VANDERBILT UNIVERSITY
MEDICAL CENTER

Emergency General Surgery
Practice Management Guideline: Percutaneous Tracheostomy

I. Overview

Patients with prolonged mechanical ventilation and endotracheal intubation are at risk for developing complications such as pneumonia, tracheomalacia, and subglottic stenosis. Tracheostomy has been shown to be an excellent option for prolonged airway management, minimizing these complications while providing greater patient comfort and oral hygiene. Bedside percutaneous tracheostomy has been shown to be a safe alternative to open tracheostomy in the operating room, reducing patient transport and anesthesia/OR costs.

II. Purpose

A. To define the indications and contraindications for tracheostomy
B. To describe the accepted safe protocol for the performance of a bedside percutaneous tracheostomy

III. Patient Selection

A. Indications for percutaneous tracheostomy
    a. Prolonged (>7 days) mechanical ventilation
    b. Inability to protect airway (i.e. altered mental status, stroke, deconditioning)
    c. Structural (i.e. inability to intubate, unresolving airway edema, severe facial fractures)
    d. Consider early (<7 days) for predicted prolonged mechanical ventilation
        i. Severe TBI
        ii. Cervical spinal cord injury
        iii. TBI + submaxillary facial fractures
        iv. Laryngotracheal injury

B. Contraindications for percutaneous tracheostomy
    a. < 7 days postoperative from anterior cervical ORIF (ACDF)
    b. High ventilator settings
        i. FiO2 >60%
        ii. PEEP> 10
        iii. intolerant of volume control mode (e.g. APRV/BiVENT, VDR)
    c. Elevated intracranial pressure
    d. Hemodynamic instability

C. Special Situations
    a. High risk patients
        i. High risk patients
            1. Morbid obesity
            2. Airway edema
            3. Cervical trauma
            4. Extremes of age
            5. Anatomic considerations (e.g. halo brace, MMF)
            6. Increased risk of respiratory decompensation (e.g. higher ventilator settings, frequent mucous plugging, desaturation events)
        ii. High risk patients should be identified prior to procedure
        iii. Consider additional proceduralist, OR tracheostomy, bronchoscopy guided tracheostomy or ENT consultation in high-risk patients
    b. Covid-19 Patients

i. When cleared from isolation
ii. PEEP <12
iii. FiO2 <80%
iv. Must be performed by the attending

c. Proximal XLT tracheostomy should be selected for patients with BMI ≥ 35

D. Tube feed and anticoagulation hold times
   a. Anticoagulation Hold Times
      i. Heparin drip: Hold 4 hours prior and 4 hours post procedure
      ii. Prophylactic dose enoxaparin or heparin: do not hold
      iii. Therapeutic enoxaparin: hold morning dose, restart evening dose if no bleeding
      iv. Direct Oral Anticoagulants (DOAC): Hold 24 hours prior, restart evening dose if no bleeding
      v. Aspirin: Do not hold
      vi. Clopidogrel/Ticagrelor/Effient (without addition of aspirin): Do not hold
      vii. Dual Antiplatelet Therapy (DAPT): Risk/benefit discussion regarding delaying tracheostomy vs. tracheostomy on DAPT
   b. Preoperative Tube Feeds
      i. Hold feeds minimum of 1 hour
      ii. Tube feeds may be held longer at discretion of ICU/intensivist team

IV. Procedure

A. Supply and instrument set up
   1. Portex percutaneous tracheostomy kit (Blue Rhino for XLT placement)
   2. One pair mayo scissors
   3. Three pair of curved hemostats
   4. Two needle-holders
   5. two Army-Navy retractors
   6. tracheostomy tubes (usually #8 Portex, with appropriate back-up sizes)
   7. sterile towels, gowns, and gloves
   8. skin prep solution (chlorhexidine)
   9. two 2-0 silk or monofilament suture
   10. intubation set with difficult airway bag
   11. CO2 detector
   12. Two towel clamps

B. Procedure
   a. Bedside Sedation
      i. See bedside surgery protocol
      ii. Recommend chemical paralysis in addition to analgesics/anxiolytic
   b. Surgical set up as per bedside surgery protocol
   c. Preoperative timeout
   d. Surgical procedure
      i. Skin infiltrated with lidocaine/epinephrine
      ii. Vertical incision made 1-2 fingerbreadths above sternal notch
      iii. Blunt dissection carried down to the level of the trachea in the midline between the strap muscles
      iv. Endotracheal tube tape is cut and procedure RN at the head of the bed manipulates the ET tube while the surgeon palpates for its presence within the trachea. Tidal volume should be closely monitored during this time. The tube is slowly withdrawn until the balloon could be palpated in the subglottic position. The balloon is deflated, and the tip of the endotracheal tube is withdrawn to the level of the cricoid cartilage under manual guidance.
      v. The percutaneous tracheostomy is completed using needle access and seldinger technique, verified by air return.

e. Confirmation of position
    i. CO_2 monitor is connected to the tracheostomy tube and color change as well as expiratory tidal volumes are confirmed
f. Once the tracheostomy is secured, the endotracheal tube may be fully withdrawn.
g. Tracheostomy secured with suture and neck strap.
h. Post procedure chest x-ray is required.

V. Downsize and Decannulation

A. Tracheostomy Downsize
    a. Downsize Considerations
        i. > POD 5
        ii. Tolerating minimum of 10 min of trach collar trials
        iii. No ongoing bronchoscopy or operating room needs
        iv. If tolerating cuff deflation and off vent for >48 hrs: consider downsizing to #6 non-cuffed XLT or 7 Portex
    b. Tracheostomy Downsize Supplies
        i. Airway box and McGrath available
        ii. Ambubag with mask and suction at bedside
        iii. New tracheostomy x 2
        iv. $ETCO_2$ detector, tracheostomy tie, 10cc syringe, lubricant
        v. Suction catheter
    c. Tracheostomy Downsize
        i. Preoxygenate with 100% FiO_2
        ii. Obturator/ Fish Hook technique:
            1. Remove existing tracheostomy
            2. Place obturator in new tracheostomy tube, position tracheostomy at 90-degree angle and insert into lumen (should feel a “pop-pop”)
            3. Remove obturator, place and lock inner cannula
        iii. Seldinger using suction catheter:
            1. Remove inner cannula and place suction catheter into existing tracheostomy
            2. Remove trach over suction catheter, place new trach (without inner cannula) over suction catheter and into stoma
            3. Remove suction catheter and insert inner cannula
        iv. Confirm placement with end tidal CO_2 and suction catheter passing
        v. Document basic/general procedure note

B. Tracheostomy Decannulation
    a. Considerations
        i. Off ventilator for >72 hrs
        ii. Tolerating capping vs. PMV
        iii. No upcoming procedures that may require positive pressure ventilation
        iv. No frequent suctioning requirement, clearing secretions independently
    b. Remove tracheostomy, cover stoma with tightly taped dry dressing, change twice daily

VI. References

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