

	RESPIRATORY SERVICES	DATE CREATED: February 2004 DATE REVIEWED/REVISED: June 2017
CLINICAL GUIDELINE	TITLE: <u>CRITICAL CARE</u> – Percutaneous Tracheotomy (Respiratory Therapy) NUMBER: B-00-12-12060	RELATED DOCUMENTS: Olympus Ambu aScope 3 Storz Setup - MSJ

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SITE APPLICABILITY:

ST. PAUL'S HOSPITAL
MOUNT SAINT JOSEPH HOSPITAL

GENERAL INFORMATION:

Percutaneous tracheotomy (PCT) is performed at the bedside in critical care areas on patients who may require long-term artificial airway access and/or prolonged ventilatory support. This method of creating a tracheostomy is an alternative to an open or surgical tracheotomy.

Numerous studies and meta analyses have been published that compared percutaneous with open tracheotomy, most of which suggest no statistical significance between the two methods when comparing overall complication rates.

POLICY STATEMENT:

Percutaneous tracheotomy will only be performed when there is uninterrupted direct visualization of the trachea via bronchoscopy. Continuous waveform capnography will be used for monitoring exhaled carbon dioxide (ETCO₂) throughout the procedure.

Two physicians are required for the procedure: Physician #1 is responsible for performing the tracheotomy; and Physician #2 is responsible for operation of the bronchoscope.

Two respiratory therapists are also required for the procedure: Respiratory therapist #1 is required to maintain the airway in a stable position; and respiratory therapist #2 assists with the bronchoscopy and monitors the ventilation status of the patient.

NOTE: At Mount Saint Joseph Hospital, if a second therapist is not available a critical care nurse will assume responsibility for manual ventilation of the patient during the procedure. The sole respiratory therapist will maintain the airway and assist with the bronchoscopy.

Use only the Tracoe tracheostomy tube that comes as part of the Tracoe Percutan kit for percutaneous tracheotomy procedures – alternative tubes should not be substituted into the percutan kit setup.

COMPLICATIONS:

The most frequently reported complications of percutaneous tracheotomy include:

- Hemorrhage
- Pneumothorax
- Respiratory acidosis
- Hypoxemia
- Tracheal ring fracture
- Posterior tracheal wall injury

RELATIVE CONTRAINDICATIONS:

- Bleeding disorders
- Gross distortion of the neck (i.e. hematoma, tumor)
- Documented or suspected tracheomalacia
- Infection of soft tissues of the neck
- Short or obese neck
- Limited ability to extend neck/cervical spine
- Hemodynamic instability
- Hypoxemia (requiring FiO₂ greater than 0.6 and/or PEEP greater than 10)
- Inhaled pulmonary vasodilator therapy (i.e. nitric oxide, nebulized flolan)

REQUIRED SUPPLIES & EQUIPMENT:

- #7 or #8 Tracoe Percutan Kit
- Sterile major dressing tray
- 10 or 12 mL syringes
 - *Slip-tip syringe for aScope - **SPH***
 - *Luer-lock for Storz scope - **MSJ***
- Scissors
- Sterile lubricant
- Oral suction supplies
- Tracheostomy dressing
- Tracheostomy ties
- Tracheostomy dilators
- Lidocaine 2%
- Epinephrine 1:1000 solution
- 4 x 4 gauze
- Sterile bowls
- 18 gauge needles
- Bite block ****MUST BE USED IF PARALYTICS ARE NOT ADMINISTERED****
- 500 mL sterile saline
- Bronchoscopy swivel adaptor and flextube
- Manual resuscitator with mask and airway
- Equipment for ETCO₂ monitoring
- Personal protective equipment
- Emergency airway management supplies
 - Intubation box
 - Cricothyrotomy kit
 - Surgical tracheotomy tray

- aScope and Ambu monitor - **SPH**
 - Refer to [Ambu aScope 3](#)
- Bronchoscopy cart with bronchoscope, light source and image processor - **MSJ**
 - Refer to [Storz Setup - MSJ](#)

ROLES & RESPONSIBILITIES:

Physician #1:

- Performs the tracheotomy

Physician #2:

- Performs the bronchoscopy

Respiratory Therapist #1 (Critical Care RN if at MSJ):

- Maintains security of ETT
- Maintains stable airway
- Provides manual ventilation

Respiratory Therapist #2:

- Assist with bronchoscopy
- Monitors ventilation status of patient
- Secures new airway

PROCEDURE:

1. Gather, assemble and check function of all equipment. Ensure emergency equipment is readily available.
2. Set up and prepare the Ambu aScope and monitor as per [Ambu aScope 3](#) (SPH), or Storz bronchoscope and cart as per [Storz Setup - MSJ](#)(MSJ).
3. Ensure continuous physiological monitoring of heart rate, SpO₂, respiratory rate, blood pressure and ETCO₂.
4. Attach bronch swivel adaptor and flex tube to manual resuscitator. Ensure resuscitation bag is connected to oxygen and flow is turned on. Adjust **PEEP** valve to **0**, as the presence of the bronchoscope in the artificial airway can result in significant air trapping and autoPEEP.
5. Respiratory therapist #1 (or Critical Care Nurse at MSJ) initiates manual ventilation with 100% O₂ and no PEEP. PEEP may slowly be increased to low levels if oxygenation is not maintained.

SAFETY STOP:

Before inserting the bronchoscope into the airway, confirm with the physician whether or not paralytics have been or will be administered.

If paralytics are NOT going to be used for the procedure, a bite block must be in place before continuing with the bronchoscopy.

6. Once the surgical site has been prepped, unsecure the endotracheal tube and prepare for insertion of the bronchoscope by holding the ETT manually throughout the procedure.
7. Physician #1 will then begin to landmark between the appropriate tracheal rings with an introducer and saline filled syringe. At the same time, Physician #2 will visualize via the bronchoscope the anterior tracheal wall for bowing from the pressure exerted by the introducer on the tracheal wall.

SAFETY STOP:

The bronchoscope must not be inserted into the airway if a needle or scalpel is being used in the area. The bronchoscope should never be passed beyond the tip of the ETT during the procedure.

8. Throughout the procedure, respiratory therapist #1 will assist with moving the endotracheal tube as directed by Physician #2, as well as other tasks such as cuff deflation and ETT tie removal.
9. Once the trachea has been entered with the introducer, a guidewire is inserted and the introducer is removed. Dilators are then threaded over the guidewire to dilate the tracheal tissue in order to accommodate the tracheostomy tube. The largest dilator is then used as the obturator to insert the tracheostomy tube.
10. Once the tracheostomy tube is in place with the inner cannula inserted and the cuff has been inflated, Physician #2 will confirm placement of the tracheostomy tube via visualization with the bronchoscope – do not remove the endotracheal tube until proper placement is confirmed.
11. Upon confirmation of the tracheostomy tube position, remove the ETT and assist physician #1 with securing the tracheostomy tube. Replace the bronchoscopy swivel adaptor with a tracheostomy-specific inline suction system.
12. Return patient to the ventilator and do a full assessment. Higher FiO₂ and/or more ventilatory support may be required temporarily immediately following the procedure.
13. Perform tracheostomy care and place a tracheostomy dressing at the site.
14. Dispose the aScope into a biohazard bin and clean the Ambu monitor as per infection control guidelines (SPH).
15. Pre-clean the Storz bronchoscope as per the Scope Pre Cleaning Procedure found in [Storz Setup - MSJ](#). Place the scope in the designated MDRD bin and deliver/send for reprocessing. Clean the bronchoscopy cart as per infection control guidelines and restock as required (MSJ).
16. Ensure the appropriate tracheostomy emergency equipment is at bedside.

DOCUMENTATION, COMMUNICATION, EDUCATION:

1. Place one Tracoe barcode sticker into the Respiratory Critical Care Kardex, and the second onto the Respiratory Flowsheet.
2. Document the procedure on the Respiratory Flowsheet and Respiratory Critical Care Kardex. Include the following information:
 - Size of tracheostomy tube inserted
 - Patient tolerance to procedure
 - Complications (if any)
 - Ventilator settings post-procedure
 - Auscultation
3. Ensure chest x-ray is obtained at the completion of the procedure.

REFERENCES:

1. Pappas S, Maragoudakis P, Vlastarakos P, et al. Surgical versus percutaneous tracheostomy: an evidence-based approach. *Eur Arch Otorhinolaryngol* Oct 2010.
2. Delaney A, Bagshaw SM, Nalos M. Percutaneous dilational tracheostomy in critically ill patients: a systematic review and meta analysis. *Crit Care Med* 2006; 10(12): R55.
3. Silvester W, Goldsmith D, Uchino S, et al. Percutaneous versus surgical tracheostomy: a randomized controlled study with long-term follow up. *Crit Care Med* 2006; 34(8): 2145-52.
4. Massick DD, Yao S, Powell DM, et al. Bedside tracheostomy in the intensive care unit: a prospective randomized

trial comparing open surgical tracheostomy with endoscopically guided percutaneous dilational tracheotomy. *Laryngoscope*. Mar 2001;111(3):494-500.

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