

## Comments on Selected Recent Dysphagia Literature

Clarence T. Sasaki, MD and Steven B. Leder, PhD

### **Prediction of Aspiration in Myasthenia Gravis**

Koopman WJ, Wiebe S, Colton–Hudson A, Moosa T, Smith D, Bach D, Nicolle MW

*Muscle Nerve* 29:256–260, 2004

The ability of four bedside clinical tools to predict aspiration in myasthenia gravis (MG) patients was assessed. Patients ( $N = 20$ ) completed a self-directed questionnaire, underwent clinical neurological and speech pathology assessments, and were evaluated with the quantitative myasthenia gravis (QMG) score followed by a modified barium swallow, all within four hours. The total self-directed questionnaire score, two specific questions on the self-directed questionnaire, the clinical neurological assessment, and the QMG bulbar subset score all correlated with aspiration on the modified barium swallow, i.e., seven patients aspirated, four silently. The speech pathology prediction was highly sensitive but less specific. This pilot study shows that simple clinical tools can predict which MG patients are at risk of aspiration.

### **Comment**

If only it were that simple. What is not known is why MG patients who aspirated during the modified barium swallow were missed by the clinical test battery. For example, were the four patients who aspirated silently, i.e., 20% of the study population, all identified clinically and, if so, how? Similarly, were all seven patients who aspirated identified by the clinical battery and, if not, why? Dysphagia is a known major precipitant of a MG crisis in up to 90% of patients, so just knowing aspiration risk status is not very helpful when almost all patients are at risk. What is needed is knowledge of what food consistencies and feeding strategies to implement to promote safer oral intake. Only an objective evaluation can determine this.

Also, it is perplexing how speech pathology was able to identify laryngeal penetration much better than aspiration without direct viewing of the pharyngeal swallow.

### **Efficacy of Swallowing Training for Residents Following Stroke**

Lin L-C, Wang S-C, Chen SH, Wang T-G, Chen M-Y, Wu S-C

*J Adv Nurs* 44:469–478, 2003

The aim of this study was to examine the functional swallowing and nutritional outcomes of swallowing training in institutionalized stroke patients with dysphagia. Criteria for participation were diagnosis of stroke; videofluoroscopic evidence of dysphagia characterized by the sum of oral transit time, pharyngeal transit time, and a swallowing trigger time of over 2.5 s; oral intake of nutrition and hydration; a Short Portable Mental Status Questionnaire score of 4 or higher, and ability to communicate in Mandarin or Taiwanese dialect. A timed swallowing test, swallowing questionnaire, and a neurological examination evaluated the effects of swallowing training. Subjects in the experimental group ( $N = 35$ ) received 30 minutes of swallowing training per day six days a week for eight weeks. The control group ( $N = 14$ ) did not receive any training. Mean differences in volume per second, volume per swallow, midarm circumference, and body weight between pre- and post-training of the experimental group were significantly higher than for the control group, while mean differences in neurological examination and choking frequency during meals for the experimental group were significantly lower than in the control group. It was concluded that a swallowing training program led to improved outcomes.

### Comment

Dysphagia was defined solely in the temporal domain, i.e., the sum of oral transit, pharyngeal transit, and swallowing trigger times of over 2.5 s. Since all subjects were receiving oral nutrition and hydration, this definition of dysphagia is problematic because the actual duration of the swallow is not as important as swallowing success. Of greater concern is what the authors believe their direct therapies are doing physiologically. As stated, "The Mendelsohn manoeuvre was designed to reduce laryngeal movement and lessen discoordination in swallowing. Supraglottic swallowing was designed to delay pharyngeal swallowing. Effortful swallowing was designed to reduce the posterior movement of the tongue base." In actuality, the purpose of the Mendelsohn maneuver is to accentuate and prolong laryngeal elevation in order to increase the extent and duration of opening of the cricopharynx. Supraglottic swallow closes the airway at the level of the true vocal folds before the swallow is initiated and clears residue from the pharynx after the swallow is completed. Effortful swallowing should increase movement of the tongue against the posterior pharyngeal wall. Also, these interventions do not correspond to the definition of delayed swallowing used by the authors as none focused on physiologically improving oral transit time, pharyngeal transit time, or triggering of the swallow. In addition all subjects received the same swallowing training making it impossible to determine which technique was most beneficial. It is impossible to determine why or how the swallowing training improved outcomes.

### Mechanism of Sequential Swallowing During Straw Drinking in Healthy Young and Older Adults

Daniels SK, Corey DM, Hadskey LD, Legendre C, Priestly DH, Rosenbek JC, Foundas AL  
*J Speech Lang Hear Res* 47:33–45, 2004

Recent research has revealed differences between isolated and sequential swallowing in healthy young adults, but the influence of normal aging on sequential swallowing has not been studied. The aim of this present investigation was to study specific features of sequential straw drinking in healthy young ( $N = 20$ , age range = 25–35 years) and older ( $N = 18$ , age range = 60–83 years) adults. Hyolaryngeal complex (HLC) movement patterns, leading edge of the bolus location at swallow onset, and occurrences of airway invasion were determined from videofluoroscopic samples of two 10-straw drinking trials. Two HLC patterns were identified: (a) HLC lowering with the

epiglottis returned to upright between swallows and (b) partially maintained HLC elevation with the epiglottis inverted between swallows. The bolus was frequently in the hypopharynx at swallow onset. A significant relation was identified between older subjects and the average Penetration–Aspiration Scale score. Subtle age-related differences for age and HLC pattern and age and leading edge of the bolus location indicated that specific inherent swallowing patterns may increase the risk of laryngeal penetration with normal aging.

### Comment

Clinically, this information provides confirmation of the variability of the normal swallow with aging. Similarities included two types of HLC movement patterns and leading edge of the bolus location in the distal pharynx at swallow onset that were independent of age. Age-related differences were that young adults typically demonstrated distal bolus location for evoking the pharyngeal swallow regardless of the HLC movement pattern, while older adults demonstrated this distal bolus location only when the HLC was elevated between swallows; when the HLC lowered between swallows, a shift to the oropharynx was evident for triggering the swallow. Clinicians need to be aware of both normal and pathological changes due to aging. The present study expands our knowledge in both areas.

### Oral Health and Care in the Intensive Care Unit: State of the Science

Munro CL, Grap MJ

*Am J Crit Care* 13:25–34, 2004

Ventilator-acquired pneumonia (VAP) can occur when microorganisms in the mouth translocate and colonize the lung. Oral health, which includes oral immunity, oral microbial flora, and dental plaque, contributes to the general health of critically ill patients. The importance of oral care in the intensive care unit has been noted in the literature, but little research is available on mechanical or pharmacological approaches to reducing oral microbial flora via oral care in critically ill adults. Theoretical support exists for a defined oral care intervention to improve oral health and thereby reduce the occurrence of VAP. However, the effects of oral care interventions on dental plaque, oral immunity, oral microbial flora, and the development of VAP in critically ill adults receiving mechanical ventilation have not been adequately tested. Additional studies

are needed to develop and test best practices for oral care in critically ill patients.

### Comment

Bravo! Routine oral care, although a low priority in the intensive care unit, needs to be performed early on in order to decrease risk of colonization with organisms which may lead to VAP. Dysphagia specialists should be on the front line to identify and promote oral health in the intensive care unit as well as in the general hospital population.

### Barriers to Limiting the Practice of Feeding Tube Placement in Advanced Dementia

Shega JW, Hougham GW, Stocking CB, Cox-Hayley D, Sachs GA  
*J Palliative Med* 6:885-893, 2003

This study attempted to analyze physician decision making for percutaneous endoscopic gastrostomy (PEG) feeding tube placement in patients with advanced dementia. A mailed survey to 500 physicians resulted in a 47% (195 of 416) participant response. A significant discord existed between self-reported physician practice and the literature regarding tube feeding in patients with advanced dementia. The survey suggested most respondents overestimated the efficacy of PEG tube placement in advanced dementia. Over 75% of physicians believed PEG tubes decreased the risk of aspiration pneumonia, even when several studies otherwise suggested PEG tubes did not decrease this risk but might actually lead to an increase in aspiration pneumonia. Similarly, more than 90% of physicians believed PEG tube placement with enteral feeding in advanced dementia improved nutritional status, even when the existing literature did not support this presumption. Also, PEG tubes have not been reported to decrease the risk of pressure ulcers, although most physician respondents (75%) believed tube feeding decreased this risk. Lastly, approximately 25% of physicians were of the opinion that a PEG tube would increase the quality of life or improve functional status in advanced dementia, even when studies have failed to document this relationship.

### Comment

The disparity between what the physician believes and what the literature reports is of considerable concern. If beliefs about PEG tubes are overly opti-

mistic, their true performance may be disappointing if not potentially harmful. There is considerable evidence that advanced dementia is a terminal medical condition. One wonders if astute palliative care might include other options.

### Laryngopharyngeal Sensory Testing and Assessment of Airway Protection in Pediatric Patients

Thompson DM  
*Am J Med* 115(3A):166S-168S, 2003

### Pediatric Laryngopharyngeal Sensory Testing During Flexible Endoscopic Evaluation of Swallowing: Feasible and Correlative

Link DT, Willging JP, Miller CK, Cotton RT, Rudolph CD  
*Ann Otol Rhinol Laryngol* 109:899-905, 2000

The 2003 review article basically summarizes the 2000 study. That is, patients with laryngopharyngeal sensory thresholds <4 mm Hg rarely, if ever, exhibit laryngeal penetration or aspiration, those with thresholds of 4-10 mmHg have variable amounts of laryngeal penetration and aspiration, and when maximum threshold intensity exceeds >10 mmHg, severe laryngeal penetration or aspiration or both occurred. It was concluded that laryngopharyngeal sensory testing has the potential ability to follow the progression of feeding and swallowing function and airway protection in the pediatric population, but prospective research is needed to demonstrate reproducibility and predictive value relative to aspiration risk.

### Comment

Little new information is provided by the review article as no studies dealing with laryngopharyngeal sensory threshold testing in the pediatric population have been published since 2000. Comparison of results in Link et al. and the literature on laryngeal stimulation in the adult population raise an interesting disparity. In adults, the glottic closure reflex in response to air pulse stimulation is described as a brief, rapid, nonrhythmic, bilateral vocal fold adduction clearly distinguishable from the rhythmic bilateral vocal fold movement seen during normal respiration. In pediatrics, the reflex is characterized as a brief, nonrhythmic break in respiration or a cough response with or without a swallow response. Is there true vocal fold adduction? If no discrete adducting

response is seen, at what developmental age does it assume the adult configuration?

### **Does Feeding Tube Placement Predict for Long-Term Swallowing Disability After Radiotherapy for Head and Neck Cancer?**

A1-Othman MOF, Amdur RJ, Morris CG, Hinerman RW, Mendenhall WM  
*Head Neck* 25:741–747, 2003

Nine hundred thirty-four patients were treated with radiotherapy (RT). Feeding tubes were placed in 235 patients (25%): 212 patients (22.5%) for acute toxicity, 18 patients (2%) for late effects, and 5 patients (0.5%) for both. Median duration of tube dependence for acute toxicity was 3.8 months. Multivariate analysis revealed that feeding tube placement for acute toxicity was increased with higher RT dose ( $p < 0.0001$ ), adjuvant chemotherapy ( $p = 0.0002$ ), advanced age ( $p = 0.0002$ ), and the presence of neck disease ( $p = 0.0045$ ). The risk of a feeding tube for late effects was 2% at 5 years. The likelihood of feeding tube placement for late effects was greater for women ( $p = 0.0293$ ), higher RT dose ( $p = 0.0345$ ), and primary sites, including the hypopharynx and multiple synchronous primary tumors ( $p = 0.0360$ ). Feeding tube placement for late effects was unrelated to tube placement for acute toxicity. Likelihood of long-term feeding tube dependence was low and unrelated to placement for acute effects.

#### **Comment**

This is an important retrospective study performed by highly capable researchers in a large patient cohort and with a high degree of observational rigor. The results seem to dispel the fear that prophylactic pre-treatment bypass increases the risk of pharyngeal atrophy in response to mucosal toxicity by aggressive radiation or concurrent chemoradiation. Because the principal evaluative criterion was the ability of sufficient oral feeding to sustain adequate post-treatment nutrition, as such, the authors rightfully concede that less severe deglutitive changes may therefore have escaped instrumental detection by the evaluative criterion used. This understanding precisely encourages

the opportunity for future prospective evaluation to answer better important questions generally unrecognized by the greater oncologic community.

### **Hypopharyngeal Pharyngoplasty in the Management of Pharyngeal Paralysis: A New Procedure**

Mok P, Woo P, Schaefer-Mojica J  
*Ann Otol Rhinol Laryngol* 112:844–852, 2003

Dysphagia after a high vagal nerve injury may be associated with a patulous hypopharynx that serves as a reservoir for pharyngeal secretions, contributing to primary or secondary aspiration. The authors describe a new hypopharyngeal pharyngoplasty procedure for the paralyzed pharynx to improve swallow. The paralyzed pyriform sinus is resected to remove insensate and redundant mucosa. The inferior constrictor muscle is then advanced anterior to the oblique line of the thyroid cartilage to improve pharyngeal tone and prevent pharyngeal dilatation. The surgery is performed in conjunction with medialization laryngoplasty and arytenoid adduction. The utility of this procedure is reviewed retrospectively in eight patients. They were evaluated by clinical evaluation, fiberoptic endoscopic evaluation of swallow, and modified barium swallow studies. All had significant preoperative dysphagia. Three patients were gastrostomy tube dependent. Postoperatively, all patients had subjective and objective improvements in swallow function and progressed to oral feeding. There were no operative complications. It was concluded that hypopharyngeal pharyngoplasty secondary to cranial nerve palsies may benefit from this new procedure.

#### **Comment**

This is an important addition to a short list of rehabilitative options in patients with combined lower cranial nerve deficits. The description and figures are clearly presented. The purpose of this surgery is to reduce the residue of swallowed matter in the paralyzed pyriform sinus in order to prevent its reflux above the laryngeal vestibule between swallows. One would hope the surgically reduced capacity of the paralyzed pharynx would continue to resist dilational forces over years of repeated swallows.