Identifying Vulnerable Patients: Role of the EAT-10 and the Multidisciplinary Team for Early Intervention and Comprehensive Dysphagia Care

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Abstract

There is underdiagnosis and low awareness of dysphagia despite that the condition is modifiable and poorly managed symptoms diminish psychological well-being and overall quality of life. Frontline clinicians are in a unique position to be alert to the high prevalence of swallowing difficulty among elderly, evaluate and identify those who need intervention, and assure that individuals receive appropriate care. Proper diagnosis and treatment of oral-pharyngeal dysphagia involves a multidisciplinary healthcare team effort and starts with systematic screening of at-risk patients. The presence of a medical condition such as acute stroke, head and neck cancer, head trauma, Alzheimer’s disease, Parkinson’s disease, pneumonia or bronchitis is adequate basis for predicting high risk. Systematic screening of dysphagia and resulting malnutrition among at-risk older adults is justified in an effort to avoid pneumonia and is recommended by clinical practice guidelines. Systematic screening with a validated method (e.g. the 10-item Eating Assessment Tool, EAT-10) as part of a comprehensive care protocol enables multidisciplinary teams to more effectively manage the condition, reduce the economic and societal burden, and improve patient quality of life. In fact, care settings with a systematic dysphagia screening program attain significantly better patient outcomes including reduced cases of pneumonia (by 55%) and reduced hospital length of stay.

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Introduction

Frontline clinicians are in a unique position to be alert to the high prevalence of swallowing difficulty among elderly, evaluate and identify those who need
intervention, and assure that individuals are appropriately treated [1]. While the condition is modifiable, too often there is a lack of diagnosis and early management of dysphagia [2]. Proper diagnosis and treatment of oral-pharyngeal dysphagia involves a multidisciplinary healthcare team effort and starts with systematic screening of at-risk patients.

**Individuals with Dysphagia Suffer Symptoms That Diminish Quality of Life**

Dysphagia is a symptom, the perception that there is an impediment to the normal passage of swallowed material [4].

Results of a landmark pan-European survey from 1999 characterize the impact dysphagia has on eating pattern, psychological well-being and overall quality of life in older adults. Individuals included in the survey were selected based on known symptoms of dysphagia. A total of 360 people cared for in nursing homes and hospitals in Germany, France, Spain and the UK were interviewed using a 28-item questionnaire [2]. Qualitative interviews with a total of 28 healthcare professionals were conducted in parallel. Sixty-seven percent of respondents had underlying medical conditions as a source of dysphagia, including stroke, Parkinson's disease, Alzheimer's disease, multiple sclerosis and head and neck injuries [2]. More than half of the individuals were between 60 and 79 years of age, i.e. the age range during which a good quality of life can still be expected [2].

In the people interviewed, a few specific symptoms were common, related to eating/drinking being painful, stressful, burdensome, and no longer pleasurable. Namely, 55% experienced ‘food sticking in the throat or choking on food’, and almost as many (46%) suffered from ‘persistent cough or sore throat’ related to an inability to swallow liquids [2]. The ‘inability to swallow liquids’ and ‘loss of appetite’ were reported by nearly 40%.

Over 50% of the individuals with known symptoms of dysphagia indicated that they ate less due to their dysphagia symptoms, while 44% reported weight loss over the previous 12 months [2]. One third of patients reported being hungry and thirsty even after their meal [2]. Dysphagia is now known to be one of the identifiable and treatable causes of malnutrition and/or dehydration. Accordingly, clinical practice guidelines of premier associations recommend early identification of dysphagia as well as malnutrition and dehydration risk, and appropriate interventions [5–11].

While eating and drinking are normally social and pleasurable experiences, 55% of respondents reported that swallowing problems ‘made life less enjoyable’ [2]. The added ‘embarrassment’ and ‘anxiety or panic during mealtimes’, experienced by 37 and 41%, respectively, of patients because of swallowing difficulties, can lead patients to ‘avoid eating with others’, which was reported by 36% of respondents [2]. All of these psychological factors may lead to reduced
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fluid and nutritional intakes, and increased risk of malnutrition and dehydration. Clearly, individuals with unmanaged dysphagia suffer a loss of the pleasure of eating.

Collectively, this study suggests a correlation between dysphagia and reduced social and psychological health. Hence, reduced quality of life is a potential consequence of poorly managed dysphagia.

Systematic Screening of At-Risk Patients Is Justified for the Early Management of Dysphagia

The pan-European study results also reveal underdiagnosis and low awareness of dysphagia, despite the high prevalence and negative impact of swallowing problems. Only 40% of the individuals with dysphagia in formal care settings included in this survey acknowledged receiving a confirmed diagnosis of dysphagia [2]. Two thirds received no treatment despite there being options available, such as changing food consistency, specifically designed nutritional products, adaptation of eating position and swallowing exercises [2]. If not asked by health care professionals about swallowing difficulties, less than half would mention their symptoms [2].

More recent evidence suggests a lack of formal dysphagia screening protocols being used, even among poststroke patients, in which advantages of systematic screening and early intervention with modified liquids and foods have been repeatedly demonstrated (as summarized in table 1). A prospective study of 15 US acute care hospitals found that only 40% of the care settings have a systematic screening program in place [12]. Among the broader at-risk population, researchers estimate that only 25% of individuals in an institutional care setting who have dysphagia are diagnosed with the disorder [13].

In care settings with a systematic dysphagia screening program, significantly better patient outcomes were observed including: reduced cases of pneumonia (by 55%) and reduced hospital length of stay [12]. Associated with these outcomes is the potential to reduce costs and the risk of early mortality common among those who develop pneumonia [12]. Based on the substantial benefits possible, clinical practice guidelines of premier associations recommend dysphagia screening among at-risk patients (as summarized in table 2). For example, the American College of Chest Physicians (ACCP) clinical practice guidelines recommend oral-pharyngeal swallowing evaluation for:

- ‘Patients who are at high risk for aspiration (that might be silent) having conditions including: Cerebrovascular disease (stroke), Head & neck cancer; Head trauma; Parkinson’s disease, Alzheimer’s disease’ (grade of recommendation B) [5].
- ‘Patients with cough that is related to pneumonia and bronchitis’ (grade of recommendation B) [5].
Table 1. Clinical study evidence summary: improved patient outcomes achieved with systematic screening and early intervention for dysphagia

<table>
<thead>
<tr>
<th>Study population</th>
<th>Age</th>
<th>Intervention</th>
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<tbody>
<tr>
<td>Poststroke patients</td>
<td>Intervention: 69.8 ± 12.5 years</td>
<td>Individuals were systematically screened and received intervention under the direction of the speech language pathologist including:</td>
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<tr>
<td></td>
<td>Control: 71.4 ± 12.7 years</td>
<td>• Swallowing interventions were based on the findings of the clinical examination and VFSS, administered at baseline and at follow-up if necessary</td>
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<tr>
<td></td>
<td></td>
<td>• Direct swallowing exercises</td>
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<tr>
<td></td>
<td></td>
<td>Examples: effortful swallowing and supraglottic swallow technique</td>
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<tr>
<td></td>
<td></td>
<td>• Duration: every working day for a month or daily for the duration of the hospital stay (if less than a month)</td>
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<tr>
<td></td>
<td></td>
<td>• Appropriate dietary modification</td>
</tr>
<tr>
<td>Poststroke patients</td>
<td>75.2 ± 1.5 years</td>
<td>Individuals were systematically screened and received intervention with modified liquids and foods as appropriate</td>
</tr>
<tr>
<td>Poststroke patients</td>
<td>NA</td>
<td>Individuals were systematically screened and received intervention from a multidisciplinary team including:</td>
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<tr>
<td></td>
<td></td>
<td>• Swallowing interventions were based on the findings of the clinical examination and endoscopy</td>
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<tr>
<td></td>
<td></td>
<td>• Individualized therapy program</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Appropriate dietary modification</td>
</tr>
<tr>
<td>Patients with neurogenic</td>
<td>Intervention:</td>
<td>Individuals were systematically screened and received intervention from a multidisciplinary team including:</td>
</tr>
<tr>
<td>conditions</td>
<td>49.3 years (range = 22–86 years)</td>
<td>• Swallowing interventions were based on the findings of the clinical examination and VFSS</td>
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<tr>
<td></td>
<td>Control: 46.1 years (range = 22–77 years)</td>
<td>• Swallow therapy included oromotor exercises, thermal stimulation, etc.</td>
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<td></td>
<td></td>
<td>Example: supraglottic swallow technique</td>
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<tr>
<td></td>
<td></td>
<td>• Appropriate dietary modification</td>
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</tbody>
</table>

VFSS = Videofluoroscopic swallow study; NA = not available.
**Control** | **Duration and follow-up** | **Outcomes** | **p value** | **Reference**
--- | --- | --- | --- | ---
Individuals received conventional care under the direction of the attending physician including:  
- Physicians referred patients to the speech pathology service if deemed appropriate  
- Treatment, if offered, consisted mainly of precautions for safe swallowing during daily meals and snacks:  
  1. Feeding supervision  
  2. Positioning during feeding  
  3. Slowed rate of feeding  
- Swallowing function is assessed by VFSS if prescribed by the attending physician (applied to 27% of patients) | 6-month follow-up | Systematic screening and early intervention with a comprehensive program of direct swallowing exercises and appropriate dietary modification:  
- Increased proportion of stroke patients who recovered swallowing  
- Increased proportion of stroke patients who returned to a normal diet  
- Decreased proportion of patients who had a clinical complication (46 vs. 63% for usual care, relative risk 0.73)  
- Decreased proportion of patients who developed pneumonia (26 vs. 47% for usual care, relative risk 0.56) | | 

No systematic screening and early intervention program in place | duration of hospitalization | Incidence of aspiration pneumonia among post-stroke patients was reduced from 6.7% to 0% in year 2 (100% relative risk reduction) | NA | 27
Potential to realize marginal cost savings | NA | 29

No systematic screening and early intervention program in place | 90-day follow-up | Reduce mortality (7.4 vs. 4.2%) | NA | 30
Reduce incidence of pneumonia (9.0 vs. 2.8%) | <0.05
Cost savings on antibiotics (50% savings) | NA

No systematic screening and early intervention program in place | Intervention: 31.9 days (range = 3–130 days)  
Control: 41.1 days (range = 4–45 days) | Improve nutrient intakes (miss daily caloric goals by only 97 vs. 488.5 kcal) | 0.05 | 3
Avoid weight loss (mean weight gain of 1.41 kg vs. mean weight loss of 2.8 kg) | 0.02
Table 2. List of clinical practice guidelines from premier associations that recommend dysphagia screening among at-risk patients

<table>
<thead>
<tr>
<th>Title</th>
<th>Body</th>
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<tbody>
<tr>
<td>Cough and aspiration of food and liquids due to oral-pharyngeal dysphagia: ACCP evidence-based clinical practice guidelines</td>
<td>ACCP [5]</td>
</tr>
<tr>
<td>Multiple sclerosis. National clinical guideline for diagnosis and management in primary and secondary care</td>
<td>National Institute for Health and Clinical Excellence [16]</td>
</tr>
<tr>
<td>Parkinson's disease in the long-term care setting</td>
<td>American Medical Directors Association [17]</td>
</tr>
<tr>
<td>Dementia care practice recommendations for assisted living residences and nursing homes</td>
<td>Alzheimer’s Association [6]</td>
</tr>
<tr>
<td>Diagnosis and management of head and neck cancer. A national clinical guideline</td>
<td>Scottish Intercollegiate Guidelines Network [18]</td>
</tr>
<tr>
<td>Nutritional management in long-term care: development of a clinical guideline</td>
<td>Council for Nutritional Strategies in Long-Term Care [21]</td>
</tr>
</tbody>
</table>

The ACCP also recommends, ‘Further evaluation, including a chest radiograph and a nutritional assessment, should be considered in patients with cough or conditions associated with aspiration’ (grade of recommendation B) [5].

Screening serves to facilitate targeted referral of persons at dysphagia risk to dysphagia specialists for further assessment and to initiate appropriate interventions. In principle, a good screening tool will be quick, easy, and validated [14].

Results of the pan-European survey and other studies point to the need for active detection and heightened awareness of dysphagia among at-risk patient populations. The 10-item Eating Assessment Tool (EAT-10; as shown in fig. 1)
**EAT-10:**
A Swallowing Screening Tool

<table>
<thead>
<tr>
<th>LAST NAME</th>
<th>FIRSTNAME</th>
<th>SEX</th>
<th>AGE</th>
<th>DATE</th>
</tr>
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</table>

**OBJECTIVE:**
EAT-10 helps to measure swallowing difficulties. It may be important for you to talk with your physician about treatment options for symptoms.

**A. INSTRUCTIONS:**
Answer each question by writing the number of points in the boxes. To what extent do you experience the following problems?

1. My swallowing problem has caused me to lose weight.
   - 0 = no problem
   - 1
   - 2
   - 3
   - 4 = severe problem

2. My swallowing problem interferes with my ability to go out for meals.
   - 0 = no problem
   - 1
   - 2
   - 3
   - 4 = severe problem

3. Swallowing liquids takes extra effort.
   - 0 = no problem
   - 1
   - 2
   - 3
   - 4 = severe problem

4. Swallowing solids takes extra effort.
   - 0 = no problem
   - 1
   - 2
   - 3
   - 4 = severe problem

5. Swallowing pills takes extra effort.
   - 0 = no problem
   - 1
   - 2
   - 3
   - 4 = severe problem

6. Swallowing is painful.
   - 0 = no problem
   - 1
   - 2
   - 3
   - 4 = severe problem

7. The pleasure of eating is affected by my swallowing.
   - 0 = no problem
   - 1
   - 2
   - 3
   - 4 = severe problem

8. When I swallow food sticks in my throat.
   - 0 = no problem
   - 1
   - 2
   - 3
   - 4 = severe problem

9. I cough when I eat.
   - 0 = no problem
   - 1
   - 2
   - 3
   - 4 = severe problem

10. Swallowing is stressful.
    - 0 = no problem
    - 1
    - 2
    - 3
    - 4 = severe problem

**B. SCORING:**
Add up the number of points and write your total score in the boxes.
Total Score (max. 40 points)

**C. WHAT TO DO NEXT:**
If the EAT-10 score is 3 or higher, you may have problems swallowing efficiently and safely. We recommend discussing the EAT-10 results with a physician.

Reference: The validity and reliability of EAT-10 has been determined.

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**Fig. 1.** The EAT-10, a validated dysphagia screening tool.
is a screening tool specifically designed to address the clinical need for a rapidly administered and easily scored questionnaire to assess dysphagia symptom severity. The tool is applicable to a broad range of dysphagic patients, those with oral-pharyngeal dysphagia as well as those with esophageal dysphagia. It was developed by a multidisciplinary group of dysphagia experts who contributed a set of questions based on existing evidence, clinical experience and established questionnaires. An initial list of 35 questions was shortened to 20 by voting and further amended to 10 items selected based on strong test-retest correlations. The EAT-10 is rapidly self-administered and can be completed in <2 min [22]. An EAT-10 score >3 is abnormal and indicates the presence of swallowing difficulties. For the subgroup with oral-pharyngeal dysphagia, who were primarily patients with a diagnosis of stroke or progressive neurologic disease (Parkinson’s disease, etc.), the average EAT-10 score was 23.1 ± 12.2. Other average EAT-10 scores typical of specific categories of swallowing disorders are shown in figure 2.

In a study among dysphagia patients receiving care in an outpatient clinic (mean age of 65 ± 16 years), the EAT-10 displayed excellent internal consistency, test-retest reproducibility, and criterion-based validity [22]. Further research among patients from acute care, long-term care, and primary care settings demonstrated that the EAT-10 is useful as a clinician- and self-administered test, easy to understand for the majority (95.4%) of patients, quick to perform having a mean completion time of <4 min, and able to differentiate patients at risk for dysphagia from those with a normal swallow [23]. The EAT-10 form

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**Fig. 2.** Typical EAT-10 scores by type of swallow impairment. * Mostly patients with a diagnosis of stroke or progressive neurologic disease (Parkinson’s disease, etc.). ** Mostly patients with a diagnosis of esophageal motility disorders, neoplasia, webs, strictures or rings.

Investigators report that a large percentage of elderly in formal care settings who suffer from swallowing problems do not receive proper diagnosis (60%) and timely treatment (66%) [2]. This is exposing a vulnerable group of the population to the possibility of dehydration and/or malnutrition, with the long-term social, psychological and medical consequences that can affect quality of life.

A systematic approach to early diagnosis can help prevent long-term consequences and improve quality of life for those suffering from dysphagia. Together, early screening and targeted in-depth assessments allow the multidisciplinary team to plan and initiate interventions as well as establish the baseline for follow-up. Implementation of a comprehensive dysphagia management protocol (such as shown in figure 3) promotes formal screening with validated methods and appropriate early management in at-risk individuals, important for optimizing clinical as well as economic outcomes.

**Proper Management of Dysphagia Patients Requires a Multidisciplinary Team Effort**

In a stepwise, integrated manner, the multidisciplinary team acts to identify dysphagia risk, conduct clinical assessment and instrumental diagnostic tests for dysphagia, intervene with therapeutic strategies and provide follow-up care.

*Step 1: Evaluate for Swallowing Difficulty: Identify Dysphagia Problems Early in Vulnerable Patients*

The first step in the process of dysphagia patient care is recognizing the vulnerable patient. The patient’s clinical history, physical examination, and results of a basic screening test are useful at this stage [4]. The patient’s clinical history and specifically the presence of a certain medical condition (e.g. acute stroke, head and neck cancer, head trauma, Alzheimer’s disease, Parkinson’s disease) is adequate basis for predicting high risk and the need for evaluation [5]. As noted in the ACCP clinical practice guidelines, it is also important to screen patients with pneumonia or bronchitis for dysphagia risk [5]. Be aware that older adults are more vulnerable to dysphagia, as the swallowing mechanism is altered among otherwise healthy older adults, what is termed ‘presbyphagia’. With additional stressors such as acute illness and use of certain medications, an older individual can begin to experience dysphagia [24].

*Step 2: Evaluate for Oral-Pharyngeal Dysphagia: Identify Aspiration Risk and Appropriate Diet Prescription*

Based on the evidence obtained by clinical history, physical examination, and a basic screening test (e.g. EAT-10), oral-pharyngeal dysphagia may be suspected,
Step 1: Evaluate for swallowing difficulty: Identify dysphagia problems early in vulnerable patients

Step 2: Evaluate for oral-pharyngeal dysphagia: Identify aspiration risk and appropriate diet prescription

Step 3: Evaluate pathophysiology of swallowing dysfunction: Identify appropriate therapeutic strategies

Step 4: Reevaluate regularly: Continue to assess, monitor, and adjust interventions accordingly

Fig. 3. Comprehensive dysphagia patient management protocol. Adapted from Clavé et al. [25].

and subsequently the physician will order evaluation by the multidisciplinary healthcare team. The dietitian may conduct a comprehensive nutrition assessment, determining the nutritional risk and needs of the individual. The nurse will provide direct patient care and may conduct relevant procedures (e.g. record daily fluid intake). The dysphagia specialist (specially trained speech-language pathologist, logopedist, etc.) will determine aspiration risk and identify the appropriate diet prescription (the texture of solids, and the volume and viscosity of liquids). The volume-viscosity swallow test (V-VST) is a sensitive clinical method to identify patients with oral-pharyngeal dysphagia whose swallowing
could be improved by intervention with liquids of specific volume and viscosity [25]. An important feature of the V-VST is that it can help improve the detection of swallowing dysfunction, including silent aspiration. Widespread use of this evidence-based method will facilitate appropriate early management oropharyngeal dysphagia.

**Step 3: Evaluate Pathophysiology of Swallowing Dysfunction: Identify Appropriate Therapeutic Strategies**

Based on the clinical evaluation of oral-pharyngeal dysphagia and aspiration (e.g. positive V-VST results), diagnostic tests may be ordered. Videofluoroscopic swallowing study is the gold standard method for identifying the pathophysiology of the dysfunction and appropriate therapeutic strategies (e.g. direct swallowing exercises). Members of the multidisciplinary team work together to assure the comprehensive needs of the patient are met.

**Step 4: Reevaluate Regularly: Continue to Assess, Monitor, and Adjust Interventions Accordingly**

Regularly assess dysphagia severity, monitoring the effects of treatment and adjusting interventions accordingly. Regular use of the EAT-10 (e.g. on each patient visit) is a practical way to assess changes in symptom severity and guide patient care.

**Conclusions**

The symptoms of dysphagia and resulting malnutrition are treatable life-threatening conditions that validated screening methods can help to quickly and easily identify. Earlier nutrition intervention coupled with systematic screening enables multidisciplinary teams to more effectively manage these under-diagnosed conditions, reduce the economic and societal burden, and improve patient quality of life.

**References**

17 American Medical Directors Association (AMDA): Parkinson's Disease in the Long-Term Care Setting. Columbia, American Medical Directors Association, 2002.


