitation of an infant with a tracheostomy tube

1. Gently stimulate the infant if he/she appears to have stopped breathing.

2. Call for help.

3. Ensure medical staff have information available detailing whether the upper airway is patent or not, available at all times.

4. Open the airway by tilting the head and gently lifting the chin to expose the tracheostomy tube (visibly confirm tube in place and not displaced).

5. Observe for any breathing movements.

6. If there is no response try passing a suction catheter down the tracheostomy tube.

7. If unable to pass a suction catheter it is important to immediately insert a new tracheostomy tube.

8. If unable to pass the new tube – try a smaller sized tube.

9. If this is unsuccessful pass a suction catheter into the stoma and use it to guide the tracheostomy tube into place.

10. If this is still unsuccessful attempt ventilation through the stoma hole OR attempt Neopuff/BVM to stoma/Neopuff/BVM to mouth resuscitation (remember to close the stoma hole before attempting mouth to mouth).

11. Breathe into the stoma gently, remove your mouth to let the breath escape – observe the chest falling. Repeat this five times – approximately one breath every two seconds.

12. Check the infant’s circulation and if necessary undertake chest compressions.

16. Parent Education

Instruction for parents regarding tracheostomy care should be introduced as soon as the need for a tracheostomy is identified. Early referral to the Tracheostomy Specialist Nurses is essential. If the infant is likely to go home with the tracheostomy, an educational programme that includes all aspects of tracheostomy care is essential for a successful transition to home. Therefore a comprehensive discharge plan is important.
to support the family, familiarise them with the equipment and understand the support that will be available to them once the infant goes home. This should be delivered by the tracheostomy specialist nurses prior to transfer to home. Parent training should be recorded on in the clinical records training programme.

Warning:
Care to be taken bathing infant with a tracheostomy as risk of drowning. No talcum powder or aerosols as they are easy to inhale.

Monitoring the effectiveness of the Guideline
In the event of their being an infant/infants with tracheostomies on the neonatal or paediatric unit then there will be a review of the infants’ notes and charts to ensure that the practices outlined in this regional guideline are followed by the relevant local care teams and gaps in knowledge/corrections identified and implemented.

References
4. NHS Quality Improvement Scotland. Best Practice Statement: Caring for the patient with a tracheostomy [IV]
Audit Standards:

Audit points

References

All Rights Reserved. The East of England Neonatal ODN withholds all rights to the maximum extent allowable under law. Any unauthorised broadcasting, public performance, copying or re-recording will constitute infringement of copyright. Any reproduction must be authorised and consulted with by the holding organisation (East of England Neonatal ODN).
The organisation is open to share the document for supporting or reference purposes but appropriate authorisation and discussion must take place to ensure any clinical risk is mitigated. The document must not incur alteration that may pose patients at potential risk. The East of England Neonatal ODN accepts no legal responsibility against any unlawful reproduction. The document only applies to the East of England region with due process followed in agreeing the content.
Exceptional Circumstances Form

Form to be completed in the **exceptional** circumstances that the Trust is not able to follow ODN approved guidelines.

<table>
<thead>
<tr>
<th>Details of person completing the form:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title:</td>
</tr>
<tr>
<td>First name:</td>
</tr>
<tr>
<td>Surname:</td>
</tr>
</tbody>
</table>

| Title of document to be excepted from: |

| Rationale why Trust is unable to adhere to the document: |

<table>
<thead>
<tr>
<th>Signature of speciality Clinical Lead:</th>
<th>Signature of Trust Nursing / Medical Director:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>Date:</td>
</tr>
</tbody>
</table>

| Hard Copy Received by ODN (date and sign): | Date acknowledgement receipt sent out: |

Please email form to: mandybaker6@nhs.net requesting receipt.
Send hard signed copy to: Mandy Baker
EOE ODN Executive Administrator
Box 93
Cambridge University Hospital
Hills Road
Cambridge CB2 0QQ