Review of the Current Science of Dysphagia Screening in Stroke

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Dysphagia and Stroke: Demographics

- 2000 people per million worldwide
- 700,000 individuals annually in U.S.
- Dysphagia occurs in ~55% of acute stroke patients
- 40% demonstrate aspiration on VFSS
- 40%-70% demonstrate silent aspiration
Screening of Swallowing

- Swallowing involves a distributed neural network
- We cannot use lesion localization to predict who will have dysphagia
- We cannot determine risk of dysphagia by patient complaints
- Thus, individuals with presenting stroke symptoms must have swallowing screened
Screening of Swallowing

- Screening-quick, minimally invasive evaluation to determine
  - Likelihood of dysphagia
  - Needs further swallowing assessment
  - Safe to feed patient orally (for purposes of nutrition, hydration, and medication administration)
Screening of Swallowing

- Implementation of dysphagia screening results in ↓ LOS, morbidity, and costs (Hinchey et al., 2005; Odderson et al., 1993)

- Earlier administration of first dose of aspirin in hospitals using a swallowing screening tool (Power et al., 2007)
Screening of Swallowing

- ASA/AHA guidelines—swallowing should be screened prior to oral intake
- VHA guideline to screen swallowing in all individuals admitted with stroke symptoms
- UK’s National Institute for Clinical Excellence—screening of swallowing w/in 4 hours of admission for acute stroke patients
Screening of Swallowing

No consensus on screening tool thus removed from the Joint Commission’s stroke guidelines (Lakshminarayan et al., 2010)

- Removal from the Joint Commission recommendations does not mean to stop screening
Screening of Swallowing

- Controversy concerning screening
- Who should screen?
  - Nurses?
  - SLPs?
  - MDs?
- What type of screening tool should be used?
  - Non-swallowing behaviors?
  - Water swallow test (WST)?
  - Both?
Screening of Swallowing

- No consensus on screening tool
  - Constructing screening tools without systematic review of the literature
  - Implementing screening tools without validation
  - Adopting published screening without close review
Screening of Swallowing

- Numerous screening tools developed over the past 5 years
  - Gugging Swallowing Screen-GUSS (Trapl et al., 2007)
  - 3-oz Water Swallow Challenge (Suiter & Leder, 2008)
  - Toronto Bedside Swallowing Screening Test TOR-BSST© (Martino et al., 2009)
  - Acute Stroke Dysphagia Screen (Edmiaston et al., 2009)
  - Modified Mann Assessment of Swallowing Ability (Antonios et al., 2010)
Screening of Swallowing

- TOR-BSST (Martino et al., 2009)
  - Assessment of vocal quality (dysphonia, tongue symmetry, and water swallows)
    - Water swallow: 10 individual teaspoons - cough, change in vocal quality
  - If fail any single item, screening is stopped and patient is NPO until SLP evaluation
  - If pass entire test, oral intake is initiated
Screening of Swallowing

- **3-oz Water Swallow Challenge** *(Suiter & Leder, 2008)*
  - Patients given 90 ml of water to swallow without interruption
  - Fail if:
    - Cough/choking up to 1 min after completion
    - Wet hoarseness after swallowing
    - Unable to complete without interruption
Screening of Swallowing

- **GUSS** (Trapl et al., 2007)
  - Indirect swallowing
    - Vigilance-stay alert for a minimum of 15 min
    - Volitional cough/throat clear x2
    - Saliva swallow
      - Swallow successfully-effectual laryngeal elevation
      - No drooling
      - No voice change
    - Must achieve maximum score of 5 to proceed
Screening of Swallowing

Gugging Swallowing Screen (Trapl et al., 2007)

- Direct swallowing section
  - Maximum score of 20
    - GUSS score ≤ 14-15 indicates risk of aspiration
  - Semi-solid trial-water thickened w/ instant food thickener
    - Start with ½ teaspoon
    - If no symptom, 3-5 teaspoons
  - Liquid-water
    - Start with 3 ml, increase to 5 ml, 10 ml, 20 ml and then 50 ml as fast as possible
Screening of Swallowing

- **Gugging Swallowing Screen** (Trapl et al., 2007)
  - Direct swallowing section
    - Solid-dry bread
      - Six individual small pieces
    - Stop any section if the following are observed:
      - Deglutition
        - Swallowing not possible
        - Swallowing delayed (>2 sec; >10 sec with solids)
      - Cough
      - Drooling
      - Voice Change
Screening of Swallowing

- Acute Stroke Dysphagia Screen – ASDS
  (Edmiaston et al., 2009)
  - Non-swallowing
    - GCS <13
    - Facial asymmetry/weakness
    - Tongue asymmetry/weakness
    - Palatal asymmetry/weakness
  - Any present, stop and consult SLP
  - Swallowing: 3-oz WST
    - Throat clear, cough, voice change
Screening of Swallowing

- **Modified-MASA** (Antonios et al., 2010)
  - Used 12 of 24 items from MASA
    - Alertness
    - Cooperation
    - Respiration
    - Expression
    - Comprehension
    - Dysarthria
    - Saliva control
    - Tongue strength
    - Tongue movement
    - Gag
    - Volitional cough
    - Palatal movement
Screening of Swallowing

- No tool has achieved consensus as a standard screening tool
- Must evaluate each screening in terms of
  - Quality
  - Validity
  - Reliability
  - Feasibility
Screening of Swallowing

- Guidelines to assessing quality and reporting of screenings
  - Cochrane (Reitsma et al., 2009)
  - Quality Assessment for Diagnostic Accuracy of Studies (QUADAS) (Whiting et al., 2003)
  - Sackett et al. (1991)
  - Standards for Reporting Diagnostic Test Accuracy (STARD) (Bossuy et al., 2004)
Screening of Swallowing

- Representative sample of patients?
- Is the reference standard (instrumental examination) protocol likely to identify dysphagia and aspiration?
- Is the time period between the reference standard and screening short enough to ensure no change in the patient?
- Did whole sample or random selection receive verification of dysphagia using the instrumental examination?
- Did all patients receive the same instrumental examination regardless of results of the screening?
Screening of Swallowing

- Did the instrumental examination not include items from the screening and vice versa?
- Was the instrumental examination interpreted without results of the screening?
- Was the same patient data available that is available in routine clinical practice?
- Were uninterpretable results reported?
- Were withdrawals from the study explained?
- Was administration and interpretation of the screening described in sufficient enough detail for replication?
Screening of Swallowing

- Was administration and interpretation of the instrumental examination described in sufficient detail for replication?
- Was patient selection criteria sufficiently described?
Screening of Swallowing

Meets criteria-Consent-N =

N=does not meet criteria

Index Test: Nursing Swallowing Screen

Items Present Indicating Risk of Dysphagia n =

Items Absent Indicating No Risk of Dysphagia n =

Reference Standard: VFSS

Dysphagia Absent n =

Dysphagia Present n =

Dysphagia Present n =

Dysphagia Absent n =
Screening of Swallowing

- Validity
  - Sensitivity: the probability that a diagnostic sign (e.g. cough after swallow) will be present given that the disease (dysphagia) is truly present (true positive)
  - Specificity: the probability that a diagnostic sign will be absent given that the disease is truly absent (true negative)
Screening of Swallowing

Validity

- In addition to validity of entire screening, important to see how much each item contributes to validation
Screening of Swallowing

Validity

- Screenings should have both high sensitivity and high specificity
- Most screenings focus on high sensitivity due to increased morbidity and mortality
- Have sacrificed specificity for sensitivity but to what expense?
  - Delay in receipt of oral intake including medication
  - Unwarranted placement of NGTs
    - ↑ morbidity with NGT placement in acute stroke (Langdon et al., 2009)
Screening of Swallowing

- Reliability
  - Inter-rater reliability for administration and interpretation
    - Identify over time

- Feasibility
  - Must be easy to implement and complete, especially if nurse or MD to complete
Screening of Swallowing

Where are we now and where do we need to go?

- Screening of swallowing in stroke is critical
- Many screening tools available, but no consensus
- Most with only high sensitivity
  - Is both high sensitivity and high specificity unrealistic?
Screening of Swallowing

Where are we now and where do we need to go?

- Appears WST is a critical part of screening
  - Feasible by nurses
  - Pilot study at MEDVAMC ED
- Reliability of implementation and interpretation over time remains unknown
- More work on facilitating implementation required