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Characteristics of patients with oropharyngeal dysphagia in a geriatric outpatient clinic

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ABSTRACT

Objective: To describe the characteristics of patients with oropharyngeal dysphagia (OD) presenting to a geriatric outpatient clinic.

Methods: Patients with positive dysphagia screening who presented to the geriatric outpatient clinic of a university hospital through August 2020 to August 2024 were retrospectively analyzed. OD was screened with the Eating Assessment Tool-10. Functionality was assessed with Katz Activities of Daily Living and Lawton Instrumental Activities of Daily Living scales. Nutritional status was evaluated using the Mini-Nutritional Assessment-Short Form and frailty was assessed with the FRAIL scale. Clinical dysphagia evaluation was recorded from patient files.

Results: A total of 87 patients were included. The mean age was 81 ± 7 and 54 (62%) were female. Out of 87 patients, 84 (97%) were frail and 36 (44%) were functionally dependent. Eighty-nine percent of the patients had malnutrition or malnutrition risk. Functionality was the only independent factor associated with frailty in multivariate analysis (OR=1.2, 95% CI 0.78-1.7, p<0.001 for semi-dependency and OR=1.3, 95% CI 0.79-1.7, p<0.001 for dependency, respectively).

Conclusion: Frailty, functional dependency and malnutrition are highly prevalent in older adults with dysphagia.

Keywords: dysphagia, frailty, malnutrition, older adult

Introduction

The global population is aging rapidly and older adults are expected to make up approximately the third of the population by 2050.[1] Oropharyngeal dysphagia (OD), difficulty transferring food from the mouth into the pharynx and esophagus, is a frequent condition among older adults. It has even been recognized as a geriatric syndrome by the European Geriatric Medicine Society.[2] Neurological disorders including stroke, Parkinson's disease and dementia constitute majority of the patients with dysphagia. Advanced age increases OD prevalence with rates between 30% and 40% in independently living older people and 44% in geriatric acute care.[2] In a systematic review, OD prevalence has been reported to reach as high as 72% in community-dwelling older adults.[3] A major cause of mortality and morbidity, OD has been associated with aspiration pneumonia, malnutrition and dehydration.[2,4-7]

Clinical suspicion of OD or a positive screening test warrants affirmative clinical or instrumental assessment. Gold standard instrumental assessment methods include fiberoptic endoscopic evaluation of swallowing (FEES) and video fluoroscopic swallowing study (VFSS). Instrumental tests can even detect silent aspiration that

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may go unnoticed with bedside evaluations and are therefore considered more accurate.[8]

Comprehensive geriatric assessment includes the evaluation of geriatric syndromes such as malnutrition, frailty, functionality and polypharmacy. Malnutrition is defined as decreased nutritional intake leading to impaired mental and physical function.[9] Frailty is another essential geriatric syndrome characterized by reduced physical reserve and increased vulnerability to stressors.[10] Dysphagia, more prevalent among older adults, may be exacerbated by poor nutritional status and frailty, as both syndromes are associated with impaired neuromuscular function.[11] However, there are contradictory findings in the literature regarding the relationship between dysphagia and other geriatric syndromes.[11-13]

Timely recognition and management OD may help prevent the morbidity and mortality related to the syndrome. Therefore, risk stratification of patients, especially among older adults, is of utmost importance. Recognizing factors associated with OD will help clinicians identify high-risk patients and allow for timely intervention. As such, the aim of this study was to describe the characteristics of patients with oropharyngeal dysphagia who presented to a geriatric outpatient clinic.

Methods

Patients who presented to the geriatric outpatient clinic of a university hospital were enrolled in this retrospective cross-sectional study. All patient files through August 2020 to August 2024 were retrospectively analyzed. Patients with positive dysphagia screening were included in the study. Patients who died during clinical follow up were excluded. In the geriatric outpatient clinic where the study was conducted, the Eating Assessment Tool-10 (EAT-10) is used to screen liquid and solid dysphagia.[14] The tool has ten questions and each question is scored between 0 to 4 points. A total score of 3 and above is considered positive, and the patient is referred to the swallowing disorders clinic for detailed evaluation.

Main Points

- Oropharyngeal dysphagia is a common geriatric syndrome.
- Frailty, functional dependency and malnutrition are highly prevalent in older adults with oropharyngeal dysphagia.
- Functional impairment is independently associated with frailty.

Patient demographics, anthropometric measurements, comorbidities, list of medications and serum albumin levels on admission were recorded from patient files. Body mass index (BMI) was calculated as weight (kg) divided by height $(m)^2$. The consultation notes from the swallowing disorders clinic were also recorded.

Functional status was assessed by the Katz Activities of Daily Living Scale-ADL and Lawton Instrumental Activities of Daily Living Scale-IADL.[15,16] While the ADL scale questions basic abilities like getting dressed, locomotion and eating, the IADL scale evaluates the ability to carry out more difficult tasks such as using a telephone, shopping, housekeeping, use of public transportation, managing self-medication, and handling finances. For this study, patients were grouped into three categories by a geriatrician (dependent, semi-dependent and independent) according to their functionality.

Nutritional status was screened with the Mini-Nutritional Assessment-Short Form (MNA-SF).[17] MNA-SF is composed of six questions and scores range between 0 to 14. A score of 0-7 is categorized as “malnutrition”, a score of 8-11 is “at risk of malnutrition”, and a score of 12 and above is “normal nutritional status”.

Frailty was assessed using the FRAIL scale, which questions five domains; Fatigue, Resistance, Ambulation, Illness, and Loss of Weight.[10] A score between 3 and 5 represents frailty and a score of 1 to 2 points represents pre-frailty.

Dementia was diagnosed according to Diagnostic and Statistical Manual of Mental Disorders, 5th edition.[18] Polypharmacy was defined as the use of 5 or more drugs.

The study complies with the Declaration of Helsinki and was approved by Clinical Research Ethics Committee of the university (Approval number: 723, Approval date: June/28/2024).

Statistics

The normality of continuous variables was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. For normally distributed data, mean and standard deviation (SD) were reported. Non-normally distributed data were reported as median and range (minimum-

maximum). Group comparisons for normally distributed numerical data were conducted with the independent-samples t-test. Wilcoxon rank sum test was used for non-normally distributed data. Chi-square test was used to analyze categorical variables. For categorical variables with low frequencies, Fisher's Exact test was used. One-way analysis of variance (ANOVA) was used to compare two groups with normally distributed data. Krukal-Wallis test was used to compare groups without a normal distribution. Logistic regression analysis was used to evaluate univariate and multivariate independent variables. All statistical tests were two-tailed. A *p*-value less than 0.05 was considered statistically significant. The study data were analyzed for statistical significance using R software (version 4.3.3).

Results

A total of 87 patients who screened positive for dysphagia were included in the study. The mean age of study participants was 81 ± 7 and 54 (62%) were female. Out of 87 patients, 84 (97%) were frail and 36 (44%) were functionally dependent. All study participants had an EAT-10 score of ≥3. The majority (89%) of the patients with positive dysphagia screening either had malnutrition or malnutrition risk. Table 1 shows the general characteristics of the study population.

Hypertension was the most prevalent comorbidity (61%). With regards to neuromuscular diseases; 38 (44%) patients had dementia, 22 (25%) had Parkinson's disease, 23 (26%) had cerebrovascular disease, 2 had myasthenia gravis and 2 had amyotrophic lateral sclerosis (ALS). Eight patients were diagnosed with cancer (3 prostate cancers, 2 gastric cancers, 1 colorectal cancer, 1 lung cancer and 1 lymphoma). None of the patients had head and neck cancer.

Categories of medications used by the study participants are presented in Table 2. A total of 66 patients (76%) had polypharmacy, defined as using 5 or more drugs.

Factors associated with frailty in the univariate analysis were lower BMI (p = 0.029), functional dependency (p<0.001), low serum albumin (p = 0.033) and statin use (p = 0.041) (Table 3).

Factors that were associated with frailty in univariate analysis (p<0.05) were used as independent factors in multivariate Cox regression analysis. Functionality was the only independent factor associated with frailty in multivariate analysis (OR=1.2, 95% CI 0.78-1.7, p<0.001 for semi-dependency and OR=1.3, 95% CI 0.79-1.7, p<0.001 for dependency, respectively) (Table 4).

Three patients had normal swallowing function documented with VFSS and one patient had normal swallowing function documented with FEES. Rest of the patients were either advised to use thickeners, enrolled in dysphagia therapy or advised to stop oral intake completely. A total of 11 patients were referred to gastroenterology for percutaneous endoscopic gastrostomy (PEG) tube placement.

Table 1. General characteristics of participants

Characteristics	**N = 87** **Mean ± SD; n (%)**
Age (year)	81.3 ± 7.1
Gender (Female) Gender (Male)	54 (62%) 33 (38%)
BMI (kg/m^2)	23.7 ± 4.4
BMI category (kg/m^2)	
<18.5	13 (15%)
18.5-24.9	39 (45%)
25.0-29.9	28 (32%)
≥30.0	7 (8%)
Serum albumin (g/L)	39.3 ± 4.4
Functionality	
Semi-dependent	40 (49%)
Dependent	36 (44%)
FRAIL score	4.0 ± 0.5
FRAIL category	
Robust	0 (0%)
Pre-frail	3 (3%)
Frail	84 (97%)
MNA-SF score	7.8 ± 2.5
MNA-SF category	
Normal	10 (11%)
Malnutrition Risk	40 (46%)
Malnutrition	37 (43%)

BMI= Body Mass Index, MNA-SF= Mini Nutritional Assessment-Short Form

Table 2. Medications used by study participants

Medication Categories	N = 87 n (%)
Steroid	6 (7%)
Antipsychotic	25 (29%)
Antidepressant	26 (30%)
Antiepileptic	12 (14%)
Anti-Dementia	36 (41%)
Antimuscarinic	4 (5%)
Calcium channel blocker	23 (26%)
Beta blocker	33 (38%)
RAS blocker	40 (46%)
OAD / insulin	32 (37%)
Antiplatelet	30 (34%)
Diuretic	26 (30%)
Anti-Parkinson	18 (21%)
Anticoagulant	27 (31%)
PPI	25 (29%)
Statin	19 (22%)
Riluzole	2 (2%)

RAS= Renin Angiotensin Aldosterone System, OAD= Oral Antidiabetic Drug, PPI= Proton Pump Inhibitor

Table 3. Univariate analysis for frailty

Variables	Odds Ratio	95% CI	*p* value
Gender			
Female	—	—	
Male	0.12	-0.10 to 0.35	0.29
BMI (kg/m^2)	-0.03	-0.05 to 0.00	**0.029**
Functionality			
Semi-dependent	1.1	0.75 to 1.5	**<0.001**
Dependent	1.3	0.91 to 1.6	**<0.001**
Serum albumin (g/L)	-0.03	-0.05 to 0.00	**0.033**
Polypharmacy	0.06	-0.20 to 0.32	0.65
Antipsychotic use	0.23	-0.01 to 0.47	0.061
Antidepressant use	-0.21	-0.45 to 0.03	0.091
Statin use	-0.28	-0.54 to -0.02	**0.041**

BMI= Body Mass Index, CI=Confidence Interval

Table 4. Multivariate analysis for frailty

Variables	Odds Ratio	95% CI	*p* value
Gender			
Female	—	—	
Male	0.00	-0.20 to 0.20	0.97
BMI (kg/m^2)	-0.01	-0.04 to 0.01	0.26
Functionality			
Semi-dependent	1.2	0.78 to 1.7	**<0.001**
Dependent	1.3	0.79 to 1.7	**<0.001**
Serum albumin (g/L)	-0.02	-0.04 to 0.01	0.16
Polypharmacy	0.07	-0.20 to 0.33	0.62
Antipsychotic use	0.02	-0.20 to 0.24	0.87
Antidepressant use	-0.10	-0.32 to 0.12	0.37
Statin use	-0.04	-0.28 to 0.19	0.72

BMI= Body Mass Index, CI=Confidence Interval

Discussion

The aim of this study was to describe the characteristics of patients with OD who presented to a geriatric outpatient clinic. The results indicate that frailty, functional dependency and malnutrition are highly prevalent in OD patients. Furthermore, functional impairment is independently associated with frailty.

OD can be defined as difficulty initiating a swallow. It is associated with malnutrition, dehydration, aspiration pneumonia and mortality.[2,4-7] The first step in the assessment of OD is screening, which helps early identification of patients at risk. The EAT-10 is a valid self-reported questionnaire frequently used as part of the comprehensive geriatric assessment.[14] Patients who screen positive for dysphagia with EAT-10 should then be referred for clinical swallowing assessment. Our center has the advantage of performing VFSS and FEES when instrumental assessment is warranted.

Frailty can be defined as increased vulnerability to stressors and multi system dysfunction. A study from Turkiye reported a frailty prevalence of 10% in community dwelling older adults using the FRAIL scale.[19] However, in the present study, nearly all patients who screened positive for dysphagia were frail. The components of frailty consist of exhaustion, decreased muscle strength, low physical activity, and unintentional weight loss. Loss

of muscle strength in frailty may lead to dysphagia, as healthy swallowing involves the collaboration of more than thirty oropharyngeal muscles.[20] Conversely, sarcopenia of the oropharyngeal muscles reduces oral intake and leads to nutritional deficiencies and weight loss, paving the path for frailty and eventually, death.[21,22]

A recent study by Güner et al.[23] showed that dysphagia is associated with frailty (according to the FRAIL scale) independent of age, sex, nutritional status and dementia. However, dysphagia assessment in this study only involved screening. The present study differs from the previous study since clinical evaluation of swallowing was also performed.

The cross-sectional design of the study prevents inference of causality. Hence, OD may be associated with frailty through the neurological comorbidities that cause OD in the first place. However, Bahat et al.[13] revealed an association between dysphagia and frailty independent of comorbidities, age, handgrip strength, nutritional status, polypharmacy. Similar to the previous study, dysphagia was evaluated using the EAT-10 questionnaire. Interestingly, a study that recruited 47 community-dwelling older women aged 85 to 94 failed to show a relationship between frailty and dysphagia, though the small study sample may have accounted for the contradictory findings.[12]

A systematic review has revealed that advanced age could be a dysphagia risk factor.[3] In the present study, all study participants were older adults, which might explain the lack of association between age and dysphagia.

Frailty and malnutrition are closely linked geriatric syndromes with common pathophysiological pathways including chronic inflammation.[24] The prevalence of malnutrition and malnutrition risk among community dwelling older adults in Turkiye were reported to be 13% and 31% respectively.[25] Strikingly, in the present study, malnutrition (43%) and malnutrition risk (46%) were more frequent among older adults with OD. In line with these findings, several studies have linked malnutrition to dysphagia.[5,11,26] Nutritional deficiencies and weight loss brought about by reduced oral intake may cause malnutrition in patients with OD. Malnutrition subsequently results in reduced oropharyngeal muscle mass, starting a vicious cycle. If not treated, malnutrition has been shown to increase mortality in older adults.[27] In our center, we treat all patients with malnutrition and malnutrition risk with energy and protein enriched diet or oral nutritional supplements if the oral route is safe. If the oral route is not safe, we recommend enteral nutrition.

In the current study, the relationship between dysphagia, frailty and malnutrition was still observed after excluding the four patients whose instrumental assessment revealed normal swallowing function, probably because they were the patients with better scores in terms of functionality, nutritional status and frailty.

Similar to the results of this study, OD has been reported to be more prevalent in community dwelling older adults with functional impairments.[28] Neuromuscular disorders frequently encountered in the study population may have caused poor functionality. However, it is of note that functional impairment was independently associated with frailty in the multivariate analysis. Consistent with the study results, functional impairment has been shown to increase proportionally to frailty in a large-scale study recruiting community dwelling older adults.[29] This is probably because components that define frailty such as of exhaustion, decreased muscle strength and low physical activity are interrelated with loss of functionality.

Majority of the patients in the study were diagnosed with a neuromuscular disease, in line with a previous report.[30] Cerebral, cerebellar and brain stem lesions in stroke patients impair various stages of swallowing. Lewy bodies deposited in neurons responsible for the control of swallowing centers may cause dysphagia in Parkinson's disease. As for late-stage dementia, in addition to loss of motor function, malnutrition may also aggravate an existing dysphagia.

Certain medications may affect swallowing function as well.[31] Medications may be the initial cause of dysphagia, or they may be a contributing factor. Medications may alter salivation, impair consciousness or cause dysfunction in the motor coordination of swallowing. Some of the culprit drugs include antipsychotics, anticonvulsants, antidepressants, antimuscarinics, antiarrhythmics, diuretics and angiotensin-converting enzyme inhibitors.[31] In the present study, most of the culprit drugs were used by the study participants, which could be a contributing factor to the development of dysphagia.

Limitations of the study

First, the sample size limits the generalizability of the findings. However, clinical dysphagia assessment was performed for all study patients, which distinguishes the

present study from prior studies in the literature. Second, the study was conducted in a tertiary healthcare setting, which is a referral center for more frail and dependent patients. Hence, this may have caused a selection bias. Third, the cross-sectional design of the study prevents the determination of causality. Prospective studies with larger study samples should be designed to better elucidate the risk factors for dysphagia. As for the strengths of the study, comprehensive geriatric assessment and clinical dysphagia evaluation were performed for all patients, as opposed to previous studies in the literature.

Conclusions

If left untreated, OD has been shown to increase the risk of aspiration pneumonia and mortality. Hospital admissions and mortality may be prevented by detecting OD in the outpatient setting. The present study highlights the characteristics of patients with OD, allowing for a risk stratification and therefore, early detection of swallowing dysfunction in the outpatient setting. Patients with frailty, functional impairment and malnutrition should be carefully assessed for OD and referred for further evaluation.

Ethical approval

This study has been approved by the Marmara University Clinical Research Ethics Committee (approval date 28.06.2024, number 723). Written informed consent was obtained from the participants.

Author contribution

The author declare contribution to the paper as follows: Study conception and design: BC; data collection: BC; analysis and interpretation of results: BC; draft manuscript preparation: BC. The author reviewed the results and approved the final version of the article.

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Conflict of interest

The authors declare that there is no conflict of interest.

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