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Dysphagia after Traumatic Brain Injury: Etiology and Evaluation

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Moderated by:
Amy Natho, MS, CCC-SLP, CEU Administrator, SpeechPathology.com

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Dysphagia After Traumatic Brain Injury: Etiology and Evaluation

Erin O. Mattingly, M.A., CCC/SLP, CBIS

April 9, 2019

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- Financial disclosures: None. I have not received any compensation from test, treatment, or application developers or publishers. These recommendations are based off of my clinical experience.
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Learning Outcomes

After this course, participants will be able to:

- Provide examples of instrumental and non-instrumental swallow assessment methods.
- Identify the impact of TBI and associated dysfunction/symptoms on the swallow.
- Discuss how dysphagia in TBI differs from that in other neurogenic populations.

TBI Etiology

- TBI is "a disruption in the normal function of the brain that can be caused by a bump, blow, or jolt to the head or a penetrating head injury." (Marr & Coronado, 2004)
  - Alteration is defined as "any period of loss of or a decreased LOC, any loss of memory for events immediately before (retrograde amnesia) or after the injury (post traumatic amnesia); neurologic deficits or any alteration in mental state at the time of the injury (confusion, disorientation, slowed thinking, etc.)" (Menon, Schwab, Wright, & Maas, 2010)

TBI Epidemiology

- An estimated 10 million people worldwide experience a TBI annually. (Zhou et al., 2013)
- An estimated 2.8 million people sustain a TBI annually in the U.S. (Taylor, Bell, Breiding, & Xu, 2017)
- TBI is a contributing factor to a third (30%) of all injury-related deaths in the United States. (Taylor, Bell, Breiding, & Xu, 2017)

TBI Epidemiology

- Children aged 0–4 years, adolescents aged 15–19 years, and adults aged 75 years and older are among the most likely to have a TBI-related emergency department visit or to be hospitalized for a TBI (Faul & Coronado, 2015)
- Estimated Average Percentage of Annual TBI by External Cause in the United States (Taylor, Bell, Breiding, & Xu, 2017)
  - Falls – 47%
  - Struck By/Against – 15%
  - Motor Vehicle – 14%
  - Assault – 9%

TBI Epidemiology

- Leading causes of non-fatal TBI in the United States:
  - Falls (35%)
  - Motor vehicle-related injuries (17%),
  - and strikes or blows to the head from or against an object (17%), such as in sports injuries (Faul & Coronado, 2015)
- Majority of TBI in United States is mild in nature (concussion) and mild TBI rarely results in dysphagia

Dysphagia

- Problems involving the oral cavity, pharynx, esophagus, or gastroesophageal junction (ASHA Dysphagia Practice Portal)
- Can result in dehydration, malnutrition, aspiration pneumonia, other lung disease processes, and possibly death

Dysphagia following TBI

- What characteristics of TBI can cause dysphagia? Thoughts?

Dysphagia following TBI

- Incidence of dysphagia is as high as 93% in patients admitted to rehabilitation for TBI (Hansen, Engberg, & Larsen, 2008)
- Complex and multifactorial in nature
  - Neurological impairment
  - Cognitive communication impairment
  - Behavioral impairment

Dysphagia following TBI

- Dysphagia caused by neurological impairment impacting the three phases of the swallow (oral preparatory, oral, and pharyngeal)
- Other items impacting swallow post-TBI :
  - Medication (e.g., sedation, pain, etc.)
  - Ventilation
  - Physical injury (e.g., head/neck, etc.)
- What else can impact swallowing post-TBI?

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Dysphagia in TBI vs. CVA

- Injury site and type
  - Cerebrovascular Accident (CVA): typically a single site of lesion
  - TBI: combination of focal injury, diffuse axonal injury, and possibly a hypoxic component (Mandaville, Ray, Robertson, Foster, & Jesser, 2014)
- Population
  - CVA: older population with co-morbidities
  - TBI: younger, healthier population
- Cognitive-communication and behavior
- TBI post-injury concomitant head and neck injury

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Dysphagia in TBI vs. CVA

- Oropharyngeal deficits
  - TBI
    - Reduced range of and/or control of tongue "in isolation or in combination with delayed or absent pharyngeal swallow" (Howle, Baguley, & Brown, 2014)
      - Delayed or disorganized oral preparatory phase
      - Premature spillage (Morgan, Ward, Murdoch, & Bilbie, 2002)
  - CVA
    - Tongue control deficits less severe; pharyngeal peristalsis reduction more frequent (Lazarus & Logemann, 1987)
  - Research
    - Rare and most studies focus on "neurogenic dysphagia" associated with stroke (Virvidaki, Nasios, Kosmidou, Giannopoulos, & Milionis, 2018)

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Dysphagia in TBI

(Howle, Baguley, & Brown, 2014)

- Most frequent is reduced range and /or tongue control
- "Other less frequent including less frequently observed deficits include decreased laryngeal elevation reduced base of tongue retraction, decreased pharyngeal peristalsis, prolonged pharyngeal transit time, prolonged oral transit time, unilateral pharyngeal paralysis, absent or weak reflexive or voluntary cough, cricopharyngeal dysfunction and primitive oral reflexes (biting, pursing and rooting)."

CONTINUED

Impact of Tracheostomy

- Tracheostomy (Trachs)
  - Studies of non-brain injured patients with prolonged endotracheal intubation and/or ventilation demonstrate a transient increased risk of silent and overt aspiration (Leder, Cohn, & Moller, 1998)
  - These studies have not been replicated in the brain injury population
  - Trachs were initially thought to negatively impact swallowing, causing aspiration and dysphagia, however more recent studies show differently
    - Bigger impact is due to illness/injury, medication, and comorbidities (Leder & Ross, 2010)

Impact of Cognitive Communication and Behavioral Deficits on Swallowing

- How can cognition and behavior impact swallowing?

Impact of Cognitive Communication and Behavioral Deficits on Swallowing

- Attention and arousal
- Memory
- Executive functioning
- Behavior and agitation

Impact of Cognitive Communication and Behavioral Deficits on Swallowing

- Inattention, may not see food in front of them, highly distractible may forget to eat or eat impulsively
- Low arousal may cause swallow trigger delay
- May forget appropriate consistency if on thickened liquids or forget compensatory strategies such as slowed rate, etc.

Impact of Cognitive Communication and Behavioral Deficits on Swallowing

- Executive dysfunction may result in planning and organizing problems, may not apply/carryover strategies to “real life” eating situations
- Behavior/agitation: outbursts may create higher risk for aspiration and choking or inadequate oral intake

Assessment of Dysphagia

- Non-instrumental
- Instrumental

Assessment of Dysphagia

- All assessment should begin with:
  - Patient history
  - Oral motor examination
    - Cranial nerve involvement (e.g., CN VII- facial nerve)
    - Dentition
  - Cognitive-communication screen
  - Observation of function

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Non-Instrumental Assessment

- Bedside Water Swallow Test
  - Consecutive sips with large volumes in patients who did not present with overt airway responses or voice changes appropriately ruled out risk of aspiration. Small volumes with single sips appropriately ruled in aspiration when clinical signs were present. (Brodsky et. al, 2016)

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Non-Instrumental Assessment

- Bedside Swallow Assessment
  - Many different protocols, some more standardized than others
  - Virvidaki et al. (2018) note “no present screening protocol provides high specificity and sensitivity for predicting the risk of aspiration. It appears that a cluster of swallowing and non-swallowing features may achieve both high sensitivity and specificity at the bedside.”

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Non-Instrumental Assessment

- Bedside Swallow Assessment
  - Water swallowing test and bolus swallowing test
  - Most frequently observed/used:
    - Ice chips via spoon
    - Spoon/straw/cup sip of water
    - Thickened trials of liquid
    - Puree, mechanical soft (peaches), regular solid
  - How many of you have a structured/standardized bedside swallow protocol?

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Instrumental Assessment

- When do I use one?
  - "Instrumental assessment of dysphagia in patients post TBI should be considered where: bedside assessment indicates possible pharyngeal stage problems (which would potentially include the aspiration of food and fluid into the lungs), the risks of proceeding on the basis of the bedside assessment outweigh the possible benefits (the patient at very high risk of choking or aspiration if fed orally), and the bedside assessment alone does not enable a sufficiently robust clinical evaluation to permit the drawing up of an adequate plan for swallowing therapy." (Scottish Intercollegiate Guidelines Network, 2013)

Instrumental Assessment

- Videofluoroscopic Swallow Study (VFSS) or Modified Barium Swallow Study (MBSS)
- Fiberoptic Endoscopic Evaluation of Swallow (FEES)
- (Modified Evans) Blue Dye Test
- Not always appropriate
  - Level of arousal
  - Cognitive- communication deficit
  - Behavior

Instrumental Assessment

- Videofluoroscopic Swallow Study (VFSS) or Modified Barium Swallow Study (MBSS) (Logemann, 1998)
  - Assesses speed and coordination of movements during chewing and swallowing in the oral cavity, tongue base, pharynx, hyoid, larynx, and cricopharyngeal region.
  - Provides information on transit times and the amount, etiology and type (silent or overt) of aspiration
  - Can assess the efficacy of management strategies Requires a patient have the ability to participate and follow direction, not always possible in TBI

Instrumental Assessment

- FEES (Logemann, 1998)
  - Passing a flexible scope through the nose to the level of the soft palate to view the hypopharynx, larynx and proximal trachea during swallowing
  - No radiation; can be used frequently
  - Some patients with tactile/sensory defensiveness or disorientation may not tolerate placement of scope

Instrumental Assessment

- Blue Dye Test
  - Dying food and liquid with blue dye and periodic tracheal suctioning to look for blue tinged secretions; possible indicator of aspiration (Brady, 1999)
  - Reliability and validity is questionable, so should rely on FEES or MBSS

Case Study

- 23 year old, Caucasian male, unrestrained driver, status post motor vehicle accident: car versus tree. Patient was unconscious at the scene and presented as a GCS 8 upon arrival to the emergency room. CT revealed large left subdural hematoma in addition to substantial subarachnoid hemorrhage. Left frontal craniotomy was performed and patient was mechanically ventilated via oral intubation while stabilized in ICU. Patient presents to your inpatient unit with left frontal skull defect and breathing room air.

Case Study

- Where do you start?
- What type of assessment will you use?
- What are some cognitive-communication and behavioral deficits you may observe?

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Summary/Question and Answer

- Dysphagia in TBI is complex and multifactorial
- Cognitive-communication and behavioral influence
- Non-instrumental assessment: dysphagia screen/bedside swallow evaluation
- Instrumental assessment: MBSS, FEES, Blue Dye Test
- When to use a non-instrumental vs. instrumental

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