Swallowing Screening in Patients with Stroke

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Background on Screening in Stroke
• Stroke is an acute event
• Dysphagia occurs in approximately 50% of acute stroke patients
• Of those with dysphagia, about 30-40% aspirate—high incidence of silent aspiration

Background on Screening in Stroke
• Lesion location and size and the NIHSS score do not consistently predict dysphagia and aspiration
• Patients with stroke are frequently unaware or unconcerned about dysphagia

Background on Screening in Stroke
• Rapid implementation of swallowing screening results in ↓ LOS, morbidity, and costs (Hinchey et al., 2005; Martino 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)

Background on Screening in Stroke
• ASA/AHA guideline to screen swallowing prior to oral intake, including medication
  — All patients presenting with suspected stroke
• In 2014, the Joint Commission re-added swallowing screening as a requirement for PSC certification
  — Requires an evidence-based screening protocol
• UK’s National Institute for Clinical Excellence screening swallowing w/in 4 hours of admission

Screening of Swallowing
• The first level in the evaluation of swallowing
• Screening-quick, minimally invasive evaluation to determine:
  — Likelihood of aspiration
    • Who should remain non-oral and have SLP or dysphagia specialist consultation expedited
    • Who can start oral intake without aspiration concerns
Screening of Swallowing

• Screening and a clinical swallowing evaluation (CSE) are NOT the same
• Components of a CSE:
  – Patient history and interview
  – Basic gross motor observation
  – Cognition and communication screening
  – Oral structure inspection
  – Cranial nerve examination
  – Swallowing evaluation

Screening and CSE

• “It is critical that the CSE not be relegated to the status of a screening tool. It is far too powerful.” John Clyde Rosenbek, et al. 2004

Screening of Swallowing

• What a screening does not do
  – It is NOT comprehensive nor diagnostic
  – Screening is NOT to identify compensatory strategies or alternative diet
    • If a screening is negative (person “passes”), only diet modification should be related to premorbid health, i.e. low sodium
    • If a screening is positive (person “fails”), individual is NPO until speech pathology evaluation

Screening and Instrumental Examination

• Screening and instrumental examination are obviously different
• Goals of instrumental assessment:
  – Determine underlying swallowing pathophysiology
  – Test results of compensatory strategies
  – Recommend specific compensatory and rehabilitative strategies based on underlying impairment

Screening Tool Standards

• Validity: Does the screen accurately measure what it is supposed to measure? (Sackett, Strauss, Richardson, Rosenberg, & Hayes, 2000; Streiner, 2003; McCullough et al., 2005)
• Reliability: Consistency in accurate administration and interpretation of the screening tool between and within administrators
• Feasibility: Ease in implementation of the screening tool
Screening Tool Standards: Validity

- Sensitivity: Probability that a clinical sign is present, given that a disease is present
  - High sensitivity yields low false-negative results
- Specificity: Probability that a clinical sign is absent given that a disease is absent
  - High specificity yields low false-positive results
- Negative Predictive Value: Probability that individuals with a negative screening test truly do not have the disease

Screening Tool Standards-Validity

- Most screening tools have high sensitivity and NPV but low specificity
  - Due to effects of aspiration, this is essential, but...
- Consequences of low specificity
  - Delay in oral intake including medication
  - Over-referral to SLT or dysphagia specialists
  - Potential for dehydration
  - Placement of unwarranted nasogastric feeding tubes

Screening Tool Standards: Reliability

- Accurate administration
- Accurate interpretation
  - Inter-rater reliability: Between individuals
  - Intra-rater reliability: Same individual over time

Screening Tool Standards: Feasibility

- Critical if disciplines outside of SLP provide the screening
- Render validity and reliability ineffective
- Requirements:
  - Time to educate
  - Time to administer
  - Ease of administration
  - Time and ease of documentation

Models for Screening Implementation

- Multiple models for screening delivery in stroke (ASHA, 2009)
- Delivery dependent on hospital

Models for Screening Implementation

- Model 1: Trained RN or MD administers screening prior to oral intake
  - Negative screening (i.e., passes), oral intake initiated
    - No SLP consult for swallowing
  - Positive screening (i.e., fails), patient maintained non-oral
    - SLP consult expedited
    - Advantages
      - Rapid completion of screening and initiation of oral intake for individuals with negative screen
      - SLP not evaluating swallowing in every stroke patient
    - Disadvantages
      - SLPs are not evaluating everyone in this high-risk population
      - Potential for delay in SLP evaluation for individuals with positive screen
Models for Screening Implementation

Model 2: Trained RN or MD administers screening prior to oral intake. SLP evaluates all individuals regardless of results.

- Negative screening (i.e., passes), oral intake initiated
- Positive screening (i.e., fails), patient maintained NPO

Advantages
- Rapid completion of screening or initiation of oral intake for individuals with negative screen
- SLP evaluates all individuals in this high-risk population

Disadvantages
- Potential for delay in SLP evaluation for individuals with positive screen
- Questionable burden to SLPs

Model 3: SLP completes screening/assessment in all stroke patients

Advantages
- SLP evaluates all individuals in this high-risk population

Disadvantages
- Delay in oral intake and medication in all stroke patients until SLP assessment
- Questionable burden to SLPs

Serial Screening?

- If delay in evaluation by SLP for individuals with a positive screen (e.g., no weekend coverage), possible solution:
  - Rescreen for aspiration risk every shift (e.g., every 8 hours)
  - If negative, initiate oral intake
    - Consult to SLP given initial positive finding

Implementation of Swallowing Screening

- Controversy concerning screening
  - Who should screen?
    - Nurses?
    - MDs?
    - SLPs?

- What type of screening tool should be used?
  - Non-swallowing behaviors?
  - Water swallow test (WST)?
  - Both?

Implementation of Swallowing Screening Who?

Typical model
- Frontline health care provider (RN/MD) completes the screening
  - Completed rapidly upon emergency department (ED) presentation or admission to hospital ward as SLPs do not work 24/7

Settings
- Acute Care
  - ED
  - Stroke ward
- Rehabilitation and/or long-term care facility

Two key components
1. Staff buy-in and engagement
   - Nurse/MD input on screening
   - Understanding that all disciplines are critical to success
   - Identify nurse champions
### Implementation of Swallowing Screening

- Two key components
  2. Education
    - Extensive enough to ensure reliability in administration and interpretation
      - 10 minutes (Edmiaston, Connor, Loehr, & Nassief, 2010)
      - 4 hours (Martino et al., 2009)
    - Sustainability of reliability over time
      - Booster sessions
    - Feasible so it does not overburden the practitioner or educator

### Training in Swallowing Screening

- Training components
  - Overview of swallowing and stroke
    - Incidence of dysphagia and aspiration
    - Healthcare costs associated with aspiration
  - Difference between screening and evaluation
  - Definition of screening items
    - Examples of presence and absence of screening items
    - SLP/RN champion demonstrates how to administer and interpret
    - RN return-demonstrates administration and interpretation
  - Documentation of screening results
    - Intermittent

### Training in Swallowing Screening

- Training of screening item administration and interpretation
  - Auditory perceptual training is key
    - Video modules
      - Didactic presentation
      - Computer modules
    - Simulation lab
    - Supervised practice with patients

### Training in Swallowing Screening

- Feasibility of screening swallowing by RNs in the ED
  - Screening composed of non-swallowing and swallowing items
  - Barriers identified by RNs
    - Recall of screening items
    - Inconsistent method in administration
    - Screening documentation in electronic medical records (EMR)

### Training in Swallowing Screening

- RN Screening Accuracy and Reliability
  - 15 RNs trained on swallowing screening items
    - 20 min didactic session with SLP included audiovisual examples of items
    - Return demonstrate knowledge of skills
    - Followed over 2 year period as screened patients with stroke symptoms
  - Accuracy of administration measured
  - Reliability of interpretation compared against SLP
    - Retraining on specific item
Training in Swallowing Screening

- **RN Screening Accuracy and Reliability** (Daniels et al., 2015)
  - RNs can accurately administer items
    - Avg rate 98.4%
  - RNs can accurately interpret items
    - $k$ [95% CI] = 0.82 [0.79-0.83]
    - Avg $k$ for 1st 10 screenings = 0.67
    - Avg $k$ for 2nd 10 screenings = 0.91
    - $k$ stabilized at > 0.90 across subsequent screenings ($p = 0.007$)

- **Administration and interpretation of screening items can be taught using medical mannequins** (Freeland et al., 2015)
  - Program mannequin responses
  - Nurse provided scenarios from which to practice
  - Cannot actually administer water
    - Need transition to standardized patient or real patient with supervision

- **Current Practice**
  - Constructing screening tools without systematic review of the literature
  - Implementing screening tools without validation
  - Adopting published screenings without close review

Available Swallowing Screening Tools

- Every screening tool has strengths and limitations
- Critical to evaluate before implementing a published screening tool
- Critical to consider before designing and implementing a site-specific screening tool
  - Quality of research (Whiting et al., 2003, 2011)
  - Validity
  - Reliability
  - Feasibility

Quality of Study

- Representative sample of stroke patients?
- Was the sample composed of consecutive stroke patients and not just referrals to speech pathology?
- Was patient selection criteria sufficiently described?
- 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 of significant proportion receive verification of dysphagia using the instrumental examination?
Quality of Study

- Did all patients receive the same instrumental examination regardless of results of the screening?
- 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 screening interpreted without results of the instrumental examination?
- Was the same patient data available that is available in routine clinical practice?
- Were uninterpretable results reported?

Available Swallowing Screening Tools

- Literature reviews concerning screening items
  (Bours, Speyer, Lemmens, Limburg, & deWit, 2009; Daniels, Anderson, & Willson, 2012; Martino et al., 2000; Perry & Love, 2001; Ramsey, Smithard, & Kalra, 2003)
- Redundancy of items
  - Non-Swallowing items
    • Dysarthria
    • Dysphonia
    • Weak volitional cough
  - Swallowing items
    • Cough after swallow
    • Voice change after swallow

Available Stroke Swallowing Screening Tools

- Numerous screening tools available
- Validated against instrumental assessment*
  - Acute Stroke Dysphagia Screen (ASDS)*/Barnes Jewish Hospital Stroke Dysphagia Screen (BJH-SDS) (Edmiaston et al., 2010; Edmiaston et al., 2013)
  - Gugging Swallowing Screen (GUSS) (Speal et al., 2007)
  - Modified Mann Assessment of Swallowing Ability (M-MAHA)* (Antonios et al., 2010)
  - Toronto Bedside Swallowing Screening Test (TOR-BSST®) (Martino et al., 2009)
  - 3-oz Water Swallow Test (WST) (Sicuter & Leder, 2008; DaPippo, Holas, & Reding, 1992)
    • Stroke and other disorders

Available Swallowing Screening Tools

- Redundancy of items
- Tiered tests
  - BJH-SDS
  - GUSS
  - TOR-BSST®
- Only non-swallowing items
  - M-MAHA
- Only swallowing item
  - 3-oz WST

Available Swallowing Screening Tools

- Swallowing Tests
  - Varied across screens
    • TOR-BSST®-5 ml trials
    • GUSS-varied volumes and consistencies
    • BJH-SDS and 3-oz WST-3 ounces of water
  • Of note: No stroke swallowing screen is composed of only questions about swallowing ability
Systematic Review of Stroke Swallowing Screening Tools

- Review of stroke swallowing screening tools (Schepp, Tirschwell, Miller, & Longstreth, 2012)
- Inclusion of tools validated against instrumental or clinical swallowing examinations
- Four screening tools met their quality criteria
  - M-MASA
  - ASDS/BJH-SDS
  - TOR-BSST©
  - ED-MD Screen

Systematic Review of Screening Tools

- Strengths and limitations of each identified
- No recommendations for implementing a specific screening tool
- Identified important factors
  - Reliability in training health care providers to screen 24/7
  - Maintaining limited time between screen and reference standard

Screening Summary

- Multiple screening tools available
- Redundancy of items evident in literature reviews and across screens
- Water swallow test appears to be an important part of screening
  - Unclear which protocol is most valid
- Cluster of items: Both non-swallowing and swallowing
  - Tiered test versus multiple items

Summary

- Outcomes
  - Risk of dysphagia, aspiration, or both
  - Reduction in pneumonia and other complications such as malnutrition and dehydration
  - Decreased length of hospitalization
  - Time to: __________________
  - Health care costs
  - Patient satisfaction

Summary

- Quality
  - Most research has studied confirmed stroke patients but we are to screen admissions w/ stroke symptoms - effects on specificity
  - Research must be read CAREFULLY before adopting
  - Must make our health care partners part of the decision process
  - Feasibility is critical, thus we must question the use of instrumentation at this evaluation level
  - Stroke SST process must be used for other disorders