



## **Standard of Procedure for Percutaneous Tracheostomy:**

### **Indications:**

- Upper airway obstruction
- Prolonged mechanical ventilation
- Access to tracheal toilet
- Airway protection from aspiration of gastric/pharyngeal contents.

### **Absolute contraindications:**

- cervical instability,
- uncontrolled coagulopathy, and
- infection at the planned insertion site.

### **Relative contraindications:**

- difficult anatomy (short neck, morbid obesity, minimal neck extension, or tracheal deviation) and
- severe respiratory disease resulting in the inability to withstand periods of apnea or in the loss of positive-pressure ventilation.

### **Complications:**

Immediate:

Bleeding

Loss of airway

Hypoxia

Pneumothorax



False tract

Pneumomediastinum

Posterior tracheal wall injury

Esophageal injury

Surgical emphysema

Early:

Tracheal ring fracture

Tracheal tube obstruction

Paratracheal placement

Posterior tracheal wall injury

Pneumomediastinum

Pneumothorax

Surgical emphysema

Atelectasis

Late:

Subglottic stenosis

Tracheal tube obstruction

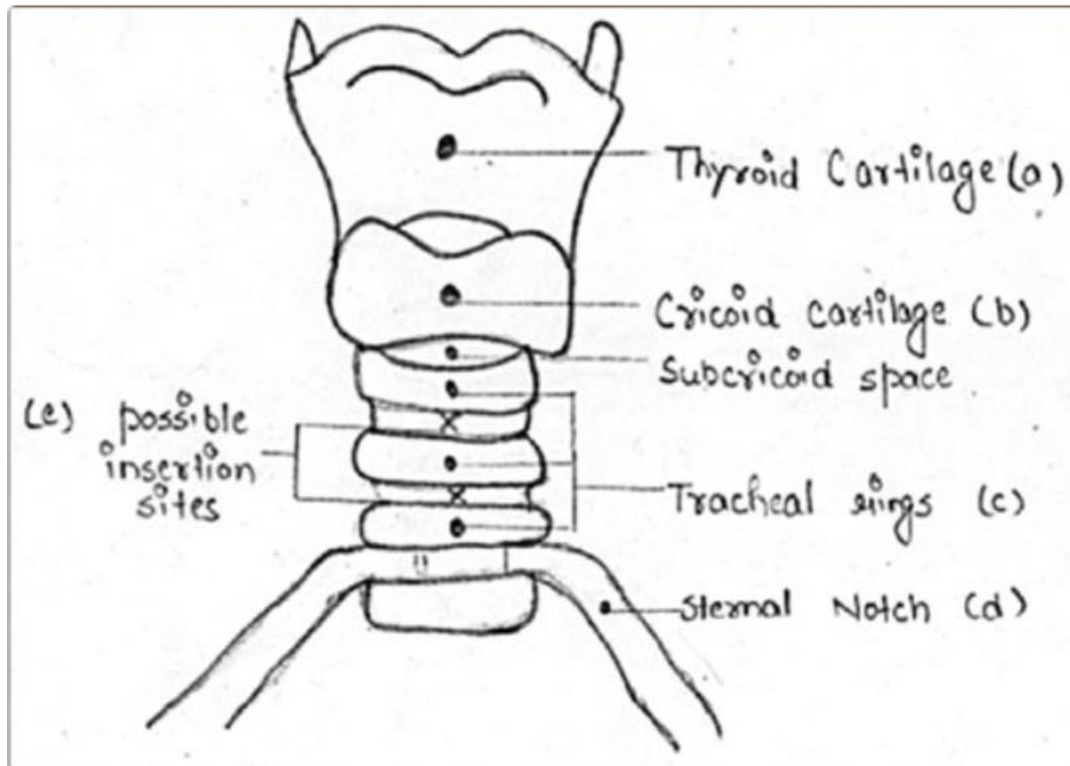
Unplanned decannulation

Tracheoinnominate artery bleed

Delayed healing after decannulation



## Tracheoesophageal fistula



## Anatomy of neck

Tracheostomy is normally performed between the second and third tracheal rings.



## Surgical steps for percutaneous dilatational tracheostomy

- Properly position the patient with maximum neck extension
- Keep patient on 100% FiO<sub>2</sub>
- Ensure adequate sedation and paralysis of the patient
- Deflate the ET cuff and withdraw ET under laryngoscope vision until the cuff is visualized just below cords, then reinflate the cuff
- Clean, drape the patient as per protocol
- Identify the site of insertion
- Infiltrate the skin with local anesthetic containing a vasoconstrictor
- Make a 2–2.5 cm transverse incision at the proposed insertion site
- Bluntly dissect subcutaneous fat and pretracheal tissue with mosquito clamp
- Pass the bronchoscope through ET tube till tracheal lumen is visualized



- Advance a 14-gauge sheathed introducer needle into trachea with a nondominant hand stabilizing the trachea during the process
- Tracheal placement of the needle is confirmed by aspirating air bubbles into the saline-filled syringe attached to the needle, and by direct visualization through the bronchoscope
- Withdraw the needle and insert the Seldinger guidewire through the plastic sheath
- Dilate the insertion site with the help of a small tracheal dilator
- Single graduated dilator is moisturized with saline and then loaded over the guiding catheter
- The whole assembly is then loaded over the guidewire and advanced as a unit into trachea in a sweeping action



- After adequate dilatation, dilator is removed and tracheostomy tube with appropriate adapter is inserted into trachea over the guiding catheter
- Placement of tracheostomy tube is confirmed by direct visualization of carina through the bronchoscope or by EtCO<sub>2</sub> graph



Positioning for percutaneous tracheostomy



Percutaneous tracheostomy sets



## Percutaneous Tracheostomy Checklist

Prepare Patient (Call in advance)	Prepare Equipment	Post Procedure
<p><b>Review:</b></p> <ul style="list-style-type: none"> <li>▫ Name/ DOB/ Code status</li> <li>▫ Intubation records</li> <li>▫ Indication for Percutaneous tracheostomy</li> <li>▫ Check allergies</li> <li>▫ Consent</li> <li>▫ Gastric Tube feeds appropriately withheld</li> <li>▫ Therapeutic anticoagulation withheld.</li> <li>▫ Coagulation status (check PT, INR, aPTT, Plt count if unknown)</li> </ul> <p><b>Personnel:</b></p> <ul style="list-style-type: none"> <li>▫ Surgeon (resident, fellow, or attending)</li> <li>▫ Bronchoscopist/ Airway (fellow or attending not performing surgery)</li> <li>▫ Optional Sedation Director (resident/NP, fellow or attending)</li> <li>▫ RT</li> <li>▫ RN</li> </ul> <p><b>Airway Assessment</b></p> <ul style="list-style-type: none"> <li>▫ Verbalize plan to team if loss of airway during procedure</li> <li>▫ Check ETT position and ETT size</li> <li>▫ Consider DL for difficult airway</li> <li>▫ Consider tube exchanger placement with DL while ETT remains in place</li> </ul> <p><b>Pre-oxygenation</b></p> <ul style="list-style-type: none"> <li>▫ Place patient on 100% FiO2 15 minutes prior to procedure</li> <li>▫ Adjust ventilator alarms/settings</li> </ul> <p><b>Position</b></p> <ul style="list-style-type: none"> <li>▫ Ensure patient tolerates being laid flat</li> <li>▫ Adjust bed height</li> <li>▫ Restraints as needed</li> <li>▫ Hyperextension of neck with shoulder roll if no contraindication</li> </ul> <p><b>Monitors</b></p> <ul style="list-style-type: none"> <li>▫ Set non-invasive BP cuff q3 minutes unless monitoring by arterial line</li> <li>▫ Audible pulse oximetry</li> <li>▫ Continuous EtCO2, 5-lead EKG</li> </ul>	<p><b>Equipment Required</b></p> <ul style="list-style-type: none"> <li>▫ PPE: Sterile gowns, gloves, hat, mask, eyewear – for all</li> <li>▫ Percutaneous Tracheostomy Kit x 2 (#6 and #8 Cook percutaneous tracheostomy kits)</li> <li>▫ Red Airway Box (LMA, oral airways and 6.0 ETT, Cook Cric kit)</li> <li>▫ Bronchoscopy cart</li> <li>▫ CMAC</li> <li>▫ Ambu bag with PEEP valve connected with O2 flowing</li> <li>▫ Yankaeur with wall suction</li> <li>▫ Soft tracheostomy tube ties</li> <li>▫ Procedure Cart</li> </ul> <p><b>Equipment Available</b></p> <ul style="list-style-type: none"> <li>▫ Crash cart immediately available. Can remain locked (Open Tracheostomy tray in bottom drawer with 6 cuffed Shiley DCT)</li> <li>▫ Yellow difficult airway box (Contains Bougie and Cook airway exchange catheter)</li> </ul> <p><b>Drugs</b></p> <ul style="list-style-type: none"> <li>▫ Sedative agents</li> <li>▫ Analgesic agents</li> <li>▫ Pre-mixed vasopressors</li> <li>▫ IV Fluids</li> <li>▫ Paralytic (optional)</li> <li>▫ Post-tracheostomy sedation discussed and ordered</li> </ul>	<p><b>Post Procedure</b></p> <ul style="list-style-type: none"> <li>▫ Obtain end tidal CO2 oximetry</li> <li>▫ Perform bronch to trach position</li> <li>▫ Confirm tracheostomy secured with sutures trach ties</li> <li>▫ Check trach cuff pressure</li> <li>▫ Order CXR. (All patients)</li> <li>▫ Document procedure size trach and medication delivered</li> <li>▫ Clarify post-op orders</li> <li>▫ Communicate results orders with the ICU</li> <li>▫ Complete trach orders</li> <li>▫ If NMB used – IV sedation and monitoring until TOF 4/4</li> <li>▫ Remove shoulder roll if present</li> <li>▫ Contact family if needed</li> </ul>



