Geriatric Dysphagia

Ozlem E. Tulunay-Ugur, MD[a,*], David Eibling, MD[b]

KEYWORDS

• Geriatric dysphagia • Dysphagia team • Aspiration pneumonia
• Cricopharyngeal spasm

KEY POINTS

- All geriatric patients should be screened for potential dysphagia. Because swallowing problems can be regarded as a normal part of aging by patients and families, it may not be brought up as a complaint unless the physician makes a specific inquiry.
- The key to diagnosis lies in a detailed and thorough history. Reported symptoms will guide further testing. Similarly, detailed understanding of the current diet will determine the urgency of intervention to improve nutritional intake and prevent complications such as aspiration pneumonia.
- Successful management requires a dysphagia team. Although many surgical treatment options are available, the most important part of successful management is rehabilitation and diet modification.

INTRODUCTION

Among the disorders precipitated by diseases accompanying aging, perhaps that with the most impact on quality of life is dysphagia. This is particularly true in patients who have undergone treatment of tumors of the head and neck, who are often affected with severe dysphagia that worsens with age and is discussed elsewhere in this issue. However, many other ailments of aging, common and uncommon, affect swallowing. The extent of the problem is immense, with 40% of institutionalized older adults having a diagnosis of dysphagia. In some instances, the effect on swallowing leads to death due to aspiration or inanition. The otolaryngologist plays a central role in the management of dysphagia, not only as the treating physician but also as the expert guiding crucial end-of-life decisions. This article focuses on critical knowledge to guide clinical decision-making rather than technical details of workup and surgical procedures.

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[a] Department of Otolaryngology–Head and Neck Surgery, University of Arkansas for Medical Sciences, 4301 West Markham Street, Slot 543, Little Rock, AR 72223, USA; [b] Department of Otolaryngology–Head and Neck Surgery, University of Pittsburgh, Eye and Ear Institute, Suite 500, 203 Lothrop Street, Pittsburgh, PA 15213, USA
* Corresponding author.
E-mail address: oetulunayugur@uams.edu

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Normal Swallowing Function

There are numerous texts describing normal and abnormal swallowing function; therefore, this article only reviews the highlights. Normal swallowing is empirically divided into 4 phases, the first 2 of which, the oral preparatory phase and the oral phase (often referred to as the horizontal subsystem), create and move the bolus under voluntary control into position, then triggering the so called vertical subsystem by pressure against the soft palate. The vertical subsystem consists of the involuntary laryngopharyngeal and the esophageal phases, moving the bolus through the pharynx, by the larynx, and through the esophagus into the stomach. Although often addressed as separate functions, in reality all phases are coordinated and often overlap significantly. Failure in any of the phases, such as inability to form a cohesive bolus during mastication, can impair the function of the pharyngeal phase. Although clinical evaluations typically focus on the laryngopharyngeal phase because it is this phase in which the greatest number of coordinated events must occur, impairment often occurs in multiple phases. Airway protection must precede bolus transport, and must be maintained until the bolus has passed in its entirety. Glottic closure during the laryngopharyngeal phase occurs in a different sequence than closure for coughing or speech, and hyolaryngeal elevation not only cantilevers the epiglottis over the glottic opening but also actively distracts the cricoid ring to distract the cricopharyngeal (CP) muscle and open the upper esophageal sphincter (UES). Moving the bolus through the pharynx and UES requires only about 0.7 seconds in normal young individuals but may be prolonged in normal-aged but asymptomatic individuals. Once through the UES into the esophagus, orderly peristaltic waves transport the bolus at a velocity of 2 to 4 cm/s into the distal esophagus, then through the lower esophageal sphincter, requiring less than 10 seconds in normal patients. The upper esophagus, consisting of striated muscle, is under central neural control, as are the pharyngeal muscles; however, the smooth muscle of the distal esophagus is intrinsically innervated, as well as subject to extrinsic control by the vagus.

Normal Swallowing in the Elderly

Swallowing changes, often termed presbyphagia, occur with normal aging. An understanding of swallowing in the normal elderly, as well as knowledge of the range of disorders is needed in planning interventions.

Robbins and colleagues[1] have extensively studied and described swallowing in normal, community-dwelling older adults. In normal subjects, changes accompanying aging are minimal and are unaccompanied by symptoms, thereby escaping detection except in focused investigations. Some of these changes are listed in **Box 1**. The most

Box 1
Characteristics of presbyphagia

Differences in swallowing function in normal-aged individuals

1. Slowing of pressure rise during pharyngeal swallowing
2. Reduced maximum isometric tongue pressure
3. Persistent cricopharyngeal bar on barium studies
4. Persistent residue following swallow
5. Increased likelihood of nonpathologic penetration
6. Various forms of esophageal dysmotility
7. Slowing of esophageal transit time

salient of these changes are slowing of swallowing pressure rise (although ultimate pressures are unchanged from younger individuals), an increased presence of residue following swallowing, and the presence of a persistent CP bar on barium studies. Because these changes are usually asymptomatic, their presence in symptomatic patients may be confusing and lead to an inaccurate diagnosis. It has been hypothesized that the observed slowing is due to the delay in recruiting additional motor units to achieve the required pressures.[2]

Although normal swallowing pressures are measured in the elderly, maximum isometric tongue pressures decrease linearly with aging. This finding suggests that the elderly are using a greater percentage of their tongue strength reserve to maintain normal pressures during swallowing. Moreover, elderly patients may use multiple lingual movement gestures to achieve sufficient pressures. These studies collaborate the observation that older adults eat more slowly, and rarely bolt their food.[2,3] It seems likely that normal adults alter their eating habits to accommodate to these changes. These findings also suggest a mechanism whereby seemingly unrelated illnesses can lead to swallowing morbidity merely as a result of depleting functional reserve. As Robbins and colleagues[1] point out, these perturbations set up the elderly to cross over from a healthy older swallower to a person with dysphagia.

Esophageal motility disorders are so common in the elderly that they should probably be considered a normal variant. In a study of 24 asymptomatic community-dwelling older adults, more than half had objective evidence of dysmotility, including stasis (residual material following primary wave) in 96% and intraesophageal reflux (retrograde movement of bolus before passing the lower esophageal sphincter) in 60%. Findings were substantially more common in older men.[4] These findings indicate that attributing symptoms to radiographic findings may not be appropriate unless the radiologist is familiar with the normal range of findings in the geriatric population.

Evaluation of Swallowing in the Elderly

Knowledge that the elderly are at risk for dysphagia-associated morbidity has driven health care institutions to focus attention on identifying, quantifying, and managing dysphagia in vulnerable populations with the goal of preventing aspiration-related pulmonary disease, as well as malnutrition. To this end, most organizations who care for the elderly or patients with chronic illnesses have well-developed procedures, typically overseen by a speech-language pathologist (SLP)-directed dysphagia team. The value of these teams cannot be overemphasized and physicians who manage vulnerable patients, such as the elderly, should make an effort to become familiar with the team in their facility, as well as their operational strategies and procedures.

Stroke patients are at significant risk for dysphagia-related comorbidities, which may lead to mortality; hence, prospective screening of these patients has been guideline-driven since 2005.[5] Some facilities, such as Veteran Affairs hospitals, use a nurse-driven standard screening process for all at-risk patients to identify patients that need further workup by SLP. Other centers are staffed adequately to enable SLP screening of all at-risk patients at admission, whereas in others evaluation will occur only on specific consultation by the treating team. Typically, dysphagia evaluation in the outpatient arena is sporadic at best, except in formal protocoled clinics such as survivor clinics and this is discussed elsewhere in this issue.

Unfortunately, bedside evaluation of many patients with neurologic disease is impaired by reduced sensation. It is self-evident that the presence of a gag reflex does not correlate with safe swallowing. As a result of sensory impairment, as many as 50% of these patients may demonstrate silent aspiration, meaning that aspiration does not trigger a cough. Identification of specific aspects of swallowing function,

particularly silent aspiration, is best demonstrated by either radiographic contrast studies, the so-called modified barium swallow (MBS) in most institutions, or direct vision of the pharynx, the fiberoptic (or flexible) endoscopic evaluation of swallowing (FEES). A full discussion of these techniques is beyond the intent of this article and the reader is referred to the many excellent texts on the topic. Regardless, the physician managing the patient should make every effort to review either the recorded MBS or the FEES examination of their patients with dysphagia to help guide decision-making.

Dysphagia due to Polypharmacy

Essentially all practitioners are familiar with the concepts of dysphagia associated with obstructive lesions or neurogenic disorders such as stroke, progressive neurodegenerative diseases, and so forth. However, the role of medications in inducing or aggravating dysphagia in the elderly is less appreciated and deserves some discussion. Dysphagia due to medications can be divided into 2 major categories: those medications that reduce the amount or increase the viscosity of saliva, and centrally acting sedatives that impair the complex neurologic-driven interplay of the multiple components of swallowing. Among the former, the most common are diuretics and anticholinergic medications, both of which are commonly encountered on medication lists of elderly patients. Not only does the presence of adherent mucus impair swallowing but also the loss of the normal rinsing effect of saliva in the esophagus may contribute to esophagitis. The role of selective serotonin reuptake inhibitors is controversial in the geriatric literature, and the anticholinergic effect may vary widely among the different formulations.

Among the common sedatives are benzodiazepines and antihistamines, again frequently encountered on review of medication lists. The effect of the drying agents is easily seen on fiberoptic examination, and the effect of the sedatives can be visualized on MBS or FEES. Many of these medications are listed in the Beers criteria as being potentially inappropriate for older adults. Joint management of geriatric patients with geriatricians is significantly helpful in the management of patients with swallowing disorders.[6]

Treatment

The management strategies can be divided into conservative through the use of swallowing therapy and nutritional modifications, and surgical. In a review of all patients presenting to a tertiary care center with dysphagia who suffered from no neurologic disorders or head and neck cancer, the authors noted that about 30% of the patients required a surgical intervention, whereas 60% needed diet modification, and another 22% needed swallowing therapy.[7] Hence, the role of a team approach with SLPs, nutritionists, and occupational therapists in the forefront of the management of the elderly patients with dysphagia cannot be overemphasized.

There continues to be no consensus on how to select patients requiring surgical intervention. This remains true for the 2 primarily surgical disorders of the elderly, which are CP muscle dysfunction and Zenker diverticulum. CP dysfunction, which can lead to solid food dysphagia, aspiration, weight loss, and reduced quality of life, can result from anatomic, neuromuscular, iatrogenic, inflammatory, neoplastic, or idiopathic cause.[8] Without well-established guidelines, management depends on surgeon preferences and background. The traditional surgical treatment of CP spasm has been myotomy through a transcervical approach. Endoscopic myotomy was introduced by Halvorson and Kuhn[9] using the potassium-titanyl-phosphate laser (KTP) in the early 1990s. The carbon dioxide (CO_2) laser later replaced the KTP due

to better coagulative abilities. The technique has been comprehensively described by Pitman and Weissbrod[10] in their 2009 paper detailing the procedure. As long as the buccopharyngeal pharyngeal fascia is preserved and the retropharyngeal space left undisturbed, endoscopic myotomy has been shown to be a safe and effective procedure in most patients.[11] Regrettably, the fear of mediastinitis continues to discourage many otolaryngologists from performing CO_2 laser myotomy. In a systematic review that evaluated the most commonly used techniques in the treatment of CP spasm, comparing endoscopic versus open myotomy, botulinum toxin injections, and dilatation outcomes and complications, it was demonstrated that best functional outcomes were achieved with endoscopic myotomy. Moreover, when complication rates were compared, logistic regression analysis showed a significant increase in the odds of complication with the open procedure.[12] Botulinum toxin injections into the CP muscle, first described by Blitzer and Brin[13] in 1993, can be performed under direct visualization and general anesthesia or in the office with electromyographic guidance. There is no agreement on the dose needed and it ranges from 10 U to 100 U in the literature.[14] Complications may arise from the injection or diffusion of the toxin into the inferior constrictor muscles, which can lead to worsening dysphagia, aspiration, and need for percutaneous endoscopic gastrostomy (PEG) tube placement; or into the posterior cricoarytenoid muscles, which can lead to respiratory compromise if both sides are affected. Mortality has been reported related to botulinum toxin injection, likely related to aspiration due to the injection of the inferior constrictors.[15] Hence, patient selection requires diligence and careful discussion of expected outcomes. Treatment should be offered to patients with dysfunctional CP muscle, who are symptomatic with additional clinical findings, such as flexible laryngoscopic examination showing pooling in the pyriform sinuses and an MBS demonstrating a CP bar. Although preferred, intact pharyngeal contraction is not a prerequisite for surgical management, as shown by Kos and colleagues.[16] In their series, 71% of subjects with normal constriction showed improvement, and 79% of subjects with reduced activity and 71% with absent activity also showed improvement in swallowing. As in any surgery on the elderly, risks of general anesthesia should be weighed; frailty and diminished functional reserve can lead to poor perioperative outcomes. It has been demonstrated that geriatric consultation improves outcomes in older patients, and can aid in decision-making.[17,18]

Similar to CP dysfunction, well-established guidelines are lacking in the management of Zenker diverticulum, and management and chosen surgical technique heavily rely on surgeon comfort. Various techniques have been described, and endoscopic techniques are preferred by most surgeons due to shorter surgical times, shorter hospital stay, earlier return to normal diet, and improved complication rates.[19,20] A 2015 systematic review by Verdonck and Morton[21] assessed treatment modalities, comparing open versus endoscopic techniques, and endoscopic stapling versus laser-assisted diverticulotomy. They reported failure of open and endoscopic approaches to be 4.2% and 18.4%, respectively, with corresponding complication rates of 11% and 7%. Within endoscopic techniques, failure rates were 18.9% for stapler diverticulotomy and 21.7% for laser diverticulotomy. Corresponding complication rates were 4.3% and 7.9%. Flexible endoscopic techniques had a higher failure (29%) and overall complication rate (14.3%). Most reported complications for transcervical techniques were related to the recurrent nerve (3.4%) and salivary fistula formation (3.7%), whereas in the endoscopic group emphysema (3.0%) and mediastinitis (1.2%) were the most common complications. Operation-related deaths were infrequent in both groups but more frequent with the open approach (0.9 vs 0.4%). They concluded open approaches had more success but more complications than

endoscopic techniques, and recommended an open approach in younger patients, as well in patients with unfavorable anatomic conditions for endoscopic exposure. Flexible endoscopic techniques were noted to provide a suitable option for patients who cannot tolerate general anesthesia. The results from Agalato and colleagues[22] were contrary to this and they reported improved outcomes with open procedures. In their series of 97 subjects, the complication rates were less in the endoscopic group with 15% versus 25% in the open procedure group, but with 1 mortality in the endoscopic group. Symptom recurrence was significantly higher in the endoscopic group (26% vs 7%) and multiple procedures were required in this group. Their conclusion was that endoscopic approaches did not have a significant advantage over open techniques. Barton and colleagues[23] compared laser-assisted with stapler-assisted diverticulotomy and demonstrated comparable success and complication rates. The addition of the laser-assisted approach to the surgical armamentarium increased the successful completion rates of endoscopic procedures because fewer surgical procedures were aborted due to exposure problems or size criteria. Recently, there is increased reporting of flexible endoscopic myotomy for the management of Zenker diverticulum, with most of the literature coming from European gastroenterologists.[24,25] Further clinical experience is needed to understand the value of this technique.

SUMMARY

Dysphagia in the elderly may be associated with morbidity and potentially even mortality. As such, it requires a thorough, diligent evaluation and team approach. Due to the complex nature of swallowing, increased comorbidities in older adults, and the dismissal of many problems in this patient population as normal aging, the diagnosis and management of clinically significant dysphagia may be delayed. This not only leads to a substantial decrease in quality of life but also places the patient at risk for malnutrition, aspiration, and death. A good understanding of both the swallowing disorders in this age group and the available management options is required to optimize care in this vulnerable population.

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