Dysphagia and Respiratory Disorders

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Diagnoses and Symptoms
- Stroke
- Dementias
- Cervical Neck Injuries or Surgeries
- Head and Neck Cancers
- Laryngectomy
- Renal Insufficiency
- Intracranial Hemorrhage
- Progressive Neurological Diseases
- Traumatic Brain Injury
- Diabetes
- PEG Tube
- Any Respiratory Diagnosis (i.e., COPD)
- CHF
- Muscle Weakness
- Dehydration/Malnutrition
- Wounds
- After oral procedural codes
- GI Conditions
- Requires increased assistance during meals
- Coughing or choking while eating or drinking, noisy airway
- Temperature spikes - Persistent temperature spikes
- Frequent throat clearing during meals
- Refluxing acid, lack of food
- Decreased Fluid Intake
- Unexplained weight loss/significant weight loss
- "Wet" or gurgly voice quality/sound
- Food falling out of mouth
- Frequent Hiccups during or after meal
- Difficulty chewing
- Complaining of pain when swallowing
- Decreased lip closure
- Respiratory problems
- History of pneumonia, recurrent pneumonia
- Starving/malnourishment during or after meals

Think Beyond Aspiration
- Only 6-9% of aspiration occurs during the swallow
- 60% of aspiration is silent or asymptomatic
- Aspiration - respiratory distress, pneumonia, death
- Choking - airway compromise
- Malnutrition/dehydration
- Weight loss
- Wound/pressure ulcer
- Chronic respiratory illness (COPD, HF)
- PEG or J-Tube Placement
- Death
- Dysphagia may result in pneumonia, which is the fifth-leading cause of death among individuals over 65 years of age and increasing to the third-leading cause of death in individuals over 80 years of age (Robbins, 1999)
Prevalence and Statistics

• Approximately 64% of COPD discharges are 65 year and older
• 1.5 million ER visits
• 726,000 hospitalizations
• Affects 14 million people in the US
• Leading cause of morbidity and mortality worldwide, resulting in substantial and increasing economic and social burden
• Smoking tends to be primary cause

Prevalence and Statistics

• As the prevalence of COPD continues to increase one of the most difficult challenges the healthcare industry continues to face is Acute Rehospitalizations (ACH).
• An estimated 15 million have COPD. Prevalence of COPD increased, from 3.2% among those aged 18-44 years to greater than 11.6% among those aged 65 years and older.
• COPD, was the third leading cause of death in the United States in 2011. (CDC.gov)
• Fifteen million Americans report that they have been diagnosed with COPD (CDC.gov).

Prevalence and Statistics

• The direct economic cost attributable to COPD and asthma in 2008 has been estimated at
  • $53.7 billion in the US. These costs include those for
    • prescription medicines ($20.4 billion)
    • outpatient or office-based providers ($13.2 billion)
    • hospital inpatient stays ($13.1 billion)
    • home health care ($54.0 billion)
    • emergency room visits ($3.1 billion)
Logemann, John Hopkins Study

- The ability to put in the appropriate clinical services prior to developing pneumonia or respiratory infections due to dysphagia is critical to keeping patients from being rehospitalized.
- COPD is noted to be a common reason patients are rehospitalized.
- Rehospitalization rates continue to be a major concern for healthcare professions.
- To date, the influence of the discipline of Speech-Language Pathology on rehospitalizations has not been determined.

Logemann, John Hopkins Study

- In this retrospective study patients will be selected based on having he respiratory diagnoses and scoring a “Shortness of Breath with Eating and Talking” and “Shortness of Breath at Rest” on the Start of Care OASIS.
- The hypothesis of this investigation is that patients who received Speech-Pathology Services of two or more visits will demonstrate a decreased percentage of rehospitalizations compared to those who did not receive Speech Pathology services accounting for other individuals.

(M1400) When is the patient dyspneic or noticeably Short of Breath?

0 - Patient is not short of breath
1 - When walking more than 20 feet, climbing stairs
2 - With moderate exertion (e.g., while dressing, using commode or bedpan, walking distances less than 20 feet)
3 - With minimal exertion (e.g., while eating, talking, or performing other ADLs) or with agitation
4 - At rest (during day or night)
Logemann, John Hopkins Study

- Research Questions:
  - Do patients with COPD that score M1400 #3 or M1400#4 on the OASIS who receive Speech Pathology services of two or more visits demonstrate a lower rehospitalization percentage?
  - Do patients with COPD that score M1400 #3 or M1400 #4 on the OASIS who do not receive Speech Pathology services of two or more visits demonstrate a higher rehospitalization percentage?

Logemann, John Hopkins Study

- 300,065 Patients identified
- One of the largest Dysphagia Studies conducted
- Speech Pathology and ACH
- Placing Speech Pathology on the forefront of healthcare issues
  - Clinically
  - Financially

10 Principles of Neural Plasticity

- Use It or Lose It
- Use It and Improve it
- Plasticity is Experience Specific
- Repetition Matters
- Intensity Matters
- Time Matters
- Salience Matters
- Age Matters
- Transference
- Interference
COPD and Dysphagia

Upper Respiratory Tract
- Nasal Cavity
- Oral Cavity
- Pharynx
- Larynx

Oral Cavity
- Primary role is respiration, but is also used for swallow, digestion and speech
- Lips – seal oral cavity for swallow, articulation
- Tongue – oral prep, oral transit (base of tongue is the primary muscle used to propel food – it rests on hyoid bone)
- Salivary Glands – secrete

Pharynx
- Muscular tube that is dual passageway for respiration and swallow
- The 3 segments are:
  - Nasopharynx
  - Oropharynx
  - Laryngopharynx – separates digestive and respiratory tracts
COPD and Dysphagia

Pharynx

- Vallecula
  - Recess between base of tongue and epiglottis
  - Common landmark during intubation
- Pharyngeal Muscles
  - Suspended from hyoid bone for laryngeal elevation and anterior motion
- Epiglottis
  - Separates the respiratory and digestive system for airway protection
  - Acts like a rudder to deflect food laterally away from the airway

COPD and Dysphagia

- Larynx
  - Larynx is the “gatekeeper” to prevent aspiration at multiple levels
  - Pharyngeal Muscles – muscles attached to hyoid elevate larynx up and pull it forward
  - Laryngeal Muscles – close larynx at vocal fold level to create a seal that separates airway from digestive tract

Shared Responsibility

“These many pressure changes within the aerodigestive tract (shared passageway for respiration and swallow) protect the airway, & speed the food bolus. Literature supports the importance of coordinating breathing and swallowing.” (Dikeman, Kazandjian 2nd Edition)
Assessment of Swallow Apnea and Respiratory Functioning

- **Objectives:** Examine deglutition in stable pts with COPD and lung hyperinflation.
- **Subjects:** 20 eligible COPD pts
- **Intervention:** Patients received VFSS and compared to 20 controlled pts. Controlled for age and sex was controlled for.
- **Measurements:** Mean total lung capacity, functional residual capacity, and residual volume.
- **Conclusions:** Researches concluded that hyperinflated patients with COPD have altered swallowing physiology.

Lung Volume During Swallowing: Single Bolus Swallows in Healthy Young Adults

- **Purpose:** Examined the relationship between swallowing and lung volume initiation in healthy adults during single swallows of boluses differing in volume and consistency. Differences in lung volume according to respiratory phase surrounding the swallow were also examined.
- **Method:** 9 men and 11 women between 19 and 28 y/o.
- **Results:** Significant differences in lung volume at swallow initiation were found based on bolus consistency but not on bolus volume. No differences were found for lung volume initiation based on the respiratory phase surrounding the swallow or for the respiratory pattern based on bolus volume.
- **Conclusions:** Findings of the study extend the existing knowledge base regarding the interaction of swallowing and respiratory systems.

Assessment of Swallow Apnea and Respiratory Functioning

- **Any Respiratory Condition**
  - COPD
  - Chronic Bronchitis
  - Pneumonia
  - Emphysema
  - CHF
- **COPD pts** will frequently inhale post swallow. Normal swallowing is characterized by exhalation post swallow.
- **OASIS:** SOB with Eating and Talking or At Rest
Global Initiative for Chronic Obstructive Lung Disease (GOLD) definition:
- Common, preventable, & treatable
- Usually progressive & associated with persistent airflow limitation
- Chronic inflammatory response in the airway & lungs to noxious particles or gasses
- Chronic Obstructive Pulmonary Disease (COPD) is typically expressed in 2 ways:
  - Emphysema
  - Chronic Bronchitis

COPD and Dysphagia
- COPD patient have been noted to have altered swallowing physiology and deficits to the swallow including reduced tongue control, vertical movement, anterior posterior movement, stabilization, lateralization and strength
- Reduced laryngeal elevation with delayed laryngeal closure
- Reduced hyoid elevation, post swallow penetration, and oxygen desaturation
- Reduced laryngo-pharyngeal sensation
- Impaired pharyngeal clearance
- Cricopharyngeal dysfunction
- GERD
- Tachynoma/Tachynae

COPD and Dysphagia (King, Michigan SLP.org)
- Increased mastication, increased resp. rate and rhythm during chewing
- Delayed pharyngeal response, decreased tongue retraction, reduced laryngeal elevation
- Increased fatigue, incoordination, weakness of upper aerodigestive tract musculature, & sensory impairment
- Increased inspiration after liquid swallow and increased apneic pause duration
- Could cause air hunger and likelihood of inhalation during swallow
- Residue in the oral/pharyngeal cavity could lead to aspiration
- Increase the risk of aspirating on inhalation
- The increased risk from air hunger during prolonged chewing times + common co-occurring oropharyngeal dysphagia in COPD = higher risk of aspiration
COPD and Dysphagia (King, Michigan SLP.org)

• Patients with dysphagia have greater than 7 times chance of acquiring aspiration pneumonia (if found to aspirate during an MBSS) (Martin-Harris et al., 2012)

• Patients who aspirate thickened liquids or semisolids, the likelihood that they will perish increased by greater than 9 times

• The most significant risk factor for aspiration pneumonia in nursing home patients was determined to be COPD (Gross et al., 2009)

COPD and Dysphagia (King, Michigan SLP.org)

• Exacerbations typically include an increase in:
  • Dyspnea, sputum, purulence
  • Negative effects on respiration and swallowing
  • Cyclical affect; inflammation – increased dyspnea – aspiration – pneumonia – COPD exacerbation

Assessment of Swallow Apnea and Respiratory Functioning

• Aerophagia – A swallowing incoordination causing patient to swallow air resulting in pain, frequent belching and bloating.
  • Commonly seen in patients who have loose dentures, excessive smoking and carbonated drinks.
  • Occurs in about 9% of Cognitively impaired patients
Assessment of Swallow Apnea and Respiratory Functioning

- Inability to clear all food from mouth and throat
- Swallowing frequently interrupted by sudden inspiration
- Inhalation post swallow is common
- Laryngeal Elevation issues
- Decreased mobility of food and liquids
- Nonproductive cough reflex
- Airway exposure
  - Increasing aspiration
  - Increasing airway obstruction and choking.

COPD and Dysphagia Treatment Approach

- Oral hygiene issues are also common among patients with COPD.
- What causes COPD patients to have oral hygiene problems can likely be attributed to persistent mouth breathing and the use of inhaled bronchodilators and corticosteroids.

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- Transferance
- Interference
Treatment of Swallow Apnea and Respiratory Functioning

- First objective is to eliminate the aspiration risk or risk of airway obstruction

COPD and Dysphagia Treatment Approach

- Modification of the diet—eliminate and diet that can be aspirated easy in oral stage or post swallow (dry crumbly foods)
- Shorten length of the meal to ensure patient does not become fatigued during intake
- Positioning
- Pharyngeal and respiratory related exercise to increase swallow and respiratory strength and coordination—Oral exercises, and swallow maneuvers that do not require the pt to hold the breath (hard swallow)

COPD and Dysphagia Treatment Approach

- Increasing airway closure
- Oral care
- Use of Resistive Breather to increase endurance, strength and airway closure
- Train the pt to swallow then exhale. Typically COPD pts do the opposite.
- Use Maximum Phonation Time (MPT). See below for normative data. I typically will have the pt do hat a high pitch, low pitch, loud and soft intensity.

Maximum phonation time in seconds *
- Young males 28.5
- Young females 22.7
- Elderly males 13.8
- Elderly females 14.4

The Resistive Breather

Purpose
- Strengthen and tone inspiratory muscles, (i.e., diaphragm, external intercostals, accessory muscles of the neck, pharyngeal, and laryngeal muscles)
- Strengthen and tone expiratory muscles, (i.e. internal intercostals, abdominal)
- Generate improved airflow through the vocal folds.
- Improve swallow.
- Improve protective cough and assist airway clearance.
- Assist teaching diaphragmatic breathing / deeper breathing (incentive spirometry).

Indications
- Dysarthria
- Dysphonia or Aphonia
- Pharyngeal Dysphagia
- Shortness of Breath (i.e., chronic obstructive lung disease; asthma, CHF, stress)

Behavioral Treatments
- Smaller, more frequent meals at least fatigued time of day
- Nutritional and convenient snacks
- Increasing calories of meals
- Caution with medication that cause nausea
- Recommend continued use of oxygen and monitoring oxygen saturation during meals for those on long term oxygen
- Smoking cessation
- Sleep study to evaluate appropriateness of CPAP machine
- Caution against risky environments that may be detrimental to health
- Pulmonary rehabilitation and education
- Encourage early recognition and self management
- Exercise programs
- (McKinstry, Tranter & Sweeney, 2010)
Voice Disorders: Impairments of the vocal folds in the throat that compromise voicing and communication.

Voice Problems are:
- Weak voice
- Low volume
- Soft voice
- Monotone

Swallowing Problems:
- Aspiration
- Pneumonia
- Weight loss

89% of individuals who have Parkinson's Disease have voice and speech disorders. Only 3-4% seek and receive treatment.

Evidence-based treatment to impact:
- Voice intensity/ Vocal Loudness
- Swallowing Dysphagia
- Improve ability to communication and needs
- Swallowing and safe intake

Daily tasks:
- First half of treatment session:
  - Rescale amplitude of voice output through CORE loud
  - Sustained "ah" (minimum 15 reps)
  - High/Low "ah" (minimum 15 reps)
  - Functional phrases (minimum 50 reps)
- Second half of session:
  - Week 1 – words, phrases
  - Week 2 – sentences
  - Week 3 – reading
  - Week 4 – conversation
Lee Silverman Voice Treatment

- LSVT LOUD can be done in patients with COPD. A few considerations:
  - Consult with physician and/or respiratory therapists
  - May need longer rest periods
  - Use your clinical judgement
  - Pts will have shorter duration max sustained phonation, and thus will need to do more reps.
  - Consider having them wear a pulse oximeter if you are concerned about saturations, and that respiratory laryngeal coordination and increased breath support.
Neuromuscular Electrical Stimulation: Hutchings & Barnes, 2009

1. Does NMES increase the timing of the pharyngeal swallow?
2. Does NMES increase muscle strength in muscles responsible for the pharyngeal stage of deglutition?

- The present investigation followed a repeated measures research design. The experimental group consisted of 20 subjects meeting strict eligibility criteria to eliminate variables to impede the study’s accuracy. The IMP 300 was used to deliver electrical stimulation to the submental region. The method and electrode placement followed a submental placement of electrodes. Surface electromyography was used to measure the level of pharyngeal activity pre- and post-NMES treatments.

- A total of 18 participants demonstrated an increase in sEMG readings after 8 NMES treatments. Of the participants who demonstrated an increase in sEMG readings, only 2 demonstrated a decrease in sEMG reading after 8 NMES treatment sessions. These results indicated that NMES increased the timing of the pharyngeal swallow and an increase in muscle strength responsible for the pharyngeal swallow.

Conclusion

How You Breathe Matters

There is likely an “interactive cooperation” between swallowing and respiration. (Gross 2009)

We have a responsibility as Health Care Practitioners to co-operate and take a team approach in the assessment and treatment of tracheostomized and mechanically ventilated patients.