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Brief Report

High Prevalence of Oropharyngeal Dysphagia in Acutely Hospitalized Patients Aged 80 Years and Older



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A B S T R A C T

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Objectives: Oropharyngeal dysphagia is a geriatric syndrome that is usually underdiagnosed in older patients. The aim of this study was to determine the prevalence and identify the main risk factors of dysphagia in the oldest old patients admitted to an acute geriatric unit.

Design: Observational prospective study.

Setting and Participants: Older patients admitted to an acute geriatric unit of a university hospital.

Measures: 329 patients (mean age 93.5 years, range 81–106) were assessed for oropharyngeal dysphagia within 48 hours of hospital admission using the Volume-Viscosity Swallow Test. Demographic characteristics, geriatric assessment, geriatric syndromes, comorbidities, drug treatment, and complications were examined to determine their association with the presence of dysphagia.

Results: Oropharyngeal dysphagia was present in 271 (82.4%) of the participants. Multivariate logistic regression showed that malnutrition [odds ratio (OR) 3.62, 95% confidence interval (CI) 1.01–12.93; $P = .048$], admission for respiratory infection (OR 2.89, 95% CI 1.40–5.94; $P = .004$), delirium (OR 2.89, 95% CI 1.40–5.94; $P = .004$), severe dependency (OR 3.23, 95% CI 1.23–8.87; $P = .017$), and age (OR 1.11, 95% CI 1.01–1.21; $P = .03$) were significantly associated with dysphagia. The use of a calcium antagonist at the time of admission was associated with a reduced risk of dysphagia (OR 0.39, 95% CI 0.16–0.92; $P = .03$).

Conclusions and Implications: The prevalence of oropharyngeal dysphagia is high in the oldest old patients admitted to an acute geriatric unit when assessed with an objective diagnostic method. Our findings suggest that objective swallowing assessment should be routinely performed on admission in order to start early interventions to avoid complications of dysphagia in this complex population.

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Oropharyngeal dysphagia (OD) is defined as the difficulty in forming or moving a bolus safely from the oral cavity to the esophagus.¹ OD is a geriatric syndrome, characterized by its high prevalence in older persons, the combination of different symptoms, and shared risk factors and interacting with other geriatric syndromes.² Moreover, multicomponent interventions are required to prevent its complications (respiratory infections, malnutrition, dehydration, increased readmissions, institutionalization, and higher mortality).^{2–6}

A prevalence of OD up to 50% has been described in patients older than 70 years admitted to an acute geriatric unit in 2 prospective studies based on the clinical diagnosis of OD through a clinical validated test.^{3,7,8} Moreover, important differences in prevalence rates of OD (from 7.9% to 30.8%) have been found among older hospitalized patients in other studies that used different screening and non-validated tests.^{9–19} At present, some professional organizations recommend that OD clinical assessment should be done routinely in hospitalized older patients using validated tools.² The Volume-Viscosity Swallow Test (V-VST) is a simple, well-validated, feasible, safe, reproducible, and reliable test^{2,20,21} that can be performed by medical and/or nursing staff with basic training.²²

Age, geriatric assessment variables (functional, nutritional and social), geriatric syndromes (dementia, immobility, urinary incontinence, pressure ulcers, and previous falls), drugs (antipsychotics, sedatives), and diseases leading to hospital admission (pneumonia,

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dehydration or fall) have all been described as risk factors of OD in hospitalized older patients in studies using univariate analysis.^{3,7} Very old age (over 80 years) has been associated with more severe OD and different etiologies than younger adults.²³

Therefore, the aim of this study was to measure the prevalence of OD in the oldest old patients admitted to an acute geriatric unit using an objective, well validated instrument (V-VST). We also wanted to analyze the main risk factors associated with OD and describe the characteristics of hospitalization (length of stay and in-hospital mortality) and discharge (number of drugs and destination at discharge) in hospitalized older patients with OD.

Methods

A prospective observational study that included older patients consecutively admitted to an acute geriatric unit of a university hospital over a 10 month-period was carried out.

All patients aged 80 years and older admitted to an acute geriatric unit were eligible for inclusion in the study ($n = 579$). Of them, 219 patients were excluded for the following reasons: 84 patients had been previously included in the study (each patient was only included in the first hospital admission of the study period), 68 were in end-of-life situations, 43 had a permanent low level of consciousness that precluded performance of the V-VST, 12 did not sign informed consent, and 10 had enteral nutrition administered by nasogastric tube or percutaneous endoscopic gastrostomy. Therefore, 360 patients were included. Of them, 31 were lost for logistic or organizational reasons that precluded V-VST testing in the first 2 days of admission, resulting in a sample of 329 participants.

On the first day of admission, a trained nurse explained the study to the patient and family caregivers and obtained the signed informed consent form. The study nurse then measured the body mass index and collected relevant data from medical records, including demographic information (age, gender, living arrangements), physical function measures (Barthel index, Lawton index, Functional Ambulation Classification), cognitive status (Reisberg Global Deterioration Scale and Pfeiffer questionnaire) and nutritional status (Mini Nutritional Assessment–Short Form), a set of comorbidities that have been associated with OD (stroke, dementia, head and neck cancer, Parkinson's disease, vascular diseases, neurodegenerative diseases, and malnutrition), the condition that had prompted hospital admission (respiratory infection, heart failure, urinary tract infection, abdominal infection, and others), geriatric syndromes present during hospitalization (dementia, delirium, malnutrition, urinary incontinence, falls in the last 12 months, pressure ulcers, and polypharmacy, defined as the chronic use of 5 or more drugs), and use before admission of some drugs that have been associated with OD (antipsychotics, benzodiazepines, antihistamines, tricyclic antidepressants, anti-Parkinson's drugs, antiemetics, opioids, calcium antagonists, and nitrates). At discharge, length of hospital stay, mortality, the inclusion of the diagnosis of OD in the discharge letter, number of drugs prescribed, and destination were also recorded.

The study nurse, who had previous training and experience in using this test, assessed the presence of OD within 48 hours of admission using the V-VST.²⁰ This test evaluates the safety and efficacy of swallowing using different volumes and viscosities detecting the presence of cough, decreased oxygen saturation, changes in voice (safety signs), as well as poor labial seal, multiple swallows, and oropharyngeal residue (efficacy signs). If any sign of OD was present, the nurse informed the patient, caregiver, and medical and nursing staff of this syndrome; registered the result of the test in clinical records; and gave personalized recommendations about diet, hydration, and posture.

Data were entered in a Filemaker file, and statistical analysis was performed using SPSS, version 20. Descriptive statistics were used to

describe the prevalence of OD and the characteristics of the sample population. Potential associations between OD and different characteristics were analyzed using chi-square, Fisher exact test, or Student *t* test as appropriate. Statistical significance was set at $P < .05$. For the analysis of independent associations, all factors that were significant in the univariate analysis were included in a multivariable regression model.

The Ethics Committee of the Hospital approved the study (Protocol Number 120/18) and the informed consent form, which was signed by all participants before any study procedure was performed.

Results

Sample Characteristics

A total of 329 patients met the inclusion criteria and accepted participation in the study; the mean age was 93.5 years (range 81–106 years old), 68.4% were women, and 73.3% were living at home before admission (the rest were living in nursing homes). Baseline characteristics of the sample are reported in [Table 1](#).

Prevalence of OD

Dysphagia was present in 82.4% ($n = 271$) of the participants, including 266 with low efficacy signs (80.9%) and 190 with safety signs (57.8%). However, only 53.1% ($n = 144$) of the physician discharge letters included the diagnosis of OD, and only 9.7% ($n = 26$) of the nurse discharge letters reported the presence of impaired swallowing.

Factors Associated with OD

In univariate analysis, patients with OD were older than patients without OD (93.7 vs 92.4, $P = .029$), more frequently women (70.8% vs 56.9, $P = .038$), and were more likely to be living in a nursing home before admission (29.9% vs 12.1%, $P = .005$) ([Table 1](#)).

Participants with OD also had a worse functional, cognitive, and nutritional status, and higher rates of delirium, dementia, malnutrition, and urinary incontinence. The number of drugs before admission and the prevalence of polypharmacy was not different in participants with and without OD, but the former reported a higher use of antipsychotics and anti-Parkinson's drugs but a lower use of calcium antagonists. Admission for respiratory infection was more common in patients with OD. There were no between-group differences in other variables ([Table 1](#)).

On multivariate regression analysis, OD was independently associated with age, admission for respiratory infection, malnutrition, delirium, and dependence for basic activities of daily living (measured with Barthel index). The use of treatment with calcium antagonists before admission had a negative (protective) association with the presence of OD ([Table 2](#)).

Hospitalization and Discharge Data

Mortality during the index admission was 2.1%, with no difference in participants with and without OD (2.6% vs 0%, $P = .611$). At hospital discharge, 68.1% returned home, 27.4% went to a nursing home, 1.5% to a post-acute rehabilitation unit, and 0.9% to a palliative care unit. The proportion of patients returning home was lower in those with than without OD (66.3% vs 84.5%, $P = .006$). Length of stay was only marginally longer in participants with OD (6.75 vs 5.45 days, $P = .067$). The number of drugs at discharge was lower in patients with OD (9.9 vs 10.9, $P = .039$).

Table 1
Baseline Characteristics of the Sample of Patients Included in the Study

Variable	Total (N = 329)	Oropharyngeal Dysphagia (n = 271)	No Dysphagia (n = 58)	P Value
Demographic				
Age, mean (SD)	93.5 (4.1)	93.7 (4.2)	92.4 (3.7)	.029
Sex, % female	68.4	70.8	56.9	.038
Living in nursing home	26.7	29.9	12.1	.005
Geriatric assessment, mean (SD)				
Barthel index	48.3 (31.4)	43.6 (30.3)	71.3 (25.9)	<.001
Lawton	1.1 (2.0)	0.9 (1.7)	2.3 (2.6)	<.001
FAC	2.5 (1.9)	2.2 (1.8)	3.6 (1.7)	<.001
GDS	4.0 (2.1)	4.2 (2.1)	2.7 (1.8)	<.001
Pfeiffer	5.9 (3.4)	6.3 (3.3)	3.6 (2.9)	<.001
MNA-SF	8.5 (3.4)	8.1 (3.4)	10.3 (2.9)	<.001
BMI	27.3 (5.3)	26.8 (5.4)	29.4 (4.3)	.001
Comorbidities				
Dementia	26.4	30.3	8.6	.001
Vascular disease	25.8	26.9	20.7	.32
Stroke	13.7	14.8	8.6	.22
Parkinson's	5.5	6.3	1.7	.22
Head and neck cancer	3.3	3.7	1.7	.69
Malnutrition	2.4	2.6	1.7	>.99
Geriatric syndromes				
Delirium	53.7	59.6	25.9	<.001
Dementia	44.8	49.6	22.4	<.001
Malnutrition	23.2	27.0	5.2	<.001
Urinary incontinence	50.6	53.3	37.9	.042
Previous falls	24.1	24.8	20.7	.51
Pressure ulcer	11.0	11.9	6.9	.36
Medications taken prior to admission				
Number of drugs, mean (SD)	8.5 (3.4)	8.3 (3.3)	8.9 (3.9)	.22
Polypharmacy	85.7	85.2	87.9	.60
Benzodiazepines	26.7	25.5	12.1	.028
Antipsychotics	23.1	28.0	20.7	.25
Calcium antagonist	13.7	11.4	24.1	.011
Opioids	10.3	11.1	6.9	.34
Antihistamines	6.1	5.5	8.6	.37
Nitrates	6.4	5.5	10.3	.23
Antiparkinson drugs	4.6	5.5	0	.08
Reason for hospital admission				
Respiratory infection	51.1	53.9	37.9	.027
Heart failure	17.6	16.6	22.5	
Urinary tract infection	9.4	9.2	10.3	
Abdominal infection	3	2.6	5.2	
Other	18.8	17.7	24.1	

BMI, body mass index; FAC, Functional Ambulation Classification; MNA-SF, Mini Nutritional Assessment Short Form. Unless otherwise noted, values are %.

Discussion

We found a high prevalence of oropharyngeal dysphagia (82.4%) in hospitalized, very old patients (mean age 93.5 years), objectively assessed by a validated tool (the V-VST), in the first 2 days after

Table 2
Factors Significantly Associated With Oropharyngeal Dysphagia in Multivariate Regression Analysis

Variable	OR	95% CI	P Value
Age (per year)	1.11	1.01-1.21	.030
Barthel index < 40	3.23	1.23-8.47	.017
Malnutrition	3.62	1.01-12.93	.048
Previous use of calcium antagonists	0.39	0.16-0.92	.030
Admission for respiratory infection	2.89	1.40-5.94	.004
Delirium during hospitalization	2.43	1.05-5.64	.038

hospital admission. This prevalence is higher than that found in 2 other similar studies, performed by Carrión³ and Melgaard⁸ (47%-50%), that also used the V-VST. Some reasons may explain this finding: our sample was a decade older (mean age 93.5 years vs 85.1³ and 83.1⁸ year), more acutely ill [with a higher prevalence of admission for a respiratory infection, a known complication of OD (51.1% vs 6.7%), delirium (53.7% vs 34.4%), and dementia (44.8% vs 30.3%)], and had worse functional status. The high prevalence of OD calls for action: detection of OD in this acute setting should probably be recommended in order to prevent potential complications. Four of five patients in our study had a low swallowing efficacy (associated with malnutrition and dehydration), and more than half showed signs of impaired safety (increased risk of aspiration pneumonia) on the V-VST. These risks imply that it might even be reasonable to assume that OD is present on admission in all geriatric patients and that dietary practices should be started immediately until OD is ruled out.

Most studies on the prevalence of OD have used screening tests or questionnaires¹⁴⁻¹⁹ that have not been appropriately validated compared with objective swallowing assessment and lack predictive value.²⁴ Instrumental assessment of dysphagia is complex, expensive, and requires expert staff. We opted to employ the V-VST, an objective, well-validated, and reliable clinical assessment of dysphagia that has shown to be reliable when compared with instrumental assessment.²⁰ Although the V-VST was developed as a screening test, it can be argued that it may also be useful as a clinical diagnostic test, as recommended by a European group.² It is easy to perform in acute settings and can guide interventions by recommending the quantity and density of food that is safe and effective, especially in patients who cannot easily undergo instrumental explorations such as our studied population.²

Previous studies, mostly based on univariate analysis, have found that OD is associated with age,^{3,10,11,16-18} sex,¹⁸ previous institutionalization,^{3,8} comorbidities,^{3,11,15,18,19} geriatric syndromes,^{3,16} functional status,^{3,11,15,19} and treatment with antipsychotics.³ They also show the bidirectional relationship between OD with malnutrition^{3,8,11,14-16,18} and respiratory infection.^{5,8,16} Our study findings are consistent with theirs, but we did not find any relation with comorbidities (we did not use a comorbidity index and only chose conditions previously associated with dysphagia). To clarify the relevance of these associations, we performed a multivariate analysis, which confirmed the relation between OD and the presence of malnutrition on admission and also with admission for a respiratory infection. We also found that age, severe dependence for basic activities of daily living, and delirium during hospitalization were strongly and independently associated with OD. This multivariate analysis was not reported in other studies with similar populations^{3,8} and may help to define a population at special risk. It also confirms that OD can be considered a geriatric syndrome, as proposed by other authors.^{2,3,25}

In multivariate analysis, patients using calcium antagonists had a lower risk of OD. This is an intriguing finding that can be linked to anecdotal reports on the effect of calcium antagonists on esophageal muscle²⁶ and needs to be confirmed by further research. Inhibition of calcium uptake can in turn inhibit esophageal peristalsis and lower esophageal sphincter pressure,²⁷ which can affect the pressure of upper esophageal sphincter. Another explanation for this relation is the improvement of nerve regeneration and neuromuscular function of the recurrent laryngeal nerve observed with calcium channel blocker in rats and a positive effect on the vocal fold and facial motion after cranial nerve injury in humans.²⁸ If confirmed, this finding may increase our insight on the pathophysiology of dysphagia and might lead to a potential drug treatment. A retrospective study that explored the association between OD and different drug treatments in older patients hospitalized in an acute geriatric unit also found a possible protective effect of selective calcium antagonists and also of beta-blockers and of agents acting on the renin-angiotensin system.²⁹

Beta-blockers can affect pharyngeal muscles. The relation between cardiac diseases and treatments and swallowing function merits further study.

This study has some limitations. First, it was performed in a specific population (patients admitted to a geriatric unit) and may not apply to older patients admitted to other hospital units. Patients admitted to the geriatric department are usually older and more complex than those admitted to other departments. Second, patients with reduced level of consciousness, feeding tubes, and in end-of-life situations were excluded. However, there is no reason to think that such patients had a lower prevalence of dysphagia. Dropouts for other reasons—rejected participation or organizational reasons—were 43 and could have potentially altered the reported prevalence, but their baseline characteristics (age, gender) were similar to that of included participants. Finally, we only assessed OD once during hospitalization, with no follow-up after discharge. Dysphagia is known to be transient in some clinical settings (after stroke; radiotherapy; or ear, nose, throat procedures),³⁰ but has never, to our knowledge, been studied after acute hospital care for medical reasons. A single study performed in the community with nonobjective assessment of symptoms of OD suggests that this syndrome may not be stable in all patients,³¹ so this is an intriguing research question.

Conclusions and Implications

The European Society of Swallowing Disorders and the European Geriatrics Medicine Society stresses the need for clinical assessment of OD in older populations,² but the European Society for Clinical Nutrition and Metabolism (ESPEN) only suggests screening for dysphagia in amyotrophic lateral sclerosis, Parkinson's, multiple sclerosis, or stroke,³² and not in geriatric patients.³³ The high prevalence found in our study calls for introducing dysphagia assessment into acute geriatric care. We propose that the V-VST, an objective assessment of OD that guides interventions, should be included in the comprehensive geriatric assessment of hospitalized older patients. Future research should explore if such assessment and intervention can reduce the short- and long-term severe complications of dysphagia.

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