Developing a Speaking Valve Protocol in the NICU




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When your child needs a hospital, everything matters.

Disclosures

- Melanie Stevens, MS-CCC/SLP
  - Disclosure: *Financial* -Received an honorarium from Passy-Muir Inc. for this presentation. *Nonfinancial* -No relevant nonfinancial relationship exists.
- Jen Finch, MA-CCC/SLP
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Disclosures

- Passy-Muir, Inc. has developed and patented a licensed technology trademarked as the Passy-Muir Tracheostomy and Ventilator Swallowing and Speaking Valve. This presentation will focus primarily on the biased-closed position Passy-Muir® Valve and will include little to no information on other speaking valves.

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Disclosure

- At Nationwide Children's Hospital NICU, we only have experience with the Closed Position Speaking Valve therefore, all information presented in this webinar relates to our experience with only Closed Position Speaking Valves
- Nationwide Children's Hospital NICU does not have experience with Open Position Speaking Valves

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Developmental care of infants & children

- The presence of a tracheostomy tube affects the typical acquisition of speech and language skills.[1]
- Communication between babies and their parents and caregivers begins at birth with crying and cooing. Essential ingredients for language development are vocal exploration and social interaction.
- The use of a speaking valve may facilitate more appropriate developmental outcomes for many of our infants
- There is some support for use of speaking valves to promote vocalizations, as well as to improve swallowing skills[2]

1. Kahson & Stein, 1985; Simon, Fowler, & Handler, 1983
2. Hull et al., 2005; Engleman & Turnage-Carrier, 1997

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What is a Speaking Valve?

- Allows the patient to create positive airway pressure and restores the patient to a more normal closed respiratory system
- Use of a speaking valve directs the air during expiration around the tracheostomy tube, up through the vocal cords, and then out through the oral and nasal cavities

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Why use a Speaking Valve?

- Restores natural positive airway pressure
- Restores patients ability to voice & communicate
- Improves sense of smell & taste
- Improves secretion management
- Improves caregiver & child bonding
- Improves swallowing
- Improves overall development

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Benefits of a Speaking Valve

- Improves quality of life
- Restores physiological PEEP
- May expedite the weaning process to decannulation which may in turn reduce hospital costs and length of stay

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Current literature that supports the use of a Speaking Valve

- 1997 retrospective study (Pediatric Nursing)
  - 64 charts reviewed for tolerance of a speaking valve
  - Age of children: 1 day to 2 years of age (mean 5.75 / median 3.5 months)
  - 29 children were eligible for speaking valve evaluation
  - 24 (83%) tolerated the speaking valve and 75% vocalized on first trial
  - 21% vocalized on subsequent trials

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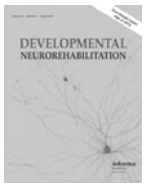
Current literature that supports the use of a Speaking Valve



- 2005 study (Pediatric Rehabilitation)
  - 12 children - ages 8 months to 21 years
  - 10 of the 12 (83%) were able to tolerate speaking valve placement and at least 3 subsequent trials for up to 45 minutes
  - 100% achieved phonation
  - 50% achieved phonation on the first trial
  - 50% on one or all of subsequent trials

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Current literature that supports the use of a Speaking Valve

- 2004 (Neonatal Intensive Care)
  - Case presentation from NICU Miller Children's Hospital in Long Beach, CA utilizing the Passy-Muir Valve to expedite weaning on the ventilator of patients with bronchomalacia
  - Prior to speaking valve placement continued mechanical ventilation with continuous positive airway pressure (CPAP) was utilized to stent the airway open
  - Use of the speaking valve was noted to restore natural pressures required to maintain a patent upper airway and provide the CPAP effect without the use of mechanical ventilation and allowing the patients to wean sooner from the ventilator

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NCH NICU

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NCH NICU

- Total NICU beds - approximately 190 (which includes 5 community hospital NICUs)
- 3 specialized areas of Neonatal services :
  - Acute management of babies requiring interventions such as Extracorporeal membrane oxygenation (ECMO), nitric oxide and surgery, as well as Extremely low birth weight (ELBW).
  - Private room environment to support the complexity of Bronchopulmonary dysplasia (BPD), chronic feeding disorders and surgical conditions.
  - Feeders and growers along with other minor surgical patients

Speaking Valve Use in the NICU at NCH

Before

- Patients in the NICU were being **randomly referred** for speaking valve evaluation
- Speech Therapy presence, a speaking valve was **sporadically used** in the NICU

After

- A standard protocol for referral and assessment was created in the fall of 2010
- Our protocol is an interdisciplinary work-flow based off of practice at the Children's Hospital of Philadelphia and Passy-Muir Incorporated

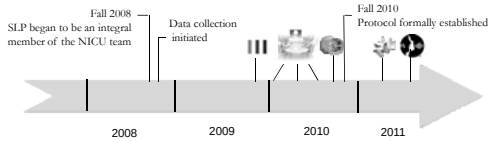
Development of Protocol

- Pediatric literature review to search for any pediatric based protocols or general information
  - Hoffman, Bolton & Ferry (2008) article from CHOP
  - Compared their practice for inline placement with our current practice
  - Proposed plan to Neonatologists providing literature reviews
  - Neonatologists supported use of a speaking valve for developmental purposes
  - Multidisciplinary team was created to develop our own protocol use involving :
    - Neonatologists
    - RT
    - ENT-APN
    - SLP

Physician support is the

- 2 Neonatologists drove the development of this protocol due to noted positive developmental outcomes and the potential for positive developmental outcomes

Timeline of Protocol Development



- 27 assessed and 20 met criteria
- All 20 trialed the speaking valve for a 4-5 day period with Speech Therapy only (as per protocol)
- Used with ventilator dependent and trach mist collar

Participation in Education

- 1/09 Developmental Interventions in Neonatal Care Conference
- 1/10 Passy-Muir Webinar
- 4/10 Passy-Muir Webinar
- 9/10 Passy-Muir Seminar
- 10/10 Passy-Muir Webinar
- 5/11 Neonatal Conference at Nationwide Children's Hospital

NCH Criteria for Referral for Speaking Valve

- ✓ Post-operative tracheotomy 7 days or greater
- ✓ Medically stable
- ✓ Awake and responsive
- ✓ Patent upper airway
- ✓ Reasonably able to manage oral secretions
- ✓ Able to tolerate cuff deflation
- ✓ Trach collar or the following ventilator settings:
  - Fraction of Inspired Oxygen (F_iO_2) < 60%
  - Positive end-expiratory pressure (PEEP) <12

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Who is NOT a candidate for NCH Protocol?

- Severe airway obstruction
- Severe neurological devastation
- Vocal cord paralysis in the adducted position
- Foam-filled cuff
- Inflated tracheostomy tube cuff of any kind that can't be deflated
- Severe risk for aspiration

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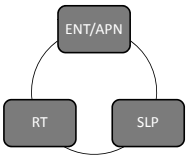
NICU Speaking Valve Assessment Team

- ENT-Advanced Practice Nurse (APN)
- Speech-Language Pathologist
- Respiratory Therapist



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Role of ENT-APN

- Airway assessment
- Manometry testing to determine transtracheal pressures
  - Equipment
    - Pressure manometer
    - Oxygen tubing
    - U/Adapt-It Straight Connector
- Use of manometry has been standard procedure at NCH for speaking valve assessments

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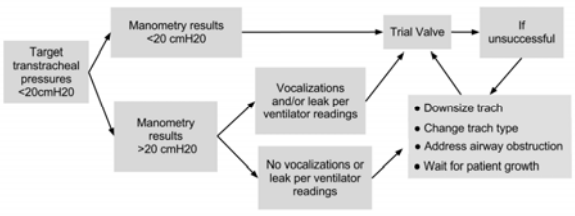
Transtracheal Pressure Manometry Decision Tree



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Role of Speech-Language Pathologist

- Assess vocal ability
- Changes in management of secretions
- Complete initial speaking valve daily trials for 4-5 day period to monitor tolerance
- Successful trial
  - no significant increase in work of breathing (WOB)
  - no/minimal change in O_2 saturation, heart rate (HR), respiratory rate(RR)
- Initial trials are generally 15-20 minutes in length
- The goal of the speaking valve trials is to monitor tolerance, increase wear time and educate caregivers

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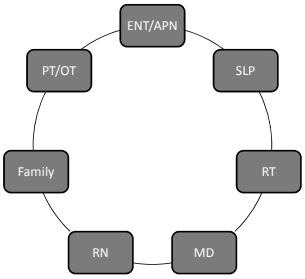
Role of Respiratory Therapist

- Adjust and monitor ventilator equipment
- Cuff deflation (if applicable)
- Technical troubleshooting

Candidacy Assessment & Initial Speaking Valve Trial

- Candidacy assessment includes:
  - Airway evaluation/manometry by ENT-APN
  - SLP assessment
  - RT monitoring of ventilator equipment
- Initial speaking valve trial:
  - Monitoring of HR, RR, oxygen saturation, patient response
  - Types of vocalizations
  - Caregiver education

Following initial trials with SLP



Following initial trials with SLP

- Children <6 months of age corrected
  - Educates RN/Caregivers regarding speaking valve use, s/s of distress
  - Determines initial wear time for RN/caregivers to begin
  - Discuss with physician and NNP wear time orders
  - SLP consultatively monitors patient to help with wear time progression as needed
- Children >6 months of age corrected
  - SLP initiates therapy to address developmental speech & language with speaking valve worn during therapy sessions
  - SLP works with RN/caregivers on speaking valve progression of wear time
  - Discuss with physician and NNP wear time orders

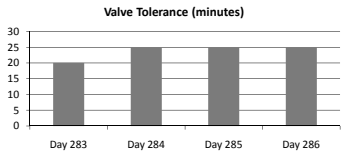
Case Presentation #1

- Medical History
  - Born at 38 weeks gestation
  - Tracheomalacia
  - Bronchomalacia
  - Tetralogy of Fallot
  - Pulmonary artery conduit stenosis
- Day of Life (DOL) 35- Tracheostomy (cuffed trach required due to high pressure ventilation)

Case Presentation #1

- DOL 203- Speech Therapy initiated to address early communication skills
- DOL 249- Successful cuff deflation trials initiated
- DOL 265- Deflated cuff 24 hours/day initiated
- DOL 280- Speaking Valve readiness assessment
  - SIMV/PS (Synchronized Intermittent Mandatory Ventilation/Pressure Support)
    - set rate (breaths/min) 12
    - pressure support (cmH_20) 18
  - PIP (Peak Inspiratory Pressure) 40
  - PEEP 10
  - F_iO_2 25%
  - Manometry testing= 10 cmH_20
  - Tolerated speaking valve for 20 minute trial with vocalizations

Case Presentation #1



- Patient continued to use speaking valve through weaning from SIMV/PS to CPAP/PS to trach mist collar
- At discharge patient wearing speaking valve during all waking hours

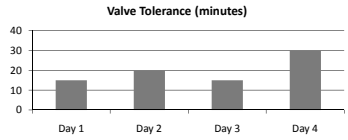
Case Presentation #2

- Medical History
  - Born at 23 weeks gestation
  - Periventricular Leukomalacia (PVL)
  - Bronchopulmonary Dysplasia (BPD)
  - Intraventricular Hemmorhage (IVH)
  - Bowel perforation
- DOL 155 - tracheotomy performed due to inability to wean from mechanical ventilation

Case Presentation #2

- DOL 212- Speaking Valve Readiness Assessment
  - 3.5 Shiley Neo cuffless trach
  - CPAP/PS 10 hours/day
  - PEEP 8
  - PS above PEEP 12

Case Presentation #2



- Trial 1- no vocalizations, patient happy and content, breathing easily
- Trial 2 - cooing
- Trial 3 - vocalizations
- Trial 4 - crying and cooing. Mother present and excited hearing patient cry

Case Presentation #2

Case Presentation #2

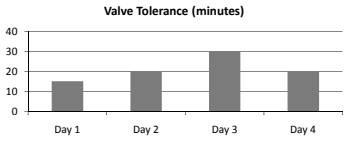
Case Presentation #3

- Medical history
  - Born at 36 weeks gestation
  - Multiple congenital anomalies
  - Neuromuscular disease
  - Obstructive sleep apnea
- DOL 55- tracheotomy performed due to obstructive sleep apnea (OSA)

Case Presentation #3

- DOL 67- Speaking Valve readiness assessment
  - 3.5 Shiley Neo trach in place
  - 21% oxygen via mist collar
  - manometry testing 6-10 cmH_20

Case Presentation #3



- Trial 1 - crying and cooing
- Trial 2 - cooing
- Trial 3 - intermittent crying
- Trial 4 - no voicing

**Due to poor secretion management from unknown neurological etiology, caregiver had specific instructions for close supervision when wearing speaking valve

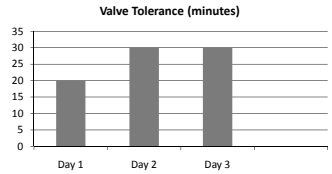
Case Presentation #4

- Baby Grady
  - Born at 25 weeks gestation
  - Grade III & IV IVH with VP shunt
  - Transferred to NCH at 12 months of age from South Dakota for BPD management
  - 4.5 Ped Bivona cuffed trach in place upon admission

Case Presentation #4

- DOL 404 (29 days after admission to NCH)
- Speaking Valve readiness assessment
  - Ventilator settings:PIP: 51, FI02: 46%, PEEP: 10 and PS above PEEP: 10
  - Manometry reading >20 cm H20
  - Initial trial tolerated for 20 minutes- immediate vocalizations of grunting/cooing

Case Presentation #4



- Trial 1 - immediate vocalizations of grunting/cooing
- Trial 2 - no true vocalizations
- Trial 3 - grunting
- Mother present at sessions for education on speaking valve
- Grady continued to be seen for biweekly developmental speech/language therapy with speaking valve use.

Case Presentation #4

Potential Research Topics

- Effects of speaking valve use on caregiver/child bonding
- Effects of speaking valve use on ventilator weaning and length of hospital stay

Questions

Nationwide Children's Hospital

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- US News and World Report Rankings
- Magnet
- Parents Magazine
- www.nationwidechildrens.org

References

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Receiving CEU's for this Course

- You will have 5 days from the time this courses 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

Late Registration

- If you are a late registrant, the meeting code is: **k1546pca8**
  - If you are already registered, you do not need to use this code