TRACHEOSTOMY

CARE BUNDLE

GUIDELINES

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(September, 2013. Updated May, 2015)
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AIMS

The aim of the tracheostomy care bundle is to standardise the care of adult patients with temporary tracheostomies in a critical care environment.

The tracheostomy care bundle follows the recommendations on tracheostomy care from the NCEPOD (2014) report “On the Right Trach” providing guidance on humidification, cuff pressure, monitoring and cleaning of inner cannula.

The care bundle has been developed utilising the ‘Intensive Care Society Standards and Guidelines for the care of adult patients with a temporary tracheostomy’ (Mackenzie et al, 2008 & 2014), ‘St George’s healthcare NHS Trust, Guidelines for the care of patients with tracheostomy tubes’ (Laws-Chapman et al, 2000), ‘the Royal Marsden Hospital’s manual of clinical nursing procedures’ (Dougherty and Lister, 2011), and evidence obtained from relevant literature supporting best clinical practice for tracheostomy management. Images are used for illustration only, and tubes may differ to images shown depending on the manufactures.

DEFINITION

A tracheostomy is the surgical opening (stoma) into the trachea through the neck, and is kept patent with a tracheostomy tube (Dougherty and Lister, 2011). Tracheostomies can either be temporary or permanent. Permanent tracheostomy is formed following a total laryngectomy.

A tracheostomy may be performed surgically or percutaneously, and as an emergency or elective procedure.

INDICATIONS FOR TEMPORARY TRACHEOSTOMY

- Airway protection e.g. bulbar palsy
- To maintain the airway e.g. reduced level of consciousness, upper-airway obstruction, intubation difficulties
- To enable the aspiration of tracheobronchial secretionse.g. excessive secretions, inadequate cough
- Long-term mechanical ventilation e.g. weaning from IPPV, patient comfort, reduction of sedation

The insertion of a Tracheostomy wherever performed is identified as a surgical procedure. The NCEPOD (2014) recommends that a WHO style checklist is used in relation to tracheosotomy procedures in Critical Care units.
TRACHEOSTOMY TUBES

Tracheostomy tubes should be chosen taking into account the patient and tube characteristics and not just the ease of insertion (ICS, 2014). It is recommended that the entire tube should be changed at least every 30 days or as per manufacturer’s recommendations.

It is recommended that all patients have a dual cannula tracheostomy inserted. A tracheostomy with an inner cannula are safer, the inner cannula can provide immediate relief of life-threatening airway obstruction in the event of a blocked tracheostomy tube. Many tracheostomy tubes are now manufactured with an inner cannula.

SINGLE LUMEN

The single lumen has a larger inner diameter than a double lumen tube, and does not have a removable inner cannula.

DOUBLE LUMEN (INNER CANNULA)

The inner cannula has a standard 15mm attachment to connect to the breathing circuit of a mechanical ventilator. Whilst some inner cannulas are disposable for single use, others can be cleaned and re-used. The advantage of an inner cannula is that it allows the immediate relief of life-threatening airway obstruction in the event of a blocked tracheostomy tube. These dual cannula tubes may either be cuffed of uncuffed and fenestrated or unfenestrated. The double lumen has a larger external diameter than the single lumen.

CUFFED TRACHEOSTOMY TUBES

In the Intensive Care setting, most patients will require a cuffed tracheostomy tube initially, both to facilitate effective mechanical ventilation and also to protect the lower respiratory tract against aspiration.

UNCUFFED TRACHEOSTOMY TUBES

This type of tracheostomy tube does not have a cuff that can be inflated inside the trachea. An uncuffed tube is suitable for a patient not requiring positive ventilation, but required for secretion clearance and airway maintenance.

FENESTRATED TRACHEOSTOMY TUBE

A fenestrated tracheostomy tube may be used to assist in directing airflow to pass the patient’s oral/nasal pharynx (mouth, nose and vocal cords) as well as their tracheal stoma when breathing. It does create a risk for oral and stomach contents to enter the lungs through the fenestrations.
Manufactures do not recommend the use of such tubes at the time of percutaneous tracheostomy, and generally they should not be used whilst a patient still requires mechanical ventilation because of significant risk of surgical emphysema (ICS, 2014). Patients who are at risk of aspiration or are on IPPV should not have a fenestrated tube unless a non-fenestrated inner cannula is used to block off the fenestration. The ICS (2014) recommends that a fenestrated tracheostomy tube should be used with caution in mechanically ventilated patients, and only with patients who are weaning from ventilation. A fenestrated tube is the most suitable for weaning patients from their temporary tracheostomy tube. It is most useful for patients who require both periods of cuff inflation (to protect the airway) and cuff deflation (to enable a speaking valve to be used) (Dougherty and Lister, 2011).

**ADJUSTABLE FLANGE**

Tracheostomy tubes with adjustable flange are specifically designed for patients who have ‘deep set tracheas’, such as those who are obese or have distorted anatomy within the neck due to inflammation and oedema. Patients with spinal abnormalities may also benefit from this type of tube.
CARE ELEMENT

1. TRACHEOSTOMY TUBE CARE

INNER CANNULA MANAGEMENT
The inner cannula (if a double lumen tube) should be removed, inspected and when necessary changed (if disposable) or cleaned (non-disposable) if needed. The ICS (2014) recommends that in a non-ventilated patient the inner cannula should be regularly removed, cleaned or changed at a maximum interval of 4 hourly in a patient with a productive chest, and at least 8 hourly in all cases, being considerate of the patient’s need for sleep and rest. However, Laws-Chapman et al (2000) recommended that the inner tube should be inspected at least 4 hourly, or more frequently if indicated. If the patient appears to be in respiratory distress, the inner cannula needs to be removed and inspected for encrustation immediately. The recommendations of 4-8 hourly inspection of the inner tube will be used for the care bundle in critical care.

For a patient undergoing mechanical ventilation, it may not be safe to repeatedly disconnect the ventilator circuit and change/clean the inner tube routinely. Cleaning or changing an inner tube should always represent the best balance of risk to patient. If an inner tube is not changed/clean, then it should be clearly documented and communicated along with the rational (National Tracheostomy Safety Project, 2010).

GUIDELINES FOR CHANGING/CLEANING INNER CANNULA
ESSENTIAL EQUIPMENT:
• Sterile dressing pack
• 0.9% sodium chloride or sterile water for cleaning
• Disposable plastic apron, powder-free gloves and eye protection
• Bactericidal alcohol handrub
• Temporary Inner cannula of the same size as the tracheostomy tube that is in situ (do not use an inner cannula from a new set, as all sets are evidently hand finished).

Pre procedure, pre oxygenate patient if known to desaturate, and clear any secretions.

<table>
<thead>
<tr>
<th>ACTION</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform procedure using a clean technique.</td>
<td>To minimise the risk of contamination.</td>
</tr>
<tr>
<td>Position patient with neck slightly extended.</td>
<td>Extending the neck will make removal and insertion of the tube easier.</td>
</tr>
<tr>
<td>Remove the dressing pack from its outer wrappings.</td>
<td></td>
</tr>
<tr>
<td>Put on a disposable apron and eye protection.</td>
<td>Minimise contamination of secretions on to nurse.</td>
</tr>
<tr>
<td>Clean hands with bactericidal handrub.</td>
<td>Minimise the risk of infection.</td>
</tr>
<tr>
<td>Put on clean disposable gloves.</td>
<td></td>
</tr>
<tr>
<td>Remove the inner cannula and if disposable, dispose in clinical waste. If non-disposable, clean cannula with sterile 0.9% sodium chloride or sterile water and dry thoroughly. Do not leave the inner cannula to soak. A temporary replacement inner tube (of the same size) can be inserted whilst cleaning takes place. Trachy</td>
<td>Soaking tubes could result in absorption of the solution into the material, causing irritation to the trachea, as well as bacterial colonization in stagnant cleaning solution. Placing a temporary inner tube reduces the risk of the outer tracheostomy tube obstructing whilst cleaning is being undertaken.</td>
</tr>
</tbody>
</table>
cleaning sponges can be used to help clean inside inner tube if needed

Replace the clean inner tube and ensure it is secured in a ‘locked’ position.

Document the time when inner cannula was changed/cleaned, and the type of secretions the patient has.

To ensure staff are aware of the need for and frequency of inner cannula changes.

Doughery and Lister (2011)

**CUFF MANAGEMENT**

The tracheostomy cuff provides a seal to enable positive pressure ventilation and also provides some protection against aspiration of secretions. Over inflated cuff may cause ischaemia of the tracheal mucosa and thereby lead to tracheal stenosis. Too little pressure may mean that the cuff fails to make an adequate seal against the tracheal mucosa and the patient is at risk of aspiration. The pressure within the cuff should be checked regularly with a hand held pressure monometer and should not exceed 25cm H₂O (ICS, 2014). Cuff pressure needs to be checked each nursing shift or 2-3 times daily, and following any tracheostomy related intervention, and documented on the chart. If an air leak occurs with the cuff pressure at the maximum recommended, the tracheostomy may have become displaced or may require changing or resizing, ask anaesthetists to review patient.

2. **SUCTION**

An effective cough requires the closure of the glottis, then the reopening of the glottis once an adequate intrathoracic pressure is achieved. When a tracheostomy is in situ the mechanism of closing the glottis is compromised, so the patient’s ability to remove secretions is reduced as they are unable to generate the high flows required for coughing. Tracheal suction is an essential component of managing secretions, maintaining respiratory function and a patient airway, Dougherty and Lister (2011). However, suctioning may be both painful and distressing for the patient, and can also be complicated by hypoxemia, bradycardia (particularly in patients with autonomic dysfunction such as spinal injuries), tracheal mucosal damage, bleeding, and introduction of infection (ICS, 2014). Therefore, the suction requirements of an individual patient should be reassessed each shift and documented (ICS, 2008).

**INDICATIONS FOR SUCTIONING**

- Coarse breath sounds (crackles) on auscultation
- Noisy breathing
- Stridor
- Increased or decreased rate of respiration
- Decreased oxygen saturation (SpO₂)
- Copious secretions
- Patient attempting to cough/clear secretions
- Distress
- Poor or absent cough
- Deteriorating skin colour

Edgtton-Winn and Wright (2005), Choate and Barbetti (2003).
**SUCTION CATHETER SIZE**

Choosing the correct suction catheter size depends on the size of the tracheostomy tube. The following formula can be used to determine the correct size catheter:

\[
\text{Suction catheter size (Fg)} = 2 \times (\text{size of tracheostomy tube} - 2)
\]

For example, 8.00mm ID tube: \(2 \times (8 - 2) = 12\text{Fg}\)

(ICS, 2008)

**SUCTION PRESSURE**

Excessively high suction pressure may lead to mucosal trauma. The lowest possible vacuum pressure should be used, ≤ 100 – 120 mmHg (13-16kPa), to minimise atelectasis and mucosal damage (ICS, 2008).

**CLOSED-CIRCUIT SUCTION CATHETER**

Closed-circuit suction catheter is the preferred way of suctioning a mechanically ventilated patient within the critical care environment. It is important that a closed suction tracheostomy catheter is used, and not an endotracheal catheter, since these vary in length. Using an endotracheal catheter with a tracheostomy tube could lead to damage of the tracheal mucosa and trauma. However, if the patient has an adjustable flanged tracheostomy tube, then it may be necessary to use an endotracheal suction catheter due to the length of the flanged tube. The use of the closed-circuit catheter reduces the number of times the patient is disconnected from the ventilator, avoiding cross-infection, hypoxia, and loss of PEEP.

**CLOSED-CIRCUIT SUCTIONING GUIDELINES**

<table>
<thead>
<tr>
<th>ACTION</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash hands with bactericidal soap and water or bactericidal alcohol handrub, and put on a disposable plastic apron, disposable gloves and eye protection.</td>
<td>To minimise the risk of cross-infection, incase of accidental disconnection.</td>
</tr>
<tr>
<td>Preoxygenate patient prior to suctioning if patient is known to desaturate with suctioning.</td>
<td>To reduce the risk of hypoxia and arrhythmias.</td>
</tr>
<tr>
<td>Turn on the suction and check the suction pressure (≤100-120mmHg, 13-16kPa).</td>
<td>To minimise atelectasis.</td>
</tr>
<tr>
<td>Pass the closed-circuit tracheostomy suction catheter into the tracheostomy tube, when the patient coughs or the passage of the catheter is obstructed, withdraw tip of the catheter by 0.5-1cm</td>
<td>The closed-circuit catheter is inserted with the suction off to avoid trauma. To reduce the risk of trauma to the tracheal mucosa and carina.</td>
</tr>
<tr>
<td>Take hold of the tracheostomy tube and closed-circuit catheter, apply suction and withdraw catheter, taking no more than 10 seconds.</td>
<td>To support tube and minimise the risk of disconnection. To reduce the risk of hypoxia.</td>
</tr>
<tr>
<td>Repeat this action as necessary, allowing patient time to recover between each suctioning.</td>
<td>To ensure general condition is stable.</td>
</tr>
<tr>
<td>When suction is complete, ensure closed-circuit catheter is withdrawn fully, and flush with 0.9% sodium chloride by applying suction while flushing via the installation port on the closed-circuit catheter.</td>
<td>To reduce the risk of any 0.9% sodium chloride passing into patient’s airways. To flush suction catheter and tubing after use assuring continued patency.</td>
</tr>
</tbody>
</table>

**OPEN SUCTION GUIDELINES**

**ESSENTIAL EQUIPMENT:**

- Suction source (wall or portable), collection container and tubing
- Disposable plastic apron, eye protection, selection of non-sterile, powder-free, clean boxed gloves
- Bactericidal alcohol handrub
- Sterile suction catheters (assorted sizes according to tube size)
- Sterile bottled water (labelled ‘suction’ with opening date), changed every 24 hours to prevent the growth of bacteria

<table>
<thead>
<tr>
<th>ACTION</th>
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</tr>
</thead>
<tbody>
<tr>
<td>If a patient has a fenestrated outer tube, ensure that a non-fenestrated inner cannula is in situ for suctioning.</td>
<td>Suction via a fenestrated tube allows a catheter to pass through the fenestration and cause trauma to the tracheal wall.</td>
</tr>
<tr>
<td>Wash hands with bactericidal soap and water or bactericidal alcohol handrub, and put on a disposable plastic apron, disposable gloves and eye protection.</td>
<td>To minimise the risk of cross-infection.</td>
</tr>
<tr>
<td>If patient is oxygen dependent pre oxygenate patient</td>
<td>Minimise risk of hypoxia.</td>
</tr>
<tr>
<td>Ensure the suction pressure is set at the appropriate level.</td>
<td>Recommended suction pressure is ≤100-120mmHg (13-16kPa) to minimise atelectasis.</td>
</tr>
<tr>
<td>Select the correct catheter size (see above formula)</td>
<td>Incorrect choice of catheter size can cause mucosal damage.</td>
</tr>
<tr>
<td>Open the end of the suction catheter pack and use the pack to attach the catheter to the suction tubing. Keep the rest of the catheter in the sterile packet. Use an aseptic non-touch technique throughout.</td>
<td>To reduce the risk of transferring infection from hands to the catheter and to keep the catheter as clean as possible.</td>
</tr>
<tr>
<td>An additional clean, disposable glove can be used on the dominant hand at this stage.</td>
<td>To facilitate easy disposal of the suction catheter after suction.</td>
</tr>
<tr>
<td>Remove the catheter from the sleeve and introduce the catheter to about one-third of its length or approximately 10-15cm or until the patient coughs. If resistant is felt, withdraw catheter approximately 1cm before applying suction by placing the thumb over the suction port control and slowly withdraw the remainder of the catheter.</td>
<td>The catheter should go no further than the carina to prevent trauma. The catheter is inserted with the suction off to reduce the risk of trauma.</td>
</tr>
<tr>
<td>Do not suction the patient for more than 10 seconds.</td>
<td>Prolonged suctioning may result in acute hypoxia, cardiac arrhythmias, mucosal trauma, infection and the patient experiencing a feeling of choking.</td>
</tr>
<tr>
<td>Wrap catheter around dominant hand, then pull back glove over soiled catheter, thus containing catheter in glove, then discard.</td>
<td>Catheters are used only once to reduce the risk of introducing infection.</td>
</tr>
<tr>
<td>If the patient is oxygen dependent, reapply oxygen immediately.</td>
<td>To prevent hypoxia.</td>
</tr>
<tr>
<td>Rinse the suction tubing by dipping its end into the sterile water bottle and applying suction until the solution has rinsed the tubing through.</td>
<td>To loosen secretions that have adhered to the inside of the tube.</td>
</tr>
<tr>
<td>If the patient requires further suction, repeat the</td>
<td>To ensure general condition is stable.</td>
</tr>
</tbody>
</table>
above actions using new gloves and a new
catheter, and allow the patient sufficient time to
recover between suction.
Dougherty and Lister (2011).

Any difficulty in passing the suction catheter should lead to consideration that the inner cannula
may be partially blocked and therefore require changing (ICS, 2014).

3. HUMIDIFICATION

In normal breathing, inspired air is warmed, filtered and moistened by ciliated epithelial cells in the
nose and upper airway. Cells in the epithelial lining produce mucus. A tracheostomy tube will by-
pass these natural mechanisms for warming and moistening inspired air and administration of dry
gas causes physiological changes. Therefore, humidification must be artificially supplemented to
humidification may lead to life-threatening blockage of the tracheostomy with tenacious sputum,
ulecration of the tracheal mucosa, sputum retention, atelectasis and impaired gas exchange ICS
(2008).

Humidification is essential for ALL hospitalised patients with tracheostomies (and laryngectomies).
The ICS (2014) provides a useful Humidification ladder guide:

- **Self-ventilating patients (no oxygen)** – HME (Buchanon bib, Swedish nose)
- **Self-ventilating patients on oxygen** – cold water humidification
- **Self-ventilating patients on oxygen with thick secretions** – heated water humidification
- **Ventilated patient/ CPAP circuit** – heated water humidification (wet circuit)

Patients with thick secretions, or who require high flow oxygen therapy will require heated water
humidification (e.g. Fisher and Paykel), and may require saline nebulisers prescribing. Wet circuit
should be used if CPAP or Positive Pressure Ventilation is applied via a tracheostomy.

When using a heated water humidifier, monitor and document temperature 2 hourly, check water
level, and change sterile water PRN.

Humidification of inspired gas can be achieved in patients with minimal or low oxygen requirements
using a cold water venturi humidifier system connected to a T-piece or tracheostomy mask.
However, if warmed humidification is required, this can be achieved using the AIRVO humidifier.

4. TRACHEOSTOMY DRESSINGS AND STOMA CARE

A tracheostomy is a surgical opening into the trachea and hence a potential route of infection, so the
area should be kept clean. Damage can also be caused to the surrounding tissues through pressure
the siteshould be assessed and stoma cleaned at least once in 24hours using a clean technique.

When assessing the wound, if infection is suspected, i.e. the area is reddened, excoriated, painful,
discoloured or exudate is present, a microbiology swab should be sent for culture. To protect the
surrounding skin from becoming red and excoriated, a Cavilon wand can be used (Hampton, 1998).
Contraindication: occasionally a surgical team may request that the original dressing remain intact for a period of time. There may be an increased risk of bleeding associated with the stoma formation and in this instance the dressing should not be changed until consultation with the surgeon has occurred (Dougherty and Lister, 2011).

**TRACHEOSTOMY DRESSING CHANGE GUIDELINES**

**ESSENTIAL EQUIPMENT:**
- Sterile dressing pack
- Tracheostomy dressing and holder
- Cleaning solution, such as 0.9% sodium chloride
- Bactericidal alcohol handrub

This procedure requires **two** nurses. One is required to hold the tracheostomy in place, and the other to change the dressing.

<table>
<thead>
<tr>
<th>ACTION</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash hands using bactericidal soap and water or bactericidal alcohol handrub, and prepare the dressing trolley.</td>
<td>To minimise the risk of infection.</td>
</tr>
<tr>
<td>Perform the procedure using aseptic technique.</td>
<td></td>
</tr>
<tr>
<td>Remove the soiled dressing from around the tube, clean around the stoma with 0.9% sodium chloride using gauze.</td>
<td>To remove secretions and any crusts.</td>
</tr>
<tr>
<td>Replace with a tracheostomy dressing.</td>
<td>To avoid pressure from the tube.</td>
</tr>
<tr>
<td>Renew tracheostomy tapes, checking that 1 – 2 fingers can be placed between the tapes and neck.</td>
<td>To secure the tube. To minimise the risk of reduced cerebral blood flow from the carotid arteries due to excessive external pressure.</td>
</tr>
</tbody>
</table>

Dougherty and Lister (2011).

**5. SAFETY**

The following equipment should be immediately available at all times for a patient with a tracheostomy, both by the bedside as well as during transfers. Some equipment may be available on the Difficult Airway Trolley (see *). The ICS (2014) suggests that a ‘tracheostomy box’ should be used to keep equipment that goes with the patient from critical care to the ward, including transfer.

- Operational suction unit, which should be checked at least daily, with suction tubing attached
- Appropriate sized suction catheters and yankeurs
- Non-powdered latex free gloves, aprons and eye protection
- Spare tracheostomy tubes of the same type as inserted: one of the same size and one a size smaller
- Tracheal dilators (available at the bedside or immediately available on the Difficulty Airway Trolley, to be agreed locally)
- Water circuit and filter
- Catheter mount or connection
- Tracheostomy disconnection wedge
Tracheostomy tube holder and dressing
• 10ml syringe (if tube cuffed)
• Scissors or Stitch cutter (if tracheostomy tube is sutured)
• Oxygen tubing and mask
• Re-intubation equipment/ resuscitation equipment
• Tracheal hook (see note below)
• Intubation drugs for transfer
• Tracheostomy/Laryngectomy emergency algorithm
• Tracheostomy/Laryngectomy bed sign
• Humidification equipment
• Clean pot for spare inner cannula
• Sterile water for cleaning the suction tubing (labelled and dated, change every 24 hours)
• Water soluble lubricating jelly
• Sterile dressing pack
• Nurse call bell (where available): the patient may be unable to call for help verbally
• Communication aids: the patient may not be able to verbalise
• Bedside equipment checklist

ICS (2014)

Tracheal hook should be available on all critical care unit (to anchor anterior tracheal wall during tube changes recommended by ENT surgeons for open procedures but unfamiliar to many other staff). Tracheal hook to be available on the Difficult Airway Trolley.

An emergency management algorithm should be available at the patient bedside, a tracheostomy management algorithm for a tracheostomy patient, and a Laryngectomy management algorithm for a laryngectomy patient. The tracheostomy/laryngectomy bed head sign should contain key information regarding the nature and date of the tracheostomy, including emergency contact details, see appendix 1.

At the beginning of each shift the nurse is responsible for checking that all equipment is available and in working order in case of any complications arising.

A transfer/discharge check list needs to be completed when transferring a patient with a tracheostomy to another ward/hospital, and placed in the nursing notes of the receiving ward (appendix 2).

6. COMMUNICATION

When a patient has a tracheostomy, majority of the air is no longer directed through the larynx, so patients may be unable to communicate verbally, especially when the cuff is inflated. Every patient with a tracheostomy needs to be referred to Speech and Language therapy.

NON-VERBAL COMMUNICATION

It is important that non-verbal communication is facilitated from the beginning:

• YES / NO questions
• Pen and paper
• Communication chart: pictures, alphabet chart

**VERBAL COMMUNICATION**

**PASSY MUIR VALVE (VENTILATOR DEPENDENT) / SPEAKING VALVE (SELF VENTILATING PATIENT)**

If a patient is ventilator dependent, and fits the following criteria, following an agreement with a senior anaesthetist and a senior physiotherapist a Passy muir valve could be used to aid communication (cuff must be deflated). For a self-ventilating patient, consider a speaking valve. Speaking valve should only be used with an uncuffed tube, a cuffed tube with cuff deflated or a fenestrated tracheostomy tube with cuff deflated, ICS (2014). *Prior to fitting a speaking valve, cuff must be fully deflated and patient assessed to ensure there is a significant leak.*

The Passy-Muir valve is a one-way valve that allows ventilated patient to vocalise. The air passes through the valve into the lungs as normal but the one-way valve redirects the expiration up through the vocal cords. The Passy-Muir valve should only be used with patients on CPAP ASB with a PEEP < 10 and ASB< 15 and FiO₂ < 60%. However, these are only guidelines, and the decision of trying the Passy-Muir valve should be done on an individual basis following discussions with a senior anaesthetist and senior physiotherapist. When the patient is using a Passy-Muir valve the ventilator alarms will keep alarming because the ventilator is not able to detect an out breath, therefore alarm settings will need adjusting to compensate this. When the Passy-Muir valve is removed the ventilator settings and alarm need to be reset as before.

**CONTRAINDICATIONS FOR USING PASSY MUIR VALVE / SPEAKING VALVE:**

- Unconscious and/or comatose patients
- Inflated tracheostomy tube cuff
- Severe airway obstruction which may prevent sufficient exhalation
- Very thick and tenacious secretions
- Severely reduced lung elasticity
- Severe aspiration
- Not for use with endotracheal tubes
- Less than 48-72 hours post tracheostomy
- Post laryngectomy
- Post head and neck surgery

**PRIOR TO FITTING PASSY MUIR VALVE / SPEAKING VALVE:**

- Patient is alert
- Tracheostomy tube was inserted at least 48-72 hours ago
- All contraindications have been out ruled
- The patient’s pulmonary status is stable (vital signs, O₂ saturation >92, respiratory rate <30, airway patency)
- Able to tolerate cuff deflation
- Ventilator settings assessed by anaesthetist (If ventilated)
- Tracheostomy tube cuff must be fully deflated before placing the Passy Muir valve or speaking valve
- If fenestrated tube in situ, ensure the inner tube is fenestrated for use with speaking valve
If all of the above criteria cannot be met, do not fit a Passy Muir valve / speaking valve at the present time.

If the above criteria are all met you can proceed with caution, following agreement with senior anaesthetist and senior physiotherapist.

**WHEN FITTING A SPEAKING VALVE:**

- Monitor Oxygen saturations
- Explain procedure to patient
- Suction
- Deflate cuff (if present), suction, change inner tube to fenestrated (if a fenestrated tracheostomy is in situ),
- Attach speaking valve and continue to monitor patient
- Remove if patient not tolerating

### 7. SWALLOWING

Patients with tracheostomies may experience problems with swallowing. The presence of an inflated cuff compresses the oesophagus, and makes swallowing difficult for some patients, increasing the risk of aspiration. The risk is greatest in those patients with associated neurological or mechanical cause of dysphagia, or those with significant on-going respiratory failures, ICS (2014). The decision to allow feeding with cuff inflated should be made on an individual basis after a swallowing assessment.

If the patient has a cuffed tracheostomy tube with **cuff inflated**, swallowing assessment should be performed using the BCUHB guidelines on assessing for dysphagia with tracheostomy tube (see appendix 3a), alongside the Swansea tracking sheet (appendix 3c) and result documented clearly on the BCUHB assessment form (appendix 3a). Do not attempt a swallowing assessment if the patient is drowsy, semi-conscious or does not open eyes to speech. Ensure patient is in an upright, supported position prior to commencing a swallowing assessment. Swallowing should be reassessed if cuff is deflated.

If the patient has an **uncuffed tube** or a **cuffed tube with cuff deflated**, then the swallowing assessment should be done using the Swansea Swallowing screen guidelines (appendix 3b) and monitor using the Swansea tracking sheet (appendix 3c). Document assessment and result on the BCUHB assessment form (appendix 3a). See flow chart below.

If a patient shows signs of aspiration when no neurological component present, then it is extremely probable that they will continue to aspirate while the tracheostomy tube is in situ unless there is a significant change such as changing to a different type of tube or deflating the cuff if it was inflated.
If the patient fails to swallow effectively, then assessment by a speech and language therapist is recommended. If neurological dysphagia is suspected, refer to Speech and Language Therapy early.

The ICS (2014) provide different risk factors for swallowing problems in patients with a tracheostomy:

- Neurological injury
- Disuse atrophy
- Head and neck surgery
- Evidence of aspiration of enteral feed or oral secretions on tracheal suctioning
- Increased secretion load, or persistent wet/weak voice, when cuff is deflated
- Coughing and/or desaturation following oral intake
- Patient anxiety or distress during oral intake
- High FiO₂
REFERENCES.


FURTHER READING


Appendix 1.

Emergency tracheostomy management - Patent upper airway

Call for airway expert help

Look, listen & feel at the mouth and tracheostomy
A Mapleson C system (e.g. Waters circuit) may help assessment if available
Use waveform capnography when available: exhaled carbon dioxide indicates a patent or partially patent airway

No

Is the patient breathing?

Call Resuscitation Team
CPR if no pulse / signs of life

Assess tracheostomy patency

Remove speaking valve or cap (if present)
Remove inner tube
Some inner tubes need re-inserting to connect to breathing circuits

Yes

Can you pass a suction catheter?

No

Deflate the cuff (if present)
Look, listen & feel at the mouth and tracheostomy
Use waveform capnography or Mapleson C if available

Is the patient stable or improving?

Yes

The tracheostomy tube is patent
Perform tracheal suction
Consider partial obstruction
Ventilate (via tracheostomy) if not breathing
Continue ABCDE assessment

Tracheostomy tube partially obstructed or displaced
Continue ABCDE assessment

REMOVE THE TRACHEOSTOMY TUBE

Look, listen & feel at the mouth and tracheostomy. Ensure oxygen re-applied to face and stoma
Use waveform capnography or Mapleson C if available

No

Call Resuscitation team
CPR if no pulse / signs of life

Yes

Continue ABCDE assessment

Primary emergency oxygenation

Standard ORAL airway manoeuvres
Cover the stoma (swabs / hand). Use:
Bag-valve-mask
Oral or nasal airway adjuncts
Supraglottic airway device e.g. LMA

Tracheostomy STOMA ventilation
Paediatric face mask applied to stoma
LMA applied to stoma

Secondary emergency oxygenation

Attempt ORAL Intubation
Prepare for difficult intubation
Uncut tube, advanced beyond stoma

Attempt intubation of STOMA
Small tracheostomy tube / 6.0 cuffed ETT
Consider Aintree catheter and fiberoptic scope / Bougie / Airway exchange catheter

This patient has a TRACHEOSTOMY
There is a potentially patent upper airway (Intubation may be difficult)

Surgical / Percutaneous

Perform on (date) ........................................
Tracheostomy tube size (if present) ...............  
Hospital / NHS number .................................

Notes: Indicate tracheostomy type by circling the relevant figure.
Indicate location and function of any sutures.
Laryngoscopy grade and notes on upper airway management.
Any problems with this tracheostomy.

Emergency Call:  
Anaesthesia  ICU  ENT  MaxFax  Emergency Team

www.tracheostomy.org.uk

Emergency laryngectomy management

Call for airway expert help
Look, listen & feel at the mouth and laryngectomy stoma
A Mapleson C system (e.g. "Waters circuit") may help assessment if available
Use waveform capnography whenever available - enhanced carbon dioxide indicates a patent or partially patent airway

Is the patient breathing?

No

Call Resuscitation Team
CPR if no pulse / signs of life

Yes

Apply high flow oxygen to laryngectomy stoma
If any doubt whether patient has a laryngectomy, apply oxygen to face also*

Assess laryngectomy stoma patency

Most laryngectomy stomas will NOT have a tube in situ

Remove stoma cover (if present)
Remove inner tube (if present)
Some inner tubes need re-inserting to connect to breathing circuits
Do not remove a tracheoesophageal puncture (TEP) prosthesis

Can you pass a suction catheter?

No

Deflate the cuff (if present)
Look, listen & feel at the laryngectomy stoma or tube
Use waveform capnography or Mapleson C if available

Yes

The laryngectomy stoma is patent
Perform tracheal suction
Consider partial obstruction
Ventilate via stoma if not breathing
Continue ABCDE assessment

Is the patient stable or improving?

No

REMOVE THE TUBE FROM THE LARYNGECTOMY STOMA if present
Look, listen & feel at the laryngectomy stoma. Ensure oxygen is re-applied to stoma
Use waveform capnography or Mapleson C if available

Call Resuscitation Team
CPR if no pulse / signs of life

Yes

Continue ABCDE assessment

Primary emergency oxygenation

Laryngectomy stoma ventilation via either
Pediatric face mask applied to stoma
LIMA applied to stoma

Secondary emergency oxygenation

Attempt intubation of laryngectomy stoma
Small tracheostomy tube / 5.0 cuffed ETT
Consider Airtraq catheter and fiberoptic
`scope / Bougie / Airway exchange catheter

* Laryngectomy patients have an end stoma and cannot be oxygenated via the mouth or nose
   Applying oxygen to the face and stoma is the default emergency action for all patients with a tracheostomy


This patient has a LARYNGECTOMY and CANNOT be intubated or oxygenated via the mouth.

Follow the LARYNGECTOMY algorithm of breathing difficulties:

- Performed on (date)
- Tracheostomy tube size (if present)
- Hospital / NHS number

Notes:
- There may not be a tube in the stoma.
- The trachea (wind pipe) ends at the neck stoma.

Emergency Call: Anesthesia, ICU, ENT, MaxFax, Emergency Team

www.tracheostomy.org.uk

Transfer/Discharge Form for Tracheostomy Patient  

Appendix 2.
To be completed by the transferring nurse and to accompany the patient on transfer/discharge.
To be placed in the nursing notes of the receiving ward/hospital.

<table>
<thead>
<tr>
<th>Name: Addressograph label</th>
<th>Date of transfer:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Date:</td>
</tr>
<tr>
<td></td>
<td>Time:</td>
</tr>
<tr>
<td>Transfer from:</td>
<td>Ward receiving:</td>
</tr>
<tr>
<td>Date of tracheostomy:</td>
<td>Stay sutures to tracheal wall:</td>
</tr>
<tr>
<td>Type of tracheostomy:</td>
<td>• Yes</td>
</tr>
<tr>
<td>Reason for tracheostomy:</td>
<td>• No</td>
</tr>
<tr>
<td>Tube changed:</td>
<td>Date:</td>
</tr>
<tr>
<td>• Yes</td>
<td></td>
</tr>
<tr>
<td>• No</td>
<td></td>
</tr>
<tr>
<td>Date of next change:</td>
<td></td>
</tr>
<tr>
<td>Make/Type of tube:</td>
<td>Size:</td>
</tr>
<tr>
<td>Inner tube:</td>
<td>Frequency required for cleaning inner tube:</td>
</tr>
<tr>
<td>• Yes</td>
<td>Reason for cuff inflation:</td>
</tr>
<tr>
<td>• No</td>
<td>Reason for cuff deflation (e.g. uncuffed):</td>
</tr>
<tr>
<td>Cuff status: inflated?</td>
<td>• Yes</td>
</tr>
<tr>
<td>• Yes</td>
<td></td>
</tr>
<tr>
<td>• No</td>
<td></td>
</tr>
<tr>
<td>Swallow screen:</td>
<td>Date:</td>
</tr>
<tr>
<td>• Yes</td>
<td></td>
</tr>
<tr>
<td>• No</td>
<td></td>
</tr>
<tr>
<td>If no, why?</td>
<td></td>
</tr>
<tr>
<td>Type of humidification:</td>
<td>Referral to speech therapy for formal swallow assessment:</td>
</tr>
<tr>
<td>Prescribed O₂ therapy:</td>
<td>• Yes</td>
</tr>
<tr>
<td>Spare tube:</td>
<td>Date:</td>
</tr>
<tr>
<td>• Yes</td>
<td></td>
</tr>
<tr>
<td>Suction:</td>
<td>• Yes</td>
</tr>
<tr>
<td>• Yes</td>
<td></td>
</tr>
<tr>
<td><em>Patient must not be left without these items.</em></td>
<td></td>
</tr>
<tr>
<td>Tracheal dilators:</td>
<td><strong>Please see overleaf for equipment list as per ICS Guidance</strong></td>
</tr>
<tr>
<td>• Yes</td>
<td></td>
</tr>
<tr>
<td>Disconnection wedge:</td>
<td></td>
</tr>
<tr>
<td>• Yes</td>
<td></td>
</tr>
<tr>
<td>Stoma site: Please tick</td>
<td>Secretions:</td>
</tr>
<tr>
<td>• Dry</td>
<td>Type:</td>
</tr>
<tr>
<td>• Inflammation</td>
<td>Amount:</td>
</tr>
<tr>
<td>• Excoriation</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
<tr>
<td>Signature transferring nurse:</td>
<td></td>
</tr>
<tr>
<td>Signature receiving nurse:</td>
<td></td>
</tr>
<tr>
<td>Print name:</td>
<td></td>
</tr>
<tr>
<td>Print name:</td>
<td></td>
</tr>
</tbody>
</table>
Bedside equipment for all tracheostomy patients (Ref: ICS 2014)

The following equipment should be immediately available at all times for a patient with a tracheostomy, both by the bedside as well as during transfers. Some equipment may be available on the Difficult Airway Trolley (see *):

- Operational suction unit, which should be checked at least daily, with suction tubing attached and Yankeur sucker
- Appropriately sized suction catheters
- Non-powdered latex free gloves, aprons and eye protection
- Spare tracheostomy tubes of the same type as inserted: one the same size and one a size smaller
- Tracheal dilators
- Rebreathing bag and tubing
- Catheter mount or connection
- Tracheostomy disconnection wedge*
- Tracheostomy tube holder and dressing
- 10ml syringe (if tube cuffed)
- Resuscitation equipment
- Tracheal hook* (to anchor anterior tracheal wall during tube changes recommended by ENT surgeons for open procedures but unfamiliar to many other staff).
- Humidification equipment
- Clean pot for spare inner cannula
- Sterile water for cleaning the suction tube
- Scissors or stitch cutter if tracheostomy tube is sutured
- Water soluble lubricating jelly
- Sterile dressing pack
- Nurse call bell (where available): the patient may be unable to call for help verbally
- Communication aids: the patient may not be able to verbalise
- Bedside equipment list
**APPENDIX 3a.**

**ASSESSMENT FOR DYSPHAGIA WITH TRACHEOSTOMY TUBE.**

Do not attempt the assessment if the patient is drowsy, semi-conscious or does not open eyes to speech.
Remember to fill in ALL SECTIONS.

<table>
<thead>
<tr>
<th>Patient's Label</th>
<th>Assessed by:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Date:</td>
</tr>
<tr>
<td></td>
<td>Consultant:</td>
</tr>
<tr>
<td></td>
<td>Medical consent for assessment: YES ☐</td>
</tr>
<tr>
<td></td>
<td>MDT discussion: YES ☐</td>
</tr>
<tr>
<td>Ward:</td>
<td></td>
</tr>
</tbody>
</table>

**Type of tracheostomy tube and is it cuffed?**

<table>
<thead>
<tr>
<th>Percutaneous or surgically performed</th>
<th>Type: ________ Size: ______</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cuffed: Yes No Date: ______</td>
</tr>
</tbody>
</table>

**Is the patient confused?**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Any neurological problems, head & neck surgery, Wet/weak voice or drooling?**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Does the patient have any respiratory secretions? What colour and how much?**

|                        | Yes | No | Secretions thick ☐ loose ☐ Colour………… min / mod / large |

Does the patient have pain on dry swallow?

|                        | Yes | No | **If yes then likely to aspirate ** |

**Does the patient have an ineffective cough?**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

**IF YES TO ANY OF THE ABOVE THEN NEEDS FULL MDT AGREEMENT TO PROCEED**

NB: Do not assess swallow if patient on ventilator or CPAP with cuff deflated without full MDT agreement.

**Cuff Inflated - Using water coloured with blue food dye please follow steps 1-5 over page and record outcome below.**

For deflated cuff please follow Swansea screen guidelines and record outcome below.

<table>
<thead>
<tr>
<th>Is patient obviously aspirating?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coughing ☐ choking ☐ stridor ☐ hoarseness ☐ wet/gurgly voice ☐</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evidence of aspiration on suction</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large amt ☐ Mod ☐ Min ☐</td>
<td></td>
</tr>
</tbody>
</table>

**PLEASE RECORD OUTCOME OF SWALLOW ASSESSMENT HERE**

<table>
<thead>
<tr>
<th>CUFF INFLATED</th>
<th>CUFF DEFLATED</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS ☐</td>
<td>FAIL ☐</td>
</tr>
<tr>
<td></td>
<td>PASS ☐</td>
</tr>
<tr>
<td>• Trial of blue water for 24 hrs</td>
<td>• Trial with blue water for 24 hrs</td>
</tr>
<tr>
<td>• Stop if blue dye on suction.</td>
<td>• Stop trial if blue dye on suction</td>
</tr>
<tr>
<td>• Record suction on tracking sheet</td>
<td>• Record suction on tracking sheet</td>
</tr>
<tr>
<td>• Evidence of aspiration</td>
<td>• Evidence of aspiration</td>
</tr>
<tr>
<td>• KEEP PATIENT NIL BY MOUTH</td>
<td>• KEEP PATIENT NIL BY MOUTH</td>
</tr>
<tr>
<td>• MDT Discussion</td>
<td>• MDT Discussion</td>
</tr>
</tbody>
</table>

**Post 24 Hrs Monitoring with trial blue water**

<table>
<thead>
<tr>
<th>PASS ☐</th>
<th>FAIL ☐</th>
</tr>
</thead>
</table>

**Post 24 Hrs Monitoring with trial blue water**

<table>
<thead>
<tr>
<th>PASS ☐</th>
<th>FAIL ☐</th>
</tr>
</thead>
</table>

Adapted by Asha Metharam-Jones, Band 7 Respiratory Physiotherapy Clinical Specialist, from the swallowing screening form developed by the Speech and Language Therapy Department from an original idea by Sister Carol Shamas RGN, Ysbyty Gwynedd, Bangor. Combined with The Swansea Tracking Sheet. Version 5.1 - 07/05/15
Advice on Conducting Swallow Assessments with Cuff Inflated

1. Obtain medical consent for swallow assessment.

2. Ensure the patient is in an upright position as possible

3. Give the patient 3 teaspoonful of blue water

4. Ensure the patient swallows each mouthful several times before taking the next mouthful.

5. If evidence of aspiration is not immediate wait 5 minutes before suctioning as sometimes secretions pool at back of throat and it takes a few minutes for aspirant to become evident.

6. If no evidence of aspiration then allow small sips of blue water via cup not straw and monitor closely for 24 hours

7. Record the monitoring on the Swansea tracking sheet. Stop oral fluids if evidence of blue dye on suction and refer back to MDT.

8. If they have a speaking tube in situ have the suction tube in place for the initial assessment so you can suction. If they pass then monitor swallow with speaking valve in situ.

9. Advise the patient not to try to talk while eating and drinking

Signature:
Swansea NHS trust.

Appendix 3b.

Swallow Screen for Patients with Tracheostomy
(Uncuffed tube or Deflated cuff)
(Prior to the commencement of oral feeding)

To be performed by nurses who have attended a dysphagia training session.

1. Is there medical consent for full cuff deflation?
   - YES
   - NO

2. Does the patient have any of the following?
   - YES
   - NO

3. Ensure patient is sitting upright and as straight as possible

4. Deflate the cuff and suction via Tracheostomy tube
   - YES
   - NO

5. Is Patient:
   - Desaturating?
   - Coughing?
   - Wet Voice?
   - Distressed?
   - YES
   - NO

6. If patient is using a fenestrated inner cannula and a speaking valve, put fenestrated tube and valve in place and go to Step 7.

NB – ensure cuff is deflated
Oral Trial

Give patient 1 teaspoon of sterile H₂O coloured with blue food colouring. Observe for ϴ indicators:
- YES
- NO

Give patient a further 3 teaspoons of H₂O coloured blue and observe the above
- YES
- NO

Give patient small sips of H₂O coloured blue from a cup (no straws or spouted beakers).
- YES
- NO

Trial with teaspoons of yoghurt consistency, dyed blue.
- YES
- NO
Appendix 3c.  

Swansea NHS Trust  

Blue Dye Tracking Sheet

A speech and language therapist or a nurse who has attended a dysphagia training session should perform the Modified Evans Blue Dye Test.

<table>
<thead>
<tr>
<th>Name:</th>
<th>Hospital Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ward:</td>
<td>Date of Test:</td>
</tr>
</tbody>
</table>

Trialled with:

Consistency:

Amount:

<table>
<thead>
<tr>
<th>SUCTION</th>
<th>Blue Dye Presence at Suction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Time</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
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</tbody>
</table>