Dysphagia in the Older Patient

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KEYWORDS

• Geriatric • Dysphagia • Older • Presbyphagia • Management • Aging

KEY POINTS

- Dysphagia is an important health concern for elderly populations, intrinsically related to the physiology of aging.
- Dysphagia in the elderly can be misconstrued as a normal part of aging both by physicians and the patients themselves, hence, remaining undetected.
- Dysphagia requires a multidisciplinary approach with involvement of primary care physicians, geriatricians, otolaryngologists, neurologists, gastroenterologists, speech language pathologists, occupational therapists, and nutritionists.

INTRODUCTION

It is estimated that by the year 2050, people aged 65 years or older will account for 25% of the population in developed countries.[1,2] As an overall increase in longevity over the past 50 years is being reported, there is an imminent need to understand changes in physiology with aging and the unique challenges this population faces.[1,3] Dysphagia is an important health concern for elderly populations, intrinsically related to the physiology of aging. A cause of malnutrition, dehydration, aspiration pneumonia, and even asphyxiation, dysphagia affects 7% to 13% of those aged 65 years or older.[1] Particularly vulnerable to dysphagia are individuals afflicted with cognitive dementia or Parkinsonism or those residing in assisted-living facilities; up to 50% of the latter group experiences swallowing difficulties.[1] It is crucial to recognize that dysphagia significantly impacts quality of life, with social and psychological consequences.[4] Often times, dysphagia in the elderly can be misconstrued as a normal part aging both by physicians and the patients themselves, hence remaining undetected. Moreover, the workup of dysphagia can be difficult, as it requires a multidisciplinary approach with involvement of primary care physicians, geriatricians, otolaryngologists, neurologists, gastroenterologists, speech language pathologists, occupational therapists and nutritionists. With dire consequences and mortality, all elderly patients should be assessed for swallowing impairment. This article aims to

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arm the geriatrician and otolaryngologist with the necessary tools in the workup of dysphagia.

Changes in the Physiology of Swallowing with Aging

Dysphagia occurs to some extent in most older adults, usually beginning at 45 years of age.[3] This process, known as presbyphagia, is the result of multiple factors: age-related changes in head and neck anatomy as well as changes in the neural and physiologic mechanisms that control swallowing. Additionally, the prevalence of diseases increase with aging, and dysphagia is a common cofinding of many disease processes or their treatments.

The process of deglutition involves both voluntary and involuntary muscles. Controlled by 6 cranial nerves and about 40 bilaterally innervated muscles, which control the upper digestive tract, swallowing can be divided into 4 distinct phases. These include the oral preparatory, oral transport, pharyngeal, and esophageal phases. Several physiologic changes associated with aging impact these processes, including loss of muscle mass and function, decreased tissue elasticity, cervical spine changes, decreased saliva production, and reduced compensatory capacity of the brain.[2] Holistically, aging slows deglutition and *reduces its efficiency*.

The tongue is the driving force for the initiation of deglutition in normal individuals. The anterior tongue is mostly used for forming a food bolus and, thus, is composed of type II fast-twitch muscle fibers, whereas the posterior tongue is involved in involuntary movements such as propulsion of the food bolus; therefore, it is composed of type I slow-twitch fibers. As we age, *sarcopenia* causes the fibers of lingual musculature to decrease in size and strength.[2] Robbins and colleagues[5] in multiple studies, demonstrated increased lingual isometric pressures and decreased swallow pressures with aging. Additionally, they discovered that swallow pressure reserve and maximum lingual pressures decrease in older adults as compared with those younger than 60 years. They proposed *sarcopenia* as the reason for the impairment of pressure production. Given the role that the tongue plays in swallowing, this is likely one of the important factors that contribute to the increased prevalence of dysphagia in older persons. Tongue strengthening exercises, such as tongue pressing effortful swallow developed by Park and colleagues,[6] have been shown to help healthy older adults increase their maximum tongue pressure, alleviating dysphagia.

Pharyngeal phase changes typically manifest as a delay in initiation of the pharyngeal phase and a delay in laryngeal vestibule closure. These delays put the elderly at a higher risk for aspiration and its consequences. Also contributing to the increased aspiration risk is deterioration of the pharyngoglottal closure reflex. In healthy individuals, this reflex induces adduction of the vocal folds, thereby preventing aspiration if premature spillage of oral content occurs. In individuals with presbyphagia, this reflex is impaired.[7]

In typical elderly individuals, the prevalence of aspiration and penetration remains to be elucidated, as there are conflicting reports, ranging from 0% to 15%.[7] A well-known risk factor is pooling in the pyriform sinuses and resultant overflow into the laryngeal vestibule.

Upper esophageal sphincter (UES) dysfunction can also contribute to postwallow residues. Indeed, esophageal manometry studies on healthy individuals older than 40 years show increased esophageal stiffness and reduced primary and secondary peristaltic pressures.[8] Additionally, Logemann and colleagues[9] demonstrated that younger adults are able to continue the anterior motion of the hyoid bone and move

it by 8 mm more once the UES opens, whereas older adults can move the hyoid just enough to open the UES. These differences in hyoid anterior movement indicate the *functional reserve* present in given individuals. Reserve is necessary to assist in recovery when muscle strength is lost.

Contributing Factors

Xerostomia is a common finding in older adults. Although functional salivary production does not seem to change throughout the age spectrum, the elderly have been shown to be very susceptible to the drying effects of certain medications.[10] These medications include but are not limited to anticholinergics, antihypertensives, antiparkinsonian agents, psychotropics, and diuretics. Certain diseases or treatments, such as diabetes mellitus, scleroderma, and radiation, can also result in xerostomia, which can hinder flow of the food bolus and thereby causes its retention in the upper digestive tract.

Other key causes of dysphagia are neurologic and neuromuscular disorders. Stroke, Alzheimer disease, dementia, and Parkinson disease have all been correlated with dysphagia.

Stroke is a prevalent cause of dysphagia with 30% to 65% of the patients experiencing swallowing problems.[11] Poststroke dysphagia can lead to pneumonia, malnutrition, dehydration, and increased length of hospitalization. About 25% of patients with stroke die of aspiration-related complications, such as pneumonia, within 1 year.[12] Dementia has also been linked with dysphagia. Up to 45% of patients with dementia experience swallowing difficulty; therefore, they are susceptible to malnutrition.[13]

ASSESSMENT

History Taking

Early detection is key in order to prevent complications. A detailed history is crucial in evaluating apatients with suspected dysphagia. This history includes inquiring about the consistency, progression, and timing of the dysphagia. Validated questionnaires, such as the 10-Item Eating Assessment Tool, can aid in screening.[14]

It can be difficult to diagnose elderly patients with dysphagia, as it can often be misconstrued as a normal artifact of aging and older patients and families may dismiss it as expected. One of the initial complaints indicating dysphagia can be a feeling of food getting stuck in the throat. They may point to the neck or chest as the area of the food getting stuck. It has been noted that when patients point to the chest as the site of obstruction, they localize the site of the obstruction, whereas patients pointing to the lower neck may have obstruction in the hypopharynx or the lower esophagus.[15] This differentiation may aid in the decision-making during further workup. Other symptoms of dysphagia include unintentional weight loss, coughing while eating, having to wash down food with liquids, increased time needed to be able to complete meals, and increased mucus in the throat. History taking needs to include a thorough understanding of the number of meals eaten during a day, with a detailed description of consistencies of the food eaten, whether aspiration with liquids or solid food occurs, the amount of water and caffeine intake, and weight changes. Social isolation should be questioned as well as how long it takes to finish a meal, the eating environment, and help with preparing meals. Recent pneumonia should be questioned, and a detailed history should be obtained of any recent hospitalizations.

Zenker diverticulum can present with solid food dysphagia. Patients' symptoms of this condition include undigested food regurgitation, borborygmi, nocturnal or

postprandial coughing, and halitosis. These patients are at higher risk of aspiration, malnutrition, and dehydration. Cricopharyngeal muscle (CP) dysfunction, which often coexists with Zenker, can also exist alone and can present with dysphagia (mostly to solid food), aspiration, and weight loss.

Patients with head and neck cancer; those afflicted with neurologic disorders, such as Parkinson disease; and patients who have undergone prior surgeries are all at risk for dysphagia.

Physical Examination

A thorough physical examination should be performed with special attention to neurologic, mental, and respiratory systems. If upper aerodigestive system disorders are suspected, it would be appropriate to obtain an otolaryngology consultation to obtain an endoscopic examination of the larynx and pharynx. Flexible laryngoscopy can reveal important findings, such as pooling in the vallecula, vocal fold immobility, laryngeal or hypopharyngeal masses, or incomplete glottis closure. The authors noted that more than 50% of the patients presenting with dysphagia have a positive finding on laryngoscopy ranging from pooling in the pyriform sinuses to glottic gap to vocal fold paralysis.[16]

DIAGNOSTIC TESTING

A good history will generally determine the appropriate testing and further management. Certain complaints can lead to more targeted testing and evaluation. For example, patients pointing to food getting stuck in the midchest will require a gastroenterology consultation and likely an esophagoscopy. Patients complaining of potential aspiration should be evaluated by an otolaryngologist with a swallow study.

Videofluoroscopic Swallowing Study

The videofluoroscopic swallowing study (VFSS), also known as a modified barium study, is the only study that assesses all 4 phases of swallowing. It demonstrates oral and pharyngeal motility problems, ascertains presence of aspiration or penetration, assesses swallow speed, and evaluates postural changes and their effect on aspiration/penetration. This study remains as the *mainstay* of diagnosis and evaluation in patients with dysphagia and is also useful in determining the type of rehabilitative strategies and therapy. **Fig. 1** shows a VFSS revealing a cricopharyngeal bar, which can be a sign of CP spasm. It should be noted that patients without dysphagia can show a CP bar on a VFSS, and the finding itself is not an indication for surgery.

Flexible Endoscopic Evaluation of Swallowing

The flexible endoscopic evaluation of swallowing method uses a flexible laryngoscope to visualize the laryngopharynx as patients are asked to eat different consistencies of food with food coloring. One of its main advantages is that it can be performed bedside, which is especially useful in hospitalized patients. Additionally, there is no exposure to radiation. However, this method is limited in the assessment of the oral and esophageal phases and is limited in assessing pharyngeal contraction. It is very useful in assessing the presence of penetration, aspiration, residue in the vallecula and pyriform sinuses, and premature spillage onto the laryngeal vestibule.

Fig. 1. The arrow points to a cricopharyngeal bar.

Esophagogram

If the cause of dysphagia seems esophageal rather than oropharyngeal in nature, esophageal function should be evaluated. This evaluation can be done through several methods, including an esophagram, which should be considered a first-line measure. This can elucidate pathology, such as webs, strictures, and ulcers. In patients with a suspected Zenker diverticulum or CP spasm, ideally a VFSS with follow-through esophagogram should be obtained.

Pharyngeal and Esophageal Manometry

Upper and lower esophageal sphincter function, pharyngeal strength and contraction duration, completeness of UES relaxation, and the coordination of pharyngeal contractions and UES relaxation can be assessed.

TREATMENT

The main purpose of dysphagia management is the prevention of aspiration and malnutrition as well as its consequences. Once safe swallowing is obtained, the ensuing aim is to improve quality of life. A multidisciplinary approach should be employed, including nurses, dietitians, speech and language pathologists, primary care physicians, neurologists, gastroenterologists, and otolaryngologists. The mainstay of management is rehabilitative and consists of swallowing therapy and diet modifications.[16]

Surgical Management

Cricopharyngeal spasm and Zenker diverticulum (**Figs. 2** and **3**) are mainly diseases of the older patients and are amenable to surgical management. Additionally, there

Fig. 2. Videofluoroscopic finding of Zenker diverticulum.

are numerous surgical procedures described for the management of chronic, intractable aspiration, which is beyond the scope of this article. The selection of the surgical candidate in CP spasm and Zenker diverticulum remains elusive, and there are no accepted guidelines for the management of these patients. Each patient is assessed individually, with factors such as weight loss and risk of aspiration pneumonia driving the decision-making. These disorders significantly affect quality of life, as patients need to significantly alter the consistencies of the food they eat, commonly cough all day because of persistent mucus in the hypopharynx, and have poor sleep quality due to continued coughing at night with the secretions

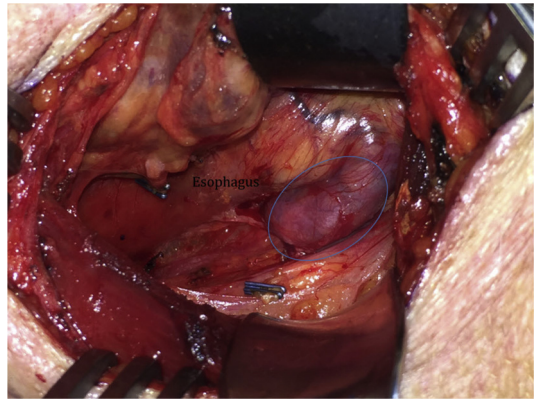

Fig. 3. The surgical findings of the patient during open resection (*diverticulum circled*).

retained in the pyriform sinuses or Zenker pouch, spilling into the laryngeal vestibule. Medical comorbidities of patients are also taken into consideration, as perioperative risk stratification can alter the type of treatment offered. In patients who are not good surgical candidates because of medical comorbidities, less invasive options can be proposed, which include placement of a feeding tube. Furthermore, there is significant proliferation of office-based procedures with minimal sedation or no sedation within otolaryngology. Transnasal esophagoscopy is now used by most otolaryngologists and enables diagnostic esophagoscopy, esophageal dilatation, biopsies, and injections to be performed on nonsedated patients in the clinic. Similarly, botulinum toxin injection for CP spasm can be performed with electromyography guidance in the clinic in patients who are at high risk for complications under general anesthesia.

In a recent systematic review in which the authors evaluated the success and complication rates of UES dilatation, botulinum toxin injection into the CP muscle (**Fig. 4**), and CP myotomy for patients with CP spasm, they demonstrated comparable complication rates but increased success as the invasiveness of the procedure increases. Thus, myotomy was noted to show significantly better outcomes. When open versus endoscopic myotomy was compared, it was noted that endoscopic myotomy had better results with less complications. Hence, patients with suspected CP dysfunction would benefit from an otolaryngology consultation to enable discussion of surgical options. Although patients with idiopathic CP spasm generally respond better to treatment, CP dysfunction due to stroke and head and neck radiation can also benefit from surgical intervention and should be evaluated.[17]

Multiple surgical techniques exist for the management of Zenker diverticulum that can broadly be classified into open versus endoscopic procedures. As discussed earlier, there are no accepted guidelines; the treatment method depends on the surgeon's preferences as well as the anatomy of patients, comorbidities, the size of the diverticulum, and symptoms. Surgical treatment options range from botulinum toxin injections and CP dilatation or myotomy to endoscopic-assisted stapling of the diverticulum (**Fig. 5**), laser-assisted myotomy, and open diverticulectomy.

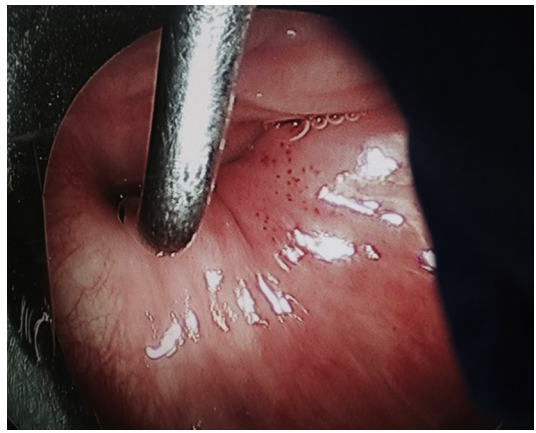

Fig. 4. CP during endoscopic surgery with laryngeal needle inserted for botulinum toxin injection.

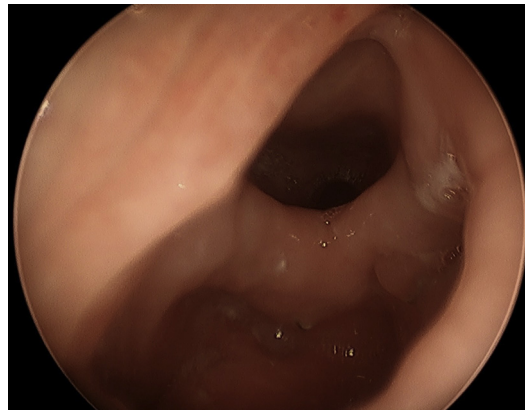

Fig. 5. Endoscopic view of Zenker diverticulum.

Nonsurgical Management

Swallowing therapy is the mainstay of dysphagia management. Swallowing rehabilitation aims to improve physiology through exercises. These exercises aim to minimize or prevent dysphagia-related morbidities and improve impaired swallowing physiology. The most commonly used strategies are postural adjustments, swallowing maneuvers, and dietary modifications. Swallow studies are used to assess the effectiveness of proposed maneuvers and are also used to provide patients with feedback on the effectiveness of the therapy.

Enteral Feeding

Placing a percutaneous endoscopic gastrostomy (PEG) tube is a difficult decision when caring for patients with dysphagia, especially if they lack decision-making capacity. However, use of PEG tubes is expanding; its indications include neurologic and psychiatric disorders, malnutrition, as well as prolonged illness. Patients with head and neck cancer often require PEG to prevent malnutrition.

Approximately 30% of PEG tubes are placed in patients with dementia, whereas 10% of institutionalized elderly patients are PEG tube fed. It is very important to note that PEG placement does not necessarily prevent aspiration pneumonia nor does it reduce the risk of pressure sores or improve survival and function.[18] Other research has confirmed that nutritional markers, such as albumin, do not change with PEG placement.[19] Mortality among tube-fed patients is not insignificant, with patients with dementia having the worst prognosis. Therefore, decisions to place a PEG tube should always be individualized and an interdisciplinary team approach should be used.

SUMMARY

Dysphagia in the older adult is a challenging problem and necessitates a team approach. The key to effective management is recognition. Patients tend to dismiss their symptoms as normal aging; therefore, early diagnosis depends on the diligence of the primary care doctors. No diagnostic technique can replace the benefits of a thorough history, with a detailed understanding of nutritional status and aspiration risk. Although one of the main goals in management is to ensure safe swallowing, the impact of a nonoral diet on the quality of life of patients should not be underestimated; all other treatment options should be exhausted before PEG placement.

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