Targeted, Evidence-Based Treatment for Swallowing Impairment Using a Standardized Approach

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Disclosures

• Salary, Medical University South Carolina*
• Consulting, Northwestern University**
• Consulting, Northern Speech, MBSimP
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Physiology of Deglutition is Synergistic & Complex

Appropriate Diagnostics Maximize Outcomes

Instrumental Assessment Techniques

Modified Barium Swallow Study

• Videofluoroscopy
• Videoendoscopy
• Ultrasound
• Scintigraphy
• Magnetic Resonance Imaging (MRI)
• Computed Tomography (CT)
BEYOND Residue and Aspiration – Signs of Risk

Risk Identification vs. Detailed Mechanism(s)

Penetration Aspiration Scale

Table 2. Final version of the Penetration Aspiration Scale.

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Aspiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Material does not enter the airway.</td>
<td>1. Material does not enter the airway.</td>
</tr>
<tr>
<td>2. Material enters the airways, remains above the vocal folds, and is aspirated from the airway.</td>
<td>2. Material enters the airways, remains above the vocal folds, and is not aspirated from the airway.</td>
</tr>
<tr>
<td>3. Material enters the airways, passes below the vocal folds, and is aspirated from the airway.</td>
<td>3. Material enters the airways, passes below the vocal folds, and is not aspirated from the airway.</td>
</tr>
<tr>
<td>4. Material enters the airways, passes below the vocal folds, and is not aspirated from the airway.</td>
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</tbody>
</table>

Penetration Aspiration Scale

PAS Levels

Fig. 1. Schematic representation of the Penetration Aspiration Scale.

Residue Scales

DIGEST – Risk Identification/Toxicity

NCI Common Terminology Criteria for Adverse Events

Penetration

Aspiration

Residue Scales

QUANTITATIVE

Normalized Residue Scales – Pearson et al., 2013

PERCEPTUAL

Categorical – Dejaeger et al., 1997

Ordinal Scale – MBSImP, Martin-Harris et al., 2008

Normalized Residue Scales – Pearon et al., 2013

Penetration

Aspiration

Penetration

Aspiration

Residue Scales

DIGEST – Risk Identification/Toxicity

NCI Common Terminology Criteria for Adverse Events
DIGEST – Risk Identification/Toxicity
NCI Common Terminology Criteria for Adverse Events

Secondary Effect → Physiology

The patient was given various consistencies of barium.
Laryngeal penetration with thin barium.
Residue cleared with repeat swallow.
Rec: nectar thick liquids and pureed diet.

Penetration/Aspiration and Residue

When reported in isolation and as the only outcome in clinical studies:

- Undermines the complexity of the swallowing mechanism and impairment
- Does not sufficiently capture impairment, recovery or inform treatment
- Simplicity does not imply reliability

Physiologic Swallowing Assessment

- We will not advance interventions if we do not understand the mechanism of their effect
  - Surgery
  - Device
  - Strength intended intervention
  - Skill intended intervention
Standardized Assessment of Swallowing Impairment
NIH/NIDCD K23DC005764, 2003-2010

• Valid – content, construct, external
• Reliable – Intra- and inter-rater
• Physiologic vs. symptom based
• Clinically practical
• Linked to clinical action – Targeted therapy.

Operational Definitions

Tongue Base (TB) Retraction
0 = No bolus between TB and posterior pharyngeal wall (PW)
1 = Trace column of contrast or air between TB and PW
2 = Narrow column of contrast or air between TB and PW
3 = Wide column of contrast or air between TB and PW
4 = No appreciable posterior motion of TB

Standardized Protocol
Viscosity, Volume, Dose, Method of Administration

Function Target & Domains
Physiologic Components of Swallowing

1. Lip Closure
2. Tongue Control
3. Bolus Preparation/ Manipulation
4. Bolus Transport/Lingual Motion
5. Oral Residue
6. Initiation of Pharyngeal Response
7. Soft Palate Elevation
8. Laryngeal Elevation
9. Anterior Hyoid Excursion
10. Laryngeal Movement
11. Laryngeal Vestibule Closure
12. Pharyngeal Contraction
13. PES Opening
14. TPA Opening
15. Tongue Base Retraction
16. Pharyngeal Residue
17. Esophageal Clearance
Instrumental Exams Do NOT Replace Clinical Evaluations

Protected Health Information Removed From Handout

Prior to Instrumental

Cranial Nerve (CN) Exam
- Speech, Language, Cognition
  - CN V, VII, IX, X, XI, and XII
- Sensation, range of motion, speed, symmetry, accuracy, and strength (against resistance)
- Motor Speech Exam
  - Respiration, phonation, articulation, resonance, prosody, and intelligibility
- Reflexes
  - Cough, gag

Post Instrumental

Clinical Validation

Translating Assessment Results to Physiologically Targeted Treatment
Compensation, Adaptation, Strengthening, Agility

Goals of Targeted Intervention
- Improve, maintain or prolong swallowing function
- Improve, maintain or prolong associated physiologic reserve (cross-system)
  - respiratory capacity, airway defense physiologic capacity
- Maximize oral intake
- Facilitate least restrictive diet
- Maximize quality of life
- Actively engage patient in their rehabilitation or maintenance program