

PERCUTANEOUS DILATIONAL TRACHEOSTOMY

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OVERVIEW:

Tracheostomy is performed to establish a definitive surgical opening into the trachea. It is commonly performed in the ICU for patients requiring prolonged ventilatory support.

There are [many different techniques and kits](#); **percutaneous dilational tracheostomy** is the most common and uses a modified Seldinger technique under bronchoscopic guidance. POCUS can be used to [exclude the presence pre-tracheal blood vessels](#).

EQUIPMENT:

- Flexible video bronchoscope
- Tracheostomy tube
- Scalpel
- Introducer needle
- J guidewire
- 14 Fr small tracheal dilator
- Single-stage progressive tracheal dilator
- Tracheostomy tube introducer/loading dilator

INDICATIONS/CONTRAINDICATIONS:

- Indications**
- Prolonged weaning & mechanical ventilation >7 days
 - Facilitate weaning
 - Decrease sedation
 - Upper airway obstruction
 - Airway protection & clearance

- Contraindications**
- Obesity
 - Short neck
 - High PEEP&FiO2
 - Antiplatelet/anticoag therapy
 - Thrombocytopenia
 - Coagulopathy, mild
 - Mediastinal & neck surgery
 - Insertion site tissue infection
 - Operator inexperience
 - Cervical instability
 - Uncontrolled coagulopathy
- Relative (Obesity, Short neck, High PEEP&FiO2, Antiplatelet/anticoag therapy, Thrombocytopenia, Coagulopathy, mild)
- Absolute (Mediastinal & neck surgery, Insertion site tissue infection, Operator inexperience, Cervical instability, Uncontrolled coagulopathy)

PREPARATION:

- Assemble team and assign roles: RN, RT, bronchoscopist, PDT operator. Operator stands on right side of patient.
- **Time out:** Informed consent obtained. Discuss airway plan & back-up. Review Anticoagulation and antiplatelet therapy
 - **Inspection** of neck anatomy and mobility
 - **Equipment:** bronchoscope, tracheostomy kit,
 - **Med:** Adequate sedation/analgesia/neuromuscular blockade
 - **Ventilator:** Set FiO2 to 1.0 and mode of ventilation to ensure adequate tidal volume and minute ventilation (e.g. VC)

PROCEDURE:

- Position:** neck extension with a roll placed in between scapula
- Sterilize** and drape anterior neck
- Landmarks:** Palpation, Bronchoscopic ± [ultrasound](#) identification of tracheal rings. 2nd and 3rd tracheal ring ideal insertion site.
- Local Analgesia:** Lidocaine w or w/o epinephrine into SC tissue
- Steps:**
- Make 2 cm vertical skin incision, can be done after guidewire advanced if preferred.
 - With bronchoscope identify tracheal rings and thyroid cartilage. Withdraw ETT above level of needle insertion site.
 - Insert needle midline, 12'o'clock during direct visualization. Advance J guidewire. Use mall 14 Fr dilator over guidewire.
 - Single-stage tracheal dilator over guidewire, remove.
 - Tracheostomy tube is inserted with the loading dilator over the guidewire.
 - Bronchoscopic confirmation of tracheostomy tube position. Tracheostomy tube is connected to the ventilator.
 - Tracheostomy secured with sutures (optional) and neck ties.

POST PROCEDURE:

- Place sign showing type of tracheostomy and procedure date
- Do not change outer cannular for at least one week
- Monitor Tracheostomy cuff pressure (goal 20-25 mmHg)
- Begin weaning Sedation & ventilator support
- Skin care, trach dressing, inner cannula changes (& suture removal if applicable)
- Trach mask and speaking valve trials when appropriate
- Swallow evaluation & [patient/family education](#)

TROUBLESHOOTING TIPS:

- **Very common:** ETT tube is too low and needle insertion not visualized. Withdrawing the ETT is very safe under bronchoscopic guidance
- **Minor bleeding during procedure:** usually stops by tamponade once tracheostomy inserted.
- **Unable to dilate tract:** most of resistance comes from small skin incision or fascia.
- Tip: Use the bronchoscope to ensure guidewire remains in the trachea throughout procedure.

