TRACHEOSTOMY: PROCEDURES, TIMING AND TUBES

Gail M. Sudderth RRT
Clinical Specialist
Passy-Muir Inc.
gsudderth@passy-muir.com
(949) 833-8255

Objectives
- Explain how the timing of the tracheotomy and tube selection criteria plays a key role in successful use of speaking valves.
- List complications of improper cuff management.
- List how the tracheostomy tube and inflated cuff can impact swallowing and suggest ways to reduce clinical complications.

Indications for Tracheostomy
- Prolonged mechanical ventilation
- Inability to perform trans-laryngeal intubation (trauma, max/fax deformity)
- Upper airway obstruction (temporary or permanent)
- Secretion management (neuromuscular disease)

Reputed Benefits
- Improved patient comfort/less need for sedation
- Lower WOB/faster weaning from MV
- Improved safety
- Improved oral hygiene and oral intake
- Less long term laryngeal damage
- Lower VAP rates
- Lower mortality
- Reduced ICU and overall LOS
- Earlier ability to speak/ Improved participation

Durbin, C. Resp Care 2010;55(8):1056-1068

WHEN: TIMING OF TRACHEOTOMY

21 Days?
7-10 Days?
2-3 Days?

Does timing affect outcomes?
What does the literature say?
Endotracheal Tube Factors Cited To Contribute To Swallowing Impairment and Aspiration

- Mucosal injury to the oral pharynx and larynx
- Injury to the vocal folds which may be transient or permanent
- Tracheal edema, ulceration and stenosis

Laryngeal Intubation Granuloma

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HOW: TRACHEOTOMY PROCEDURES

Open or Surgical Tracheotomy
Tried and True Method

Percutaneous Dilatation or Balloon Dilatation Tracheotomy
Less costly and more convenient

Cricothyroidotomy
As seen on ER Shows

Does the method of tracheotomy affect outcomes?

Cricothyroidotomy

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Parts of a tracheostomy tube - ISO STANDARDS

Neck flange
Tube shaft
15 mm connector
Cuff
Inflation line
Pilot balloon
Pilot port with one way valve

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Tracheostomy: Procedures, Timing and Tubes

Tracheostomy Tubes
- Single Lumen/Cannula
- Double Lumen/Cannula

Routine Tracheostomy Tube Changes
- After initial tracheotomy
  - Surgeon preference
- To assure stoma and tract established
- To reduce complication of granulation tissue
- For down-sizing
- Difficult airways and special considerations

Types of Tubes
- MATERIALS
  - PVC, Silicone, Metal
  - Metal Reinforced
- SHAPE
  - Curved, Angular, Non-pre formed
- LENGTH
  - Standard
  - Extra length
  - Proximal
  - Distal
  - Adjustable Range
- SINGLE LUMEN
- DOUBLE LUMEN
- FENESTRATED
- MRI COMPATIBLE
- Subglottic Suction
- Trach Talk
- CURFS
  - Air, water, or foam
  - Double cuffed
  - Un-cuffed
- Custom Made

Jackson Tracheostomy Tubes
- Improved Inner Cannula
- Original Style

Jackson Metal Tracheostomy Tubes
- Original Style
- Improved
- Permanent 15mm Adapter

PMV® 2020 (clear) With Jackson Improved
Calculating Tube Size

- ATS Consensus: The tracheostomy tube should take up no more than 2/3 the ID of the trachea.
  (for pediatrics, no adult standard)

- AP Diameter of trachea
  - Male: 18 +/- 5 mm
  - Female: 12 +/- 3 mm

Not all size 6 trachs are equal!!

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<th>ID</th>
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Extra Length Tubes

- distal
- proximal

Tracheal Malacia or Stenosis

Increased skin-to-tracheal-wall distance

Image used by permission from Nellcor Puritan Bennett LLC, Boulder, Colorado, doing business as Covidien.

Adjustable Flange Tube

Cuff Choices

- AIR FILLED – minimal leak
- TTS™: WATER FILLED – minimal occlusion (can be air filled)
- FOME-Cuf® – self sealing
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Air Filled Cuffs
- Cuff Inflated
- Cuff Deflated

Water Filled Cuffs TTS
- Cuff Up
- Cuff Deflated

Cuff: Choices and Management
- Cuff up or down?
  - Purpose of cuff
  - Cuffs and aspiration
- Cuff pressures
  - 18-22* cm H₂O
  - Minimal Leak
  - Minimal occlusion

Cuff Management – Minimal Leak

Cuff Management – Direct Measure

Clinical Complications - Cuff
- Esophageal impingement
- Reflux
- Necrosis and Trauma
- Laryngeal tethering
- Reduced airway protection
Tracheostomy: Procedures, Timing and Tubes

Cuff Over-Inflation

Clinical Complications
- Reduced Airflow
- Taste, Smell, Sensation
- Voice
- Reduced Positive Airway Pressure
- Physiologic Peep
- Cough
- Valsalva
- Swallow
- Late Complications
- Granuloma- Stenosis
- Tracheal Malacia
- Fistulae

Benefits of Passy-Muir® Valve
- Improved Voice/Speech
- Improved Smell & Taste
- Improved Swallow
- May Reduce Aspiration
- Improved Secretion Management
- Restored PEEP
- Improved Oxygenation
- Improved Quality of Life
- Expedites Weaning and Decannulation
- Cost Savings
- Shorter Lengths of Stay

Airway Assessment
- How does tube size and type affect airway assessment?
  - Tube must be small enough for adequate airflow.
  - Cuff takes up space in the airway
  - Tube length may cause resistance to airflow
  - Foam cuff is absolute contraindication

Routine and Emergency Procedures
- Suctioning
- Broncho-pulmonary Hygiene
- Oxygen and Humidity Therapy
- Trach Care/Stoma Care
- Inner Cannula Change Cleaning
- Oral Care
- Unplanned Decannulation
- Blocked Tube or Inner Cannula

Decannulation Plan
- Begins at Intubation-What is the Plan?
- Evaluation for Decannulation
  - Reason for tracheotomy has resolved
  - Medically stable
  - Patent upper airway
  - Tolerates speaking valve
  - Can manage oral and tracheal secretions
  - Tolerates capping/plugging
  - Risk of aspiration assessed

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Airway Management Team

- "Tracheostomy expertise must follow the patient wherever they go in the hospital." Heffner, John E.
- Team Approach
  - Timing and tube selection
  - When to downsize
  - Plan of care
  - Communication
  - Swallowing
  - Decannulation
  - Impacts continuity of care
  - Impacts safety, length of stay and costs

Resources

- Epstein, S. Late Complications of Tracheostomy. Respir Care. Apr 2005;50(4); 542-549.

Resources

- Heffner, J H. Toward Leaner Tracheostomy Care: First Observe, Then Improve. Respir Care, 2009:50(12)

Resources

- www.Smiths-medical.com
- www.Cookmedical.com
  Cook Medical Inc., Bloomington, Indiana
- www.Premusa.com
  Premier Medical, Inc.
- Shiley Tracheostomy Pocket Guide
  http://respiratorysolutions.covidien.com/LinkClick.aspx?fileticket=AF0%2b2G%2bTVaU%3d&tabid=184
- www.hopkinsmedicine.org/tracheostomy/about

Resources

- LeBlanc, et al. (2009) Outcome in Tracheostomized Patients with Severe TBI following Implementation of a Specialized Multidisciplinary Tracheostomy Team. Published in: Journal of Head and Trauma Rehab.

Additional Educational Opportunities

- Self-study webinars available on demand
  - Getting Started
  - Ventilator Application
  - Swallowing
  - Pediatric
  - Special Populations
- Live group webinars
- www.passy-muir.com
- Passy-Muir Inc. is an approved provider of continuing education through ASHA, AARC, CMSA and California Board of Nursing Credit
Receiving CEU’s for this Course

- You will have 72 hours from the time this course ends to complete the evaluation, which is required to receive credit.
- Look in your email for a reminder link, or type this into your internet browser’s address bar:
  - [ep.passy-muir.com](http://ep.passy-muir.com)

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