

Review of the State of the 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 with 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 observational 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 'validated' 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 \leq 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)

Quality of the Screening Studies: How Valid is Valid?

- 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?

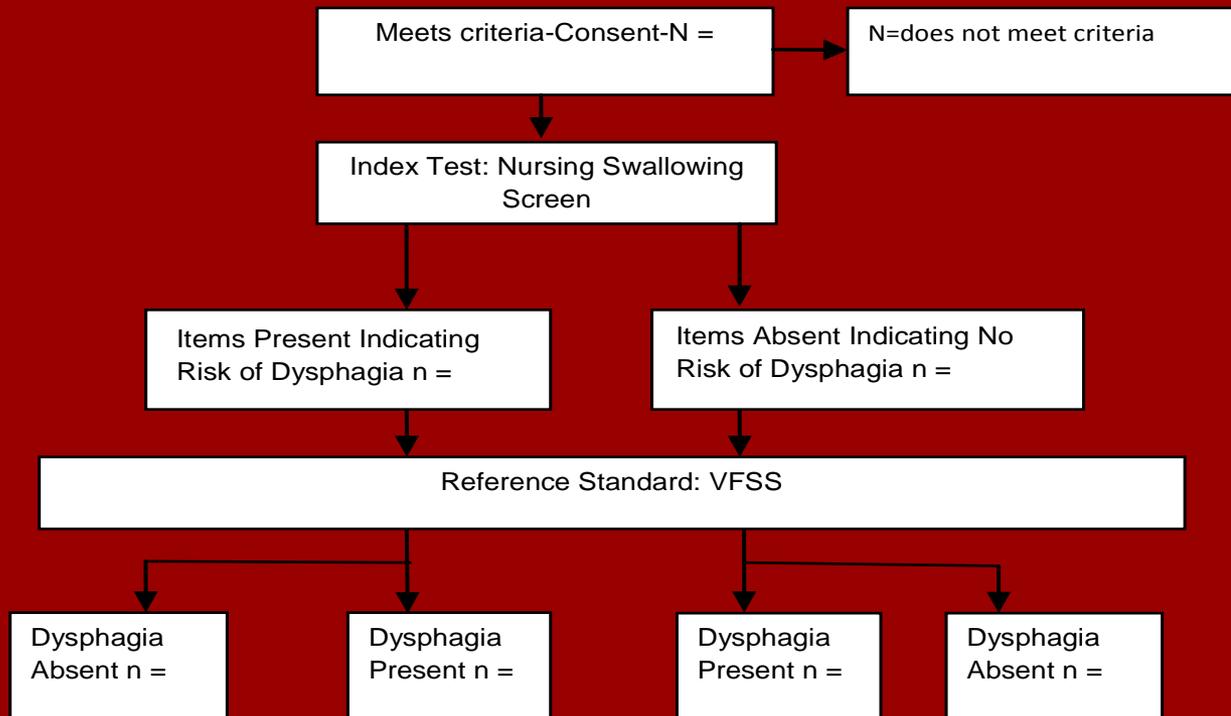
How Valid is Valid?

- 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?

How Valid is Valid?

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

Screening of Swallowing



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)
 - Diagnostic sign absent but disease is present—
FALSE NEGATIVE
- Specificity: the probability that a diagnostic sign will be absent given that the disease is truly absent (true negative)
 - Diagnostic sign present but disease is absent—
FALSE POSITIVE

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

- Developing and validating your own tool
- Literature Review (Daniels, Anderson, Willson, 2012)
 - Same Cochran, QUADAS, Sackett guidelines
 - Reviewed studies through March 2011
 - Identified 16 studies meeting inclusion criteria

Screening of Swallowing

- Literature Review (Daniels, Anderson, Willson, 2012)
 - Quality of study graded
 - Sensitivity and specificity of each clinical feature associated with dysphagia/aspiration identified
 - 5 principle categories of items identified
 - Demographics
 - Medical history
 - Global assessment
 - Oral , pharyngeal, laryngeal features
 - Direct swallowing assessment

Screening of Swallowing

- Literature Review (Daniels, Anderson, Willson, 2012)
 - When determining items to construct screening, must consider:
 - Past validity
 - Past reliability
 - Feasibility

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?
 - Consider needs of facility

Screening of Swallowing

- Where are we now and where do we need to go?
 - Decision to be made:
 - Use previously validated tool?
 - Develop a new tool?
 - 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
 - Work on facilitating implementation required