**POLLICY**

1. Bedside Percutaneous Dilatational Tracheostomy (PDT) is an elective tracheostomy performed in the Intensive Care Unit (ICU).

2. Health Care Professionals **required** to be present during the bedside PDT include:
   2.1. Physician with expertise in bronchoscopy and airway management (i.e.: staff intensivist, staff anesthesia, thoracic surgeon, respirology fellow or staff, or other staff or resident who has specific training in bronchoscopy.)
   2.2. Physician with specific training in percutaneous tracheostomy insertion to perform the actual insertion (may include qualified surgery residents).
      
      **Note:** The physician who is inserting the tracheostomy does not necessarily need to know how to perform bronchoscopy.

2.3. Another physician to order and/or administer drugs that are labelled physician only (see IV drug manual)

2.4. Registered Respiratory Therapist (RRT)

2.5. Registered Nurse RN)

   **Note:** The decision as to which physicians will be at the bedside is the responsibility of the Intensivists. Critical Care Fellows may only perform PDT in the presence of a supervising Intensivist.

3. One of the two physicians performing the tracheostomy **must** be proficient in oral tracheal intubation in the event that the endotracheal tube (ETT) is accidentally dislodged.

4. All Health Care Professionals involved with bedside PDT must be knowledgeable about contraindications to and complications of the procedure.
5. All PDT’s must be performed using bronchoscopic guidance.

GUIDING PRINCIPLES AND VALUES

1. Several tracheostomy techniques are now described as a percutaneous technique by performing a percutaneous dilatational tracheostomy (PDT). The Ciaglia technique, including its modifications, has become the technique that is increasingly performed at the bedside. The patient is positioned and prepped in the same way as for the standard operative tracheostomy utilizing sedative and paralytic agents as ordered.

2. PDT has become standard of care at most tertiary centres.

3. Advantages of PDT compared to operative tracheostomy in the Operating Room include:
   3.1. Ability to perform it at the bedside, avoiding patient transfer out of the unit.
   3.2. Savings in operating room time and charges.
   3.3. Less bleeding than surgical tracheostomy.
   3.4. Reduced infection rates.
   3.5. Less tracheal erosion.
   3.6. Improved Cosmesis (smaller scar).
   3.7. Faster time to tracheostomy once decision is made to perform.
   3.8. Shorter overall procedure time.
   3.9. Trends toward reduced mortality.
   3.10. Reduction in vocal chord injury relative to oral ETT.
   3.11. Fewer overall complications.

PROCEDURE

Equipment
- Bronchoscope
- Bronchoscopy cart
- Line insertion cart
- Intubation kit
- Percutaneous dilatational tracheostomy kit
- Sterile water, 1 bottle
- #25 needle (for injecting local), #18 needle (for drawing up local)
- 5mL syringe (for drawing up local)
- 1% Xylocaine with epinephrine
- Foam tracheostomy ties
- Sterile preps (Chlorhexidine 2%), gowns, gloves, masks and caps
- 2 tracheostomy tubes of different sizes, with low pressure cuffs
BEFORE THE PROCEDURE

Note - It is recommended that the patient be deeply sedated and paralyzed. Fentanyl bolus (and/or infusion) is used for analgesia; propofol infusion for sedation; rocuronium for muscle relaxation are typically used.

1. Assess for the following Contraindications, Considerations, Complications, and Risks as per the following tables.

Note: The best predictor of success is appropriate patient selection.

Contraindications—Absolute

<table>
<thead>
<tr>
<th>Contraindications—Absolute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency situations – PDT is not an appropriate technique for establishing an airway nor for emergency airway access</td>
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<tr>
<td>Gross Distortion of the neck anatomy due to:</td>
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<tr>
<td>Malignancy of the head and neck area, e.g., tracheal tumours, etc.</td>
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<tr>
<td>Hematoma</td>
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<tr>
<td>Thyromegaly (second or third degree)</td>
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<tr>
<td>High innominate artery</td>
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<tr>
<td>Medically uncorrected bleeding diatheses</td>
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<tr>
<td>Prothrombin time or activated partial thromboplastin time more than 1.5 times reference range</td>
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<tr>
<td>Platelet count less than 50 000/µL</td>
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Contraindications- Relative

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Nonpalpable cricoid cartilage (very obese, short neck or no cartilage)</td>
</tr>
<tr>
<td>Need for positive end expiratory pressure (PEEP) of more than 20 cmH₂O pressure</td>
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<tr>
<td>Cervical spinal injury</td>
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<tr>
<td>Thyroid enlargement</td>
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<tr>
<td>Deviation of the trachea</td>
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Considerations

<table>
<thead>
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<tr>
<td>Obese patients</td>
</tr>
<tr>
<td>Previous tracheostomy—(manufacturers guidelines although it has been done successfully) (Clinical Review, Al-Ansari &amp; Hijazi)</td>
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</tbody>
</table>

Complications and Risks

<table>
<thead>
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<tbody>
<tr>
<td>Bleeding (minor and major)</td>
</tr>
<tr>
<td>Penetration of the soft posterior tracheal wall</td>
</tr>
<tr>
<td>Subcutaneous emphysema</td>
</tr>
</tbody>
</table>

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Bradycardia and dysrhythmias
Hypoxia
Infection
Pneumothorax
Premature/accidental extubation
Cardiac arrest (very rare)
Tracheal ring rupture

Long Term Complications
Tracheal stenosis

2. Registered Nurse

2.1. Confirm the following:

2.1.1. All required HCPs are present {surgeon, anaesthesiologist /senior anaesthesia resident/intensivist (fellow or attending), RRT and bedside nurse}

2.1.2. Consent obtained (by physician)

2.1.3. Phenylephrine (neosynephrine) or other vasoactive agent (e.g., norepinephrine) readily available (for rescue, in the event of hypotension in the setting of deep sedation)

2.1.4. Ultrasound of the neck completed (if ordered by the physician)

2.2. Check PTT, PT and platelet count.

2.3. For a right handed surgeon, obtain venous access on the patient’s left side (and vice versa).

3. Physicians

3.1. Confirm adequate preoxygenation with 100% FiO₂ prior to starting procedure.

3.2. Don appropriate apparel (sterile gown and gloves, with mask and cap).

3.3. Verify integrity of tracheostomy tube cuff.

3.4. Prepare the neck with 2% Chlorhexidine and drape with sterile towels.

3.5. Activate the Blue Rhino lubricant with sterile water.

3.6. Confirm the mode of ventilation, mechanically or mandatory, for the patient during the procedure with the RRT, and that the RRT is ready to begin.

4. Registered Respiratory Therapist (RRT)

4.1. Pre-oxygenate with 100% O₂ prior to procedure.

4.2. Don appropriate apparel (gown, glove, mask; need not be sterile).

4.3. Determine whether to mechanically or manually ventilate the patient during the procedure.
4.4. Ensure patient is ventilated as per physician order.

4.5. Assist with bronchoscopy and airway management as necessary.

**DURING THE PROCEDURE**

1. **Registered Nurse**
   1.1. Monitor vitals (heart rate and rhythm, blood pressure and O$_2$ saturations).
      1.1.1. If using the automatic sphygmomanometer, ensure cuff is set to measure blood pressure every two minutes.
   1.2. Assist with administration of drugs as necessary.
      **Note:** This should only be done when one of the two physicians present is not able to do so. **Nurses are not permitted to administer those medications in the Capital Health IV Direct manual labelled as “PHYSICIAN ONLY” (e.g., IV boluses of propofol; phenylephrine).**
   1.3. Document drugs administered as stat doses on the nursing record.

**AFTER THE PROCEDURE**

**Note:** If inadvertent extubation occurs, the patient will require intubation.

1. **Physicians**
   1.1. Write orders for the medications given during the procedure; annotate as “done” or “given”.
   1.2. Document the procedure and drugs administered on the progress note.
   1.3. Assess the need for and order chest x-ray as required.
      **Note:** The tracheotomy position must be confirmed with the bronchoscope immediately after insertion.
   1.4. Assess the need for and order the required sedation.
      **Note:** The patient should receive continuous sedation until the paralytic (muscle relaxant) has worn off (typically 1 hour with rocuronium). However, the doses of sedation required post-procedure are generally much lower than those needed during the performance of PDT.

2. **Registered Nurse**
   2.1. Obtain vital signs as follows:
      - every 15 minutes x 2
      - every 30 minutes x 2
      - every 1-hour x 8
   2.2. Provide appropriate education and explanation once the patient is awake.
   2.3. Note on the patient’s kardex to change the tracheostomy tube in one week.
   2.4. Use drainage sponges for dressings as per operative tracheotomies.

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2.5. Complete appropriate documentation on the Nursing Care Flow Sheet.

2.6. Provide tracheostomy care as per CC 45-090 Tracheostomy, Care and Management of Patients with Tracheostomy.

3. **Respiratory Therapist**

3.1. Return patient to mechanical ventilator, if required, on appropriate settings.

3.2. Check tracheal cuff pressure and document on *Respiratory Monitoring Record* (CD0279MR).

3.3. Document procedure on *Respiratory Monitoring Record* (CD0279MR).

**REFERENCES**


RELATED DOCUMENTS

Policies
CC 45-090 Tracheostomy, Care and management of patients with Tracheostomy

Forms
CD0279MR  Respiratory Monitoring Record (HI, VGH)
CD0267MR  ICU Flow sheet- Days
CD0268MR  ICU Flow sheet-Nights

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