Dysphagia in Older Adults
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Abstract
Dysphagia, which is a geriatric syndrome affecting 10% to 33% of older adults, is commonly seen in older adults who have experienced a stroke or neurodegenerative diseases such as Alzheimer or Parkinson disease. Patients diagnosed as having dysphagia can experience malnutrition, pneumonia, and dehydration. Patients can also experience increased rates of mortality and long-term care admission. Providers can identify the specific type of dysphagia for treatment in approximately 80% of patients by asking 5 questions in the patient's history: What happens when you try to swallow? Do you have trouble chewing? Do you have difficulty swallowing solids, liquids, or both? Describe the symptom onset, duration, and frequency? What are the associated symptoms? Providers can then request a videofluoroscopic swallow study or a fiberoptic endoscopic evaluation of swallowing for further evaluation of oropharyngeal dysphagia. If providers are diagnosing esophageal dysphagia, barium esophagography or esophagostroduodenoscopy (EGD) can be used as part of the assessment. Patients can be treated for oropharyngeal dysphagia by using compensatory interventions, including behavioral changes, oral care, dietary modification, or rehabilitative interventions such as exercises and therapeutic oral trials. Providers often address treatment of esophageal dysphagia by managing the underlying etiology, which could include removal of caustic medications or using EGD as a therapeutic modality for esophageal rings. High-quality, large research studies are necessary to further manage the diagnosis and appropriate treatment of this growing geriatric syndrome.

Dysphagia is a geriatric syndrome that affects 10% to 33% of older adults.\(^1\)-\(^4\) Dysphagia is generally defined as swallowing difficulties. Many patients who have undiagnosed dysphagia adapt through behavioral changes, and others experience silent aspiration. For these reasons, it is challenging to accurately quantify the prevalence of dysphagia.\(^5\) There is a higher prevalence in the hospital and nursing home settings.\(^3\) Oropharyngeal dysphagia is reported more commonly in older adults diagnosed as having neurologic diseases (80% of Alzheimer disease and 60% of Parkinson disease).\(^3\) Patients with stroke also commonly have dysphagia, with a prevalence of 37% to 78%.\(^6\)

Patients experiencing dysphagia are found to be at higher risk for other serious illnesses. For example, patients experiencing dysphagia due to a stroke have an increased risk of contracting pneumonia (relative risk, 3.17; 95% CI, 2.07 to 4.87)\(^5\) and malnutrition.\(^7\) Furthermore, patients with dysphagia are 33.2% more likely to be transferred to a post–acute care facility (71.9% vs 38.7%; \(P < .001\)).\(^2\) This condition can also be associated with poor physical performance\(^7,8\) and a higher mortality rate. Indeed, in a large cross-sectional study of nursing home residents, residents experiencing dysphagia possess 6-month mortality of 24.7% compared with 11.9% in those without dysphagia (\(P < .001\)).\(^9\) In the hospital, patients diagnosed as having dysphagia were 1.7 times (95% CI, 1.67 to 1.74 times) more likely to experience mortality compared with a group without dysphagia.\(^2\) In addition, dysphagia is associated with a longer hospital length of stay (LOS). In the National Inpatient Sample database from 2009 to 2013, patients with dysphagia experienced a mean hospital LOS 3.8 days longer than patients without dysphagia (8.8 days vs 5.0 days; \(P < .001\)).\(^2\) Patients with dysphagia incurred inpatient costs $6243 higher than...
patients without a dysphagia diagnosis ($19,244 vs $13,001; P < .001).2

Patients with dysphagia often experience decreased quality of life resulting from impaired social and psychological well-being. Specific examples include patient and caregiver fear/anxiety, increased worry regarding choking in front of others, and caregiver burnout in managing the needs of an unfamiliar disease.10 A study in Europe reported that although 84% of nursing home residents felt that eating should be an enjoyable activity, only 45% actually found it to be so. Approximately 30% of those studied reported avoiding eating with others, and 41% experienced anxiety resulting from mealtimes.5 Counseling has proved helpful in allowing patients and families to be better informed of what to expect. Given the more common prevalence of dysphagia found in older adults as well as its many adverse outcomes, dysphagia is now considered to be a geriatric syndrome that affects a patient’s independence and quality of life.11,12 There continues to be a lack of comprehensive guidelines for the management of dysphagia in older adults.

AGING AND SWALLOWING

Even some healthy older adults can experience changes in the structure, physiology, and innervation of the swallowing mechanism, which is termed presbyphagia. These specific changes can result in decreases in range of motion, generation of pressure, and speed of movements.13-16 In the oral cavity, older adults often develop an impaired sense of smell or taste6,18 due to changes in dentition, oral hygiene, and salivary flow. In addition, there is reduced muscle mass and contraction, which leads to poor strength and function of the tongue, lips, velum, and jaw.16,18 Some older adults experience tongue hypertrophy, which results from fatty deposits and increased connective tissue and can lead to reduced mobility and delayed force generation.18 All these changes can cause an altered rate and efficiency of bolus movement in the oral cavity.

In the pharyngeal region, older adults may also experience a delay in initiation of the swallow reflex. In addition, inadequate laryngeal anterior movement may also be observed due to decreased connective tissue elasticity, which reduces the opening of the pharyngeal esophageal sphincter.14,18 With these pharyngeal changes, some older adults may find themselves at increased risk for penetration and aspiration of food.16,18 In the esophageal region, the normal timing of a food bolus transfer (8-20 seconds) is delayed. Older adults may also experience reduced flexibility of the upper esophageal sphincter.16 Other effects of the esophageal aging process include reduced contraction of the smooth muscles of the esophagus,18 occurrence of nonperistaltic contractions, and delayed esophageal emptying.16

In older adults, presbyphagia may also lead to dysphagia when a stressor occurs, such as delirium, dementia, an adverse effect of a medication, or a hospitalization.13,16-18 See Figure for a summary.

ETIOLOGY

Dysphagia can be broadly classified into 3 major categories: oral, pharyngeal, and esophageal (oral and pharyngeal types are
commonly classified together as oropharyngeal in clinical practice). The oral phase of swallowing consists of a voluntary process requiring attention and coordination. A person forms and moves the food bolus from the mouth to the pharynx. Oral dysphagia occurs when patients experience problems in this formation and movement process of a bolus to the pharynx region. The pharyngeal phase of swallowing is predominantly an involuntary process that involves the swallow reflex ranging from the pharynx to esophagus areas. Patients can experience dysphagia when there is an interruption of the swallowing reflex or within the muscles involved in the movement of bolus from the pharynx to the esophagus. Common causes of oropharyngeal dysphagia in older adults include Alzheimer disease, Parkinson disease, dementia, and stroke.18

The esophageal swallowing process involves intrinsic nerve innervation with no major contribution made from the central nervous system. Esophageal dysphagia occurs when there is evidence of pathology along the esophageal tract (ie, peristalsis, tissue injury, etc). Common causes of esophageal dysphagia may be attributed to strictures, pill-induced esophagitis, and infectious etiologies.

ELICITING A GOOD HISTORY
With a detailed patient history, providers can identify the specific type of dysphagia in 80% of patients with the condition.19 Providers should recognize warning signs of dysphagia in older adults (Table 1). Five specific history questions are described in the following subsections.20-22

What Happens When You Try to Swallow?
Patients may describe difficulty with moving food and liquid in the mouth or initiating swallowing, suggesting pathology in the oral stage of swallow.23 If the patient describes symptoms of coughing, choking, or nasopharyngeal regurgitation, it may indicate likely pathology in the pharyngeal structures of the swallow. Providers should also inquire regarding the presence of frequent throat clearing.20 In addition, if the patient describes food becoming stuck behind the sternum, chest pain, or heartburn after swallowing, such indicators could point to a pathologic disorder in the esophagus, such as a stricture.20

Do You Have Trouble Chewing?
Caregivers of patients with dysphagia may note prolonged mealtimes, laborious chewing, or repetitive swallowing.20 These symptoms are commonly seen in patients with dementia because of poor motor coordination or apraxia. Providers should inquire about ill-fitting dentures.18 More specifically, patients may describe difficulty chewing due to dentures that may not be fitted properly or may cause erosion of the gingiva. Other causes of chewing difficulty include painful oral lesions or dry mouth due to dehydration and anticholinergic medications.

### TABLE 1. Warning Signs of Dysphagia18,20

<table>
<thead>
<tr>
<th>Category</th>
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<tr>
<td>Cognition</td>
<td>Delirium</td>
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<td>Playing with food</td>
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<td>Inappropriate sizes of bites</td>
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<td>Eating behavior</td>
<td>Increased amount of fluid remaining on plate</td>
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<td>Specific food/texture avoidance</td>
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<td>Prolonged mealtime</td>
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<td>Laborious chewing</td>
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<td>Repetitive swallowing</td>
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<td>Food pocketing in cheeks</td>
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<td>Increased need to clear throat</td>
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<tr>
<td>Impaired oropharyngeal function</td>
<td>Wet, hoarse voice</td>
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<td></td>
<td>Dysarthria</td>
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<td></td>
<td>Drooling</td>
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<td></td>
<td>Facial asymmetry, dystonia, atrophy</td>
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<td></td>
<td>Cough, choke when swallowing</td>
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<tr>
<td>Complaints or observations</td>
<td>Sensation of obstruction or bolus in throat or chest</td>
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<tr>
<td></td>
<td>Regurgitation of food or acid</td>
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<td></td>
<td>Unexplained weight loss</td>
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<td>Impaired breathing during meals or immediately after eating</td>
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Do You Have Difficulty Swallowing Solids, Liquids, or Both?
Patients who describe difficulty swallowing liquids often are affected by oropharyngeal dysphagia, whereas those experiencing difficulty swallowing solids are often diagnosed as having esophageal dysphagia. Patients who experience swallowing difficulties with both liquids and solids are evident in all phases of dysphagia.18

Describe the Symptom Onset, Duration, and Frequency?
A sudden onset of dysphagia may be related to a stroke, food, or a foreign body impaction; a slow and progressive onset can be attributed to a neurodegenerative disease such as Alzheimer dementia. The frequency of dysphagia provides help; for example, patients with intermittent swallowing difficulties with solids are evidenced in esophageal webs. With longer duration, the patient may describe progressive solid food swallowing difficulty, which can be seen with peptic strictures or neoplasm.18

What Are the Associated Symptoms?
Dysphagia is commonly caused by systemic illnesses resulting in other associated manifesting symptoms. For example, the patient may describe facial asymmetry or numbness of the face, along with cough with swallowing, which are potential indicators of a stroke. If the patient experiences cognitive changes along with other indicators, such as food pocketing, prolonged mealtimes, the need for caregiver cueing during swallowing, and weight loss, all could point to a possible diagnosis of dementia. If there is weight loss the provider may also consider malignancy as a differential diagnosis in this patient population.

PHYSICAL EXAMINATION
The physical examination for dysphagia should focus on the neuromuscular components of swallowing to aid in the diagnosis and management of dysphagia. The bedside water swallow test is a quick and helpful indicator that can be performed by simply asking the patient to swallow water. A 2016 systematic review and meta-analysis investigated the quality of the bedside water swallow to determine aspiration in the acute care and rehabilitative settings for those aged 46 to 75 years possessing mixed primary diagnoses, including dementia.24 Aspiration was measured by airway response (cough/choke) and voice change (wet/gurgled voice). The authors reported that swallowing 1 to 5 mL of water was 71% sensitive and 91% specific, and swallowing consecutive sips of 90 to 100 mL of water was 91% sensitive and 53% specific for radiographically demonstrated aspiration.24

Beyond the water swallow test, the provider can also perform a focused physical examination with specific attention given to the head and neck areas as well as neurologic examination. The vital signs can provide clues as to dehydration, weight loss, or orthostatic hypotension.25 In a state of decreased consciousness, the patient may exhibit impaired swallowing (mainly the oral phase). The provider can then evaluate the oral cavity for ill-fitting dentures, oral hygiene, gingival inflammation, mucosal dryness, or lesions such as thrush (candidiasis) or ulcerative herpetic lesion.18 During the oral examination, the patient may exhibit tongue atrophy or tongue fasciculation, which are common symptoms of lower motor neuron diseases.18 On the neck examination, the provider may observe muscle asymmetry, an ipsilateral neck mass, or lymphadenopathy. The provider should observe and palpate the thyroid notch region as the patient swallows, which evaluates for the presence and extent of laryngeal elevation (normal is 2-4 cm), which is key in the opening of the upper esophageal sphincter.18 Additional observations of note include muscle tone, muscle bulk, and gait.

A cognitive evaluation that includes a functional status assessment and a memory evaluation can prove helpful in diagnosing dementia.26

SCREENING, CONSULTATIONS, AND TESTS
Despite the demonstrated need, there are no screening or clinical bedside evaluation tests that have been designed and validated for
diagnosing dysphagia in older adults. Despite this challenge, many institutions do use some screening tests, such as the Massey Bedside Swallowing Screen or the Gugging Swallowing Screen, which have been studied in patients with stroke. However, these tests have not been studied in general geriatric patients. The basic premise in using screening tests is to look for alertness, cough, vocal quality, drooling, cranial nerve abnormalities, dysarthria, and impaired gag or cough reflex. Evidence to support the screening assessments is scant and limited, despite their widespread use.

When oropharyngeal dysphagia is suspected on the basis of a clinical swallow evaluation, patients often undergo an instrumental evaluation to understand the specific structural or physiologic nature of the swallowing impairment. Such assessments also help determine what consistency of both solids and liquids the patient is able to swallow safely. Providers and swallowing therapists often consider 2 common swallowing studies: the videofluoroscopic swallow study (VFSS; also known as the modified barium swallow study) and the fiberoptic endoscopic evaluation of swallowing (FEES). During a VFSS, patients are asked to consume different consistencies of barium contrast, as well as foods that are mixed or coated with barium contrast, which is then viewed by using videofluoroscopy. When a VFSS is performed, the trained therapist visualizes the swallowing mechanics, including the oral cavity, tongue movement, velar elevation, hyolaryngeal excursion, complete inversion of the epiglottis, and upper esophageal sphincter opening. Fiberoptic endoscopic evaluation of swallowing involves inserting an endoscope via the nares to directly visualize the naso-oropharyngeal and laryngeal structures. Swallowing is then assessed while the patient consumes varying textured consistencies that are tinted with food coloring. During both evaluations, the dysphagia-trained therapist can observe the effectiveness of a variety of therapeutic maneuvers, such as postural changes such as chin tuck.

The choice of which test is most beneficial often involves consideration of patient characteristics. In 2016 a systematic review of the accuracy of VFSS and FEES reported that FEES had higher sensitivity for detecting aspiration (0.88 vs 0.77; P=.03), penetration (0.97 vs 0.83; P=.001), and postswallow residue (0.97 vs 0.80; P<.001) than VFSS. This review also indicated that sensitivity for premature spillage was similar in both procedures (FEES: 0.69, VFSS: 0.80; P=.28) and that the specificity was also similar (range, 0.93-0.98). Clinicians must also consider the patient’s ability to participate in each test. For example, VFSS requires travel to the radiology suite, the ability to sit upright, and a body habitus that fits in the fluoroscopy machine. A FEES requires the patient to be able to tolerate an endoscope passed through the nose, which carries some risk of bleeding, as well as increased agitation if the patient is delirious.

There is a gradual rise in mobile dysphagia diagnostic testing units. This can be beneficial in rural homes or long-term care settings, where resources may be limited.

**MANAGEMENT OF OROPHARYNGEAL DYSPHAGIA: COMPENSATORY MECHANISMS AND REHABILITATION**

In the treatment of oropharyngeal dysphagia, a collaborative team approach consisting of a swallow therapist, a primary care provider, and a dietitian has proved beneficial in providing appropriate care for adults with dysphagia. The unified goal is to treat the underlying pathology, manage symptoms, and meet nutritional needs. In oropharyngeal dysphagia, 2 broad categories of therapeutic options can be pursued in the form of compensatory and rehabilitative interventions. Compensatory interventions aid in minimizing symptoms and adverse consequences of dysphagia; however, these interventions do not change swallowing physiology. Instead, rehabilitative measures involving concerted training are necessary to optimize the normal swallowing physiology.
With compensatory interventions, the patient and caregiver receive education related to modifying the amount and rate of feeding by promoting slow eating habits and mindful swallowing. Family members or caregivers can assist in this process by providing cues or assisting with the eating process. Maintaining oral care has also proved useful in reducing occurrences of fatal pneumonias. Patients and caregivers should consider implementing general aspiration precautions during mealtimes, including sitting upright and avoiding distraction while eating meals and postprandial aspiration precautions such as elevating the head of the bed at least 30° while resting. The swallow therapist may recommend common swallowing maneuvers, such as the effortful swallow and the Mendelson maneuver, to aid the swallowing mechanism. Patients can implement postural changes such as the chin tuck, which positions the chin near the chest to assist with swallow mechanics. Note that patients with moderate to severe dementia may have difficulty remembering to perform swallowing maneuvers or postural modifications.

Dietary modification is among the most widely used compensatory measure to aid in the treatment of dysphagia. The traditional classifications of modified diets are derived from the National Dysphagia Diet. Dysphagia options for solid foods are pureed, mechanically altered, advanced, and regular, and liquid consistency options are thin, nectar-thick, honey-thick, and pudding-thick. A newer classification system is derived from the International Dysphagia Diet Standardisation Initiative. It is a global standardized method of describing dysphagia diets that ranges from level 0 to level 7 (Table 2).

There may also be institutions implementing other dysphagia diet consistencies beyond what the National Dysphagia Diet and the International Dysphagia Diet Standardisation Initiative outline. Providers should understand that as the diet is modified, decreased acceptability may result from the altered taste, texture, and appearance. These changes in solid and liquid consistencies may lead to decreased adherence and malnutrition. Indeed, many studies have demonstrated a lower caloric intake resulting from modified diets. In a prospective study of 55 older adults (age >63 years), patients complying with a modified diet consumed fewer calories (3877 kJ vs 6115 kJ; \( P < .001 \)) and less protein (40 g vs 60 g; \( P < .003 \)). In a 2008 multicenter randomized clinical trial focused on patients with dementia, the act of drinking honey-thick liquids demonstrated an immediate positive effect in preventing fluid from entering the lungs (\( P < .001 \)) compared with consuming nectar-thick liquids. However, at 3-month follow-up, patients drinking honey-thick liquids had an increased incidence of pneumonia compared with those consuming nectar-thick or regular thin liquids with chin tuck posture.

In addition to dietary changes, the medical team may also consider a free water protocol. The free water protocols (including the Frazier Free Water Protocol as well as modifications) allow plain, unthickened water for patients with a predilection to aspirate. The patient must meet the swallow therapist’s specific criteria. A small 2016 study demonstrated no significant difference in the development of aspiration pneumonia in the comparison between a modified Frazier Free Water Protocol and a control group, even among hospitalized patients already

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<td><strong>National Dysphagia Diet</strong></td>
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<tr>
<td><strong>Food</strong></td>
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<td><strong>Advanced</strong></td>
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<td><strong>Mechanically altered</strong></td>
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<td><strong>Pureed</strong></td>
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<td><strong>Liquid</strong></td>
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<td><strong>Honey thick</strong></td>
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experiencing pulmonary compromise. A recent systematic review of the Frazier Free Water Protocol provided low-quality evidence to support that its use was not associated with increased lung complications. Indeed, the protocol improved swallow-related quality of life in patients using the protocol. Some clinicians argue against the use of free water protocols. Clinicians are urged to ensure that such protocols are not rigidly followed in lieu of good clinical judgment and consideration of possible risks for patients that may change day to day.

Rehabilitative efforts compose the second major method for managing dysphagia. Swallow therapists can perform strengthening and skills-based training in patients with dysphagia. The therapy helps optimize the oropharyngeal swallowing physiology and function, (ie, safety and efficiency) while lessening dysphagia severity. Swallowing rehabilitation approaches can vary widely.

Swallowing rehabilitation includes intensive, highly structured programs such as the McNeill Dysphagia Therapy Program, as well as individual clinician-designed treatment plans. Rehabilitation may involve a range of graded swallowing exercises (ie, tongue-hold, lingual strengthening) and/or therapeutic swallows of targeted consistencies. In 2019, a small trial focused on the McNeill Dysphagia Therapy Program found decreased dysphagia severity and improved oral intake compared with usual care in patients with stroke.

In a randomized trial of patients with postschismic stroke aged 55 to 65 years in an acute care hospital setting, patients received either usual care or a multimodal structured dysphagia management strategy that included caregiver education, swallowing compensatory training, and exercises. Program use resulted in improved cough, swallow reflex, and swallow time for participating patients.

ESOPHAGEAL DYSPHAGIA: DIAGNOSIS AND MANAGEMENT
The management of esophageal dysphagia depends on the underlying etiology and may involve interventions from a gastroenterologist. Sharing the decision-making process with the patient and his or her family before testing or intervention is vital. There are both conservative and procedure-based strategies. Providers should review medications that could cause pill esophagitis, xerostomia, and/or esophageal dysmotility. An esophagogastroduodenoscopy (EGD) serves as the mainstay in the diagnosis and management of esophageal dysphagia. However, the use of EGD must be cautiously considered in the older adult population due to an increased risk of aspiration. If aspiration is a concern (eg, a history of aspiration pneumonia), providers should consider the use of anesthesia with the EGD for airway protection. Alternatively, an esophagram offers a noninvasive alternative to the evaluation of esophageal dysphagia. However, it is important to consider that an esophagram serves as a diagnostic test whereas an EGD provides an opportunity for direct visualization and therapy (ie, esophageal dilation).

The management of esophageal dysphagia should be tailored to the underlying etiology, which is often structural in nature. Gastroesophageal reflux management is important in patients who present with dysphagia resulting from a Schatzki ring, esophagitis, or peptic stricture. Patients who undergo esophageal dilation should be assessed for therapeutic responses as well as need for repeated EGD. A detailed discussion on esophageal dysphagia is beyond the scope of this article.

ETHICAL CONCERNS
In dysphagia, upholding the ethical principles of beneficence, nonmaleficence, and autonomy can be challenging. The importance of eating in relationship to the quality of life varies among individuals. Decisions regarding dietary modification should be considered in relation to cultural and societal values/expectations. Autonomy is further complicated for patients diagnosed as having cognitive impairment, who may lack decision-making capacity. When considering restrictions of food and liquid to prevent harmful complications for
at-risk people, one must weigh these risks against the harm of depriving the patient of the pleasure of the sustenance of their choice.

Due to the overwhelming evidence, the American Geriatrics Society and the Choosing Wisely campaign of the American Board of Internal Medicine have provided evidence-based recommendations against the use of feeding tubes in patients with advanced dementia. Feeding tubes are associated with increased agitation, physical/chemical restraints, and pressure ulcers. A multidisciplinary collaborative discussion involving the patient, family, provider, and swallow therapist proves helpful in providing appropriate counseling and offering available options reflecting the patient’s wishes. Initiating early discussions will allow the patient and caregivers time to understand and make crucial decisions without being rushed to avoid feelings of guilt relating to the decision that is made.

TECHNOLOGY IN DYSPHAGIA
Regarding technological devices used in treating dysphagia, a Cochrane review in 2018 provided an assessment of a variety of stimulatory techniques in patients with acute and subacute stroke. These techniques include neuromuscular electrical stimulation (NMES), pharyngeal electrical stimulation (PES), physical stimulation, transcranial direct current stimulation, and transcranial magnetic stimulation. These swallowing therapies had no significant effect on functional outcomes (death, dependency, or disability). These techniques did not affect case fatality or penetration aspiration score. However, the review did suggest that the PES intervention reduced hospital LOS, and the presence of dysphagia was reduced with NMES, PES, physical stimulation, and transcranial direct current stimulation. There was reduced frequency of pulmonary infections with NMES and PES.

Other advances in treatment include devices designed to monitor biofeedback during swallowing therapy tasks, such as surface electromyography, tongue manometry, surface laryngeal manometry, pharyngeal manometry, respiratory plethysmography, and accelerometry. A 2019 systematic review focusing on a heterogeneous group of primary diagnoses (ie, stroke, Parkinson disease, traumatic brain injury) determined, with a high risk of bias, that treatments involving surface electromyography, accelerometry, tongue manometry, or biofeedback therapy may improve some physiologic factors of the swallow process. However, improvements in swallow function and reduced dependency on feeding tubes have not been established.

CONCLUSION
Dysphagia is a growing geriatric syndrome of increasing frequency. It affects morbidity, mortality, and hospital LOS. Herein, we discussed the importance of obtaining a good history and physical examination, as well as understanding management strategies of oropharyngeal and esophageal dysphagia in the older adult population. Patients may experience improvement by using multimodal, structured dysphagia therapy programs; however, tolerance for such therapies in frail, older adults or those diagnosed as having advanced dementia is questionable. Investing in further dysphagia research, especially randomized clinical trials, can result in significant potential for advancing the care options and quality of life for older adults.

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REFERENCES


