Tracheostomy Tubes: Managing Communication and Swallowing Issues

Carmin Bartow, MS, CCC-SLP, BRS-S
Speech Pathologist
Vanderbilt University Medical Center
Nashville, TN
Disclosure Statement

Disclosure:

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Topics

- Trach overview
- Communication Options
- Passy-Muir Speaking Valves
- Dysphagia Management
- Conclusion / Hands-on time
Tracheostomy Overview

- Tracheostomy Tubes
- Physiologic Changes after Tracheotony
Tracheotomy

Indications for tracheotomy

- Prolonged intubation
- Need for long term mechanical ventilation
- Need for permanent tracheostomy tube
- Upper airway obstruction / edema
Trach Tube Components

Tracheostomy Tube Diagram

- Inner Cannula
- Neck Plate (Flange)
- Fenestration
- Outer Cannula
- 15 mm Hub
- Cuff
- Pilot Line
- Pilot Balloon

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Tracheostomy Tube
Inflated Cuff
Tracheostomy Tube
Deflated Cuff
Tracheostomy Tube
Over-inflated cuff
Trach Tubes - Shiley
Trach Tubes - Bivona
Trach Tubes – Portex
Trach Tubes – Jackson Metal
Physiologic Changes after Tracheotomy
Physiologic Changes after Tracheotomy

- **Respiration** – breathing in and out through tracheostomy tube
- **Speech** – inability to produce phonation due to lack of airflow through vocal folds
Physiologic Changes after Tracheotomy

- Smell/taste – decreased sense of smell and taste due to lack of airflow into upper airway
- Secretion management – inability to mobilize secretions effectively due to decreased cough effort
Physiologic Changes after Tracheotomy

Swallowing – many research studies regarding trach tubes and swallowing report a negative impact on swallowing efficiency

- Aspiration
- Pressure Differences
- Airflow Differences
- Cuff issues
- Laryngeal Sensitivity
Aspiration

- An association b/t aspiration and trachs has been well documented
  - Trach associated with increased risk of aspiration and pneumonia (Muz et al, 1987)
  - Delayed laryngeal vestibule closure which was associated with tracheal aspiration (Abraham and Wolf, 2000)
  - Disruption of vocal fold function (Nash 1988, Shaker, 2000)
Pressure Differences

- Aerodigestive tract is a set of tubes and valves (Logemann, 1988); swallowing is a pressure driven event
- There is an inability to build up adequate pressure to propel the bolus through the pharynx with an open trach (Eibling and Gross, 1996)
- When subglottic pressure is altered with a trach, neuroregulation of pharyngeal swallow physiology is likewise altered (Gross, et al, 2003)
Airflow differences

- The loss of expiratory airflow through the upper airway for normal respiration has been linked to increased pooling of secretions within the larynx and pharynx (Siebens, et al, 1993)
Cuff issues

- Reduced laryngeal elevation and silent aspiration were significantly higher in cuff inflated vs. cuff deflated condition (Logemann, 2005)

- The cuff DOES NOT prevent aspiration (Ross & White, 2003); it is not “watertight”
Laryngeal sensitivity

- Normal laryngeal sensitivity = Cough

- Trach tubes result in reduced pharyngeal / laryngeal sensation (Tippett et al, 1991)
VFSS - aspiration
Communication Options

- **Non-Verbal**: writing, AAC, communication board, mouthing
- **Verbal**
  - Leak speech
  - Finger occlusion
  - Talking trach
  - Speaking valves
  - Plugging / capping
Leak Speech

- Ability to produce voice with airflow “leaking” around a trach tube into upper airway
- Occurs most often with cuffless tubes, deflated cuffs or fenestrated trachs
- Airflow takes path of least resistance through trach tube typically making speech breathy and weak
Finger Occlusion

- Placing finger over the hub of the trach tube to allow for increased airflow into the upper airway for phonation
Talking Trach Tube

Portex Trach Talk  Bivona Talking Trach  Portex Suctionaid trach
Figure 4-11: Talking tracheostomy tube. Air for speech is provided by independent air source (A). Upon occluding the air control port (B), air travels through the airflow tubing (C) and exits through a fenestration (D) located above the cuff.
Capping / Plugging

- Capping – placing a “cap” or “plug” on the trach to seal off airflow
Passy-Muir Valves
Passy-Muir Valve

- Valve opens during inhalation with less than normal inspiratory pressure
- Closes at the end of inhalation
- Allows airflow to pass through vocal folds for phonation
Passy-Muir Valve

- Remains in closed position except when patient inhales
- No leakage of air through valve
- Restoration of a closed system
- Restoration of subglottic pressure
Passy-Muir Valve

- Use on and off ventilator
- FDA indicated for use in communication and swallowing treatment
- Medicare/Medicaid reimbursable
- Supported by research as providing the best speech quality as compared with other speaking valves (Leder, 1994)
Passy-Muir Valves
Passy-Muir
Patient Care Kit
Patient Criteria

- Awake and alert
- Medically stable
- Able to tolerate cuff deflation
Patient Assessment

- Can the patient exhale around the trach into their upper airway?

- How to establish upper airway patency:
  - Deflate the cuff
  - Finger occlude the trach
  - Listen for exhalation and/or phonation
Upper Airway Patency Issues

Sizing of trach tube - the #1 Issue
- Often requires downsizing trach

- Other possibilities
  - Upper airway edema / obstruction
  - Granulation tissue
  - Foam filled cuff
  - Partially inflated cuff
  - Secretions
Valve Placement

Team involvement is key to successful use of valve!
Valve Placement

- Educate patient and family
- Obtain baseline measurements
  - Oxygen saturation (O2 sats)
  - RR
  - HR
  - Color
  - WOB
  - Responsiveness
- Suction patient if needed
Valve placement

- MUST DEFLATE THE CUFF
Deflating a cuff

- **Deflation** - To make sure the cuff is fully deflated, continue to remove air until resistance is met.
Inflating a cuff

- **Inflation** - An over-inflated cuff can result in damage to the tracheal walls. Recommended cuff pressure is approximately 20 – 25 mmHg.
Valve placement

- Place with a gentle twist to secure it on the hub of the trach
Placement of Speaking Valve

DIAGRAM OF AIRFLOW WITH PASSY-MUIR VALVE

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Placement

- Allow patient to adjust to airflow change
- Continue education and reassurance
- Establish phonation
- Continue to monitor for any changes from baseline measurements
- Remove valve if any significant changes occur
Troubleshooting

- Decreased O2 with cuff deflation – may need to increase FI02 (must check with RT)
- Inadequate exhalation/phonation

Check for:

- Complete cuff deflation
- Trach tube size
- Suctioning needs
- Need for MD assessment
- Patient position
- Trach position
Session Wrap-up

- Wear times vary
- Confer with medical staff as needed
- Post warning labels
- Storage
- Care and Cleaning
Physiologic Benefits of the Passy-Muir Valve

- Improved voice
- Improved cough
- Improved secretion management
- Improved swallowing
- Quicker decannulation

* Can result in improved quality of life!
Dysphagia Management

- Assessment
- Treatment
Dysphagia Assessment

- Clinical bedside assessment with or without blue dye
- FEES
- VFSS
Blue Dye Test

- No set standards; varies from facility to facility
- Involves use of blue food coloring to dye secretions, liquids or foods
- Tracheal secretions that are either coughed or suctioned from trach are monitored for signs of aspiration
Clinical Bedside Swallowing Assessment

- Diagnosis
- Physical, medical and nutritional status
- Underlying pulmonary disease
- Ability to manage secretions
- H/o dysphagia
- Type of trach tube
- Mechanical ventilation
- H/o endotracheal intubation
  - How long?
  - How many times?
Clinical Bedside Swallowing Assessment

- Deflate cuff (if cannot deflate cuff, should proceed with instrumental assessment)
- Suction as needed
- Place speaking valve if present
- Oral mech exam
Clinical Bedside Swallowing Assessment

- Begin po trials with or without blue dye
- Observe for s/s of aspiration
  - Vocal quality
  - Cough
  - Evidence of aspiration in tracheal secretions (immediate and delayed assessment)
The Blue Dye Dilemma

- False negatives
- Availability
- Potential systemic effects
- Limitations
- Use results cautiously
VFSS/FEES

- Objective results
- Can be performed on vent and non-vent patients
- Identifies etiology of aspiration (not just presence of aspiration)
- Can implement therapeutic maneuvers and strategies
Eating while on the vent

66% of patients swallowed successfully; no aspiration. Of the patients that did aspirate (33%), 80% was silent aspiration (Leder, 2002)

This indicates:

1) MANY patients can eat even when on the vent
2) Need for instrumental assessment for our vent dependent patients
Instrumental Assessment

- Need to be sure to assess patient in the condition of which he / she will eat
  - Cuff up
  - Cuff down
  - Valve on
  - Valve off
- Make recs accordingly
Treatment

- Oral hygiene program
- Traditional swallow therapy
- Compensatory strategies
- Diet modifications
- Restoration of a closed system
Considerable evidence exists to support a relationship between poor oral health, the oral microflora and bacterial pneumonia, especially ventilator-associated pneumonia in institutionalized patients.

A number of studies have shown that the mouth can be colonized by respiratory pathogens and serve as a reservoir for these organisms. Other studies have demonstrated that oral interventions aimed at controlling or reducing oral biofilms can reduce the risk of pneumonia in high-risk populations. Taken together, the evidence is substantial that improved oral hygiene may prevent pneumonia in vulnerable patients.
Traditional Swallow Therapy

General tips:
- Most traditional swallow exercises and adjunctive rehabilitative therapy such as use of the IOPI and/or sEMG biofeedback are fine
- *Probably* should not do Shaker with this population
- Mendelsohn - don’t do it if it causes pain
- Breath holding techniques like the supraglottic won’t work with open trach
Compensatory Strategies and Diet Modifications

- Same as non-trach / non vent dependent patients
  - Compensatory strategies such as head turns, chin tucks, reduce bolus size, multiple swallows, etc
  - Diet modifications such as texture changes, thicken liquids, etc
Restoration of a closed system

- Decannulation
- Plug
- Passy-Muir Valve
Restoration of a closed system

- **Open trach vs closed trach**
  - Stachler et al (1996)

All report improved swallow function with a closed trach
Use of Passy-Muir to aid swallowing function

- Airflow over the baroreceptors allows the vocal cords to move into a closed position
- Improved sensation in the oropharynx allows the patient to sense pooled secretions
- Restored subglottic pressure results in a safer more efficient swallow
- Cuff issues negated due to always having cuff down with PMSV
- Improved cough
Treatment

“The predisposition to aspirate with an open tracheostomy tube is now well recognized. Decannulation is known to benefit many of these patients by reducing or eliminating aspiration. Moreover, we have now shown that the use of a one-way speaking valve will also result in improvement.” (Gross, 1996)
Speech Pathologists play a key role in intervention with the tracheostomized and ventilator dependent population
Ventilator dependent patients’ feelings of anxiety, fear, panic and insecurity caused by inability to talk and communicate

“Assessment of Patients’ Experience of Discomforts During Respirator Therapy”
(Bergbom-Engberg, Haljamai, 1989)
Thank You!

Carmin.bartow@vanderbilt.edu