Tracheostomy Care in the ICU

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February 2019
VTA Symposium
Trache Fast Facts

- Tracheostomy is one of the oldest recorded surgical procedures, depicted on Egyptian tablets dated from around 3600 BC.
- The 1952 polio epidemic saw tracheostomies used in the first ICU in Copenhagen, Denmark. It allowed positive pressure ventilation to be delivered to patients and reduced mortality from bulbar polio from ±85% to <15%.
- One of the most frequently done procedures on critically ill patients requiring prolonged mechanical ventilation in the ICU
  - 24% of all ICU patients
Reasons for Tracheostomy

• **Performed:**
  - **Airway obstruction** - Bypass airway obstruction at or above the trachea
  - **Secretions** - To clean & remove secretions from the airway (bronchopulmonary toileting)
  - **Ventilation** - To manage the airway for long-term ventilatory support
  - **Airway protection** – those patients who can’t protect their airway or those with an inefficient swallow &/or cough mechanism

• **Temporary vs. long-term**
  - Temporary <6/12
  - Permanent >6/12
Indications for tracheostomy in the ICU

• Usually performed in critically ill patients:
  • Prolonged weaning from assisted ventilation
  • Acute or chronic neuromuscular conditions
  • Poor cardiorespiratory reserve
  • Bulbar dysfunction
  • Brain injury
  • Upper airway obstruction
Role of tracheostomy in the ICU

• Better tolerated by patients as compared to oral or nasal intubation
• **Less discomfort** = reduction in analgesic, sedative & muscle relaxant drugs
• Clearance of airway secretions; more effective suctioning of the secretions
• Mouth care; improved oral hygiene
• Airway resistance & anatomical dead space are reduced
• Allows a seamless transition between different modes of assisted ventilation and weaning modes without trials of extubation and reintubation
• Earlier d/c from the ICU
• Allows for mobilisation and rehabilitation
Timing of tracheostomy

• Controversial
• Tracheostomy vs translaryngeal intubation
• Commonly done 7 – 14 days
  • Unless rapid improvement is likely to make trache unnecessary
• Evidence of better outcomes if trache done in first few days in ICU patients with:
  • Severe respiratory failure
  • Severe traumatic brain injury
  • Older patients with chronic chest disease or neurological disease (e.g. GBS)
Tracheostomy procedure

- Open tracheostomy
- Percutaneous tracheostomy techniques (percutaneous dilatational tracheostomy (PDT))
  - Procedure is usually performed at the bedside in ICU
## Risk/Complications of a tracheostomy

<table>
<thead>
<tr>
<th>Early</th>
<th>Late</th>
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</thead>
<tbody>
<tr>
<td>Haemorrhage</td>
<td>Stomal infection</td>
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<tr>
<td>Obstruction due to blood clot or mucus</td>
<td>Tracheal stenosis</td>
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<tr>
<td>Misplacement of the tube</td>
<td>Tracheo-oesophageal fistula</td>
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<tr>
<td>Dislodgement of the tube</td>
<td>Tracheo-innominate artery fistula</td>
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<td>Subcutaneous emphysema</td>
<td>Tracheomalacia</td>
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<tr>
<td>Pneumothorax</td>
<td>Tube occlusion</td>
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<td>Injury to adjacent structures</td>
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Different Types of Trache Tubes
Different Types of Trache Tubes

- Cuffed vs. Uncuffed
- Fenestrated vs. Unfenestrated
Different Types of Trache Tubes

- Cuffed vs. Uncuffed
- Fenestrated vs. Unfenestrated
- Parts
  - Outer cannula
  - Inner cannula
  - Obturator
Aftercare of the tracheostomy

When a clinical incident occurs relating to a tracheostomy, the chance of some harm occurring is between 60 – 90% (Thomas, 2009; McGrath, 2010)

- Obstruction is a recurrent problem with all types of tracheostomy tube
- Appropriate equipment at the patient’s bedside
- Appropriate care plans (humidification, suctioning etc.)
- In emergency replace trache
Changing & Cleaning

- **Cleaning around the stoma**
  - Potential for stoma problems
    - Considered as a full thickness, open wound
      - Complicated by the moisture & mucus associated with respiratory.
    - Added is a large foreign body which slides about every time the patient moves

- **Trache change (single lumen – paeds)**
  - First change ±9 days by the ENT
    - it is necessary to wait for this period of time in order for a mature tract to be established (Mitchell et al., 2012).
  - Advocate for daily changes
Suctioning

• Essential part of routine care of the tracheostomy patient

• Should not occur distal to the tube tip. Catheters should only be inserted so that the distal hole sits at the end of the tube
  • This allows collection of the secretions but not trauma to the distal tracheal mucosa
Humidification

- During normal breathing, inspired air is warmed, filtered and moistened by ciliated epithelial cells in the nose and upper airways.
- Failure to adequately humidify could result in tube or stoma blockage as secretions become dry and viscous, forming a crust around the tracheostomy.
Emergency management with a tracheostomy tube
Emergency Paediatric Tracheostomy Management

SAFETY - STIMULATE - SHOUT FOR HELP

LIFE:
Check safe area. Stimulate, and shout for help. Call team on call.

AIRWAY:
Open child's airway by head tilt/chin lift/pillow or towel under shoulders. Remove any attachments: humidifier (HME), speaking valve and inner tube.

SUCTION TO ASSESS TRACHEOSTOMY PATENCY

Can you pass a suction catheter?

Yes
The tracheostomy tube is patent
Perform tracheal suction
Consider partial obstruction
Consider tracheostomy tube change
Check position of trache tube

No

EMERGENCY TRACHEOSTOMY TUBE CHANGE

Spare trache
1st insert same size
2nd insert size smaller

No spare trache
Insert size 3 ET through stoma (only 3cm should go in)

Unable to reinsert trache (no upper airway obstruction)
Deliver O2 via oral nasal route. Close stoma with plaster/nastru. Facemask over mouth or may use ET or LMA

Unable to reinsert trache (upper airway obstruction)
Deliver O2 via stoma
Place facemask + Ambu bag over stoma

IS THE PATIENT BREATHING? - Look, listen and feel at the mouth and tracheostomy/stoma

No

5 RESCUE BREATHS – USE TRACHEOSTOMY IF PATENT

Patent upper airway - deliver breath to the mouth
Obstructed upper airway - deliver breath to tracheostomy/stoma

CHECK FOR SIGNS OF LIFE? - START CPR

15 compressions: 2 rescue breaths
Ensure help called

Yes
RESPOND: put oxygen, reassessment and stabilisation
Plan for definitive airway if tube change failure

Primary emergency oxygenation

Standard oral airway manoeuvres may be appropriate.

If so cover the stoma (wards / hand).

Gas: Bag valve face mask
Oral or nasal airway adjuncts
Supraglottic airway device e.g. LMA

Secondary emergency oxygenation

ORAL intubation may be appropriate with a down sized ET tube
Uncut tube, advanced beyond stoma
Prepare for difficult intubation
'Difficult Airway' Expert and equipment

Tracheostomy STOMA ventilation

Facialicr face mask applied to stoma
LMA applied to stoma

**EQUIPMENT: Fibreoptic scope, bronchus airway exchange catheter, Airway trolley
Emergency Paediatric Tracheostomy Management

SAFETY - STIMULATE - SHOUT FOR HELP

SAFE:
- Check Safe area, Stimulate, and Shout for help, CALL team on call

AIRWAY:
- Open child’s airway: head tilt / chin lift / pillow or towel under shoulders
- Remove any attachments: humidifier (HME), speaking valve and inner tube

SUCTION TO ASSESS TRACHEOSTOMY PATENCY

Can you pass a SUCTION catheter?

Yes
- The tracheostomy tube is patent
  - Perform tracheal suction
  - Consider partial obstruction

No
- Uncomfortable
- Consider tracheostomy tube change
- Check position of trache tube

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Ensure help called

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RESPONDS: put oxygen, reassessment and stabilisation
Plan for definitive airway if tube change failure
**Primary emergency oxygenation**

- Standard **ORAL airway** manoeuvres may be appropriate.
  - If so **cover the stoma** (swabs / hand).
  - Use:
    - Bag-valve-face mask
    - Oral or nasal airway adjuncts
    - Supraglottic airway device e.g.
    - Laryngeal Mask Airway (LMA)

- **Tracheostomy STOMA ventilation**
  - Paediatric face mask applied to stoma
  - LMA applied to stoma

**Secondary emergency oxygenation**

- **ORAL intubation may be appropriate with a downsized ET tube**
  - Uncut tube, advanced beyond stoma
  - Prepare for difficult intubation
  - ‘Difficult Airway’ Expert and Equipment**

- Attempt **intubation of STOMA**
  - 3.0 ID tracheostomy tube / ETT
  - ‘Difficult Airway’ Expert and Equipment**

- **EQUIPMENT:** Fibreoptic scope, bougie, airway exchange catheter, Airway trolley
Decannulation in the ICU

- Multidisciplinary approach to evaluation of readiness
- Monitor tolerance of trache & cuff deflation regime, capping regime & suitability for oral intake
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• Multidisciplinary approach to evaluation of readiness
• Monitor tolerance of trache & cuff deflation regime, capping regime & suitability for oral intake
• After successful decannulation, stomas are usually left to granulate and close spontaneously
Christopher Reeve (actor)

Elizabeth Taylor (actress)

Stephen Hawking (physicist) Amyotrophic Lateral Sclerosis (ALS)

Luther Vandross (singer)

Catherine Zeta Jones (actress)

John Paul II (Pope)

John Fitzgerald Kennedy (U.S. President)

Val Kilmer (actor)
Questions?
References

- Brighton and Sussex University Hospitals Tracheostomy Guidelines. 2010