Effects of Swallowing Therapy

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Pertinent History

◆ 55 year old male
  - Idiopathic pulmonary fibrosis resulting in end-stage pulmonary failure and hypertension
  - Status-post bilateral lung transplant on 6/20/05, on extended cardiopulmonary bypass support during operation
  - PMH: non-insulin dependent diabetes mellitus and atrial fibrillation

Dysphagia history

◆ Extubated 7/12
◆ Bedside swallow evaluation on 7/13
  - Hoarse voice, weak cough
  - Delayed swallow
  - Multiple swallows and throat clearing – concerning for pharyngeal stasis and s/s of aspiration

Videofluoroscopic eval

◆ Performed on 7/14 with findings of:
  - weakened pharyngeal squeeze
  - severe valleculae and pyriform sinus stasis across all consistencies
  - aspiration of thin and nectar thickened liquids, inconsistent laryngeal sensate
  - recs for NPO and ENT c/s

Otolaryngology consult

◆ 7/18 bed-side evaluation
  - Maximum phonation time (MPT) = 3 seconds
  - Hoarse immediately post-extubation with no significant improvement in the last week
  - Flexible nasopharyngoscopic exam: immobile right true vocal fold and immobile right arytenoid
  - s/p injection of cymetra into R vocal cord on 7/19 in clinic
Repeat videofluoroscopic eval  

◆ 7/20 (one month post-transplant)  
- Significant valleculae stasis with nectar and honey thickened liquids, silent aspiration after the swallow secondary to stasis  
- Compensatory strategies not helpful  

**Recs for NPO, dohhoff TFs, rigorous therapy program, introduce IOPI (pressures at 23 kpa and 20 kpa)**

**IOPI**  
Iowa Oral Performance Instrument

Robin & Luschei, 1992

Additional therapy  
◆ Improve overall lingual strength and thereby improve valleculae clearance:  
- tongue retraction  
- yawn  
- gargle  
- hard /k/ sounds  
- tongue protrusion with resistance  
- Masako

VFSS prior to PEG  
◆ 7/25  
- Continued decreased epiglottic inversion with valleculae stasis  
- Symptomatic aspiration of nectar thick liquids  
- Recommendations to begin therapeutic trials of puree alternated with honey thick liquids with chin tuck, head turn right  
- Pt elected to undergo PEG placement
Discharge
◆ Pt medically stable to d/c from hospital on 7/29 – had been seen daily for Rx.
◆ Reports he fatigues easily with IOPI and general lingual/pharyngeal exercises, would rather “just eat.”
◆ Tolerating trials with stable status and doing exercises as tolerated.

Outpt follow-up – one week
◆ Still fatigues easily with Rx, trials going well with stable respiratory status
◆ IOPI improved 60 kpa at front and 40 kpa at back, instructed for increased resistance
◆ c/o voice still hoarse and “effortful” despite injection

Ongoing vocal cord mgmt
◆ Fixed right vocal cord in paramedian position
◆ s/p right Gore-tex implant and thyroplasty
◆ Voice and cough subjectively improved significantly after procedure

Outpt follow-up – two weeks
◆ IOPI measurements improved and “back to baseline” for age-matched peers
◆ Repeat VFSS 8/10 – mild stasis in valleculae, penetration of thin liquids (PAS of 4); head turn right and chin tuck somewhat improved (PAS 2)

Recommendations
◆ Diet started conservatively – mechanical soft w/nectar thick liquids
◆ Head turn right and chin tuck
◆ Multiple swallows per bolus
**Pt motivated to advance to thin liquids safely; questioning if he can f/u prior to going home to Michigan from hotel

Repeat VFSS
◆ 8/17
◆ Continued penetration of nectar thick liquids despite postural changes
◆ Increased valleculae stasis of solids, head turn helps clear
◆ Recs for general diet (no mixed textures) and nectar thick liquids with postural changes
Set-back
◆ Pt re-admitted on 9/13
◆ Diagnosed with invasive aspergillosis at right anastomosis
◆ Extubated 9/17, needing multiple bronchs, collapsed RLL.
◆ Re-intubated, eventual trach 9/20
◆ s/p B thoracentesis

VFSS
◆ 9/30 – essentially same swallow prior to “setback” and trach, shiley #8, montgomery speaking valve on
◆ Appropriate to re-initiate mechanical soft diet w/nectar thick liquids
◆ Head turn right and chin tuck, multiple swallows per bolus
◆ Re-eval prior to d/c on 10/12 – Jackson trach, capped. No change; recs to f/u in one month

“In-house” follow-up
◆ Re-admitted on 11/14 with R bronch anastamosis and stricture; recannulated
◆ Re-evaluation 11/16 – Shiley #6 trach, speaking valve on
◆ No penetration or aspiration except when pt flexing head back to clear pill
◆ Head turn R/chin tuck helps clear valleculae stasis.
◆ Recs for general diet w/thin liquids, meds crushed as approved per pharmacist.

Conclusion
◆ Pt with good outcomes: non-oral status to unrestricted diet
◆ Evaluate and treat all deficits associated with swallow mechanism
◆ Conservative diet upgrade with critically ill patients, avoid pneumonia
◆ Consistent therapy leads to improvement
Swallowing postures/maneuvers

◆ We have some evidence that a postural change (e.g. head turn) or a maneuver (e.g. super supraglottic swallow) improves swallowing with properly selected patients. (Rasley, et al, 1993; Logemann, Pauloski, Rademaker, Colangelo, 1997)
◆ Improvement can be swift and dramatic (Lewin, Hebert, Putnam, DuBrow, 2000)

Swallowing therapy

◆ There are several reports that patients improve with swallowing therapy (usually, several exercises are used and/or the therapy regimen is not described). (Kasprisin, Clumeck, Nino-Murcia, 1989; Odderson, Keaton, McKenna, 1995; Denk, Swoboda, Schima, Eibenberger, 1997)
◆ There are a few studies examining a single therapy (e.g. Shaker head-lift exercise). (Shaker, et al, 2002)
◆ There are some reports that swallowing therapy does not help much. (DiPippo, et al, 1994)

Questions regarding swallowing therapy regimens

◆ For whom?
◆ Which exercises?
◆ How often?
◆ How many?
◆ How long?
◆ How much improvement to expect?
◆ We are beginning to see some lines of research to help answer these questions. (Robbins, et al, 2005; Burkhead, Sapienza, Rosenbek, 2007)

Mary Bacon’s personal musings

◆ We do have some exercises that can potentially improve aspects of swallow function (e.g. Mendelsohn). (Kahrilas, Logemann, Krugler, Flanagan, 1991)
◆ Perhaps we do not provide intensive enough treatment. In one recent study a group randomized to “traditional swallow therapy” received 1-6 sessions with a mean of 3.36 sessions. (Kiger, Brown, Watkins, 2006)
When patients are cognitively intact (as most H&N cancer patients are), perhaps we overestimate their ability to follow their home therapy program.

A typical patient
◆ This patient seemed a good candidate for swallowing therapy.
◆ A miraculous improvement was not shown (nor was it expected Nguyen, et al, Anticancer Research, 2005).
◆ The progress made improved the patient’s quality of life.

History
◆ 79 y.o. gentleman
◆ Completed Chemo/RT for base-of-tongue cancer 10 months before (recall that organ preservation does not equal function preservation)
◆ MBS revealed severe pharyngeal dysphagia characterized by vallecular residue, aspirated after swallows
◆ Vallecular residue seemed due to poor hyoid elevation and poor base-of-tongue to pharyngeal wall approximation

MBS #1
Swallows prior to swallowing therapy

Swallow therapy
◆ Aggressive therapy aimed at the two identified physiologic deficits was begun

An additional factor?
◆ Profound pharyngeal shortening is known to occur during swallow. It seems related to “pharyngeal stripping” and helps eliminate access of the bolus to the airway (Kahrilas, Logemann, Lin, Ergun, 1992)
◆ Pharyngeal shortening is more difficult to measure on MBS but can be inferred
◆ Decreased pharyngeal shortening may be a factor in post-RT patients

Repeat MBS
◆ Following eight weeks of therapy
◆ Improvement is not dramatic
◆ Improvement sufficient to allow some intake of nectar-thick liquids, pureed food (or food chewed to puree consistency) and small sips of water
◆ In addition, swallows may help secretions from thickening and remaining in valleculae
MBS #2
◆ Swallows following eight weeks of swallowing therapy

Take home message
◆ Properly selected swallowing exercises, aggressively applied, can produce gains in swallow function that are meaningful in terms of patient quality of life.
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Patient Description
◆ Patient is a 57 y.o. male with a history of SCCA of the right tonsil and floor of mouth.
◆ Treated with chemoradiation and had PEG placed prior to XRT.
◆ Developed severe odynophagia and mucositis which limited oral intake.
◆ Maintained total non-oral intake for 9 months from end of XRT until SLP eval.

Functional Status at Swallowing Evaluation
◆ 60 lb weight loss
◆ Xerostomia
◆ Awakened at night with thick secretions
◆ Energy level returning
◆ Works 4-5 hours daily

MBS Results:
Moderate to severe pharyngeal phase dysphagia
◆ Mildly delayed swallow response
◆ Reduced pharyngeal contraction
◆ Poor laryngeal elevation and epiglottic inversion
◆ UES narrowing
◆ Consistent laryngeal penetration
◆ Intermittent audible aspiration

Recommendations
◆ Small sips of thin liquid with supraglottic swallow
◆ Series of UES dilations
◆ Repeat MBS
◆ Prognosis for return to modified diet using compensatory strategies good based on stimulability.

Post-dilation MBS
◆ 3 dilations performed to 14 mm.
◆ Minimal to mild improvement reported by patient.
◆ Other post-radiation complaints unchanged.
Post-dilation MBS Findings

- Persistent moderate to severe pharyngeal dysphagia
- Pharyngeal motor function unchanged, as expected
- Persistent penetration, no aspiration
- Persistent but lessened UES narrowing.

Treatment Plan

- Begin 5 cc swallows thin/thick liquids.
- Increase BOT retraction using Masako, yawn and gargle.
- Increase pharyngeal contraction using effortful swallow with EMG biofeedback.
- Increase airway protection using supraglottic swallow maneuver.
- Increase laryngeal elevation/epiglottic inversion using Mendelsohn/Shaker maneuvers.

“Strength” of Swallow

SEMG measures
Post-Treatment Outcomes
◆ 4 swallowing treatments over 5 weeks.
◆ Dilation to 17 mm.
◆ Cohesive soft diet with liquid supplements.
◆ PEG removed
◆ 20 lb. weight gain
◆ Infrequent choking on liquids
◆ Independent use of compensatory strategies (dry swallow, liquid wash)

Post-treatment MBS
Mild to moderate pharyngeal dysphagia

Points to Ponder...
◆ Swallowing tx was initiated 9 months after chemo/XRT completion, minimizing effect of spontaneous recovery.
◆ Swallowing tx was provided with dilation, but dilation alone did not produce functional improvement.
◆ Swallowing tx is not provided in a vacuum. Use all resources available.
◆ Be realistic. Goal is “new normal”.
◆ Objective change in function occurred with evidence based strategies.
◆ Subjective QOL was enhanced.
Swallowing Treatment After Spontaneous Recovery in Head and Neck Cancer

Case Presentation: AB

- 68 yo male diagnosed with a T4N2cM0 of left oropharynx involving left BOT, left valleculae, and left pharyngeal wall
- Medical hx: HTN, emphysema
- Surgical hx: Umbilical hernia repair, hemorrhoidectomy
- Social hx: h/o smoking 2-3 ppd x 30 years; Quit 20 years ago; social drinker
- Retired construction worker

Medical Treatment

- December 2005: Induction chemotherapy (3 cycles)
- February 2006: Chemoradiation (7 weeks)
  - C/o difficulty swallowing (no SLP intervention)
    - Sx: mucositis, odynophagia, choking on liquids/solids
      - PEG tube placed (<50% PO, >50% PEG)
    - Noncompliant with chemo
- July 2006: Residual SCC of BOT with lymph node involvement
- July 2006: Neck and BOT resection with radial forearm free flap plus trach tube
  - Completely PEG dependent
- August 2006-October 2006: Lost to follow up
- November 2006: Adjuvant chemotherapy (5 months)
- July 2007: SLP finally consulted!!

Initial MBS Results

- Oral prep:
  - Unremarkable
- Oral phase:
  - Delay in triggering swallow reflex
  - Premature spillage
- Pharyngeal phase:
  - ↓ Tongue base retraction
  - ↓ Laryngeal elevation
  - ↓ Cricopharyngeal opening
  - Pharyngeal residue
- Mild penetration and silent aspiration
- Effect of Strategies/Maneuvers/Postures
  ◆ Multiple swallows: somewhat beneficial
  ◆ Chin tuck: beneficial

Recommendations/Plan
◆ Small quantities of pureed PO with chin tuck
◆ Continue PEG tube feedings as primary nutrition
◆ Enroll & participant in swallowing therapy
  - ↑ Tongue base retraction
  - ↑ Laryngeal elevation
  - ↑ Cricopharyngeal opening
  - Airway protection exercises

Treatment Exercises
◆ Chin tuck
  - Purpose: Narrows airway entrance
  - Evidence: (Ayuse, Ishitobi, Kurata, Sakamoto, & Okayasu, 2006; Shanahan, Logemann, Rademaker, Pauloski, & Kahrilas, 1993; Welch, Logemann, Rademaker, & Kahrilas, 1993)
◆ Super-supraglottic swallow
  - Purpose: Voluntarily close airway entrance before and during the swallow
  - Evidence: (Boden, Hallgren, & Witt Hedstrom, 2006; Chaudhuri, Hildner, Brady, Hutchins, Aliga, & Abadilla, 2002; Logemann, Pauloski, Rademaker, & Colangelo, 1997)
◆ Masako (tongue-hold)
  - Purpose: Improve tongue base retraction and pharyngeal wall contraction
  - Evidence: (Lazarus, Logemann, Song, Rademaker, & Kahrilas, 2002; Fujiu & Logemann, 1996)
◆ Mendelsohn
  - Purpose: Increase extent and duration of laryngeal elevation; Increase duration and width of cricopharyngeal opening
  - Evidence: (Boden, Hallgren, & Witt Hedstrom, 2006; Ding, Larson, Logemann, & Rademaker, 2002; Lazarus, Logemann & Gibbons, 1993; Logemann & Kahrilas, 1990; Dodds, Man, Cook, Kahrilas, Stewart, & Kern, 1988)
Swallowing Treatment
◆ Total of 7 sessions
◆ Session #1:
  – Minimal pureed PO with chin tuck
  – 3-4 cans of nutritional supplement via PEG
◆ Session #7:
  – Mostly nectar, honey, pureed PO
  – 1-2 cans of nutritional supplement via PEG

Repeat MBS Results
◆ Oral prep:
  – Unremarkable
◆ Oral:
  – Premature spillage
◆ Pharyngeal phase:
  – ↓ Tongue base retraction
  – ↓ Laryngeal elevation
  – ↓ Cricopharyngeal opening
  – Pharyngeal residue
  – Trace penetration and silent aspiration
  – Effect of Strategies/Maneuvers/Postures
    ◆ Super-supraglottic swallow: beneficial
    ◆ Head turn to left: beneficial

Recommendations/Plan
◆ Small quantities of honey and pureed PO with super-supraglottic with head turn to left
◆ Continue PEG tube feedings for nutritional support
◆ Continue swallowing therapy
  – ↑ Tongue base retraction
  – ↑ Laryngeal elevation
  – ↑ Cricopharyngeal opening
  – Airway protection exercises

References:


Case Study:

- 67 yr. old male
- T2N1M0 SCCA BOT
- PEG placed prophylactically
- s/p IMRT/chemotherapy completed 12/23/07
- s/p L MRND 1/26/06
- Initial MBS done 6/22/06 at an outside facility
  - Results: unknown …Patient report “not good”

Case Study:

- Repeat MBS done 6/22/069 at another outside facility:
  - Results: “Gross frank silent aspiration due to incomplete transfer into the esophagus. Stricture noted proximal to the thoracic esophagus”

Case Study:

- Dilation 9/25/06 to a 30Fr
- Initiated swallowing therapy at an outside facility: Oral-motor exercises and Vital-Stim 3X’s per week. Minimal improvement in swallowing.

Case Study:

- Patient frustrated with lack of improvement, continued NPO status. MD refers for a second opinion.
- MBS at H. Lee Moffitt Cancer Center 10/13/06 (NPO almost 1 year):

MBS 10/13/06

- Results: Mild oral stage dysphagia with clinically significant silent aspiration
- Reduced oral manipulation of the bolus
- Absent epiglottic inversion
- Reduced hyolaryngeal elevation
- Reduced BOT retraction towards the PPW
- Absent epiglottic inversion

Case Study:

- Recommendations:
  - Aggressive swallowing therapy with “traditional therapy measures”
Case Study:
- 10/25/06 Initiation of swallowing therapy
  - Weekly therapy
    - Mendelsohn Maneuver
    - Tongue-holding maneuver
    - Effortful swallow
    - Super-supraglottic swallow maneuver
    - Xerostomia management techniques
    - Food management strategies
    - Instruction in daily log

MBS 3/7/07:
- Results: Mild oral stage dysphagia
- Mild-moderate pharyngeal stage dysphagia.
- Penetration/no aspiration.
- Safe for PO intake of thin, nectar, pudding consistencies
- Stricture noted. Referral made for repeat dilation

Take Home Message:
- Evidence not available indicating that electrical stimulation alone can improve the functionality of the swallow mechanism.
- Don’t forget use of evidence based maneuvers!
Pertinent History: 66 yo male
- R-Cerebellopontine (CP) angle tumor removed in 06/05. Complete paralysis of CIX, CX
- First seen at NWU on 09/06
- Completely non-oral: PEG - spit out saliva
- Alert, awake and cooperative

Swallow disorders
- Slow oral transit
- Delayed pharyngeal swallow (2-3 secs)
- Reduced laryngeal elevation
- Reduced base of tongue movement
- Reduced pharyngeal contraction causing 50% aspiration
- Reduced airway closure

Therapy attempted
- Head rotation to the left
- Super-supraglottic swallow

Patient lived in Kansas City
- Came for MBS every 4 to 6 weeks
- Given new exercises, evaluation of progress and had questions answered

Recommendations 9/27/06
- Swallowing exercise- 10 times/day, 5 minutes /time
- Brush teeth 3 times/day before meals
- Practice using 1 ml amounts of thin liquid in therapy only
- Tongue base exercises
  - Tongue base retraction
    - Pull tongue straight back
    - Gargle
    - Yawn

3 months later
- Added the Mendelsohn maneuver, Effortful Breath hold
- MBS shows
  - Improved bolus clearance on 3, 5 ml thin liquids and nectar
  - 20% bolus residue cleared in 2-3 follow-up swallows
6 months later
MBS results- using 1-10 ml liquid, paste, cookie
◆ Normal oral transit
◆ Head rotation
◆ Pharyngeal swallow triggered well
◆ Laryngeal elevation excellent
◆ Mild residue throughout pharynx
◆ Aspiration on 1 swallow

9 months later
MBS results using all bolus types, head rotated
◆ Normal oral transit
◆ Pharyngeal swallow triggered well
◆ No aspiration
◆ Minimal coating on pharynx
◆ On pudding, liquid assist better than liquid wash

Therapy – Add Shaker maneuver

Liquid Wash
◆ Swallow is completed. Much residue
◆ Take a 5 – 10 ml liquid swallow.
◆ Wash residue clear.

Liquid Assist
◆ Place food in mouth.
◆ Chew as desired.
◆ Add water in mouth.
◆ Chew and mix water with food in mouth.
◆ Swallow entire bolus

Lessons to be learned
◆ Therapy may take 1 year to return to oral intake
◆ Compensations and exercise may be needed
◆ Patient motivation/practice is critical – not time spent with SLP
◆ Can we attribute improvement to therapy or to spontaneous recovery, or both?
Presenters

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