Integrated management of dysphagia and malnutrition

Oropharyngeal dysphagia is a common consequence of medical conditions such as stroke and progressive neurodegenerative diseases. It is commonly associated with malnutrition, dehydration, and aspiration pneumonia, and can cause early death. A Nestlé Nutrition Institute Satellite Symposium was held in conjunction with the 7th European Union of Geriatric Medicine Society (EUGMS) Congress. Experts discussed the practicalities of integrating nutrition into geriatric care, with a particular focus on the pathophysiologic mechanisms leading to dysphagia, and the evidence-based methods and instruments for screening, identifying and treating this condition.

Oropharyngeal dysphagia: A growing concern in healthcare

Dysphagia is defined as any difficulty with swallowing solids or liquids. At-risk populations include older adults and patients who have had an acute stroke (65–81%),\(^1\) hospitalized patients (30%),\(^7\) individuals in nursing homes (75%),\(^8\) and individuals with progressive neurological conditions such as Parkinson’s disease (20–40%)\(^5\) and multiple sclerosis (30%).\(^10\) Dysphagia is also increasingly recognized as a risk factor in children with unexplained respiratory symptoms.

Dysphagia negatively impacts quality of life and increases mortality

Serious complications commonly occur in individuals with dysphagia including malnutrition, weight loss, dehydration, aspiration, pneumonia and death. Dysphagia negatively impacts quality of life and causes significant morbidity, mortality, and costs. In the US, 6 to 10 million individuals are evaluated each year for dysphagia,\(^7\) with over 900,000 fluoroscopic swallow studies performed annually.\(^11\) Dysphagia among at risk individuals increases the length of hospital stay by an average of 1.64 days, at an annual cost of $US547 million.\(^12\) It is also associated with a significantly increased risk of mortality in hospitalized patients. In the US, there were 271,983 hospitalizations for dysphagia in 2005–2006, the adjusted mortality rate in these patients was 13.7 (p<0.001 vs non-dysphagic patients).\(^12\)

“A dysphagia represents a significant healthcare burden”

Elderly patients are most affected by dysphagia

Dysphagia commonly occurs in older individuals as result of aging or other health problems. Epidemiologic studies suggest that it may occur in up to 22% of adults aged 50 years and above.\(^6\) Physiological changes associated with advancing age, independent of other variables, compromise swallow function.

Radiological evaluation (videofluoroscopy) is the gold standard method for diagnosing and evaluating the pathophysiology of this condition. At the University of California-Davis Medical School, fluoroscopic swallow studies are performed on several hundred patients per year. Subjective observations (eg, aspiration and penetration) and objective timing and displacement measures are routinely conducted. Administration of a 20cc liquid bolus in elderly individuals, prolonged transit times by at least 25 to 30%, the effects of which are often more pronounced in those with chronic medical conditions (ie, hypertension, diabetes). The upper esophageal opening is reduced by 12 to 18%, and cricopharyngeal bars are identified in 30% of patients. At rest, the pharynx is larger and longer and the posterior pharyngeal wall is thinner. These findings imply that in the elderly, the airway is at greater risk of dysphagia due to prolonged transit times and possibly altered sensation. Any pharyngeal residue not cleared during swallowing represents a potential threat to the airway. As a consequence, the work of swallowing is increased and some bolus materials may be especially difficult to swallow. The elderly also have fewer reserves in the presence of comorbid conditions affecting swallowing function.

Dysphagia is a modifiable condition

The first step in the treatment of swallowing disorders is to identify individuals with symptoms. Validated dysphagia screening methods are available to identify patients with symptoms early, allowing initiation of treatment and avoiding the negative consequences associated with this condition.

A number of strategies can be initiated to:

- Protect the airway and optimize bolus control with modified textures
- Ensure that fluid and nutrition intakes are adequate
- Reduce embarrassment and/or anxiety during mealtimes due to swallowing problems
- Maximize the pleasures associated with eating
- Help prevent clinical complications and early mortality associated with dysphagia.

In summary, dysphagia represents a significant healthcare burden, and is particularly common in the elderly. Typical changes associated with aging may also compromise swallow function. These changes are exacerbated by underlying medical conditions and circumstances commonly occurring in the elderly. Specific strategies may help to prevent clinical complications and reduce dysphagia-related mortality.
Pathophysiology, relevance, and natural history of oropharyngeal dysphagia among the elderly

**Elderly are at greater risk of dysphagia**

The risk of oropharyngeal dysphagia increases with age. At present, nearly 40% of Americans aged over 60 years experience dysphagia.1 The loss of swallowing function can have severe health implications including dehydration, malnutrition, and respiratory complications (eg, pneumonia), as well as an increased need for care provision and reduced quality of life.

**Age-related changes affect normal swallowing function**

In older adults, age-related changes place them at risk for dysphagia. In healthy elderly individuals, changes in head and neck anatomy as well as physiological and neural mechanisms underpinning swallowing function (eg, sarcopenia, sensory impairments) can place individuals at risk for dysphagia (Figure 1).1 There are reports in the literature on sarcopenia-like changes in muscles of the upper aerodigestive tract and the observed age-related changes in strength and function, which suggest pervasive changes in lingual muscle composition.6-7 Healthy older individuals have a reduced maximum tongue strength but they can still generate normal tongue pressures during swallowing.4 However, they may need to work harder to produce adequate swallowing pressures, and this may have an impact on bolus flow outcomes and place the elderly at greater risk for dysphagia.4

Sensory discrimination thresholds in the oral cavity and laryngopharynx increase with age. The disruption of sensory-cortical motor feedback loops may interfere with proper bolus formation and the timely response of the swallowing motor sequence.5 The healthy older swallow is slow: oral transit times are slightly but significantly longer in older adults (0.5–0.6 seconds; p=0.01) compared with younger individuals.1,4 Pharyngeal delay times are also slightly but significantly longer in older adults (0.5–0.6 seconds). Pharyngeal wall contraction is inconsistently found to be slower. The initiation of laryngeal and pharyngeal events, including laryngeal vestibule closure, is delayed. Airway penetration also occurs more frequently in older individuals.2

**A number of factors precipitate dysphagia**

The presence of different stressors such as an acute illness and certain medications can result in the transition from a healthy swallow to dysphagia. Dysphagia in the elderly can be precipitated by:1

- Neurologic diseases (eg, stroke, Alzheimer’s disease and Parkinson’s disease) or problems involving the head and neck that can directly damage the muscles involved in swallowing
- Combinations of several co-morbidities such as chronic obstructive pulmonary disease, congestive heart failure, an immunocompromised status, and/or cachexia
- Medications which diminish saliva production, cause dryness, make bolus flow difficult, and cause residue retention along the swallowing tract. The drying effects of medications are more pronounced in older adults, as humans have fewer saliva-producing acinar cells as they age.

**Dysphagia can be effectively managed**

The optimal intervention for elderly individuals with dysphagia is compensatory, rehabilitative or a combination of both. Dysphagia specialists use videofluoroscopy of an individual swallowing to identify issues, and suggest proper interventions based on the following observations:

- Bolus formation and positioning of the tongue
- Bolus propulsion by the tongue
- Timing of the swallow (normal vs delayed)
- Airway penetration (impaired swallowing safety)
- Retention of food along the swallowing tract (presence of residue)
- Bolus types that create problems (and modifications necessary for a safe swallow)
Swallow rehabilitation is based on a number of principles. The oropharyngeal musculature predominantly involves Type II muscle fibers. These muscle fibers deliver strength rather than endurance, and therefore fatigue rather easily compared with Type I fibers. Like any muscle, the lingual and oropharyngeal musculature will atrophy when not used. However, atrophy is reversible with exercise of the oropharyngeal musculature.10,11

“Transitioning dysphagia rehabilitation from a face-to-face program to a telemedicine program offers numerous advantages”

‘Telemedicine’ rehabilitation programs are making use of the internet to enable dysphagia specialists in swallow rehabilitation centers to provide guided therapy to patients in their homes. These programs improve the follow-up care of patients once they are discharged from acute care settings, avoiding or reducing potential readmissions when their condition is not managed. Telemedicine programs effectively increase the number of patients a dysphagia specialist can treat on an hourly basis, and reduce the cost of standard rehabilitation therapy by 50%.

Table 1. Recommended screening tools for malnutrition.4,6

- ESPEN recommendations:6,5
  - Community MUST (Malnutrition Universal Screening Tool)
  - Hospital NRS-2002 (Nutrition Risk Screening)
  - Frail elderly MNA® (Mini Nutritional Assessment)
- ASPEN recommendations:6,5
  - SGA (Subjective Global Assessment)

While more than 70 nutrition screening methods have been published, scientific societies recommend the use of four specific methods, including the Mini Nutritional Assessment (MNA®).4,5 The MNA® is a highly sensitive and specific method to screen for malnutrition in the elderly. It is easy to perform, and the results are associated with worsening of health, mortality, hospital stay and cost of hospitalization, social activity and general practitioner visits.7

EAT-10: A validated screening tool for dysphagia

While many dysphagia screening methods have been published, these methods generally require trained personnel, take time to perform and have low sensitivity. Most screening tools for detecting malnutrition consider body mass index, changes in weight over time, a decrease in food intake, and the impact of the disease/condition on nutritional status. In choosing a good screening method, it is important to consider the sensitivity and specificity, and the ease of use.7 Scientific societies recommend the use of specific nutritional screening tools based on the care setting (Table 1).

References
the EAT-10 is:
- A useful self-administered test of 10 items
- Easy to understand for the majority (95.4%) of patients
- An analogical and direct-scored test, that is quick to perform (mean administration time of <4 minutes)
- Useful for identifying patients at risk of dysphagia, with a clear cut-off level (a score of ≥3 is abnormal).

The need for systematic screening of malnutrition and dysphagia among the elderly is justified, in order to prevent the occurrence of pneumonia in this population. Together, early screening and targeted in-depth assessments allow the multidisciplinary team to better plan a nutritional intervention for elderly patients with dysphagia. In Spain, there is a standardized protocol for early screening and management of dysphagia among at-risk patients (Figure 2). A multidisciplinary team will identify dysphagia risk with the EAT-10 screening tool, conduct clinical assessment and instrumental diagnostic tests for dysphagia as needed, and evaluate nutritional and hydration status before providing the necessary nutritional intervention and follow-up.

Nutritional intervention is recommended in elderly with dysphagia
The European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines support nutritional intervention in elderly individuals with malnutrition and dysphagia, with Grade A recommendations. The objectives of nutritional intervention in dysphagia are to:

1. Determine the most safe and effective route to feed the patient (oral vs alternative routes)
2. Determine the most appropriate consistency and texture of both solids and liquids. The highest degree of evidence available today suggests dietary modification is effective in reducing the risk of aspiration pneumonia. Several National Descriptors for texture modification have been developed, proposing definitions of solid food textures and thickened liquid consistencies
3. Ensure that patients meet their nutritional requirements (for energy, protein, and fluids)
4. Monitor the outcome and re-evaluate at regular periods.

"High level of evidence supports nutritional intervention in elderly patients who are malnourished or those who have dysphagia”

Nutritional intervention is an integral part of dysphagia management. In Spain, a multidisciplinary team links dysphagia and malnutrition screening with a protocol of action. If oral intake is appropriate, elderly individuals in particular, may benefit from: a balanced and modified-consistency diet; a fractioned diet; pureed food items, and thickened liquids and gelified beverages. Commercially-available pureed foods enable provision of nutrient-dense meal items, with exact nutritional content, homogeneous texture, and microbiologic safety. An adapted mealtime schedule with 5 small meals spread
Nutritional supplementation is indicated in patients with safe swallowing, when the oral diet does not meet the nutritional requirements. Tube feeding is indicated in patients with absolute dysphagia or for those patients who fail to meet their nutritional or fluid requirements with a supplemented oral diet (Figure 3). It is very important to plan the feeding route and schedule. Intragastric feeding (via either nasogastric (NG) or percutaneous endoscopic gastrostomy (PEG) delivery method) with shots of small volume and postural treatment seems to be a better choice. Jejunal infusion is reserved for patients who are intolerant to intragastric tube feeding.

For relative dysphagia, an evaluation of nutritional and hydration status is needed. Nutritional requirements will be covered by dietetic modification of texture, and liquid requirements will be covered by use of thickeners or gelified beverages. If oral diet is insufficient in either nutrient or fluid intakes, partial or complete use of tube feeding is needed (Figure 3).

Dysphagia and malnutrition are highly prevalent conditions for which validated screening methods exist. There is a need to connect screening methods to comprehensive patient management protocols for in-depth assessment, treatment interventions, and follow-up care. The early use of validated and easy to perform screening methods will enable initiation of nutritional intervention that improves clinical outcomes of malnourished patients and reduces costs associated with the condition, such as decreasing hospital stay by at least 2 days on average and reducing readmissions by 28%.

References